DOI: 10.7860/JCDR/2025/74645.20598

Original Article

Dermatology Section

Dermoscopic Patterns of Facial Melanoses in Adult Patients: A Cross-sectional Study

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ABSTRACT

Introduction: Facial melanoses encompass a heterogeneous group of diseases characterised by altered pigmentation on the face, including melasma, lentigines, freckles, Lichen Planus Pigmentosus (LPP), actinic lichen planus, periorbital hyperpigmentation, nevus of Ota, nevus of Hori, Riehl's melanosis and Postinflammatory Hyperpigmentation (PIH). Dermoscopy is a non invasive and reliable tool for the direct visualisation of skin pigmentation and early diagnosis due to its distinctive dermoscopic patterns.

Aim: To evaluate various patterns of dermoscopy in disorders of facial melanoses.

Materials and Methods: A cross-sectional study was conducted at the Konaseema Institute of Medical Sciences and Research Foundation in Amalapuram, Andhra Pradesh, India, over a period of 20 months, involving patients attending the Dermatology, Venereology, Leprosy (DVL) Outpatient Department (OPD). The study included both sexes aged over 18 years with clinical evidence of facial pigmentation. Clinical and dermoscopic examinations were performed using a contact polarised DE-3100 dermoscope attached to a smartphone. Data were analysed using Statistical Package for the Social Sciences (SPSS) version 23.0.

Results: A total of 114 subjects with facial melanosis were included in the study, with the majority of patients in the age group of 31-40 years (42, 36.8%), followed by 41-50 years (33, 29%) and a female predominance (82, 71.93%). The pigment network was present in 87.7% of the cases and absent in 12.3%. The most common dermoscopic pattern observed was reticular observed in 46 (40.4%), followed by reticulo-globular in 23 (20.2%). The most common non melanocytic feature identified was arciform structures seen in 42 (36.8%), followed by crista cutis and sulcus cutis in 17 (14.9%). Vascular structures such as telangiectasia were seen in 36 (31.6%) patients, while arborising vessels were observed in 1 (0.9%) patient.

Conclusion: In this study, the most commonly reported condition was melasma, followed by facial acanthosis. Different pigmentary conditions exhibit specific pigment patterns, networks and special features on dermoscopy, which aid in their diagnosis. This study emphasises the importance of pigmentoscopy in facial melanosis and its significant role in assessing prognosis, treatment response and follow-up.

Keywords: Dermoscopy, Lichen planus pigmentosus, Melasma, Pigment patterns

INTRODUCTION

Facial melanoses encompasses a group of diseases characterised by altered pigmentation on the face, which is a common clinical feature predominantly observed in individuals with pigmented phenotypes (Fitzpatrick skin types III-V). These conditions are a frequent reason for individuals seeking dermatological care. The quality of life for patients is significantly decreased due to cosmetic disfigurement, which profoundly affects psychosocial wellbeing [1]. This group includes a wide variety of conditions such as melasma, lentigines, freckles, LPP, actinic lichen planus, periorbital hyperpigmentation, nevus of Ota, Hori nevus, various other nevi, drug-induced hyperpigmentation, exogenous ochronosis, PIH, facial acanthosis nigricans, erythema dyschromicum perstans, Riehl's melanosis, poikiloderma of civatte and ashy dermatosis, among others [2].

The occurrence and psychological effects of these conditions vary depending on the region and skin type. Indian patients frequently suffer from pigmentary disorders, which are a common reason for many dermatology consultations. Melasma, the most common form of facial melanosis, is encountered on a daily basis. Pigmentary disorders are influenced by a multitude of factors. An important aspect of the aetiology of different melanoses is the role of external agents such as sun exposure and photodynamic chemicals [3], as well as endogenous factors related to endocrine influences [4].

Given that facial melanoses have many underlying aetiologies, accurate diagnosis is crucial for effective treatment. While lesions are primarily diagnosed clinically, some conditions have overlapping features that can complicate diagnosis [1]. Although biopsy can aid in achieving a definitive diagnosis, the histopathological features of some cases may overlap, potentially leading to pigment incontinence, cosmetic disfigurement and scarring.

Dermoscopy, a non invasive method that has proven to be a reliable tool for the direct visualisation of skin pigmentation, is increasingly being used for the diagnosis of pigmentary disorders. Facial melanoses can be diagnosed early due to their distinctive dermoscopic patterns, which also assist in identifying various causes [5]. Dermoscopy offers several advantages, including the ability for clinicians to examine the entire affected area, repeat the examination as the disease progresses and adjust or confirm the diagnosis. As a result, dermoscopy is a trustworthy and useful tool for prognosis, diagnosis and monitoring treatment efficacy [6].

Most of the available literature [3] originates from urban areas and there is a lack of studies on facial melanoses in rural settings, where many individuals are dependent on farming or manual labour and have limited awareness regarding photoprotection. Therefore, this current study was conducted to bridge this gap and highlight the importance of dermoscopy in the diagnosis of facial melanosis, which can, in turn, reduce the need for more invasive investigations such as histopathological examinations. The aim of this study was to evaluate various dermoscopic findings in disorders of facial melanoses.

MATERIALS AND METHODS

A hospital-based cross-sectional study was conducted at the Konaseema Institute of Medical Sciences and Research Foundation in Amalapuram, rural South India, over a period of 20 months, from November 2022 to June 2024. The protocol for this study was approved by the Institutional Ethical Committee (IEC) under letter number IEC/CD/2022, with serial number 77/19.10.2022. Informed consent was obtained from every participant and participant confidentiality was maintained.

Inclusion criteria: Patients of both sexes, aged over 18 years, with clinical evidence of facial pigmentation attending the DVL OPD were included in the study.

Exclusion criteria: Patients who had undergone invasive or non invasive procedures on the lesion within the past six weeks and those who were not willing to provide consent were excluded from the study.

Sample size: A total of 114 patients were included in the study. The sample size was calculated using the formula:

$$N = \frac{z^2 \mathrm{x}\, \hat{P}(1-\hat{p})}{\varepsilon^2}$$

Where, N is study population;

Z is Z score (z for 95% confidence level is 1.96);

ε is margin of error (5%);

$\hat{P}$ is population proportion. (About 5% of patients attending the outpatient department have facial melanosis);

N=73.

Methodology: A clinical and dermatological examination was conducted after taking a detailed history and a clinical diagnosis was established. The mean and standard deviation of age and types of facial melanoses were calculated using descriptive statistics. The areas of pigmentation were examined using a contact polarised DE-3100 Dermoscope attached to a smartphone. Dermoscopic findings regarding colour and pattern in the affected areas were noted and dermoscopic and clinical features were correlated.

STATISTICAL ANALYSIS

Patients' data were collected using a predesigned proforma and analysed using SPSS 23.0. Microsoft Word and MS Excel were used to generate graphs, tables and other visual representations.

RESULTS

In the present study, involving 114 participants, 82 patients (71.93%) were female and 32 (28.07%) were male, resulting in a gender ratio of 2.57:1. The mean age was observed to be 41.08±11.99 years. The demographic details are included in [Table/Fig-1]. Most of the patients had Fitzpatrick skin Type-III (51 patients, 44.7%), followed by Type-IV (44 patients, 38.6%) and Type-V (19 patients, 16.7).

Age (years)	Male	Female	Total
<30	10	10	20 (17.5%)
31-40	8	34	42 (36.8%)
41-50	3	30	33 (29%)
51-60	6	4	10 (8.8%)
>60	5	4	9 (7.9%)
Total	32	82	114

[Table/Fig-1]: Demographics.

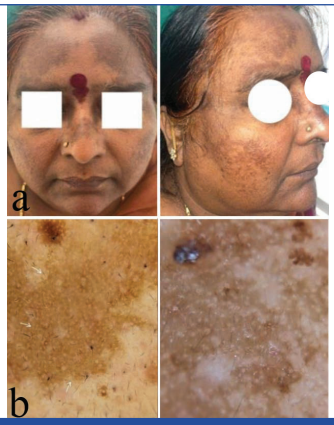
The duration of symptoms for more than one year was observed in 71 patients (46 females and 25 males) (62.2%), followed by 19 patients (16 females and 3 males) (16.67%) with symptoms lasting 4-6 months, 13 patients (10 females and 3 males) (11.4%) with symptoms lasting 0-3 months and 11 patients (8 females and 3 males) (9.6%) with symptoms lasting 6-11 months, respectively.

The majority of the lesions were brown in 43 patients (37.7%), followed by black lesions in 29 patients (25.4%) [Table/Fig-2].

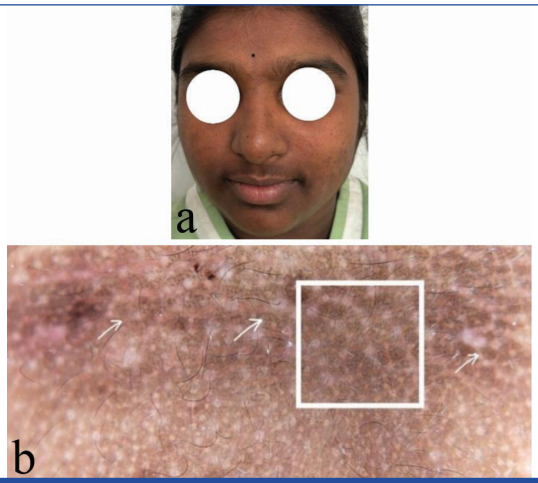
Colour	n (%)
Brown	43 (37.7)
Black	29 (25.4)
Brown black	20 (17.5)
Bluish black	8 (7.0)
Gray brown	3 (2.63)
Reddish brown	4 (3.5)
Slate gray	6 (5.3)
Tan brown	1 (0.9)

[Table/Fig-2]: Colour of the lesions.

The most commonly reported condition was melasma (46 patients, 40.4%) [Table/Fig-3a,b], followed by facial acanthosis (15 patients, 13.2%) [Table/Fig-4a,b,5a,b], LPP (10 patients, 8.8%) [Table/Fig-6a,b], maturational hyperpigmentation, freckles and periorbital melanosis (each 6 patients, 5.3%) [Table/Fig-7a,b]. Riehl's melanosis and Pigmentary Demarcation Lines (PDL) were each observed in five patients (4.4%), Seborrheic Melanosis (SM) in four patients (3.5%), PIH (due to trauma) and peribuccal pigmentation of Brocq (each 3 patients, 2.6%). Nevus of Ota was observed in two patients (1.8%) [Table/Fig-8a,b] and Hori nevus [Table/Fig-9a,b], nevus spilus and clofazimine-induced hyperpigmentation were each seen in one patient (0.9%). The clinical diagnoses and the dermoscopic patterns found have been summarised in [Table/Fig-10].

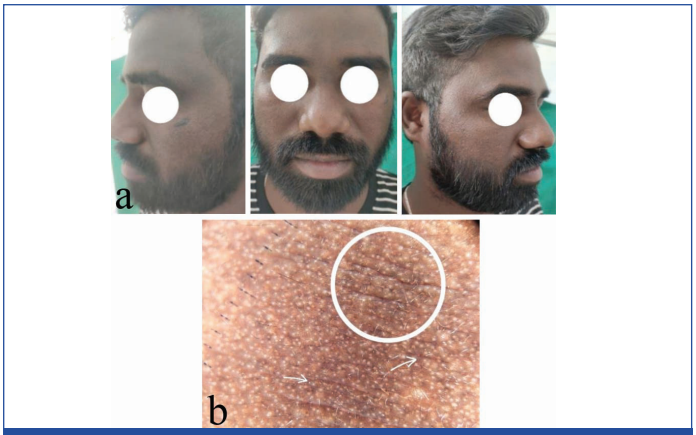


[Table/Fig-3]: a) Clinical picture of melasma; b) Dermoscopic image with 10x magnification showing accentuated pigment network with dark brown colour reticular patten with perifollicular sparing.



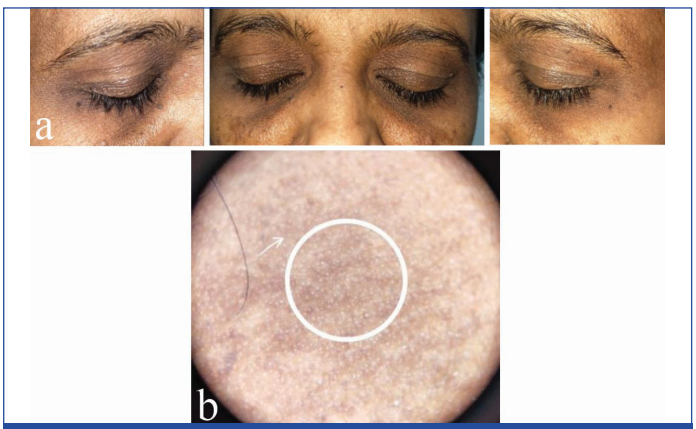
[Table/Fig-4]: a) Clinical picture of perioral acanthosis nigricans; b) Dermoscopic image with 10x magnification showing scattered brown black dots and globules with reticulo-globular pattern.

In this study, the most common site of involvement for facial melanosis was noted to be the malar area, affecting 30 patients (26.3%), followed by the periorbital area in 25 patients (21.9%)

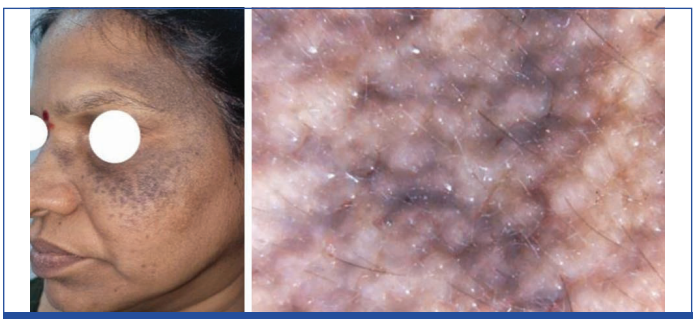


[Table/Fig-5]: a) Clinical picture of facial acanthosis nigricans; b) Dermoscopic image with 10x magnification showing accentuated pigment network in reticulo-globular pattern, linear crista cutis and sulcus cutis.

[Table/Fig-6]: a) Clinical picture of female showing LPP all over the face; b) Dermoscopic image with 10x magnification showing blue grey pigmentation in reticular pattern in peri acro syringeal deposition.

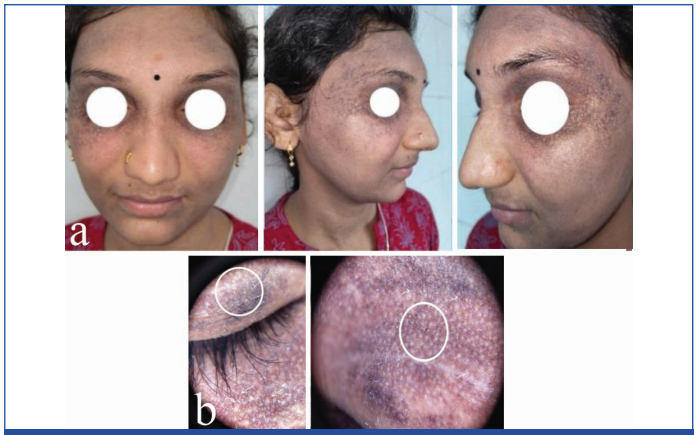


[Table/Fig-7]: a) Clinical picture showing periorbital melanosis; b) Dermoscopic image with 10x magnification showing brown blotches and globules in reticular pattern.



[Table/Fig-8]: a) Clinical image of nevus of ota on left-side of face; b Dermoscopic image with 10x magnification showing blue grey colour pigment in curvilinear pattern.

[Table/Fig-11]. Among the total melasma patients, 23 (50%) had malar distribution, followed by 17 patients (37%) with centrofacial distribution and 6 patients (13.0%) with mandibular distribution. Additionally, among the 114 patients, 91 (79.8%) with melanotic



[Table/Fig-9]: a) Clinical picture of Hori nevus; b) Dermoscopic image with 10x magnification showing blue grey colour in speckled pattern.

Diagnosis (number of patients)	Dermoscopy pattern (%)
Clofazimine-induced hyperpigmentation (1)	Honey comb like and arcuate (1, 100%)
Facial acanthosis (15)	Reticulo-globular and granular (4, 26.67%) Reticulo-globular (10, 66.67%) Reticular (1, 6.67%)
Freckles (6)	Reticular (6, 100%)
Hori nevus (1)	Speckled, homogenous (1, 100%)
Lichen Planus Pigmentosus (LPP) (10)	Granular (3, 30%) Hem like (4, 40%) Reticular (3, 30%)
Maturational hyperpigmentation (6)	Reticulo-globular and granular (1, 16.67%) Pseudo-reticular (5, 83.33%)
Melasma (46)	Pseudo-reticular (11, 23.9%) Reticular (25, 54.3%) Reticulo-globular- (10, 21.7%)
Nevus of ota (2)	Curvilinear- (2, 100%)
Nevus spilus (1)	Reticular (1, 100%)
Periorbital melanosis (6)	Reticular, hem like and cobble stone (3, 50%) Reticular, hem like (2, 33.33%) Speckled (1, 16.67%)
Pigmentary Demarcation Lines (PDL) (5)	Granular-(4, 80%), pseudo-reticular-(1, 20%)
Postinflammatory hyperpigmentation (trauma) (3)	Homogenous (2, 66.67%) Reticular (1, 33.33%)
Riehl's melanosis (5)	Granular (2, 40%) Pseudo-reticular (2,40%) Reticular (1, 20%)
Seborrheic Melanosis (SM) (4)	Pseudo network (2, 50%) Arborising vessels (1, 25%) Telangiectasia (1, 25%)
Peribuccal pigmentation of Brocq (3) *	Reticular (3, 100%) Hem like (2, 66.7%)

[Table/Fig-10]: Diagnosis and dermoscopic patterns.
*Reticular pattern was seen in three out of three patients, Hem like pattern was seen in two out of the same three patients

Clinical distribution of facial melanoses	n (%)
Forehead	23 (20.7)
Malar	30 (26.3)
Centrofacial	21 (18.4)
Mandibular	6 (5.3)
All overface	11 (9.6)
Cheeks	14 (12.3)
Around both eyes	25 (22)
Alar crease, angles of mouth	4 (3.5)
Perioral	17 (15)
Temples	8 (7)

[Table/Fig-11]: Clinical distribution of facial melanoses.
multiple areas involved in some patients

lesions had a smooth surface, 17 patients (14.9%) had a rough surface and the remaining six patients (5.3%) had a granular surface

when observed under the dermoscope. Furthermore, among the 114 patients, 106 (93%) had symmetrical distribution of lesions on the face, while 8 (7.0%) had asymmetrical distribution.

Dermoscopic examination: The most common pigment pattern observed was reticular, seen in 46 patients (40.6%) [Table/Fig-3b], followed by reticulo-globular in 23 patients (20.2%) [Table/Fig-4b,5b] and pseudo-reticular and granular patterns in 19 patients each (16.7%). Hem-like patterns were observed in 12 patients (10.5%), homogeneous patterns in three patients (2.6%) and curvilinear patterns in two patients (1.8%). Honeycomb-like, mixed and speckled patterns were each noted in one patient (0.9%), respectively. The various patterns of dermoscopy concerning diagnosis are provided in [Table/Fig-12].

Pattern	n (%)
Reticular	46 (40.4)
Psuedo-reticular	19 (16.7)
Reticulo-globular	23 (20.2)
Granular	19 (16.7)
Hem like	12 (10.5)
Curvilinear	2 (1.8)
Homogenous	3 (2.6)
Honeycomb like, Arcuate	1 (0.9)
Mixed	1 (0.9)
Speckled, homogenous	1 (0.9)

[Table/Fig-12]: Patterns of dermoscopy.
There were multiple patterns in the same patient

In the current study, 100 lesions (87.7%) exhibited a pigmented network on dermoscopy, while 14 lesions (12.3%) did not show a pigment network. The most common colour of lesions under dermoscopy was brown, observed in 59 patients (51.7%), followed by brown blotches in 14 patients (12.3%) [Table/Fig-7b], blue-grey blotches in 10 patients (8.8%) [Table/Fig-6b], black in seven patients (6.1%), light brown in six patients (5.3%), brown-black in four patients (3.5%), dark brown in four patients (3.5%), grey-brown in three patients (2.6%), brown-red in three patients (2.6%), blue-grey in three patients (2.6%) and coppery-red in one patient (0.87%), respectively.

On dermoscopic examination, 37 patients exhibited vascular findings, of which 36 patients (31.6%) had telangiectasia and one patient (0.9%) had an arborising pattern of vessels. Arciform structures were the most common non melanocytic feature observed on dermoscopy of facial melanoses, found in 42 patients (36.8%), followed by crista cutis and sulcus cutis in 17 patients (14.9%) [Table/Fig-3b], dots in 13 patients (11.4%), globules in 11 patients (9.6%), linear structures in one patient (0.9%) and yellow-white globules in one patient (0.9%).

DISCUSSION

In this study, facial melanosis most commonly affects the age group of 31-40 years, with a mean age of 41.08±11.99 years, which was similar to a study conducted by Devraj Y et al., where the majority of patients were in the age group of 20-40 years, with a mean age of 34.60±10.11 years [1]. A study conducted on the clinico-dermatoscopic aspects of facial melanosis by Patel DR et al., found that the majority of patients were in the age group of 19 to 40 years (55%), with a mean age of presentation of 27.40 years [5].

The female-to-male ratio was found to be 2.57:1, with females (82 patients, 71.9%) outnumbering males (32, 28.1%), which was similar to the study conducted by Amatya B where female patients were 146 (71.6%) and males were 58 (28.4%), resulting in a female-to-male ratio of 2.5:1 [3]. This discrepancy is probably due to the underlying hormonal changes in females compared to males, as well as increased awareness among female patients. Thoyyib M et al., observed that females constituted 688 (67.2%) and males 336 (32.8%) of their study population [7]. According to this study, the female-to-male ratio was 2.04:1.

The duration of symptoms for more than one year was observed in 71 patients (46 females and 25 males). Melasma was reported to be the most common condition, affecting 46 patients (40.4%). On dermoscopy, a reticular pigment network with light brown to dark brown colour was observed, along with pseudo-reticular and reticulo-globular patterns associated with perifollicular. The most common dermoscopic pattern in the present study was reticular, whereas in a study conducted by Patel DR et al., Nanjundaswamy BL et al., and Kaur S et al., the reticulo-globular type was the most common pattern [5,8,9].

The second most common condition was facial acanthosis nigricans (15 patients, 13.2%). The reticulo-globular pattern, linear crista cutis, sulcus cutis and accentuated pigment network were observed in all patients (100%). Sulcus cutis and crista cutis are characteristic patterns of dermoscopy for acanthosis nigricans. The granular pattern was observed in only four patients, accounting for 26.6%. Studies conducted by Devaraj Y et al., Patel DR et al., and Solanki V et al., reported similar findings [1,5,10].

The LPP, characterised by slate grey pigmentation all over the face, was found to be the third most common type of facial melanosis. Of these patients, 40% exhibited a hem-like pattern, 30% had a granular pattern and 30% displayed a reticular pattern on dermoscopy. A pigment network was also present. Hassan I et al., reported the prevalence of LPP to be 4.8% [11], while Devaraj Y et al., reported 3% and Patel DR et al., reported 3.33% in their respective studies [1,5]. Sharma VK et al., reported dots with/without globules (86%) distributed in a hem like pattern to be most common feature on dermoscopy [12].

Ephelides, or freckles, were observed in 5.2% of patients. They exhibited an accentuated pigment network and a reticular pattern in 100% of cases. Moth-eaten borders, sharply demarcated dark brown dots and globules were seen in some patients. Similar findings were reported by Devraj Y et al., (9%), Amartya B, and Patel DR et al., (2%), who noted dark brown dots in 93.8% and a brown reticular pattern with moth-eaten borders in 100 [1,3,5].

Six patients in the study population had periorbital melanosis (5.3%). Clinically, the lesions appeared brown-black in colour. On dermoscopy, brown blotches were observed in 100% of the cases. Among the pigment patterns, reticular and hem-like patterns of pigmentation were the most common findings, noted in 83.3% of patients, followed by a speckled pattern in 16.7%. A cobblestone pattern was seen in 50% of the cases. In a study conducted by Devraj Y et al., brown-coloured globules, blotches and a reticular pattern were found [1]. Patel DR et al., identified reticulo-globular and speckled patterns in their study [5]. Mahesh AR et al., reported that 85% of their study population showed a dermoscopic pigmentary pattern, either alone or in combination with vascular [13].

Riehl's melanosis was observed in five patients (4.4%), similar to the 2% reported by Devraj Y et al., 3% by Patel DR et al., and 6% by Hassan I et al., in their respective studies [1,5,11]. Clinically, the lesions of Riehl's melanosis varied in colour, including brown-black (1), grey-brown (3) and brown (1). On dermoscopy, grey-brown to brown-black dots and globules were seen in 100% of cases, with granular and pseudo-reticular patterns observed in 40% each and a reticular pattern in 1%. Patel DR et al., reported a reticular pigment network in 40% and black-brown globules in 60 [5].

Four cases of SM were found in the current study, accounting for 3.5% of the total. Clinically, the lesions appeared black (25%) to brown-black (75%). On dermoscopy, a brown-black pseudo-network pattern was seen in 50%, arborising vessels in 25% and telangiectasia in 25%, along with follicular plugging and yellow-white scales in 75%. A study by Devraj Y et al., found SM in 1.8% of total cases, with follicular plugging and yellow-white scales accompanied by a brown reticular pattern [1].

The PDL were reported in five patients (4.4%). They appeared black in colour on the cheeks. Dermoscopic findings included brown blotches (100%) and globules (20%). The patterns observed were granular (80%) and pseudoreticular (20%). Devaraj Y et al., found PDLs in 0.6% of total subjects [1].

Peri-buccal pigmentation of Brocq was seen in three patients (2.6%). These lesions appeared brown-red in colour and exhibited dermoscopic features such as a brown reticular pattern (100%), hem-like patterns (66.7%), follicular keratinisation (100%) and vascular features like telangiectasia (100%). Amartya B, reported 2% of cases with dark brown reticular (100%) and hem-like (50%) patterns in their study [3].

The PIH secondary to trauma cases accounted for 2.6% (3). It appeared dark brown in colour and the dermoscopic findings included brown blotches (100%), dots (33.3%) and patterns such as homogeneous (66.7%) and reticular (33.3%), with a moth-eaten border (100%). The study by Devaraj Y et al., found similar findings, noting a peripheral dark brown colour with central hypopigmentation, along with patterns like homogeneous and reticular and special features such as a moth-eaten border [1]. PIH was noted in 10% of cases in a study conducted by Patel DR et al., [5], 16% of cases in Hassan I et al., [11] and 4% in Amartya B, [3]. Patel DR et al., found a reticulo-globular pattern in 78% and dark brown globules in 28% [5]. Amartya B, noted dark brown dots, as well as dark brown homogeneous or reticular patterns [3].

Nevus of Ota [Table/Fig-6a] was found in 1.8% (2) of the study population. It appeared brown to blue-black in colour, with dermoscopic features such as a blue-grey curvilinear pattern (100%) [Table/Fig-6b], similar to the study conducted by Amartya B, where 1% of total patients had nevus of Ota and similar dermoscopic findings [3]. Elmas OF et al., noted structureless brown, grey irregular patches with white clods and rosettes [14].

Clofazimine-induced pigmentation was noted in one (0.9%) patient. On dermoscopy, there was a coppery-red colour with yellow-white globules, a honeycomb-like pattern and an arcuate pattern. In studies conducted by Amartya B, Patel DR et al., Behera B et al., and similar findings were observed [3,5,15].

Hori nevus was observed in 1 (0.9%) patient. On dermoscopy, blue-grey speckled and homogeneous patterns were noted. Amartya B, reported 2% of cases that had bluish-brown blotches with a speckled pattern on dermoscopy [3].

In the present study, 1 (0.9%) patient had nevus spilus. On dermoscopy, it exhibited a tan-brown reticular pattern with sparing of follicles. Amartya B, reported 0.5% of cases with similar findings [3].

Limitation(s)

Since, it was a single-centre observational study, its findings cannot be generalised. Larger studies are required to formulate criteria for the diagnosis of facial melanosis based on dermoscopic patterns.

CONCLUSION(S)

Facial melanosis is a major concern, both cosmetically and psychologically, for most of the Indian population. The most common facial melanosis identified in this study was melasma, followed by facial acanthosis nigricans. Dermoscopy is a non invasive diagnostic tool that aids in reaching a diagnosis at an early stage. It facilitates the initiation of early treatment, as it is a simple outpatient-based investigation that provides better outcomes for patients. The characteristic patterns observed in dermoscopy, such as the reticular pigment pattern with perifollicular sparing in melasma and the sulcus cutis and crista cutis in acanthosis nigricans, can help in arriving at the diagnosis quickly and without any scarring. This study emphasises the need for pigmentoscopy in facial melanosis and its significant role in assessing prognosis, treatment response and follow-up.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Sep 10, 2024
- Manual Googling: Dec 24, 2024
- iThenticate Software: Jan 18, 2025 (7%)

ETYMOLOGY: Author Origin

EMENDATIONS: 9

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Sep 08, 2024**
Date of Peer Review: **Oct 03, 2024**
Date of Acceptance: **Jan 20, 2025**
Date of Publishing: **Feb 01, 2025**