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ORIGINAL ARTICLE

A cross-sectional study to evaluate different dermoscopic patterns in the diagnosis of pityriasis versicolor.

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ABSTRACT… Objective: To evaluate dermoscopic patterns in the diagnosis of pityriasis versicolor. **Study Design:** Cross-sectional study. **Setting:** Dermatology Department of Ghurki Trust Teaching Hospital, Lahore. **Period:** October, 2023 to May, 2024. **Methods:** Included 60 consecutive patients diagnosed clinically with pityriasis versicolor. Skin scrapings from the lesions were examined using potassium hydroxide (KOH). Woods lamp examination was done and the fluorescence was documented. Dermoscopy was performed using HEINDELTA 30 and images were recorded for analysis. **Results:** Non-uniform pigmentation was observed in all the representative lesions. Clearly defined borders were observed in 93.3% of cases, predominantly in the hypopigmented variant (41.7%). Inconspicuous ridges and furrows were identified in 68.3%. The halo sign was observed in 36.7% patients, predominantly in the hypopigmented variant (28.3%), while the contrast halo sign was noted in 8.3% chiefly in the hyperpigmented variant (33.3%). Folliculocentric pattern was present in 40% cases. Invasion of hair follicles was seen in 31.7% patients. Gender-based analysis of data showed a statistically significant higher frequency of non-uniform pigmentation, clearly demarcated borders, perilesional hyperpigmentation, invasion of hair follicles, and scaling in males compared to females. Vascular patterns i.e. linear branching and dotted pattern were significantly more common in older patients. **Conclusion:** Dermoscopy is a valuable, non-invasive tool for identifying characteristic patterns of pityriasis versicolor, thereby improving diagnostic accuracy. Key dermoscopic features, along with observed age and gender variations, can aid in early diagnosis and better clinical assessment.

Key words: Dermoscopic Patterns, Fungal Infection, Malassezia Specie, Pityriasis Versicolor.

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INTRODUCTION

Pityriasis versicolor (PV) is a common superficial mycotic infection caused by proliferation of malassezia species in the stratum corneum of skin.[1] It predominantly involves areas of skin rich in sebaceous glands i.e. upper trunk, neck and upper arms.[2] This condition clinically manifests as hypopigmented or hyperpigmented macules and patches. Some patients may experience mild pruritus although symptoms are usually undetectable.[3] It is estimated that PV has a prevalence of 30 to 40% worldwide in tropical areas.[4] The triggering factors of the disease include hot climate, poor hygiene, occlusion and humidity.[5]

The diagnosis of PV is usually clinical although microscopic examination is useful in case of diagnostic uncertainty.[6] The microscopic examination of slides prepared with KOH reveals characteristic "spaghetti and meatball" appearance representing fungal hyphae and spores. However, this technique can be time consuming.[7,8] Woods lamp examination is also useful to detect PV as it shows yellow-orange to yellow-green fluorescence in Woods light due to the presence of pityrialactone.[9]

Dermoscopy has gained incredible acceptance among dermatologists as an adjunctive technique in identifying specific patterns that can aid the diagnosis of a wide variety of skin disorders.[10] Its utility extends to non-neoplastic dermatoses, like inflammatory and infectious skin diseases.[11] Dermoscopy, as a non-invasive bedside tool, not only simplifies the diagnosis of pityriasis versicolor through telltale clues[12,13], but also differentiates it from a wide spectrum of similar dermatoses.[14,15] However, large scale analysis are still required and association between several observations need to be further studied.[16]

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This study endeavors to delineate the common dermoscopic patterns in the diagnosis of pityriasis versicolor, a prevalent condition in Pakistan yet under-represented in the existing research. Dermoscopy emerges as a precise and efficient diagnostic modality for early identification and accuracy of diagnosis. Moreover, the concomitant scaling patterns observed may provide insights into disease severity and inform the selection of optimal therapeutic interventions for affected individuals.

METHODS

This cross sectional study was conducted at Dermatology Department of Ghurki Trust Teaching Hospital Lahore, after taking approval by the institutional ethical review committee (LMDC/16785/23) from October, 2023 to May, 2024. A sample size of 60 was calculated using 90% confidence interval, 8.5% margin of error and taking the proportion of patients with hypo-pigmented variant observed as 80%.[5] The diagnosis of pityriasis versicolor (PV) was made on clinical evaluation of lesions with confirmation from KOH examination. All patients with a positive KOH examination between the ages of 1 to 60 years were included in the study. However, the patients who had a negative result on KOH examination and those with any history of antifungal treatment in the previous month or a concurrent fungal infection were excluded. Demographic and clinical characteristics were collected using a structured proforma. Patients were categorized into three groups: hypopigmented, hyperpigmented, and mixed variants of PV. Woods lamp examination was done on the characteristic lesions and the colour of fluorescence was noted. Dermoscopy was performed on all the representative lesions using a handheld dermoscope (HEIN DELTA 30) with and without interface medium connected to iPhone 12 pro max. Images were obtained and stored for further analysis. Data analysis was performed using SPSS version 27. For continuous variables mean and standard deviation (SD) were used while categorical variables were expressed as frequencies and percentages. The chi-square test was applied to check the association between demographic characteristics and different dermoscopic variables.

RESULTS

Among the 60 participants, equal gender distribution was observed (50% either sex). The mean age was 24.73 years and majority of the patients (61.7%) were aged between 19 to 40 years. Fitzpatrick skin type IV was present 50% and type III in 43.3%. The duration of disease varied, with 48.3% cases reporting symptoms lasting for 1 to 6 months. Pruritus was present in 55% of patients.

Lesions were mainly distributed on the back (70%), followed by the front of chest (55%), neck (63.33%), and upper limbs (38.33%) while face and lower limbs were infrequently involved (6.66% and 1.6% respectively) detailed in Table-I. Wood's lamp examination revealed a positive fluorescence in 45% of patients.

Table-II highlights the dermoscopic patterns observed in different variants of pityriasis versicolor (hypopigmented, hyperpigmented, mixed). Non-uniform pigmentation (Figure-1) was common, seen in all representative lesions. Clearly demarcated borders were present in 93.3% patients, particularly in the hyperpigmented variant (43.3%). Perilesional hyperpigmentation was present in 40%, most prominent in the hypopigmented variant (28.3%).

Inconspicuous ridges and furrows were present in 68.3% patients, with 30% displaying hypopigmentation and 31.7% showing hyperpigmentation. The halo sign was seen in 36.7% cases, predominantly in the hypo-pigmented variant (28.3%), while the contrast halo sign was seen in 38.3% more frequent in the hyper-pigmented variant (33.3%). Folliculocentricity was present in 40% (Figure-2), observed in both the hyper-pigmented (20%) and hypo-pigmented (16.7%) variants.

Invasion of hair follicles (Figure-3) was seen in 31.7%, including 16.7% cases showing hypo-pigmented and 15% exhibiting hyper-pigmented variant. Scaling was present in all patients, with similar frequencies in both major variants. Most common type of scaling was patchy (61.7%), followed by scaling in furrows (50%) as shown in Figure-4 and diffuse scaling (38.3%). Perifollicular involvement was seen in 23% cases. Vascular patterns were infrequently detected, with linear branching pattern in 11.7%

(Figure-1) and dotted vessels in 8.3% participants. Table highlights the key gender-based differences in the dermoscopic features of pityriasis versicolor. Specific features such as non-uniform pigmentation, clearly demarcated borders, perilesional hyperpigmentation, invasion of hair follicles and scaling showed significant association with male gender. The vascular patterns, linear branching and dotted vessels were more commonly present in older age groups (p-values of 0.002 and 0.004, respectively).

TABLE-I

Demographic features.

Parameters	N (%)
Gender	
Male	30(50.0)
Female	30(50.0)
Age (Years)	
1-18	18(30.0)
19-40	37(61.7)
41-60	5(8.3)
Duration of Disease	
1-6 Months	29(48.3)
7-1 Year	10(16.7)
1-2 Years	7(11.7)
2-5 Years	9(15.0)
>5 Years	5(8.3)
Pruritus	
Present	33(55.0)
Absent	27(45.0)
Site Of Lesions (Absent: Present)	
Front Of Chest	27:33
Back Chest	18:42
Neck	22:38
Upper Limb	37:23
Face	56:4
Lower Limb	59:1
Skin Type	
I	1(1.7)
III	26(43.3)
IV	30(50.0)
V	3(5.0)

N: number of patients %: percentage of patients

FIGURE-1

Dermoscopic image of a pityriasis versicolor patient showing branching vascular pattern with background non-uniform pigmentation

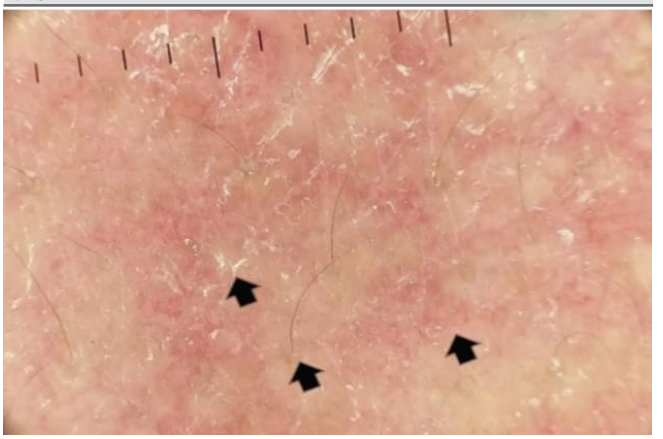


FIGURE-2

Dermoscopic image showing folliculocentricity.

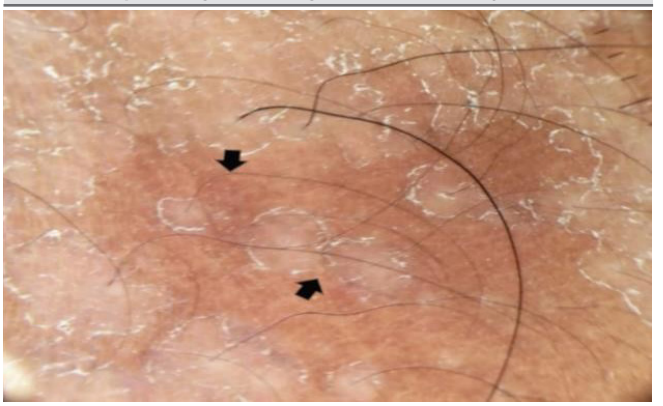


FIGURE-3

Dermoscopic image showing invasion of hair follicle.

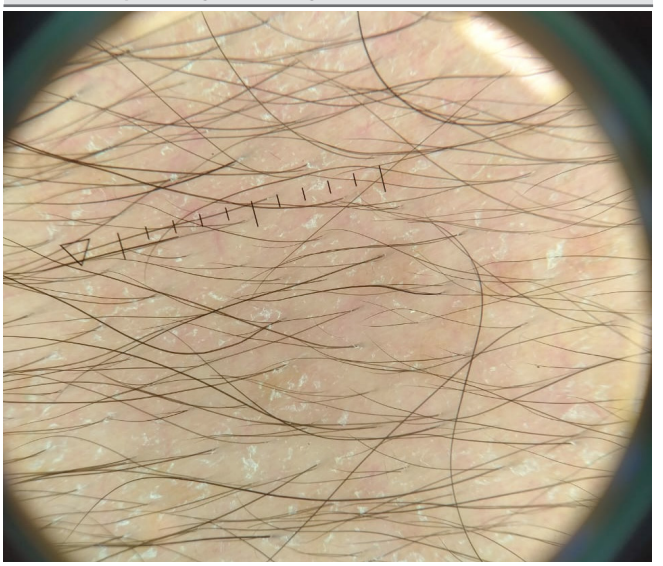


TABLE-II

Dermoscopic patterns in Pityriasis Versicolor.

Parameters	Hypopigmented Variant N(%)	Hyperpigmeted Variant N(%)	Mixed Variant N(%)	Total N(%)
Non uniform pigmentation	26 (45.3)	27 (45.0)	7 (11.7)	60 (100.0)
Clearly demarcated border	25 (41.7)	26 (43.3)	5 (8.3)	56 (93.3)
Perilesional hyperpigment ation	17 (28.3)	1 (1.7)	6 (10.0)	24 (40.0)
Inconspicuous ridges and furrows	18 (30.0)	19 (31.7)	4 (6.7)	41 (68.3)
Halo sign	17 (28.3)	0	5 (8.4)	22 (36.7)
Contrast Halo sign	0	20 (33.3)	3 (5.0)	23 (38.3)
Folliculocentricity	10 (16.7)	12 (20.0)	2 (3.3)	24 (60.0)
Invasion of hair follicle	10 (16.7)	9 (15.0)	0	19 (31.7)
Scaling	26 (43.3)	27 (45.0)	7 (11.7)	60 (100.0)
Patchy	16 (26.7)	17 (28.3)	4 (6.7)	37 (61.7)
In_furrows	10 (16.7)	15 (25.0)	5 (8.3)	30 (50.0)
Diffuse	10 (16.7)	11 (18.3)	2 (3.3)	23 (38.3)
Peripheral	4 (6.7)	2 (3.3)	0	6 (10.0)
Perifollicular	7 (11.7)	7 (11.7)	0	14 (23)
Vascular pattern	8 (13.3)	3 (5.0)	1 (1.7)	12 (20.0)
Linear branching	6 (10.0)	1 (1.7)	0	7 (11.7)
Dotted vessels	1 (1.7)	3 (5.0)	1 (1.7)	5 (8.3)

N:number of patients %: percentage of patients

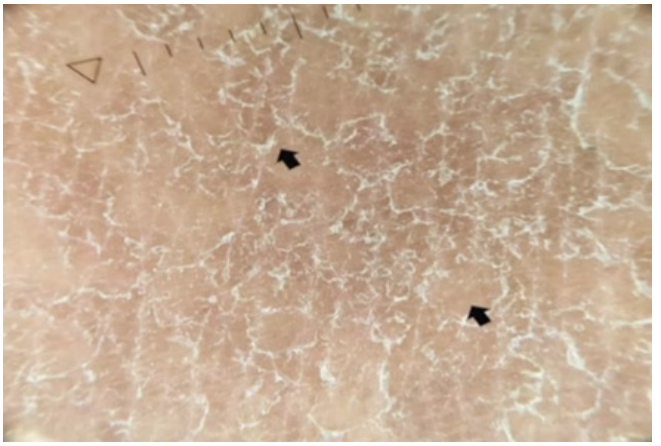
TABLE-III

Association between Dermoscopic variables of various types of pityriasis versicolor lesions with demographic profile of patients.

Parameters	Gender		P-Value
	Male	Female	
Perilesional hyperpigmentation	14	10	.007
Inconspicuous ridges and furrows	21	20	.107
Halo sign	11	11	.317
Contrast Halo sign	11	12	.199
Folliculocentricity	14	10	.109
Invasion of hair follicle	14	5	.014
Scaling	30	20	.009
Age (years)			
	1-18	19-40	41-60	
Vascular pattern	-	10	2	.002
Linear branching	-	6	1	.004
Dotted vessels	-	4	1	.591

FIGURE-4

Deermoscopic image showing scaling in furrows.



DISCUSSION

Pityriasis versicolor is an asymptomatic yet aesthetically impactful fungal infection presenting as discolored patches posing a significant cosmetic concern. The unusual presentations of this disease may become a diagnostic dilemma, particularly for less experienced physicians.[15] Dermoscopy is a portable, easy-to-use, non-invasive tool that has been used in the diagnosis of various dermatoses. This study aimed to identify the different dermoscopic patterns in pityriasis versicolor.[16,17]

The mean age (24.73 years) in our cohort echoes a recurring epidemiological pattern, consistently observed by Mathur et al., Manickam et al., and Dsouza et al., likely attributable to the increased sebum production in this age group.[5,15,17,18] Gender distribution was equal reflecting the findings of Labedz et al., who reported no discernible sex or ethnic predisposition.[13] However, this is at odds with other studies demonstrating a male predominance, possibly linked to demographic variations in our population.[5,15,16] Pruritus in 55.0% is comparable to the findings of Ismail et al., who documented it in 44.2%. In contrast, Vishwanath et al. observed that 71.67% of the patients were asymptomatic. However, Kaur et al. reported pruritus in only 10%.[5,16,19] Duration of symptoms (1 to 6 months) in most of the patients (48.3%) corroborated the findings of prior studies.[5-17]

The predilection of lesions for the upper back (72% cases), re-affirmed the well organised topographical pattern of involvement in seborrheic areas, a trend persistently highlighted in dermatological literature. This frequency, though slightly lower than the 78.84% reported by Ismail et al., contrasts sharply with the significantly lower rates documented by Dsouza et al. and Vishwanath et al. (47.8% and 44.1%).[16,18,19] The discrepancies might be attributed to the differences in study population and geographical factors. Most of the patients had Fitzpatrick skin type III and IV, consistent with the prevalence of these types in previous studies, likely owing to geographical congruence.[16,19,20]

In our study, 45% of patients exhibited positive fluorescence under Woods lamp, aligning with prior observations of positive rates in around one-third of the cases.[13] However, this differs from the findings of Dsouza et al., who reported a higher prevalence of positive fluorescence (66.1%).[18] Other studies have documented even greater proportions.[19,20] The negative fluorescence in our cases could be explained by the stage or severity of the lesions, where early or less active lesions may not produce characteristic fluorescence or individual factors such as taking a bath may wash off pityrialactone.

Highlighting the key dermoscopic features, non-uniform pigmentation evident in all the representative lesions is in accordance with all other studies reported so far.[15,16,17] Scaling was also observed in all the characteristic lesions. Most frequent type of scaling was patchy (61.7%), in both hypopigmented and hyperpigmented variants followed by scaling in furrows (50%) then diffuse (38.3%). Marginally comparable observations were reported by Manickam et al., where both patchy scaling (58.13%) and perifollicular scaling (30.23%) were seen in hypopigmented PV while hyperpigmented PV showed more diffuse scaling (50.00%) followed by patchy scaling (41.66%).[5,17] This may suggest differences in disease progression between the two variants guiding variant specific management startegies.

Perilesional hyperpigmentation (40%), prominent in the hypopigmented variant supports the observations made by Mathur et al. and Manickam et al.[15,17] The prevalence of inconspicuous ridges and furrows in our cohort was lower than the 46.51% documented

by Manickam et al., and markedly below the rates reported by Mathur et al. in both major variants. In contrast Dsouza et al. reported prominent ridges and furrows in 7.8 % of cases[15,17,18], potentially reflecting variation in patient population or disease stage and chronicity. Folliculocentricity (60%) was comparable to 66.67% reported by Kaur et al. A halo sign and contrast halo sign paralleled the findings of Manickam et al. and Kaur et al.[5,17]

Although vascular structures are not considered pathognomonic in this dermatosis, their presence may reflect an underlying inflammatory activity. This pathophysiological premise is demonstrated in our findings where vascular patterns were less frequently seen, with linear branching (11.7%) and dotted vessels (8.3%) slightly exceeding Mathur et al.'s findings (Linear branching vessels 8.54% and dotted vessels 2.44%). However, a greater proportion was reported by Vishwanath et al. with distinct vascular patterns.[15,16]

This study also reveals the gender based differences in the dermoscopic features of pityriasis versicolor. A statistically significant higher prevalence of non-uniform pigmentation, clearly demarcated borders, perilesional hyperpigmentation, invasion of hair follicles and scaling was observed in males compared to females. These findings corresponded with those reported by Rajiv et al., although the difference was not statistically significant.[20]

Vascular patterns, including linear and branching types, were found to be significantly more common in older age groups, possibly linked to dermal thinning and age-related vascular remodelling. Although similar patterns have been previously reported by Vishvanath et al. and Mathur et al., no prior studies have established a direct correlation between these patterns and age.[15,16] These findings can aid clinicians in differentiating other inflammatory and neoplastic conditions in older age reducing likelihood of unnecessary biopsies or misdiagnosis and guiding a tailored management approach in such patients.

A positive family history of similar lesions was noted in 15% of patients, in concordance with the 15.7% identified by Dsouza et al.[18] A more substantial proportion was reported by Ismail et al. (26.6%) and Rao et al. (38.3%).[19,22] Despite this familial occurrence, Jaffer et al. mentioned that there is minimal evidence to support the transmissibility of pityriasis versicolor among close contacts.[21] These findings suggest that familial clustering is more plausibly attributed to shared predisposing factors such as genetic susceptibility, environmental exposure or skin type, rather than direct interpersonal transmission.

The limitations of this study were small sample size and the type of study i.e., a cross-sectional study. A case-control study with a greater sample size would have better demonstrated the patterns. Most of the patients in this study had Fitzpatrick skin type III and IV, other skin types may have varying findings. Dermoscopic evaluation is based on experience by the operator, so the outcome may vary.

CONCLUSION

Dermoscopy is a valuable, non-invasive tool for identifying characteristic patterns of pityriasis versicolor, thereby improving diagnostic accuracy. Key dermoscopic features, along with observed age and gender variations, can aid in early diagnosis and better clinical assessment.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Shariqa Khan:** Study design, manuscript writing.
2	**Sumera Hanif:** Data analysis.
3	**Aliza Hamadani:** Critical revision.
4	**Ayesha Arshad Chattha:** Critical review.
5	**Iram Kausar:** Data analysis.
6	**Haroon Nabi:** Acquisition of data.