

Original Research Article


# Unveiling the risk factors behind melasma: An observational study

Manjusha Martin<sup>1\*</sup>, A. Hameedullah<sup>2</sup>, Sneha Priya M<sup>3</sup>

<sup>1</sup>Post Graduate, <sup>2</sup>Professor and HOD, <sup>3</sup>Post Graduate

Department of Dermatology, Meenakshi Medical College Hospital and Research Institute, Enathur, Kanchipuram, Tamil Nadu, India

\*Corresponding author email: [manjusha.martin@gmail.com](mailto:manjusha.martin@gmail.com)

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## Abstract

**Background:** Melasma is a common, acquired, recurrent and chronic disorder of hypermelanosis. It is distributed symmetrically and affects the sun-exposed areas mainly the face (forehead, cheeks, upper lip and chin), and manifests as light to dark brown patches of hyperpigmentation. The objective of this study is to identify the major predisposing and aggravating factors of melasma.

**Materials and methods:** This was an observational, cross-sectional study, conducted in the Dermatology OPD of Meenakshi Medical College, among 100 patients with melasma for a period of 18 months. Melasma was diagnosed clinically and using Wood's lamp examination. Factors such as the age at presentation, gender, duration of sun exposure per day, family history, intake of precipitating drugs and systemic diseases were assessed.

**Results:** Most of the patients were in the age group of 36-45 years and the majority of patients were females. Sun exposure for >2 hours was observed to be an important triggering factor. Positive family history was present in 46% patients, 12 patients had a history of intake of precipitating drugs and 30 patients had systemic diseases.

**Conclusion:** It can be concluded from this study that the above factors play a significant role in the development and prognosis of melasma. Sun exposure for longer duration was observed to be a very important factor, especially because of the climatic conditions prevailing here. So elimination of the exacerbating factors and treatment of associated systemic conditions are important in the management along with the therapeutic agents.

## Key words

Melasma, Wood's lamp, Sun exposure.

## **Introduction**

Melasma is a chronic, acquired and recurrent disorder of hypermelanosis with symmetrical distribution, affecting the sun-exposed areas mainly the face, where it involves the forehead, cheeks, upper lip, and chin [1]. It manifests as light to dark brown patches of hyperpigmentation [2, 3]. It is more frequently seen in darker skin types, hence it is the most common pigmentary dermatoses among Indians [4]. Women in reproductive age group account for the majority of the cases with men accounting for only about 10% of the cases. Melasma is rare before puberty [5]. In melasma, the melanin pigment synthesis is increased mainly due to increase in the number of melanosomes, which are membrane-bound cell organelles within melanocytes, in which melanin synthesis occurs and they are transferred to keratinocytes. Usually, the number of melanocytes won't be increased except in very few cases [6]. The melanocytes will become larger and dendrites will become more prominent [7]. Even though exact cause remains an enigma, certain factors are postulated in the aetiopathogenesis of melasma. Among this, the strongest primary trigger for its development is sun exposure (UV light), which explains the sites of predilection of melisma [8]. Other main factors include genetic predisposition, female hormones - both endogenous (that is during pregnancy) and exogenous (contraceptives and hormone replacement therapy). Thyroid disturbances, drugs, and cosmetics can be other triggering factors. Identification and avoidance of aggravating factors are very important to prevent recurrence [9, 10].

## **Materials and methods**

This was an observational, cross-sectional study, done among 100 melasma patients who came to the Dermatology out-patient department of Meenakshi Medical College Hospital and Research Institute, Kanchipuram. The study period was 18 months from February 2016 to July 2017. Inclusion criteria: Patients who gave consent for the study; both males and females, all age groups. Melasma was diagnosed clinically

and confirmed by Wood's lamp examination. With the consent of the patient, thorough history taking was done to assess age of presentation (whether 25-35 years, 36-45 years or >45 years), gender, duration of sun exposure per day (whether <1hour/day, 1-2 hours/day or >2 hours/day), family history of melasma, intake of precipitating drugs (like OCP-Oral Contraceptive Pill), HRT-Hormone Replacement Therapy, Tetracyclines, Retinoids, Antiepileptics or any other); systemic diseases (hypothyroidism, dyslipidemia, diabetes mellitus or any other).

## **Statistical Analysis**

The data were entered into Microsoft Excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of frequencies, mean. Graphical representation of data using bar diagrams, pie charts, and line diagram, was done.

## **Results**

Among the 100 patients included in the study, the relation of melasma to the age of presentation, gender, duration of sun exposure per day, family history, intake of precipitating drugs and systemic diseases; were listed below:

### **Age distribution**

In the present study, most of the patients (45%) were in the age group of 36-45 years, followed by 31% in the age group >45 years and then 24% in the age group 25-35 years (**Figure - 1**). The age of the youngest patient at the time of presentation was 25 years and the eldest was 55 years. The mean age of presentation was 40.65 years.

### **Sex distribution**

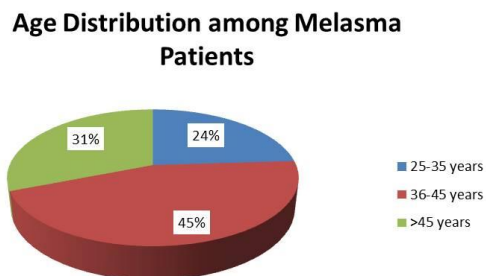
In the present study, females predominated constituting about 72% and males constituted 28% (**Figure - 2**). The total female to male ratio was 2.57:1.

### **Sex distribution in various age groups**

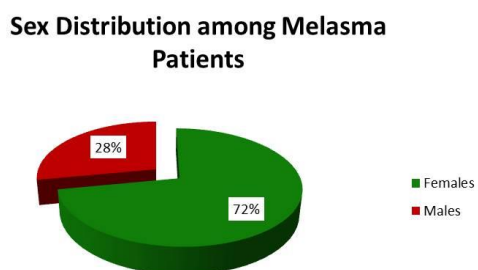
In this study, the majority of the females (34 patients) were in the age group of 36-45 years

and most of the males (13 patients) were in the age group of >45 years (Table - 1).

**Figure - 1:** Age distribution among melasma patients.



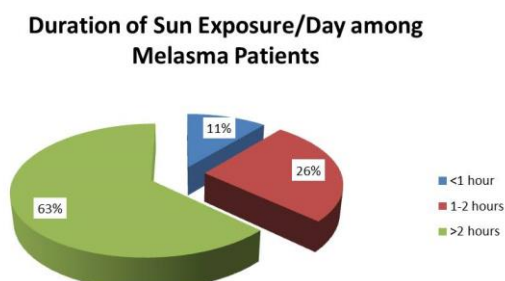
**Figure - 2:** Sex distribution among melasma patients.



**Table - 1:** Sex distribution in various age groups.

Age Groups	Females (Nos.)	Males (Nos.)	Total
25-35 years	20	4	24
36-45 years	34	11	45
>45 years	18	13	31
Total	72	28	100

**Figure - 3:** Duration of sun exposure per day among melasma patients.



#### Duration of sun exposure per day

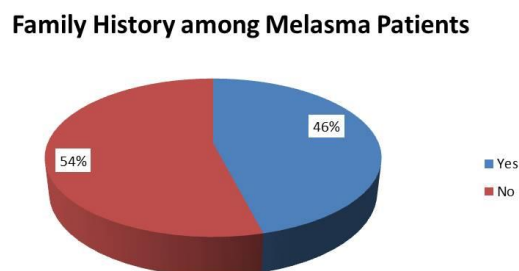
In this study, 63% patients gave a history of >2 hours of sun exposure a day, followed by 26% patients who had a sun exposure of 1-2 hours a

day, and then 11% with a sun exposure of <1 hour a day (Figure - 3).

#### Family history

46% patients in this study gave a positive family history of melasma among first degree relatives (Figure - 4).

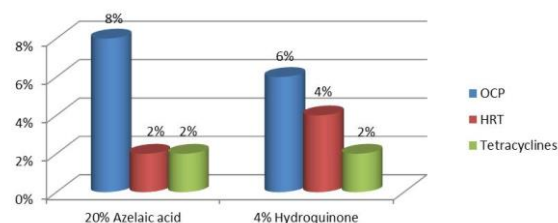
**Figure - 4:** Prevalence of positive family history among melasma patients.



#### Intake of precipitating drugs

In the present study, 7 patients gave a history of intake of oral contraceptive pills. 3 patients gave a history of hormone replacement therapy, and 2 patients gave a history of intake of tetracyclines (Figure - 5).

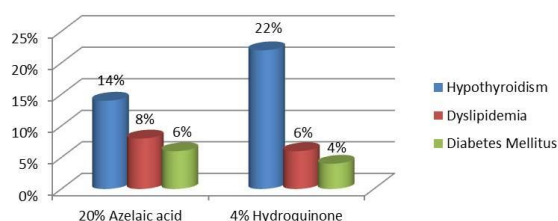
**Figure - 5:** Comparison of intake of precipitating drugs among melasma patients.



#### Systemic diseases

About 18% patients in this study had hypothyroidism, followed by 7% with dyslipidemia and then 5% with diabetes mellitus (Figure - 6).

**Figure - 6:** Association of melasma with systemic diseases.



## Discussion

Melasma is common among middle-aged individuals. In this study, there was no specification for the age group in the inclusion criteria. The mean age of presentation in this study was 40.65 years, and the majority of patients came from the age group of 36-45 years (45%). This was in concordance with an Indian study done by Bansal C, et al, in which the mean age of patients at the time of presentation was 37.7 years [11]. MMU Khan, et al. observed that majority of the Indian patients under study were in the age group of 31-35 years (40%), which was followed by 36-40 years (24%) [12]. Theoretically, melasma is more common among females because of the hormonal influence of female hormones (estrogen, progesterone). In this study, among melasma patients, females were more in number compared to males, on the whole, and in each study group. There were 72 females and 28 males in this study and the total female to male ratio were 2.57:1. This was similar to a study done by Dwari BC, et al., among melasma patients in Western Nepal and the female to male ratio was 2.3:1 [13]. Females predominated (80%) in an Indian study done by MMU Khan, et al, with a female to male ratio of 4:1 [12]. Duration of sun exposure per day: Sun exposure was found to be an aggravating factor in this study. According to the literature, both UVA and UVB play an important role in triggering melasma, (mainly UVB). In this study, 63% of patients were exposed to sunlight for >2 hours a day, mostly because of the nature of their work. Then 26% had a history of 1-2 hours of sun exposure a day and lastly 11% with sun exposure of <1 hour a day. This was in concordance with a study was done by MMU Khan, et al, concluded that sun exposure was the most important exacerbating factor among 60% Indian patients and most of them were outdoor workers [12]. Arun, et al. (Indian study) observed that melasma was aggravated by sunlight in 55.12% patients.[14]Family history: In this study, a positive family history (among first-degree relatives) was seen in 46% of the melasma patients. This was similar to another

study done by Griffiths CE, et al., among melasma patients, where 47% had a positive family history of melasma and first degree relatives were affected [15]. Arun, et al. reported that among 312 Indian patients, 104 (33.33%) had positive family history of melasma. Intake of precipitating drugs: In the present study, only a few patients gave a history of intake of precipitating drugs. 7 patients gave a history of intake of oral contraceptives, 3 patients had taken hormone replacement therapy (post-menopausal) and 2 patients had taken tetracyclines. So in this study, it cannot be completely established that these drugs can cause exacerbation of melasma. According to Arun, et al, 18.4% Indian females with melasma gave a history of oral contraceptive drug usage. A similar association was also observed with hormone replacement therapy.[14]Systemic diseases: Melasma can be associated with autoimmune and systemic diseases. Our study reported hypothyroidism in 18 patients, followed by dyslipidemia in 7 patients and diabetes mellitus in 5 patients. In a study conducted by Arun, et al., among 312 patients, hypothyroidism was reported in 20 patients [14, 15]. But Sacre RC, et al. observed that the thyreotropic, prolactin, gonadotropic reserves and thyroid and ovarian function were normal in melasma patients of Brazil [16].

## Conclusion

Melasma is a common pigmentary dermatosis. Management of melasma is challenging for us dermatologists due to difficulty in treatment, the long term treatment, variable therapeutic response, discontinuation of treatment, recurrence and psychosocial impact on the patient. We found that sun exposure for a longer duration (>2 hours) to be an important triggering factor for melasma, mainly due to the climatic conditions prevailing here. This was in concordance with many previous studies among Indians as well as in Western population. There was also poor compliance among patients regarding sun protection because of lack of awareness and outdoor work. Hence patient counseling regarding the use of sunscreens and

physical protection play a very important role in melasma management. In this study, females outnumbered males, which was mainly due to the influence of female hormones. Most of the patients were middle-aged. These two observations were similar to previous studies. For effective management of melasma, besides sunscreens and therapeutic agents, diagnosis, and treatment of systemic diseases and identification of any precipitating drugs and its stoppage, is also equally important.

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