Common Pigmentary Skin Lesions in Dark Skin People: A Dermoscopic Evaluation

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Abstract:

Background: Nowadays, dermoscopy is a helpful technique for assessing pigmentary skin lesions. It symbolizes a link between clinical and histological sights. Dermoscopy is a non-invasive diagnostic technique that allows the visualization of morphologic features not detectable by the naked eye; accordingly, it represents a link between macroscopic clinical dermatology and microscopic dermatopathology.

Aim: To appraise the usefulness of the hand-held dermoscope (x10) in evaluating different pigmentary skin lesions in dark skinned people, and to identify dermoscopic patterns of pigmentary skin lesions among those people.

Patients and Methods: A descriptive study was carried out on 105 patients with different clinical forms of pigmentary skin lesions. Dermoscopic examination was done on all patients to delineate the dermoscopic findings.

Results: Different dermoscopic features are present for different pigmentary skin lesions, both hypo- and hyperpigmented. For example, melanocytic nevi showed a homogenous pattern, globular and reticular patterns, pseudo-network, and cobblestone pattern, while vitiligo showed a white glow with pigmented edge and interfollicular pigmentation.

Conclusion: Dermoscopy is a method that expands clinicians' diagnostic accuracy. It is a valuable tool for helping dermatologists diagnose pigmentary skin lesions in routine clinical practice. Pigmentary skin lesions showed specific dermoscopic criteria that may aid the clinical diagnosis.

Keywords: Dermoscopy; Pigmentary skin lesions; Nevi; Melasma; Vitiligo.

Introduction:

Skin pigmentation is largely inherited. Endocrine, genetic, and environmental variables control melanin's amount, type, and distribution in the skin, hair, and eyes. Melanin plays significant roles in heat regulation, aesthetic variation, and UV radiation protection in the human defense system against dangerous elements. [1]

Many factors affect skin pigmentation, such as carotene, the amount and type of melanin, stratum corneum thickness, and degree of skin vascularity. [2]

Meanwhile, skin is the body's largest organ; internal and external effects persistently impact it. Skin typically reacts to these variables by changing the pigmentation pattern that is naturally present. [3]

In clinical practice, individuals with pigmentary skin lesions experience significant social and psychological suffering. Therefore, it is important to

promote careful and truthful diagnosis to improve the management of such conditions. [4]

Although most dermatological disorders are still best assessed by a dermatologist's eyes, non-invasive diagnostic procedures have been discovered and serve as adjuvant diagnostic tools. [5]

By permitting the visualization of morphologic features that are not visible to the naked eye, dermoscopy bonds the breach between microscopic dermatopathology and macroscopic clinical dermatology. [6]

Both dermatologists and their patients frequently request dermoscopic examinations even when unnecessary, making the dermoscopic device pondered to the dermatologist's stethoscope. [7]

Besides, dermoscopy is a beneficial technique for exploring pigmentary skin lesions.[8] The distribution, color, pigmentation intensity, configuration, regularity, and other qualities of the margin and surface of pigmented skin lesions are examples of dermatoscopic features. [9]

To practice dermoscopy, one needs to be familiar with the expressions for the numerous structures visible during dermoscopic inspection. Numerous terms including "pigment network," "dots," "globules," "branched streaks," "radial streaming," "pseudopods," "structureless areas," "blotches," "regression pattern," "blue-white veil," "vascular patterns," "fingerprint-like structures," "moth-eaten border," "leaf-like areas," "spoke wheel-like structures," "large blue-grays[10]

This study's objectives were to appraise the usefulness of the hand-held dermoscope (x10) in evaluating different pigmentary skin lesions in dark skinned people, and to identify dermoscopic patterns of pigmentary skin lesions among those people.

Patients and Methods

Our descriptive study was carried out on 105 patients between January 2018 and September 2020 on 105 patients (of any age and both sexes) who had various clinical manifestations of pigmentary skin lesions.

The chosen patients were divided into two groups according to their clinical diagnosis:

1) Patients with hyperpigmentary skin lesions.
2) Patients with hypo-pigmentary skin lesions.

Patients suffering from severe systemic diseases or on topical or systemic treatment in the last 3 months were excluded from the study.

All participants in the study underwent a comprehensive history-taking process that covered their names, ages, sexes, places of residence, occupations, marital status, onset, location, course, and duration of skin lesions, possible causes, provoking factors, prior investigations, concurrent medical conditions, past histories, and family histories of conditions similar to their own.

All participants underwent meticulous dermatological and general examinations. The patients underwent a clinical examination to assess the lesion's site, shape, size, and distribution. Following the clinical examination, the same doctor photographed the patients in the same setting with stable lighting using a Canon IXUS digital camera. For specific lesions including melasma, vitiligo, pytriasis alba, and pytriasis versicolor, Wood's light examination was conducted.

Dermoscopic examination was carried out by using the Dermlite DL4 (3 Gen, San Juan Capistrano, CA, USA) with magnification 10X, which is a pocket epiluminescence microscopy, and the attached Canon IXUS camera 185 (20 MP) to save images. The dermoscopy device is placed approximately 25 mm from the skin, and then the power button is pushed for 2-3 seconds to activate the LEDS. Moving the device away from the lesion to obtain the desired image focus to establish the dermoscopic findings.

Every skin lesion was inspected for dermoscopic aspects such as color, morphology of the lesion, pattern, scale, color and distribution, and blood vessels, if present, according to Lallas et al. (2012). [11]

Ethical Considerations:

The study was approved and monitored by the Medical Ethics Committee, Assiut Faculty of Medicine (IRP no: 17100453). All patients provided informed consent to take part in this study. Furthermore, all authors have examined and agreed to the copyright policies within our research system.

Statistical Analysis:

SPSS (Statistical Package for Social Sciences) version 23.0 program for Windows was used for data processing. Continuous variable presented as mean ± Standard Deviation (SD). Categorical factors are presented as frequencies and percentages. Fisher's exact test was used for nonparametric data, and the Wilcoxon signed-rank test was used for numerical data. A probability value (P-value) less than 0.05 was considered significant.

Results

Patient Demographics

The study enrolled 105 patients with an average age of 27.89 ± 14.87 years (2-76 years). The majority were female (57.1%), lived in rural areas (72.4%), and were either students (41%) or housewives (31.4%). Full demographic characteristics are presented in **Table 1**, which includes age, gender, residence, and occupation data.

Table (1): Demographic data of the studied patients.

Age (Years):	
(Range) Mean ± SD	(2-76) 27.89 ± 14.87
Gender: n (%)	
Male	45 (42.9)
Female	60 (57.1)
Residence: n (%)|	
Rural	76 (72.4)
Urban	29 (27.6)
Occupation: n (%)|	
None	18 (17.1)
Student	43 (41)
Housewife	33 (31.4)
Employee	9 (8.6)
Farmer	2 (1.9)

Date expressed as frequency (percentage), mean (SD), and range.

Clinical Presentation

66 patients presented with hyperpigmented skin lesions, most commonly melanocytic nevi (21.9%), seborrheic keratosis (16.2%), freckles (14.3%), and melasma (10.5%). Of the 34 patients with hypopigmented lesions, pityriasis alba was most frequent (17.2%), followed by vitiligo (12.4%), hypopigmented tinea versicolor (4.7%), and other mixed hypo- and hyperpigmented lesions (4.7%).

Dermoscopic Findings in Hyperpigmented Lesions

The 23 patients with melanocytic nevi most often exhibited a homogeneous pattern, dots, globular pattern (26.1% each), reticular pattern (21.7%), pseudonetwork (13%), and cobblestone (8.7%) on dermoscopy (Figure 1a,a1). In the 17 seborrheic keratosis patients, comedo-like (47.1%), milia-like (41.2%), and cribriform (29.4%) patterns were common, along with moth-eaten borders, fingerprint patterns, and crypts (Figure 1b,b1). All 15 freckle cases showed a delicate pigmented pseudonetwork with regular openings throughout the lesions (Figure 1c,c1). The 11 melasma patients frequently had mixed (72.7%), regular (45.5%), or irregular (27.3%) pigment networks and fine telangiectasias (18.2%) (Figure 1d,d1). **Table 2** summarizes these findings.

Table (2): Dermoscopic features of patients with hyperpigmented lesions

Hyperpigmented lesions	**n (%)**
Melanocytic nevi: n=23|	
Homogenous pattern	6 (26.1%)
Dots	6 (26.1%)
Globular pattern	6 (26.1%)
Reticular pattern	5 (21.7%)
Pseudonetwork	3 (13%)
Cobblestone	2 (8.7%)
Seborrheic keratosis: n=17|	
Comedon like	8 (47.1%)
Milia like	7 (41.2%)
Cribriform pattern	5 (29.4%)
Moth-eaten border	4 (23.5%)
Fingerprint pattern	4 (23.5%)
Crypts	3 (17.6%)
Freckles: n=15|	
Delicate, typical pigmented pseudonetwork	15 (100%)
Regular-sized openings throughout the lesion	15 (100%)
Melasma: n=11|	
Dark brown lesion	5 (45.5%)
Light brown lesion	6 (54.5%)
Irregular network	3 (27.3%)
Regular network	5 (45.5%)
Mixed network	8 (72.7%)
Short fine telangiectasia	2 (18.2%)

Dermoscopic Findings in Hypopigmented Lesions

All 17 pityriasis alba cases had fairly ill-defined hypopigmented areas with fine scales and normal hair color within lesions (Figure 2a,a1). The 12 vitiligo patients commonly showed white glow (91.7%), interfollicular pigment (41.7%), white hair (33.3%), and pigmented margins (33.3%) (Figure 2b,b1). In the five tinea versicolor cases, hypopigmented patches with ill-defined edges and non-patterned scaling were universal findings (Figure 2c,c1). These results are compiled in **Table 3.**

Table (3): Dermoscopic features of patients with hypo-pigmented skin lesions

Hypo-pigmented lesions (34)	**n (37.14%)**
Pityriasis alba: n=17	
Fairly ill-demarcated white area within and outside the lesion	17 (100)
Scales	17 (100)
Hair inside the patch of normal color	17 (100)
Vitiligo: n=12|	
White glow	11 (91.7)
Interfollicular pigmentation	5 (41.7)
White hair within the lesion	4 (33.3)
Pigmented edge	4 (33.3)
Hypo-pigmented tinea versicolor (TVC): n=5|	
Hypo-pigmented lesions	5 (100)
Satellite lesions	2 (40)
Fairly demarcated edge	5 (100)
Scales	5 (100)
Peripheral hyperpigmentation	3 (60)

Table 4 provides an overview of the dermoscopic features across all the studied skin conditions. Figures 1 and 2 show representative dermoscopic images of the hyperpigmented and hypopigmented lesions.

Table (4): Dermoscopic findings in all studied skin lesions

	Melanocytic nevi (n=23)	**Seborrheic keratosis (n=17)**	**Pityriasis alba (n=17)**	**Freckles (n=15)**	**Vitiligo (n=12)**	**Melasma (n= 11)**	**Tinea versicolor (n=6)**
Irregular network						3 (27.3%)	
Regular network						5 (45.5%)	
Mixed network						8 (72.7%)	
Short fine telangiectasia						2 (18.2%	
Pseudonetwork	3 (13%)			15 (100%)			
Dots/globules	6 (26.1%)						
Homogenous pattern	6 (26.1%)						
Regular-sized openings throughout the lesion				15 (100%			
Comedon like		8 (47.1%)					
Milia like		7 (41.2%)					
Cribriform pattern		5 (29.4%)					
Moth-eaten border		4 (23.5%)					
Fingerprint pattern		4 (23.5%)					
Crypts		3 (17.6%					
Reticular pattern	5 (21.7%)						
Cobblestone	2 (8.7%						
Hyperpigmented							1 (16.7%)
Hypopigmented							5 (83.3%)
Satellite lesions							2 (33.3%)
Fairly demarcated edge							6 (100%)
Scales			17 (100%)				5 (83.3%)
Peripheral hyperpigmentation							3 (50%)
White glow					11 (91.7%)		
Interfollicular pigmentation					5 (41.7%)		
Hair within the lesion			17 (100%)		4 (33.3%)		
Pigmented edge					4 (33.3%)		
Fairly ill-demarcated white area within and outside the lesion			17 (100%)				

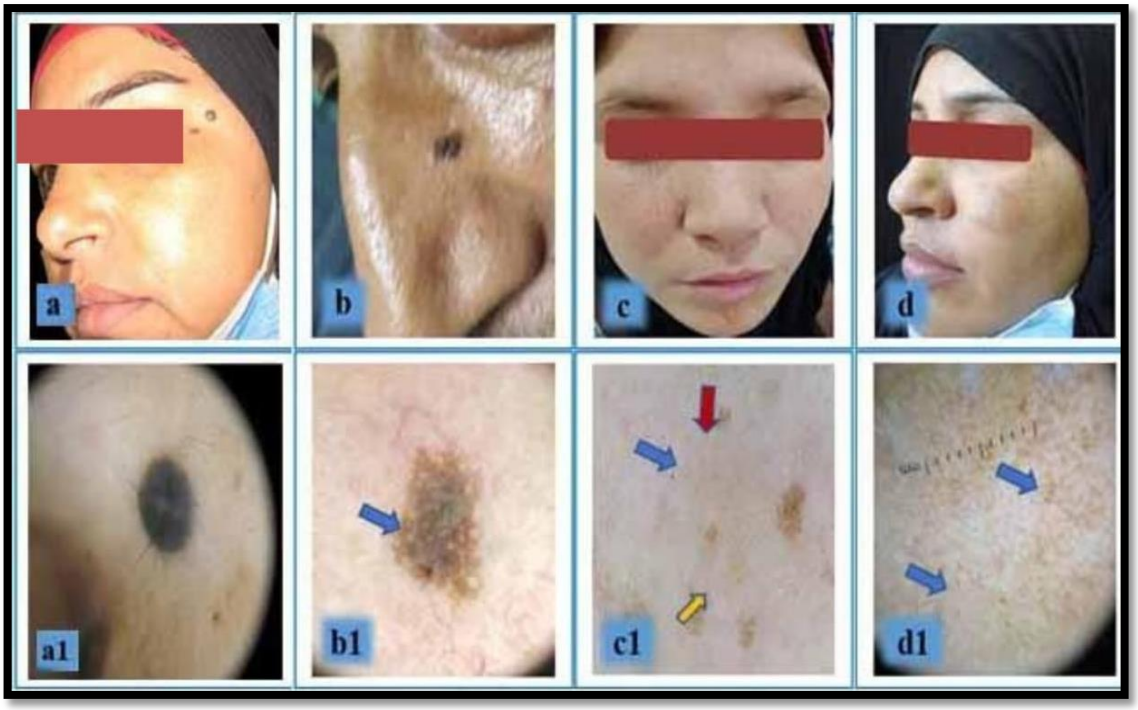

Figure 1 shows representative dermoscopic images of melanocytic nevi (a,a1), seborrheic keratosis (b,b1), freckles (c,c1), and melasma (d,d1)

Figure 2 shows the key dermoscopic features of pityriasis alba (a,a1), vitiligo (b,b1), and tinea versicolor (c,c1)

Discussion

Practicing dermoscopy for dermatological issues, such as inflammatory, pigmentary, and infectious dermatosis, hair, scalp, and nail disorders, has increased impressively over the past few years. [12] In the current study, we aimed to assess dermoscopic results in pigmentary skin lesions in dark-skinned people.

The current study recruited 23 patients with melanocytic nevi. Based on dermoscopic findings, the most frequent findings in such patients were a homogenous pattern, dots, and a globular pattern, which was present in 6 (26.1%) patients, while 5 (21.7%) patients had a reticular pattern. 3(13%) patients had pseudo-network, and another 2 (8.7%) had cobblestone.

Our findings are consistent with the multicenter study of Stanganelli et al. (2012)[13], in that the most frequent pattern was the globular. [14] Also, another previous study, Erfan et al. (2021)[15], revealed the same findings, where the globular pattern was presented in the majority of patients. [15]

Savas et al. (2020) [16] found that the parallel furrow pattern was the most prevalent in childhood and adolescence and dominant in 57.8% of instances. Combination patterns came in second with 14.1% of cases, while fibrillar patterns were in third with 10.1%. [16]

Seventeen patients with seborrheic keratosis were included in the current study. The most frequent features in these patients, according to dermoscopic findings, were comedon-like (47.1%), milia-like (41.2%), and cribriform pattern (29.4%). Other finds included crypts (17.6%), fingerprint patterns (23.5%), and borders with moth holes (23.5%).

According to Braun et al. (2002) [17] and the current study, seborrheic keratosis commonly had comedo-like apertures, which were discovered in 144 lesions (71%). Milia-like cysts were found in 135 lesions (66%). [12] Additionally, the authors discovered 94 lesions (46%) with moth-eaten borders, including 19 papular/nodular lesions (20%), 44 plaque lesions (47%), and 31 patch lesions (33%). Similar to this, Alapatt et al. (2016) [18] observed that the most frequent dermoscopy findings were comedo-like apertures (68%), followed by fissures and ridges (FR) (62%) and sharp demarcation (62%). Network-like structures were observed in 40% of the instances, followed by milia-like cysts in 38%, moth-eaten borders in 26%, and fingerprint-like features in 6%. [18]

Concerning freckles, we enrolled 15 patients. Dermoscopic findings revealed that all patients had delicate, typical pigmented pseudo-networks and regular-sized openings throughout the lesion. These findings are parallel to those of Clarke (2019)[19] and Lu et al. (2020)[20], who also described delicate, typical pigmented pseudo-networks and regularly sized openings throughout the lesion.

The current study enrolled 11 patients with melasma. Deromoscopic evaluation of those patients revealed that 6 (54.5%) patients had light brown color and another 5 (45.5%) patients had dark brown lesions. There were 8 (72.8%) patients who had mixed networks, while 3 (27.3%) patients had irregular networks, and another 5 (45.5%) patients had regular networks. Only 2 (18.2%) patients had short fine telangiectasia.

Our findings are consistent with a prior study's findings that a mixed network was a typical dermoscopic observation in melasma. [21] Closer findings were displayed in Nanjundaswamy et al.'s study [22], which revealed that 36% of their patients had melasma with a heterogeneous pattern. The authors also mentioned atrophy, telangiectasia, an enlarged pseudo-network with granular pigmentation, reticulo-globular pattern, and other results. [22]

The majority of epidermal melasma exhibited a homogeneous reticular network of pigmentation, and a Wood's lamp examination supported the diagnosis. [23] Melasma often displays a reticular pigment

network with perifollicular sparing and hue ranging from light to dark brown, according to a recent study by Yalamanchili et al. (2015). [24]

In contrast to the current study, Abdel-Hay et al. (2020) [25] discovered that telangiectasia was present in 74.2% of their patients. [25] Additionally, Kim et al. (2007) [26] revealed a considerable increase in the quantity and size of melasma's cutaneous blood vessels. UV toxicity and vascular mediators generated by mast cells may be secondary causes. [26]

We enrolled 17 patients with pityriasis alba. All patients with pityriasis alba had fairly ill-demarcated white areas covered with fine scales, hair inside the patch was of normal color, and none of these patches had a sharp margin from surrounding skin.

According to our findings, Al-Refu (2019)[27] found that the hypopigmented macules of pityriasis alba are generally poorly defined white areas with fine scales that are dispersed throughout the macules, and the hair inside the patches is of normal color (100%). A clear border cannot distinguish the hypopigmented area from the surrounding skin. Additionally, erythematous alterations were present in 30% of instances.[27] Additionally, a prior study by Ankad and Koti (2020)[28] describes white, unstructured patches with hazy borders. At the lesion's center, there are little scales visible. Scales are white, evenly distributed, and do not protrude in the cleavage lines of the skin. [28]

Twelve vitiligo patients were included in the current investigation. White glow is the most noticeable dermoscopic feature (91.7%), followed by interfollicular pigmentation (41.7%), white hair within the lesion (33.3%), and pigmented edge (33.3%).

Al-Refu (2019), in line with the current study, diffuse white glow was observed in 78% of cases, perilesional hyperpigmentation was present in 30% of cases, perifollicular hyperpigmentation was present in 75% of cases, interfollicular pigmentation was observed in 40% of cases, white villus and terminal hair were observed in 70% of cases, and the pigmentary network within the lesions was present in 23% of cases. Lesional and perilesional telangiectasia were also present in 8% of cases. [27]

A previous study by Kumar et al. (2018)[29] reported that perifollicular changes constituted the most common dermoscopic feature, with the presence of perifollicular pigmentation in 38 cases (63.3%) and perifollicular depigmentation in 22 cases (36.7%). [29] Meng et al. (2009) [30] studied 176 patients with various types of depigmentation, of whom 97 had vitiligo. They observed residual perifollicular pigmentation in 57 (91.9%) of 62 patients with progressing vitiligo and 22 (62.9%) of 35 with stable vitiligo. [30] Thatte and Khopkar's (2014) [31] study revealed that only 6.7% and 3.3% of patients showed perifollicular and marginal pigmentation, respectively. [31] Gandhi et al. (2017) [32] stated that 46.25% patients had perifollicular pigmentation, 20% showed marginal pigmentation16.25% showed both patterns [32].

Six TVC patients were included in the study; five (83.3%) had the hypopigmented type and one (16.7%) had the hyperpigmented type. Scales and hypopigmented lesions were found in 5 (83.3%) patients; all had reasonably well-defined edges.

According to Mathur et al. (2019)[33], non-uniform pigmentation was the most prevalent dermoscopic observation, with a prevalence of 92.68% in hypopigmented lesions and 100% in hyperpigmented lesions. Scaling, another dermoscopic TVC hallmark, was visible in 86.58% of hypo- and 92.86% of hyperpigmented lesions. Hypopigmented TVC had the highest rate of patchy scaling (57.93%), whereas hyperpigmented TVC had the highest rate of scaling in the furrows (50%). [33] According to Kaur et al. (2019) [34], the pigmentary network was consistently altered (100%) and, in the majority of instances, was found to be folliculo-centric (66.67%) and linked with scaling (83.33%). The unique contrast halo ring detected in 20

patients (66.67%) around the primary lesion, which has never been reported before, was another frequent yet intriguing dermoscopic feature in their investigation.[34]

Conclusion

Dermoscopy is a method that expands clinicians' diagnostic accuracy. It is a valuable tool for helping dermatologists diagnose pigmentary skin lesions in routine clinical practice. Pigmentary skin lesions showed specific dermoscopic criteria that may aid the clinical diagnosis.

Limitations

Our study has the following drawbacks: first, a limited sample size revealed that our findings and those of other studies differed significantly. Besides, the fact that we exclusively included patients from the Upper Egypt region highlights the importance of geographic background in the clinical presentation of pigmentary skin disorders.

Recommendations

Additional research, including long-term, randomized controlled trials from many ethnic groups.

References:

1. Costin GE, Hearing VJ. Human skin pigmentation: melanocytes modulate skin color in response to stress. FASEB J. 2007;21(4):976-94.
2. Plensdorf S, Martinez J. Common pigmentation disorders. Am Fam Physician. 2009;79(2):109-16.
3. Brenner M, Berking C. Principles of skin pigmentation: biochemistry and regulation of melanogenesis. Hautarzt. 2010;61(7):554-60. German.
4. Aurangabadkar SJ. Optimizing Q-switched lasers for melasma and acquired dermal melanoses. Indian J Dermatol Venereol Leprol. 2019;85(1):10-7.
5. Pathania YS, Apalla Z, Salerni G, Patil A, Grabbe S, Goldust M. Non-invasive diagnostic techniques in pigmentary skin disorders and skin cancer. J Cosmet Dermatol. 2022;21(2):444-50.
6. Sonthalia S, Kaliyadan F. Dermoscopy overview and extradiagnostic applications. StatPearls. Treasure Island (FL): StatPearls Publishing; 2020.
7. Argenziano G, Ferrara G, Francione S, Di Nola K, Martino A, Zalaudek I. Dermoscopy - the ultimate tool for melanoma diagnosis. Semin Cutan Med Surg. 2009;28(3):142-8.
8. Campos-do-Carmo G, Ramos-e-Silva M. Dermoscopy: basic concepts. Int J Dermatol. 2008;47(7):712-9.
9. Whiting G, Stocks N, Morgan S, Tapley A, Henderson K, Holliday E, et al. General practice registrars' use of dermoscopy: prevalence, associations and influence on diagnosis and confidence. Aust J Gen Pract. 2019;48(8):547-53.
10. Braun RP, Rabinovitz HS, Oliviero M, Kopf AW, Saurat JH. Dermoscopy of pigmented skin lesions. J Am Acad Dermatol. 2005;52(1):109-21.
11. Lallas A, Apalla Z, Chaidemenos G. New trends in dermoscopy to minimize the risk of missing melanoma. J Skin Cancer. 2012;2012:820424.
12. Kaliyadan F. The scope of the dermoscope. Indian Dermatol Online J. 2016;7(5):359-63.
13. Stanganelli I, Argenziano G, Sera F, Blum A, Ozdemir F, Karaarslan I, et al. Dermoscopy of scalp tumours: a multi-center study conducted by the International Dermoscopy Society. J Eur Acad Dermatol Venereol. 2012;26(8):953-63.
14. Errichetti E, Stinco G. The practical usefulness of dermoscopy in general dermatology. G Ital Dermatol Venereol. 2015;150(5):533-46.
15. Erfan G, Demircioglu D, Erdemoglu Y, Ozturk D, Sezer E, Sahin S. Demographic, clinical and dermoscopic features of melanocytic nevi on the scalp. Australas J Dermatol. 2021;62(3):354-9.
16. Savas ES, Falay GT, Turgut EV, Dogan BT. Dermoscopic characteristics of acral

melanocytic nevi in children and adolescents. Pediatr Dermatol. 2020;37(4):597-603.
17. Braun RP, Rabinovitz HS, Krischer J, Kreusch J, Oliviero M, Naldi L, et al. Dermoscopy of pigmented seborrheic keratosis: a morphological study. Arch Dermatol. 2002;138(12):1556-60.
18. Alapatt GF, Sukumar D, Bhat MR. A clinicopathological and dermoscopic correlation of seborrheic keratosis. Indian J Dermatol. 2016;61(6):622-9.
19. Clarke P. Benign pigmented skin lesions. Aust J Gen Pract. 2019;48(6):364-6.
20. Lu QS, Chen X, Wang S, Xu SS, Wu T, Jiang G. Dermoscopy combined with Wood lamp, a diagnostic alternative for five pigmented lesions on the face: an observational study. Chin Med J (Engl). 2020;133(22):2771-2.
21. Manjunath K, Kiran C, Sonakshi S, Ashwini N, Agrawal R. Comparative study of Wood's lamp and dermoscopic features of melasma. J Evid Based Med Healthc. 2015;2(60):9012-5.
22. Nanjundaswamy B, Joseph J, Raghavendra K. A clinico dermoscopic study of melasma in a tertiary care center. Pigment Int. 2017;4(2):98-103.
23. Gil I, Segura S, Martínez-Escala E, Lloreta J, Puig S, Vélez M, et al. Dermoscopic and reflectance confocal microscopic features of exogenous ochronosis. Arch Dermatol. 2010;146(9):1021-5.
24. Yalamanchili R, Shastry V, Betkerur J. Clinico-epidemiological study and quality of life assessment in melasma. Indian J Dermatol. 2015;60(5):519-26.
25. Abdel-hay R, Mohammed FN, Sayed KS, Abd El Fattah NA, Ibrahim S. Dermoscopy as a useful tool for evaluating melasma and assessing the response to 1064-nm Q-switched Nd: YAG laser. Dermatol Ther. 2020;33(4):e13649.
26. Kim EH, Kim YC, Lee ES, Kang HY. The vascular characteristics of melasma. J Dermatol Sci. 2007;46(2):111-6.
27. Al-Refu K. Dermoscopy is a new diagnostic tool in diagnosis of common hypopigmented macular disease: a descriptive study. Dermatol Rep. 2019;11(2):7996.
28. Ankad B, Koti V. Dermoscopic approach to hypopigmentary or depigmentary lesions in skin of color. Clin Dermatol Rev. 2020;4(2):79-83.
29. Kumar JA, Sonthalia S, Lallas A, Chaudhary R. Dermoscopy in vitiligo: diagnosis and beyond. Int J Dermatol. 2018;57(1):50-4.
30. Meng R, Zhao G, Cai R, Meng X, Jiang Z. Application of polarized light dermoscopy in the early diagnosis of vitiligo and its differential diagnosis from other depigmented diseases. Chin J Dermatol. 2009;42(12):810-3.
31. Thatte SS, Khopkar US. The utility of dermoscopy in the diagnosis of evolving lesions of vitiligo. Indian J Dermatol Venereol Leprol. 2014;80(6):505-8.
32. Gandhi S, Shamanur M, Shashikiran A, Kusagur M, Bhaskar V. A study of clinico-epidemiological and dermoscopic patterns of vitiligo in pediatric age group. Indian J Paediatr Dermatol. 2017;18(4):292-7.
33. Mathur M, Acharya P, Karki A, Kc N, Shah J. Dermoscopic pattern of pityriasis versicolor. Clin Cosmet Investig Dermatol. 2019;12:303-7.
34. Kaur I, Jakhar D, Singal A. Dermoscopy in the evaluation of pityriasis versicolor: a cross-sectional study. Indian Dermatol Online J. 2019;10(6):682-5.