

# SKIN COMPLEXION AND PIGMENTARY DISORDERS IN FACIAL SKIN OF 1204 WOMEN IN 4 INDIAN CITIES

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## INTRODUCTION

Defining Indian skin as "Asian skin" or "skin of color" may lack accuracy, although India clearly belongs to Asia geographically. The Indian population shows a remarkable diversity with more than 2,000 ethnic groups. In addition, great variations exist in terms of climate, diet, and social parameters within the country. In this context, Indian skin shows a wide variability in color as well as in some specific features. In particular, pigmentary disorders are a major concern in India and have a great psychosocial impact on quality of life. Surprisingly, there are few studies that have classified skin types in the Indian population.

To fill such a gap, an extensive descriptive study based on a multifactorial evaluation approach, including some skin color parameters, was conducted on Indian women of different ages and from different cities. The main objective was to describe the characteristic features of facial skin color in Indian women in terms of overall skin complexion and pigmentary disorders, and to evaluate the impact of age upon these findings.

## MATERIALS AND METHODS

**Subjects:** 1204 women were included, aged 18–84 years from four Indian cities: Chennai, Mumbai, Kolkata, and Delhi (about 300 subjects per city with a balanced distribution through 11 age groups). They were selected from the general population through print advertisements, without any restriction of socio-economic status. Illiterate women were eligible for inclusion; in this case presence of a third party was required for reading and completing documents.

**Dermatological assessments:** The dermatologists clinically assessed facial skin complexion and pigmentary disorders (small hyperpigmented spots <3 mm, melasma, ill-defined patchily hyperpigmented macules, hypopigmentation, and hyperpigmented areas). In addition, facial photographs of each subject were taken with Visia<sup>®</sup> CR booth (Canfield Scientific, Fairfield, USA). This system is used to capture standardized face pictures in different lighting conditions standard, cross-polarized, parallel-polarized, and ultraviolet (UV) and from three different angles (left, front, and right).

**Instrumental measurements:** Skin color measurements were performed on the photo-exposed skin of the cheek and on the photoprotected skin of the upper inner arm as reference, using the Chroma Meter<sup>®</sup> CR-400 (Konica Minolta, Tokyo, Japan). This device measures the intensity of reflected light and the color of the skin surface. The skin surface is illuminated with polychromatic light and the signal from the skin is reflected into the device and separated into its spectral components using the L\*a\*b\* system of the ("Commission Internationale de l'Eclairage" (CIE) Lab). Briefly, the components are L\* for luminance/brightness (the higher the value, the higher the intensity), a\* for red/green components of light, positive values representing the red component and negative values representing the green component, and b\* for yellow/blue components of light, positive values representing the yellow component and negative values representing the blue component. All measurements were performed by the same technician in each city and repeated three times per area.

## RESULTS

### 1 SKIN COMPLEXION

In the present study, a range of skin complexions were represented, from light to dark. The relative proportions of different complexions differed between study sites with darker complexions seen more frequently in subjects at the Chennai study location.



Figure 1: Skin complexion: dermatologist assessment

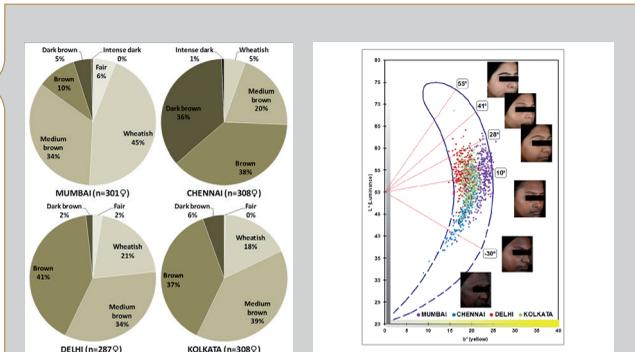


Figure 2a: Distribution of skin complexions based on dermatologist assessment in Mumbai, Chennai, Delhi, and Kolkata (N = 1,204)

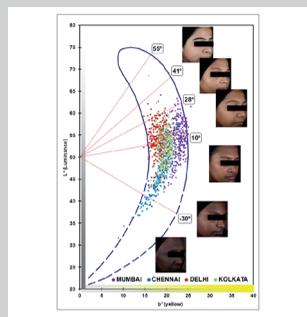


Figure 2b: Skin color volumes in L\*b\* plan measured by ChromaMeter<sup>®</sup> (N = 1,202) in Mumbai, Chennai, Delhi, and Kolkata. L\* = luminance/brightness (the higher the value, the higher the intensity) b\* = positive values represent the yellow component of the light (the higher the value, the higher the intensity)

Aging did not significantly affect complexion which barely darkened with age. Skin darkening with age has previously been described in various populations, for example, a Chinese group living in Chicago as reported by de Rigal et al. However, such age-related changes were not observed in African-Americans, Caucasians, and Mexicans. Recent study on Chinese women living in China showed progressive darkening of the complexion with advancing age. A more recent study conducted in eight Asian cities found that Asian skin is generally darker with age. Using colorimetry to objectively record changes, after 35 years of age, there was a slight whitening of unexposed skin and a slight darkening on the exposed area with age. This may account for the overall impression of facial darkening compared to the whole body, even though darkening is mild.

## CONCLUSION

This is the first descriptive study of the complexion of Indian skin in the general population; most previous reports included only people consulting in dermatological centers. A sample size of 1,204 women may appear small considering the immense size of the Indian population but it is large enough to permit statistical analysis. In addition, the study protocol was rigorous and composed of individual clinical examinations by dermatologists and objective colorimetric measurements. This study confirmed the aesthetically, the overall facial skin complexion is not greatly affected by age but hyperpigmented disorders appear early in life and increase with age contributing to an overall unevenness of facial pigmentation. There is a need to further characterize and explore the mechanisms underlying the early onset and high prevalence of hyperpigmented spots, ill defined, patchy pigmented macules, and specific pigmented lines observed in this population.

### 2 PIGMENTARY DISORDERS

The study data confirmed the importance of pigmentary disorders in the Indian general population, particularly a significant prevalence of small hyperpigmented spots irrespective of age. Some disorders have already been described in India: hypopigmentation, such as vitiligo, pityriasis alba, or versicolor; and also hyperpigmentation, such as melasma and some other facial melanoses. A few studies document the increased frequency of disorders characterized by hyperpigmentation in darker ethnic groups.

Surprisingly, many lentigo simplex were noted during clinical assessment. This high prevalence, and the early onset of actinic lentiginos and seborrheic keratosis (around 30 years) does not appear to have been described previously. Histopathological analyses need to be carried out to better understand these disorders.



Figure 4: Hyperpigmented spots

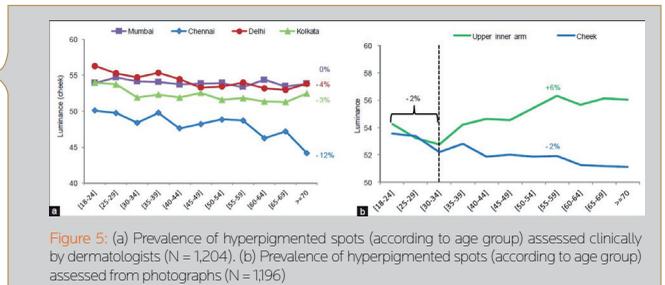


Figure 5: (a) Prevalence of hyperpigmented spots (according to age group) assessed clinically by dermatologists (N = 1,204). (b) Prevalence of hyperpigmented spots (according to age group) assessed from photographs (N = 1,196)

In this study, melasma affects one-third of women between 40 and 65 years, an overall prevalence consistent with that found in other countries. In addition, ill-defined, patchily hyperpigmented macules were noted which caused greater concern to our subjects than melasma. These pigmented macules steadily increased with age, unlike the bell curve distribution of melasma prevalence along life span.



Figure 6: Melasma and patchy pigmented macules

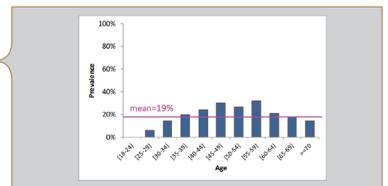


Figure 7: Prevalence of melasma (according to age group) assessed clinically by dermatologists (N = 1,204)

Some facial areas showed homogeneous hyperpigmentation, in particular periorbital, perioral, and nose areas. More than 50% of women were concerned by such pigmentation, increasing up to 80% after the age of 35 years. Periorbital melanosis is well-known and described in Indian skin. In addition, many subjects presented 2 other characteristic pigmentary findings, both of which caused major concern: pigmentation of the lip corners associated with pigmented marionette lines, noted in 70% of subjects and pigmentation of the nose, noted in 50%. Recent studies have described linear pigmentation across the nose associated with a groove or ridge, referred to as transverse nasal groove or nasal crease. The crease has been particularly emphasized in the case of the allergic salute. This study did not evaluate any change in the contour of the skin and only the linear nasal pigmentation was noted. The self-perception of uneven skin color is contributed to by these various pigmentary changes.



Figure 9: Specific hyperpigmented areas: (a) Periorbital area, (b) lip corners, and (c) nose bridge

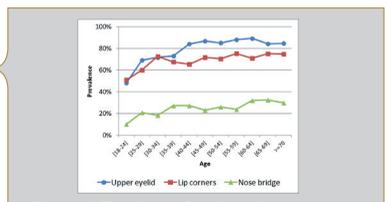


Figure 10: Prevalence of moderately to severely hyperpigmented areas (according to age group) assessed clinically by dermatologists (N = 1,204)

"The authors declare no conflict of interest"