Section: Dermatology

Original Research Article

A CLINICO-EPIDEMIOLOGICAL STUDY ON FACIAL MELANOSIS IN PATIENTS PRESENTING TO DERMATOLOGY DEPARTMENT AT TERTIARY CARE CENTRE IN CENTRAL INDIA

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ABSTRACT

Background: Facial melanosis is a common dermatological disorder with significant aesthetic and psychosocial impact. It encompasses conditions such as melasma and post-inflammatory hyperpigmentation, often influenced by ultraviolet exposure, hormonal changes, and cosmetic use. Despite its high prevalence, limited clinico-epidemiological data are available from India. The aim and objective is to determine the prevalence, clinical patterns, and types of facial melanosis among patients attending a tertiary care dermatology department, and to assess demographic, clinical, and epidemiological risk factors. **Materials and Methods:** A descriptive cross-sectional study was conducted in the Department of Dermatology, LN Medical College and JK Hospital, Bhopal, from September 2022 to March 2024. A total of 250 adults aged 18–60 years with newly diagnosed facial melanosis were enrolled using convenience sampling. Data collection included clinical examination, Wood's lamp assessment, structured questionnaires, and standardized photography. Statistical analysis was performed using Stata v17.0. **Result:** The prevalence of facial melanosis among new dermatology patients was 8.8%. The mean age was 34.4 ± 12.3 years, with most patients between 21–30 years (34.8%). Females accounted for 69.6% of cases. The most common pattern was centrofacial (36%), followed by malar (23.6%). Melasma (40.8%) and post-inflammatory hyperpigmentation (27.6%) were the predominant diagnoses. Sunlight exposure (26.4%) was the leading risk factor, while cosmetic use, pregnancy, and oral contraceptives were also important contributors. **Conclusion:** Facial melanosis is prevalent in central India, affecting predominantly younger women. Melasma and post-inflammatory hyperpigmentation were the most frequent forms, strongly associated with ultraviolet exposure, hormonal factors, and cosmetic use. Preventive strategies focusing on photoprotection, safe cosmetic practices, and early patient education are essential for reducing disease burden and improving quality of life.

INTRODUCTION

Human interactions are strongly influenced by facial appearance and skin tone, and dermatological conditions that alter pigmentation often affect self-esteem and social confidence. Disorders such as melasma, freckles, and post-inflammatory hyperpigmentation arise from excess melanin production and are driven by multiple factors, including genetic predisposition, hormonal imbalance, chronic sun exposure, and inflammation.[1]

In India, the high ultraviolet (UV) exposure associated with tropical climate further amplifies the burden of pigmentation disorders. Cultural perceptions that equate lighter skin with beauty and success add psychosocial implications, making facial melanosis a common cause of cosmetic concern.[2]

Facial melanosis refers to darkening of the facial skin due to diverse conditions such as melasma,

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photomelanosis, and post-inflammatory hyperpigmentation.[3] These disorders have significant social and psychological consequences, particularly in populations where appearance carries strong cultural value.[3]

Although pigmentation disorders are widespread, comprehensive epidemiological data remain limited.[4–6] Existing studies are often small or lack detailed clinicodemographic analysis, leaving gaps in understanding of risk factors and regional patterns.[7,8] A systematic clinico-epidemiological evaluation can help identify prevalence, clinical patterns, and associated risk factors, thereby enabling better preventive strategies and tailored treatment.[9,10]

Given these considerations, the present study was conducted to evaluate the prevalence, clinical characteristics, and etiological factors of facial melanosis in patients presenting to a tertiary care dermatology centre in central India.

MATERIALS AND METHODS

Study Design and Setting: This descriptive, cross-sectional epidemiological study was conducted in the Department of Dermatology, LN Medical College and JK Hospital, Bhopal. The hospital caters to patients from both urban and semi-urban areas, offering a diverse representation of the population. The dermatology department is staffed with qualified dermatologists and equipped with comprehensive diagnostic facilities.

Ethical Considerations: Approval was obtained from the Institutional Ethical Committee of LN Medical College and JK Hospital, Bhopal. Written informed consent was secured from all participants prior to inclusion, in accordance with ethical guidelines. Consent forms were provided in both Hindi and English for participant clarity.

Study Duration: The study was conducted over a period of 18 months, from September 2022 to March 2024, and was divided into three distinct phases. The initial three months were dedicated to planning, which involved protocol development, training of the research team, and obtaining ethical approvals. This was followed by a 12-month period of participant recruitment and data collection, during which eligible patients were enrolled and comprehensive clinical assessments were carried out. The final three months were allocated to data analysis and report writing, which included statistical evaluation, interpretation of findings, and preparation of the manuscript.

Study Participants: The study population comprised patients presenting with facial melanosis to the dermatology department. Participants were included if they were adults aged between 18 and 60 years and provided written informed consent. Patients were excluded if they had received treatment for facial melanosis within the previous six months, had other active dermatological conditions involving the face, were immunocompromised, or were unwilling or unable to complete the study requirements.

Sample Size: A total of 250 participants were enrolled using non-probability convenience sampling. Eligible patients attending the dermatology outpatient clinic were invited to participate during the study period.

Recruitment and Consent Process: Participants were screened by dermatologists for facial pigmentation. Eligible individuals were briefed on study objectives, procedures, risks, and benefits. Those willing to participate signed informed consent forms in their preferred language (Hindi or English). Each participant received a unique identification code to ensure confidentiality.

Data Collection: Data were collected using a multimodal approach. Each participant underwent a standardized clinical examination by dermatologists under controlled lighting conditions, with Wood's lamp examination employed to distinguish epidermal from dermal pigmentation. In cases where diagnostic uncertainty remained, biopsy and histopathological evaluation were performed. The severity of pigmentation was quantified using validated scales, specifically the Melasma Area and Severity Index (MASI). Additionally, demographic information, family history, sun exposure, cosmetic use, and lifestyle practices were obtained through structured questionnaires and interviews. Standardized photographic documentation was performed at baseline to ensure consistent visual records. Environmental exposure data, including patterns of sunlight exposure and the use of photoprotective measures, were also systematically assessed.

Study Variables: The dependent variable was the presence of facial melanosis, including its type and severity. Independent variables included demographic factors (age, gender, and ethnicity), environmental exposure (UV radiation and sun protection), genetic predisposition (family history of similar conditions), and lifestyle factors such as cosmetic use and skincare routines

Outcome Measures: The primary outcome was the prevalence of facial melanosis, assessed by clinical examination. Secondary outcomes included classification of its type, evaluation of severity using validated scales, and identification of associated factors such as demographics, sun exposure, skincare practices, and family history

Data Quality Assurance: All data were collected using pre-tested, pilot-validated forms. Data entry was double-checked to ensure accuracy. Supervisors conducted spot checks, and regular monitoring reports were submitted to the ethics committee.

Statistical Analysis: Data were first entered into Microsoft Excel and then analyzed using Stata version 17.0. Descriptive statistics were used to summarize baseline characteristics. Associations between variables were assessed using chi-square tests for categorical data. Logistic regression was applied to identify predictors of facial melanosis.

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Results were supported with graphical presentations including histograms, box plots, and scatter plots.

RESULTS

Prevalence of Facial Melanosis: During the recruitment period, 14,500 patients attended the Dermatology OPD. Among them, 10,590 were aged between 18 and 60 years. Of the 2,850 newly registered patients, 250 were newly diagnosed with facial melanosis, yielding a prevalence of 8.8%.

Table 1: Age Distribution of Participants (n = 250)

Age Group (years)	n	%
18–20	29	11.6
21–30	87	34.8
31–40	67	26.8
41–50	47	18.8
51–60	20	8.0
Total	250	100.0

Mean age: 34.4 ± 12.3 years (range 18–60 years).

Table 2: Gender Distribution of Participants (n = 250)

Gender	n	%
Female	174	69.6
Male	76	30.4
Total	250	100.0

A majority of participants were female (69.6%), indicating a higher prevalence of facial melanosis among women.

Table 3: Clinical Patterns of Facial Melanosis (n = 250)

Pattern	n	%
Centrofacial	90	36.0
Malar	59	23.6
Butterfly	36	14.4
Mandibular	33	13.2
Diffuse	15	6.0
Temple	9	3.6
Reticular	8	3.2
Total	250	100.0

The most common clinical pattern was centrofacial (36%), followed by malar (23.6%) and butterfly distribution (14.4%).

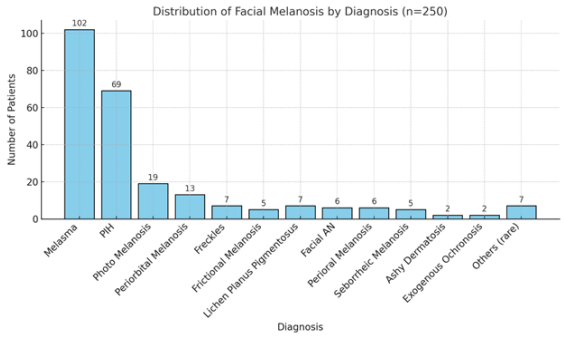

Figure 1: Distribution of Facial Melanosis by Diagnosis (n = 250)

The most frequent diagnosis was melasma (40.8%), followed by post-inflammatory hyperpigmentation (27.6%), and photomelanosis (7.6%). Less common diagnoses included periorbital melanosis (5.2%), freckles (2.8%), lichen planus pigmentosus (2.8%), frictional melanosis (2%), and facial acanthosis nigricans (2.4%). Rare diagnoses such as ashy dermatosis, exogenous ochronosis, pigmentary demarcation lines, and other conditions accounted for <3% of cases each.

DISCUSSION

This descriptive cross-sectional study demonstrated that facial melanosis is a prevalent dermatological condition, affecting 8.8% of newly registered patients in the dermatology outpatient department. The disorder was most common in younger adults, particularly those aged 21–30 years, followed by the 31–40 year age group. These findings are consistent with Solanki et al,[11] who reported that 53% of their study population was within 21–40 years, and Amatya et al,[12] who also noted a higher prevalence in younger individuals due to greater sun exposure and hormonal influences. In contrast, Bostan et al,[15] reported melasma to be more common in middle-aged adults, suggesting that geographical and lifestyle differences may account for such variation. Shah et al,[13] and Zhu Y et al,[14] similarly emphasized that pigmentation disorders often manifest early in adulthood, with significant psychosocial implications.

A marked female predominance was observed in our study, with 69.6% of cases occurring in women. This aligns with the findings of Solanki et al,[11] Bostan et al,[15] and Ramakrishnan et al,[16] all of whom

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reported higher prevalence of facial pigmentation disorders among females. The influence of hormonal factors such as pregnancy and oral contraceptive use, along with cosmetic use, likely explains this disparity. Zhu Y et al,[14] further highlighted the disproportionate psychosocial impact on women, underscoring the importance of gender-sensitive counseling and management.

Melasma was the most frequent diagnosis, affecting 40.8% of participants, followed by post-inflammatory hyperpigmentation (27.6%). Similar results were described by Solanki et al,[11] and Bostan et al,[15] who identified melasma as the leading cause of facial melanosis, closely associated with UV radiation and hormonal factors. Amatya et al,[12] demonstrated the diagnostic advantage of combining dermoscopy with Wood's lamp for melasma, while De Abreu et al,[17] confirmed histopathological differences among subtypes, supporting individualized therapeutic approaches. Post-inflammatory hyperpigmentation was mainly associated with acne and trauma, corroborating Shah et al,[13] who also linked it with obesity, insulin resistance, and other inflammatory conditions. Less common conditions, including periorbital melanosis, freckles, and facial acanthosis nigricans, were also identified, reflecting the heterogeneous nature of facial pigmentation disorders described previously.[12–14,16]

Sunlight exposure was identified as the most common etiological factor, present in 26.4% of participants. This finding is consistent with Bostan et al,[15] who reported UV radiation as the most significant risk factor for melasma. The role of UV-induced melanocyte activation is well established, highlighting the importance of preventive strategies such as sunscreen and protective clothing. Hormonal factors, including pregnancy and oral contraceptive use, contributed to nearly 10% of cases, paralleling the findings of Bostan et al.[15] Cosmetic use was another significant contributor, as noted by Ramakrishnan et al,[16] and Amatya et al.[12] Other associations included acne excoriée leading to post-inflammatory pigmentation, seasonal variation with winter-related melanosis,[13] and facial acanthosis nigricans linked to obesity and insulin resistance.[13] The psychosocial burden of facial melanosis is considerable. Zhu Y et al,[14] demonstrated that melasma significantly impairs quality of life, and even mild pigmentation may result in embarrassment, reduced confidence, and negative social interactions. This underlines the need for holistic management that addresses not only the dermatological but also the psychological aspects of care.

Limitations

This study has certain limitations. Being hospital-based and using convenience sampling, the findings may not be fully generalizable to the community. The cross-sectional design limited the assessment of seasonal or longitudinal changes in pigmentation. While Wood's lamp and clinical examination were routinely performed, dermoscopy and histopathology were not used in all cases, which may have led to under-classification of certain conditions. Despite these limitations, the study provides valuable regional data on prevalence, clinical patterns, and risk factors of facial melanosis, offering important insights for prevention and management.

CONCLUSION

Facial melanosis emerged as a significant dermatological concern in this study, affecting 8.8% of new patients attending the dermatology outpatient department. The condition was predominantly seen in younger adults, particularly those in the 21–30 year age group, with an average age of 34.4 years. A marked female predominance was observed, suggesting the influence of hormonal and lifestyle factors. Clinically, the lesions were most often light brown or brown-grey in colour, with the majority exhibiting a normal texture. The centrofacial and malar patterns were the most common, and the cheeks and malar regions were the areas most frequently affected.

Among the various diagnostic categories, melasma and post-inflammatory hyperpigmentation accounted for the majority of cases, highlighting their importance in clinical practice. Sunlight exposure was identified as the most significant aggravating factor, while cosmetic use, pregnancy, and oral contraceptive use also played notable roles. For melasma, ultraviolet radiation and hormonal influences were predominant triggers, whereas acne excoriée was the major contributor to post-inflammatory hyperpigmentation.

Overall, these findings underline the multifactorial nature of facial melanosis and emphasize the need for preventive strategies, including strict photoprotection, careful cosmetic use, and hormonal awareness. Early diagnosis, targeted management, and patient education are critical in reducing the burden of this condition and improving both dermatological outcomes and quality of life.

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