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## Clinical spectrum of pigmentary disorders in an Indian skin at an urban tertiary teaching hospital

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### Abstract

**Background:** Pigmentary disorders are common dermatological conditions, particularly prevalent in South Asian populations. These disorders, characterized by alterations in melanin production or distribution, pose significant clinical and cosmetic challenges. Understanding the epidemiological and clinical spectrum of pigmentary disorders is crucial for effective management and resource allocation.

**Aims:** This study aimed to establish the epidemiological and clinical spectrum of pigmentary disorders among Indian individuals attending a dermatology outpatient department at an urban tertiary teaching hospital. The primary objective was to determine the prevalence of various pigmentary disorders, while secondary objectives included evaluating the demographic distribution and clinical presentations of these disorders.

**Methods:** We conducted a cross-sectional observational study over a three-month period from June to September 2023. A total of 400 patients attending the dermatology outpatient department were included in the study. Data collection involved obtaining detailed clinical histories, performing dermatological examinations, and recording relevant demographic information. Statistical analysis was performed using SPSS version 17.0, with categorical variables presented as absolute numbers and percentages, and continuous variables as mean  $\pm$  SD.

**Results:** Our findings revealed a high prevalence of pigmentary disorders among Indian individuals, with melasma, post-inflammatory hyperpigmentation, vitiligo, and pityriasis versicolor being the most commonly encountered conditions. Demographic factors such as age, sex, occupation, sunlight exposure, and family history were found to influence the development and progression of pigmentary disorders. Clinical presentations varied widely, ranging from localized patches of hyperpigmentation or hypopigmentation to more diffuse involvement. Dermatoscopic examination proved valuable in aiding diagnosis and guiding management strategies.

**Limitations:** Several limitations of this study should be acknowledged, including its cross-sectional design, which limits causal inference, and the potential for selection bias inherent in a hospital-based sample. Additionally, the study was conducted at a single center, which may limit the generalizability of the findings to broader populations.

**Conclusion:** This study provides valuable insights into the epidemiological and clinical spectrum of pigmentary disorders among Indian individuals. Our findings underscore the need for comprehensive approaches encompassing both clinical management and public health strategies to address the burden of pigmentary disorders effectively. Future research efforts should focus on elucidating underlying mechanisms, exploring novel therapeutic modalities, and evaluating long-term treatment outcomes.

**Keywords:** Pigmentary disorders, melasma, post-inflammatory hyperpigmentation, vitiligo, pityriasis versicolor, epidemiology, clinical spectrum, Indian population, dermatology, urban tertiary teaching hospital, demographic factors, sunlight exposure, family history, dermatoscopic examination, public health implications

### Introduction

Pigmentary disorders encompass a diverse array of dermatological conditions characterized by abnormal pigmentation of the skin, affecting millions worldwide and representing a significant burden on healthcare systems <sup>[1]</sup>. Among these disorders, those prevalent in the Indian population exhibit unique clinical presentations, epidemiological patterns, and underlying etiologies <sup>[2]</sup>. Despite their considerable impact on individuals' quality of life and psychosocial well-being, the understanding of pigmentary disorders in the Indian context remains limited, necessitating further exploration and characterization.

The Indian subcontinent hosts a heterogeneous population with varied genetic backgrounds, cultural practices, and environmental exposures, contributing to the complex interplay of factors influencing pigmentary disorders [3]. Additionally, sociocultural perceptions of skin color and beauty ideals exert profound effects on individuals' psychosocial health, amplifying the significance of pigmentary disorders in this population [4]. However, existing literature on pigmentary disorders primarily derives from studies conducted in predominantly Caucasian populations, potentially overlooking important nuances specific to individuals of Indian descent [5].

Notably, pigmentary disorders in India encompass a wide spectrum of conditions, including but not limited to melasma, post-inflammatory hyperpigmentation, vitiligo, and various forms of hypopigmentation [6]. These conditions not only pose diagnostic and therapeutic challenges but also carry implications for the long-term management and prognosis of affected individuals. Moreover, the high prevalence of certain pigmentary disorders, such as melasma, in the Indian population underscores the urgency of elucidating their epidemiology, risk factors, and treatment outcomes [7].

Despite the growing recognition of pigmentary disorders as a public health concern in India, significant gaps persist in our understanding of their clinical manifestations, natural history, and optimal management strategies [8]. Furthermore, disparities in healthcare access and utilization may exacerbate the burden of pigmentary disorders among vulnerable populations, necessitating targeted interventions and resource allocation [9].

Therefore, the present study aims to comprehensively characterize the clinical spectrum of pigmentary disorders in an Indian population, with a particular focus on patients attending an urban tertiary teaching hospital. By systematically evaluating the prevalence, clinical features, associated factors, and treatment outcomes of pigmentary disorders in this setting, we seek to address several key objectives. Firstly, we aim to provide a detailed epidemiological profile of pigmentary disorders, shedding light on their burden and distribution within the Indian population. Secondly, we aim to identify demographic, clinical, and environmental factors associated with the development and progression of pigmentary disorders, thereby informing preventive and therapeutic strategies. Lastly, we aim to contribute to the existing body of knowledge on pigmentary disorders in India, bridging critical gaps and guiding future research directions.

In summary, this study represents a crucial step towards enhancing our understanding of pigmentary disorders in the Indian context, with implications for clinical practice, public health policy, and patient advocacy. By elucidating the complex interplay of genetic, environmental, and sociocultural factors underlying these disorders, we aspire to empower healthcare providers and policymakers to deliver more effective and equitable care to individuals affected by pigmentary disorders in India.

## Materials and Methods

### Study Design

This study employed a cross-sectional, observational design to investigate the epidemiological and clinical spectrum of pigmentary disorders among Indian individuals presenting

to the dermatology outpatient department (OPD) at Hinduhridayasamrat Balasaheb Thackeray Medical College and Dr. R. N. Cooper Municipal General Hospital, Vile Parle (West), Mumbai.

### Sample Size and Study Area

A total of 400 patients attending the dermatology OPD were included in the study, which was conducted over a period of three months from June 2023 to September 2023.

### Inclusion criteria

All patients of both genders attending the dermatology OPD were eligible for inclusion in the study.

### Exclusion criteria

Patients who were unwilling to provide informed consent for participation were excluded from the study.

### Ethical considerations

Prior to commencement, institutional ethics committee approval was obtained in accordance with established guidelines. Written informed consent was obtained from all enrolled patients before their participation in the study.

### Data collection

Upon enrollment, basic demographic information including age, sex, occupation, duration of sunlight exposure, family history, use of oral contraceptive pills, and topical application of skin lightening creams was recorded for each patient. A detailed clinical history was obtained, focusing on the onset, duration, distribution, and progression of pigmentary lesions. Dermatological examinations were conducted to diagnose pigmentary disorders based on clinical and dermoscopic findings, assessing characteristics such as size, color, extent, and any associated systemic or cutaneous manifestations.

### Statistical analysis

Data analysis was performed using the SPSS program for Windows, version 17.0. Categorical variables were presented as absolute numbers and percentages, while continuous variables were presented as mean  $\pm$  standard deviation (SD). Normality of the data was assessed prior to statistical analysis. Fisher's exact test was utilized for categorical variables, and the unpaired t-test was employed for normally and non-normally distributed continuous variables, respectively.

## Results

### Demographic characteristics

A total of 400 patients attending the dermatology outpatient department of Hinduhridayasamrat Balasaheb Thackeray Medical College and Dr. R. N. Cooper Municipal General Hospital, Mumbai, were included in the study. The demographic profile of the study population is summarized in Table 1.

The mean age of the participants was 37.5 years (SD  $\pm$  9.2), with a range from 18 to 65 years. The majority of the patients were female (60%), and the remaining 40% were male. Occupation-wise distribution showed that 45% were professionals, 30% were homemakers, and 25% were students or unemployed individuals. The mean duration of sunlight exposure was 4.2 hours per day (SD  $\pm$  1.3).

**Table 1:** Summary of demographic profile of the study population

Demographic characteristic	Frequency (n = 400)	Percentage (%)
<b>Age (Years)</b>		
Mean ± SD	37.5 ± 9.2	
Range	18-65	
<b>Gender</b>		
Female	240	60
Male	160	40
<b>Occupation</b>		
Professionals	180	45
Homemakers	120	30
Students/Unemployed	100	25
Duration of Sunlight Exposure (hours/day)	4.2 ± 1.3	

**Prevalence of Pigmentary Disorders**

Among the 400 patients, various pigmentary disorders were observed, presented in table 2. The most prevalent disorders were melasma (35%), followed by postinflammatory

hyperpigmentation (25%), vitiligo (20%), and pityriasis Alba (10%). Other less common disorders included lichen planus pigmentosus (5%) and pigment contact dermatitis (5%).

**Table 2:** Prevalence of Pigmentary Disorders

Pigmentary Disorder	Frequency (n=400)	Percentage (%)
Melasma	140	35
Postinflammatory Hyperpigmentation	100	25
Vitiligo	80	20
Pityriasis Alba	40	10
Lichen Planus Pigmentosus	20	5
Pigment Contact Dermatitis	20	5

**Clinical Presentation**

The clinical presentation of pigmentary disorders varied among the patients, presented in Table 3. Melasma predominantly affected the malar region (70%), while postinflammatory hyperpigmentation was commonly observed on the face (60%) and extremities (40%). Vitiligo presented with depigmented macules distributed

symmetrically on the face (40%), hands (30%), and trunk (30%). Pityriasis alba was characterized by hypopigmented, scaly patches mainly on the face (80%) and arms (20%). Lichen planus pigmentosus typically involved the face (60%) and neck (40%), presenting as hyperpigmented papules and plaques.

**Table 3:** Clinical presentation

Pigmentary Disorder	Clinical Presentation (%)
Melasma	Malar Region (70)
Postinflammatory Hyperpigmentation	Face (60), Extremities (40)
Vitiligo	Face (40), Hands (30), Trunk (30)
Pityriasis Alba	Face (80), Arms (20)
Lichen Planus Pigmentosus	Face (60), Neck (40)

**Associated factors**

Several associated factors were identified in patients with pigmentary disorders. A positive family history of similar disorders was reported in 30% of cases, while 25% had a

history of oral contraceptive pill usage. Furthermore, 20% of patients reported regular use of skin-lightening creams.

**Illustrations (Pics)**



### Statistical Analysis:

Statistical analysis using the SPSS program revealed significant associations between certain demographic factors and pigmentary disorders. Fisher's exact test showed a significant association between family history and melasma ( $p < 0.05$ ). Additionally, the unpaired t-test demonstrated a significant difference in the mean duration of sunlight exposure between patients with and without vitiligo ( $p < 0.01$ ).

### Discussion

The findings of this study shed light on the epidemiological and clinical spectrum of pigmentary disorders in the Indian population, contributing to the existing literature on this topic.

### Prevalence and Clinical presentation

The prevalence rates of pigmentary disorders observed in this study align with previous research conducted in India [1]. Melasma emerged as the most common pigmentary

disorder, consistent with its high prevalence reported in South Asian populations [2]. Interestingly, our study also revealed a significant proportion of patients presenting with post inflammatory hyperpigmentation, indicating the impact of inflammatory skin conditions in contributing to pigmentary changes [3]. Additionally, the spectrum of clinical presentations observed underscores the heterogeneity of pigmentary disorders, ranging from localized patches to diffuse involvement, which is consistent with previous reports [4].

### Association with environmental factors

The observed association between pigmentary disorders and environmental factors, such as sunlight exposure and the use of topical skin lightening creams, underscores the multifactorial nature of these conditions [5]. The prevalence of pigmentary disorders in urban settings like Mumbai highlights the potential influence of urbanization and lifestyle factors on skin health [6]. Further exploration of these associations could provide valuable insights into

preventive strategies and public health interventions aimed at mitigating the burden of pigmentary disorders.

### Clinical Implications and Quality of Life

Pigmentary disorders not only pose clinical challenges but also impact patients' quality of life [7]. The emotional distress and psychosocial implications associated with these conditions underscore the importance of holistic management approaches that address both medical and psychological aspects. Our findings emphasize the need for dermatologists to adopt a patient-centered approach, providing not only effective treatment but also psychological support and counseling to improve patient outcomes and well-being.

### Limitations

Despite its contributions, this study has several limitations that warrant consideration. The cross-sectional design limits our ability to establish causality or determine temporal relationships between variables. Additionally, the study's reliance on self-reported data and the potential for recall bias may have influenced the accuracy of our findings. Furthermore, the study was conducted at a single urban tertiary teaching hospital, which may limit the generalizability of our results to other settings or populations.

### Future directions

Future research efforts should aim to address these limitations by adopting longitudinal study designs and incorporating objective measures of pigmentary changes. Additionally, exploring the role of genetic factors and biomarkers in predisposing individuals to pigmentary disorders could enhance our understanding of disease mechanisms and inform personalized treatment approaches. Collaborative multicenter studies involving diverse populations would also facilitate a more comprehensive understanding of pigmentary disorders and their determinants.

### Conclusion

In conclusion, our study provides a comprehensive insight into the clinical spectrum of pigmentary disorders among individuals with Indian skin attending an urban tertiary teaching hospital. Through meticulous examination and analysis, we observed a diverse range of pigmentary disorders prevalent in this population, including but not limited to, melasma, vitiligo, post-inflammatory hyperpigmentation, and drug-induced pigmentation. Our findings underscore the importance of understanding the epidemiology and clinical characteristics of pigmentary disorders in Indian skin, considering the significant impact on quality of life and psychosocial well-being. Furthermore, our study highlights the need for tailored diagnostic and therapeutic approaches to effectively manage these conditions. Addressing pigmentary disorders in Indian skin requires a multi-disciplinary approach involving dermatologists, primary care physicians, and public health policymakers. Future research endeavors should focus on elucidating the underlying mechanisms, identifying novel therapeutic targets, and implementing preventive strategies to mitigate the burden of pigmentary disorders in this population.

### Conflict of Interest

The authors declare no conflicts of interest.

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### Ethical Approval

Approved by institutional ethics committee of HBT Medical College & Dr R. N. Cooper Municipal General Hospital, Mumbai.

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