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COMPARATIVE STUDY OF DERMOSCOPIC FINDINGS IN HYPERKERATOTIC PALMOPLANTAR ECZEMA AND PALMOPLANTAR PSORIASIS

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ABSTRACT

Introduction: A dermoscope is a valuable tool in dermatology, magnifying skin lesions and reducing the need for biopsies. It helps differentiate between conditions like hyperkeratotic palmoplantar eczema, characterized by yellow scales, crusts, and dotted vessels, and palmoplantar psoriasis, showing white scales and evenly distributed dotted vessels. Dermoscopic evaluation aids in accurate diagnosis, preventing unnecessary invasive procedures. **Aim and Objective:** The study aims to compare dermoscopic findings in hyperkeratotic palmoplantar eczema and psoriasis, analyse clinical differences, and confirm diagnostic accuracy using dermoscopy. **Material and Methods:** The study is a hospital-based, cross-sectional, observational study conducted at a tertiary care centre. It compares cases of hyperkeratotic palmoplantar eczema and palmoplantar psoriasis. After ethical clearance, 137 cases were divided into 2 groups. Group A (eczema) 74 cases and Group B (psoriasis) 63 cases, sampled from outpatients. **Results:** The study compared dermoscopic findings in two groups with similar age (59-60% aged 31-50, p=0.711) and sex distribution (52% male, p=0.893). Group A had 60.8% on topical drugs, while 63.5% of Group B were on combined therapy (p<0.001). Nail changes were more frequent in Group B (25.4% coarse pitting, p<0.001), and vessel types differed, with Group B showing more dotted vessels (88.9%, p<0.001). Dot globules and yellowish crusts were present only in Group A (p<0.001)

INTRODUCTION

Dermoscopy is a pivotal non-invasive diagnostic tool in dermatology, known for its efficacy in the evaluation of pigmented skin lesions. Recently, its application has extended to a broader range of dermatological conditions, including inflammatory skin diseases such as psoriasis and eczema. It employs optical magnification to enable the observation of patterns and structures that are not easily visible to the unaided eye, so establishing a connection between the clinical examination of the skin at a larger scale and the microscopic examination of skin tissue.[1]

Psoriasis is a chronic inflammatory condition of the skin, nails, and joints that is caused by an overactive immune system.[2] It is commonly identified by the presence of keratinized plaques that have white scales.[3] The global prevalence of psoriasis ranges from 0.09% to 11.43%, with a minimum of 100 million individuals affected by the condition.[4]

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Psoriasis can typically be diagnosed with clinical observation alone. However, in cases where there is uncertainty, a histological investigation is necessary as it is considered the most reliable and accurate procedure. Nevertheless, it necessitates a procedure that invades the body and demands a significant amount of time for pathological preparation. Dermoscopy allows for noninvasive differentiation of psoriasis from other similar disorders in a clinical setting.

The primary dermoscopic characteristic of palmar psoriasis is the presence of white scales that are normally scattered in a diffuse pattern, with only occasional instances of patchy or central distribution. Dotted vessels, which exhibits a consistent distribution (sometimes appearing in rings or patchy patterns) are frequently observed when utilizing a fluid interface that reduces scaling. Focal yellowish scales are an additional, although very uncommon, discovery.[5]

Eczema is a chronic skin condition that manifests in various forms, such as infiltration, edema, vesicles, scaling, and hyperkeratosis, accompanied by itching.[6] Hand eczema (HE) is the predominant skin condition that specifically affects

the hands. It is also considered one of the most widespread occupational skin diseases.[7]

Hyperkeratotic palmoplantar eczema (HKE) is a specific type of hand eczema characterized by thickening of the skin, and its underlying causes are not well understood. Hyperkeratotic eczema is identified by the presence of painful hyperkeratotic plaques, which consist of scales, fissures, and cracks. Typically, the palms and the undersides of the fingers are affected, and occasionally the soles of the feet as well. The precise cause is uncertain, however factors such as atopy, contact allergy, irritation, and friction may play a role.[8]

The characteristic dermoscopic features of HKE consist of brownish-orange dots/globules, which correspond to small spongiotic vesicles, as well as yellowish scales and yellowish-orange crusts. Additionally, less frequently observed findings include whitish scaling that is localized in specific areas and dotted capillaries.[9] Additionally, there are descriptions of globules that have a light-colored interior and a dark outside edge. The presence of a dark peripheral rim may be linked to the presence of hyperkeratotic foci around the vesicles, however this does not hold much importance in distinguishing it from psoriasis. Punctate vessels, observed in an uneven pattern along with yellow scales, are a reliable sign of eczema. The yellow scales are indicative of a combination of hyperkeratosis and desiccated serous fluids.[10,11]

Despite widespread use, the specificity of dermoscopic features for differentiating between Hyperkeratotic Palmoplantar Eczema (HKE) and Palmoplantar Psoriasis (PPP) is not well-defined, leading to potential diagnostic inaccuracies and unnecessary biopsies.

This study aims to fill the knowledge gap by defining specific dermoscopic features that can accurately distinguish between HKE and PPP. By clarifying these criteria, we seek to reduce the need for invasive diagnostic procedures, thus streamlining clinical workflows and enhancing patient care in dermatology. The relevance of this research is underscored by the high prevalence and similar clinical presentations of HKE and PPP, which often complicate the clinical management and therapeutic outcomes.

With a focus on establishing clear dermoscopic signatures for these conditions, this research aligns with the current needs for precision in dermatologic diagnostics and represents a step forward in the application of dermoscopy beyond traditional uses.

MATERIALS AND METHODS

Study Design and Setting

This study was a hospital-based, cross-sectional observational study conducted at the tertiary care centre. Ethical clearance was obtained from the institutional ethical committee, and all participants provided informed consent.

Study Population

A total of 137 patients, diagnosed with either Hyperkeratotic Palmoplantar Eczema (HKE) or Palmoplantar Psoriasis (PPP), were enrolled based on inclusion and exclusion criteria. Group A consisted of 74 patients with HKE, while Group B included 63 patients with PPP. Inclusion criteria included clinically diagnosed cases of HKE and PPP with patient consent, while patients with secondary infections or other unrelated dermatological conditions were excluded.

Sample Size

The sample size was calculated at an 80% study power with a 0.05 alpha error, based on previous studies highlighting a 36.4% difference in vascular distribution patterns between HKE and PPP.

Data Collection

After informed consent, a thorough clinical history was taken, including demographic data, duration of disease, distribution of lesions, and treatment history. All patients underwent routine blood tests and screening for systemic involvement.

Dermoscopic Evaluation

Dermoscopic examination was conducted using a DermLite DL4 with 10x magnification. Parameters recorded included:

- **Vascular Patterns**: regular or irregular
- **Vessel Type Distribution**: Dotted, linear, or a combination
- **Scale Colour**: White or yellow
- **Scale Distribution**: Patchy or diffuse
- **Brownish-orange dots/Globules**: Present or absent
- **Yellowish Crusts**: Present or absent
- **Background Colour**: Red or yellow

Statistical Analysis

Data were analyzed using Microsoft Excel. Continuous data were summarized as mean ± SD, and differences between groups were analysed using Student's t-test. Categorical data were summarized as proportions, and the Chi-square test was applied to compare groups, with a 95% confidence interval considered significant.

RESULTS

Demographic and Clinical Characteristics

The study included 137 patients, divided into Group A (74 patients with HKE) and Group B (63 patients with PPP). The average age across both groups was 45.6 years, with a male-to-female ratio of approximately 1.3:1. In terms of disease duration, PPP patients generally exhibited a longer disease history compared to those with HKE, highlighting the chronicity associated with psoriasis.

Dermoscopic Findings

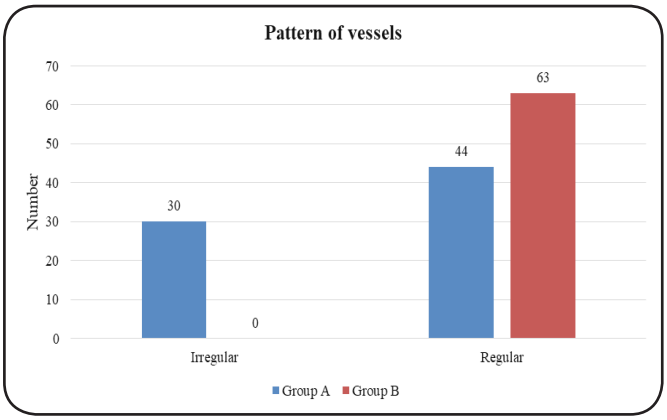
1. **Vascular Patterns**: The vascular patterns observed under dermoscopy showed significant variations between the two groups:
   - In PPP, all of cases had regular vessels, a regular dotted vascular pattern was observed, which is consistent with existing literature on psoriatic lesions. This pattern reflects the neovascularization seen in psoriasis and is considered a key differentiating feature.
   - In contrast, HKE displayed irregular vascular patterns that varied in both size and distribution, which is less uniform than that seen in PPP. More than half

44(59.5%) of cases had regular vessels, and rest 30(40.5%) cases had irregular vessels. This irregular pattern can be attributed to the inflammatory changes unique to eczema.

Table 1. Distribution of pattern of vessels among both study groups

Pattern of vessels	Group A	Group B
Irregular	30(40.5)	-
Regular	44(59.5)	63(100)
Total	74(100)	63(100)

Chi-square = 30.374 with 1 degree of freedom; P<0.001(S)



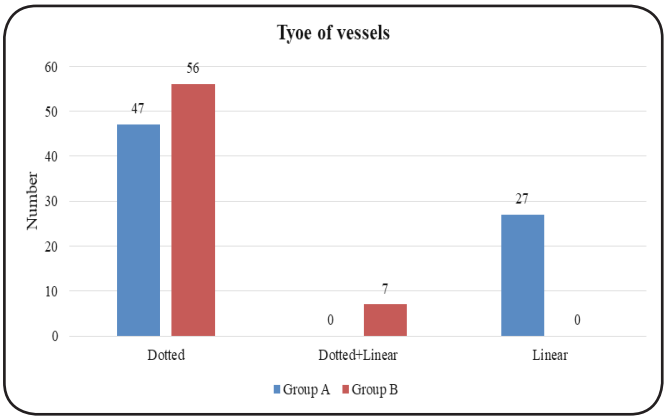
1. **Vessel Type Distribution**:

- In PPP, maximum 56(88.9%) cases had dotted vessels, rest seven (11.1%) cases had dotted+linear type of vessels, and none of case had linear vessels.
- For HKE, most of cases (63.5%, 47/74) cases had dotted type of vessels, rest 27(36.5%) cases had linear vessels, and none of case had dotted+linear type of vessels.

Table 2. Distribution of type of vessels among both study groups

Type of vessels	Group A	Group B
Dotted	47(63.5)	56(88.9)
Dotted+Linear	-	7(11.1)
Linear	27(36.5)	-
Total	74(100)	63(100)

Chi-square = 34.123 with 2 degrees of freedom; P<0.001(S)



cale Colour and Distribution:

- **Scale Colour**: In HKE majority 60(81.1%) cases had yellow scales, and 14(18.9%) cases had white scales. While in PPP, most 58(92.1%) cases had white scales and rest five (7.9%) cases had yellow scales.**Scale Distribution**: In HKE, majority 52(70.3%) cases had patchy scales, and rest 22(29.7%) cases had diffuse scale. In PPP, more than half 34(54%) cases had patchy scale distribution and rest 29(46%) cases had diffuse scale distribution.

Table 3. Distribution of scale colour in cases among both study groups

Scale colour	Group A	Group B
White	14(18.9)	58(92.1)
Yellow	60(81.1)	5(7.9)
Total	74(100)	63(100)

Chi-square = 70.111 with 1 degree of freedom; P<0.001(S)

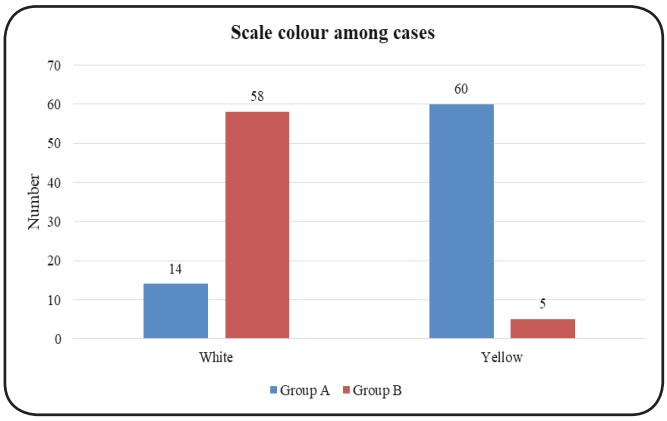
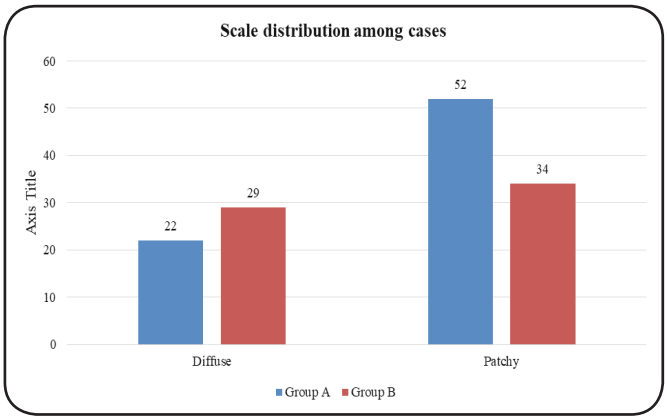


Table 4. Distribution of scale distribution in cases among both study groups

Scale distribution	Group A	Group B
Diffuse	22(29.7)	29(46)
Patchy	52(70.3)	34(54)
Total	74(100)	63(100)

Chi-square = 3.204 with 1 degree of freedom; P = 0.073(NS)



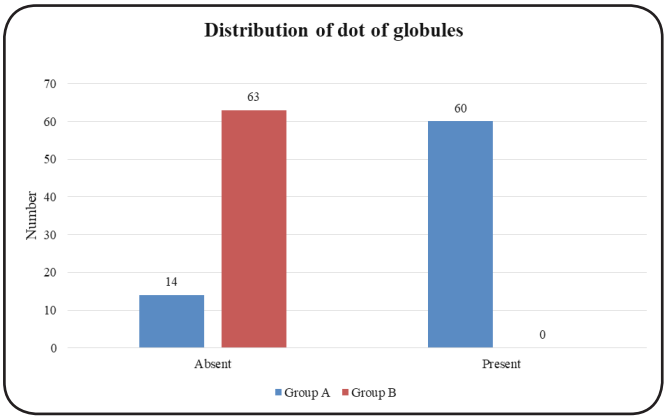
2. Presence of Dots and Globules:

In HKE, most of cases had presence of dot of globules, and in PPP none of case had presence of dot of globules.

Table 5. Distribution of presence of dot of globules among both study groups

Presence of dot of globules	Group A	Group B
Absent	14(18.9)	63(100)
Present	60(81.1)	-
Total	74(100)	63(100)

Chi-square = 87.620 with 1 degree of freedom; P<0.001(S)

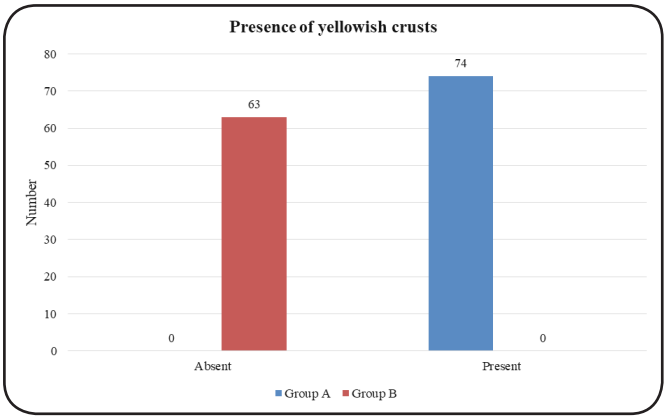


3.Yellowish Crusts:

- In group A, all cases had presence of yellowish crusts, and in group B none of case had presence of yellowish crusts.

Table 6. Distribution of presence of yellowish crusts among both study groups		
Presence of yellowish crusts	Group A	Group B
Absent	-	63(100)
Present	74(100)	-
Total	74(100)	63(100)

Chi-square = 133.004 with 1 degree of freedom; P<0.001(S)

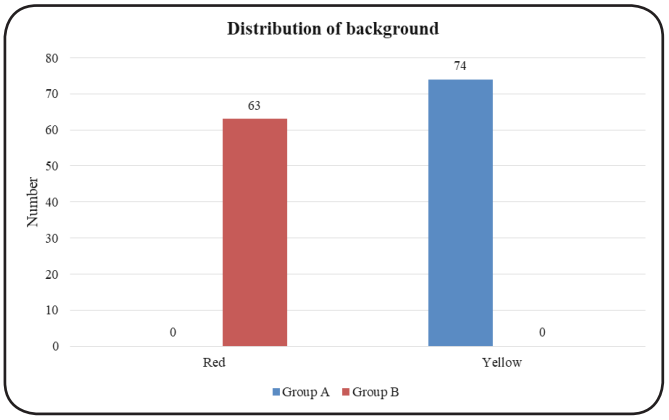


4. Background Colour:

- In group A, all cases had yellow background, and in group B all cases had red background.

Table 7. Distribution of background among both study groups		
Background	Group A	Group B
Red	-	63(100)
Yellow	74(100)	-
Total	74(100)	63(100)

Chi-square = 133.004 with 1 degree of freedom; P<0.001(S)



Statistical analysis revealed significant differences between HKE and PPP across multiple dermoscopic parameters, including vascular pattern, vessel distribution, scale colour and distribution, and background colour ($p < 0.05$ for each parameter). These findings underscore the effectiveness of dermoscopy in differentiating these two conditions based on distinct morphological markers, providing clinicians with a reliable, non-invasive diagnostic tool.

DISCUSSION

Dermoscopy has emerged as a valuable non-invasive diagnostic tool in dermatology, extending its utility beyond melanocytic lesions to inflammatory dermatoses. This study aimed to establish more definitive dermoscopic criteria for differentiating palmoplantar psoriasis (PPP) from hyperkeratotic palmoplantar eczema (HKE), two conditions that often present diagnostic challenges due to their similar clinical appearances. Our findings, corroborated by recent literature, highlight several key dermoscopic features that can aid in accurate diagnosis, potentially reducing the need for invasive biopsies and guiding appropriate treatment strategies.

Demographic and Clinical Characteristics

Our study included patients predominantly in the 31-50 year age group for both HKE and PPP, with a slight male predominance (53%) in both conditions. The majority of cases in both groups had a disease duration of 7-12 months, and bilateral involvement was almost universal in PPP (100%) and nearly so in HKE (97.3%). These similarities in demographic and clinical presentation underscore the importance of dermoscopic evaluation for accurate diagnosis. The high rate of bilateral involvement in both conditions aligns with findings from previous studies. **Chauhan et al (2023)** [12] reported bilateral involvement in 90.5% of PPP cases and 85.7% of palmoplantar eczema cases. This high rate of bilateral involvement in both conditions highlights a diagnostic challenge, as it removes unilaterality as a distinguishing clinical feature.

Vascular Patterns

One of the most distinguishing dermoscopic features between HKE and PPP was the vascular pattern, which showed significant differences in both vessel type and distribution.

Vessel Type

In our study, PPP cases predominantly exhibited dotted vessels

(88.9%), with the remaining 11.1% showing a combination of dotted and linear vessels. In contrast, HKE cases showed a more varied pattern, with 63.5% displaying dotted vessels and 36.5% showing linear vessels.

These findings are consistent with several recent studies. **Yu et al (2021)** [13] reported that 84.6% of PPP cases in their study showed dots or globular vessels.

Vessel Distribution

Our study found that all PPP cases (100%) demonstrated regular vessel distribution, whereas HKE cases showed a mix of regular (59.5%) and irregular (40.5%) distributions. This significant difference corroborates findings by **Chauhan et al**[12] **(2023)**, who reported regular/diffuse vessel distribution in 84.6% of PPP cases compared to only 2.2% in palmoplantar eczema.

Scale Characteristics

Scale features provided another set of important differentiating criteria, with both scale colour and distribution offering valuable diagnostic clues.

Scale Colour

Our study revealed a striking difference in scale colour between PPP and HKE. PPP cases predominantly exhibited white scales (92.1%), while HKE cases mostly showed yellow scales (81.1%). This distinction is consistent with findings from several studies. **Yu X et al**[13] **(2021)** reported white scales in 92.3% of PPP cases and yellow scales in 61.3% of palmoplantar eczema cases.

Scale Distribution

Although both conditions showed a mix of patchy and diffuse scale distribution, PPP had a higher proportion of diffuse distribution (46%) compared to HKE (29.7%). However, this difference was not statistically significant in our study, contrary to some previous reports. **Chauhan et al**[12] **(2023)** found diffuse scale distribution in 87.2% of PPP cases compared to 66.7% of palmoplantar eczema cases, while **Çetinarslan T et al**[14] **(2020)** reported diffuse scaling in 74.3% of psoriasis cases and 56.4% of eczema cases.

The lack of statistical significance in our findings regarding scale distribution may reflect the variability in disease stages and treatment status among our study participants. This discrepancy highlights the need for larger, multi-centre investigations to establish the true diagnostic value of scale distribution patterns.

Dots/Globules

One of the most striking findings in our study was the presence of brown or orange-brown dots/globules exclusively in HKE cases (81%) and their complete absence in PPP. This observation aligns with findings from **Chauhan et al**[12] **(2023),** who reported brown/orange-brown dots and globules in 66.7% of palmoplantar eczema cases and none in PPP. **Çetinarslan et al**[14] **(2020)** also noted brownish-orange globules in 25.7% of eczema patients compared to only 5.7% in psoriasis cases.

Yellowish Crusts

Similar to dots/globules, yellowish crusts were observed in all HKE cases but were absent in PPP. This feature was also noted by **Chauhan et al**[12] **(2023)** and **Çetinarslan et al**[14] (2020). The formation of yellowish crusts in HKE can be attributed to the spongiotic nature of eczematous inflammation, allowing for the exudation of serum, which dries on the skin surface to form crusts.

Background Color

Our study revealed a clear distinction in background color between PPP and HKE. All PPP cases displayed a red background, while all HKE cases showed a yellow background. This finding is supported by **Soni et al**[15] **(2023),** who reported a light red or dull red background in PPP cases and a yellow or yellow-red background in palmoplantar eczema cases.

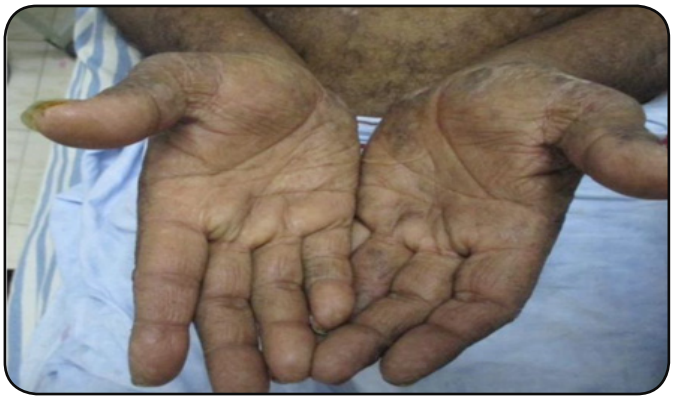


Figure 1. Clinical photograph of Hyperkeratotic Palmar Eczema.

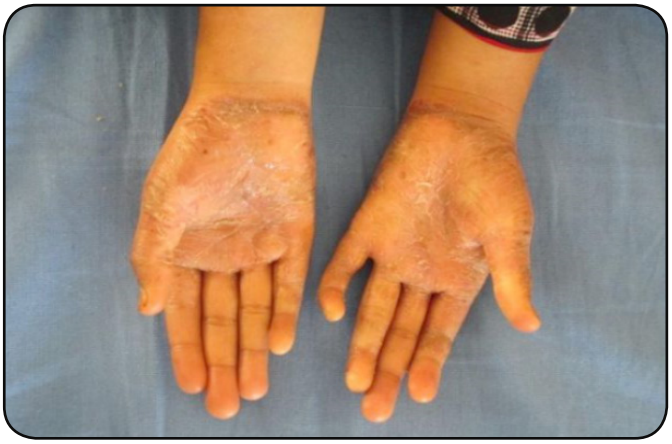


Figure 2. Clinical Photograph of Palmoplantar Psoriasis.

Clinical Implications and Diagnostic Applications

The implications of these findings are significant in a clinical context. The ability to use dermoscopy as a reliable diagnostic tool for differentiating between HKE and PPP could streamline the diagnostic process, reduce the need for invasive biopsy procedures, and expedite targeted treatment. As these two conditions require different therapeutic approaches—topical corticosteroids and emollients for eczema, and immunosuppressants or biologics for psoriasis—accurate differentiation is essential for effective management and can prevent potential adverse effects from inappropriate therapy.

Our study supports the growing body of evidence on the efficacy of dermoscopy beyond pigmented lesions, extending its use to inflammatory conditions.

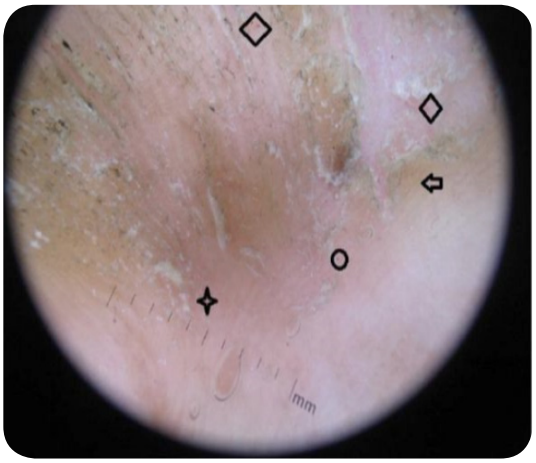


Figure 3. Dermoscopic image of Hyperkeratotic Palmar Eczema in 10x magnification in non-polarised light. Star showed yellow to brownish dots and globules, and Diamond shows focally distributed vessels, and Circle showed whitish scales.

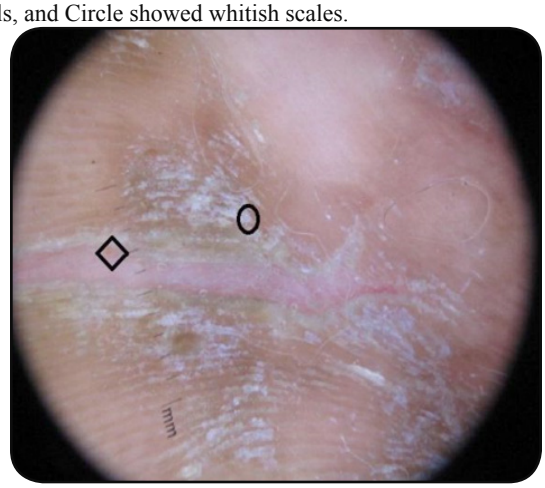


Figure 4. Dermoscopic image of PPP using 10x magnification. Circle showed white scale, here is a diffuse presence of white scales with an erythematous background. Diamond showed regular arrangement of red dots and globules.

In resource-limited settings, where access to histopathological confirmation may be constrained, dermoscopy offers a cost-effective, accessible diagnostic method that can be employed at the point of care.

Limitations and Future Directions

While this study provides valuable insights, several limitations must be acknowledged. The single-centre nature of this study limits the generalizability of the results, as the population sample may not fully represent broader demographic and clinical variability. Additionally, the findings were not correlated with histopathological data, which could provide further validation of the observed dermoscopic patterns. Future multicentre studies with larger sample sizes and histopathological correlation would be beneficial to confirm these results across diverse populations and clinical settings.

Combining dermoscopy with other non-invasive diagnostic techniques, such as reflectance confocal microscopy or optical coherence tomography, could also enhance diagnostic accuracy, particularly in cases with atypical presentations. Integrating these tools could provide a comprehensive, multi-modal approach to diagnosing challenging dermatologic conditions.

CONCLUSION

In summary, the distinct dermoscopic features identified in this study underscore the role of dermoscopy in differentiating HKE from PPP. The findings contribute valuable information to dermatologic diagnostics and support a more precise, patient-centered approach to managing these chronic conditions.

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