

# Clinico-epidemiological Study of Patients with Melasma in a Tertiary Care Hospital - A Prospective Study

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## Abstract

**Background:** Melasma is a common pigmentary disorder with symmetrically occurring brownish patches, most commonly in sun-exposed skin.

**Aims:** This study aimed to establish the epidemiological pattern of melasma in patients attending our hospital and to study the variation in demographics, etiological factors, and clinical features in melasma occurring in males and females.

**Materials and Methods:** This study was conducted over a period of 1 year and a total of 100 patients were enrolled.

**Results:** The mean age of 100 patients with melasma was 40.53 years, with a female-to-male ratio of 4:1. Melasma had a peak incidence of onset in the third decade with mean age of onset at 31.22 years. Nearly 35% of the study population gave a definite exacerbation due to sun exposure. Among the 80 female patients, 23 reported onset of melasma during pregnancy and 11 reported exacerbation with oral contraceptive. There appears to be a strong genetic predisposition evident by the increased incidence of familial cases of melasma in about 38% of patients. Malar area involvement was the most common pattern seen in 61% of patients. In Wood's lamp examination, the epidermal type was common, as seen in 47% of patients.

**Conclusion:** Melasma is a very common dermatological condition with unknown etiology. There is a wide variation in demography, clinical picture, and etiological factors. Both environmental and genetic factors play a role in the precipitation and exacerbation of melasma.

**Key words:** Epidemiology, Melasma, Sun exposure

## INTRODUCTION

Melasma is an acquired hyperpigmentation disorder, attributed as a cause of facial melanosis. It is characterized by hyperpigmented or brownish macules distributed bilaterally symmetrically mainly in sun-exposed areas. It usually affects people with Fitzpatrick skin Types III and IV. It is associated with exposure to sunlight, pregnancy,

and exogenous hormones.<sup>1</sup> Women are most commonly affected. It is derived from the greek word "melas" meaning black. It occurs mostly on the face, occasionally on the neck, and rarely on the forearms. The term, "chloasma," is derived from greek term "chloazein" meaning "to be green" which describes melasma developing in pregnancy. Melasma has been described in olden literatures like reports of Hippocrates (470-360 BC) where they documented hyperpigmented facial lesions exacerbated by heat, sunlight. Doctrine of Morbis Cutaneis written by Joseph Plenck described melasma under the term Ephelis.<sup>2</sup> Prevalence of melasma is different from region to region since it varies with skin type, intensity of sun exposure, and also ethnicity. It is one of the most common causes of facial melanosis in Indian population.<sup>3</sup> According to the distribution of lesions, three clinical patterns of melasma are recognized.

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Month of Submission : 12-2016  
Month of Peer Review : 01-2017  
Month of Acceptance : 01-2017  
Month of Publishing : 02-2017

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The centro-facial pattern involves the forehead, nose, upper lip, and chin. The malar pattern involves cheeks and nose. The mandibular pattern is melasma occurring along the ramus of mandible. With the help of Wood's light examination, melasma is classified into four major types - epidermal, dermal, mixed, and indeterminate.<sup>4</sup> Dermoscopy will show diffuse reticular pigmentation with sparing of follicular openings. Melasma adversely affects the quality of life of patients as most melasma lesions occur on the face. Melasma Quality of Life scale is used to assess the impact of melasma upon the emotional state of patient, how melasma affects the social relationship and daily activities.<sup>5,6</sup> Melasma Area Severity Index score was proposed by Kimbrough-Green *et al.*, in 1994, to quantify severity of melasma occurring on the face.<sup>7</sup> It takes into account the hyperpigmentation, area affected, and homogeneity of pigmentation. Forehead, right cheek, left cheek, and chin are separately calculated.<sup>8</sup>

#### Aim

This study aimed to establish the epidemiological pattern of melasma in patients attending our hospital and to study the variation in demographics, etiological factors, and clinical features in melasma occurring in males and females.

## MATERIALS AND METHODS

This prospective observational study was conducted in the Dermatology Department at Madras Medical College. 100 patients with a clinical diagnosis of melasma were enrolled in the study after obtaining informed consent. Ethical Committee's approval was obtained. Pregnant patients and patients on treatment were excluded from the present study. Data regarding various demographic features such as present age, age of onset of melasma, gender, total duration of disease as well as socio economic status, occupational history and family history were noted. Data on various predisposing and precipitating factors such as sun exposure, cosmetics, pregnancy, endocrine disorders, ovarian tumor, and sunscreen usage were enquired. After clinical examination of patients, they were categorized into centrofacial, malar, or mandibular depending on the distributions of lesions. Wood's lamp examination was carried out to identify the histological pattern.

## RESULTS

The study population comprised 100 patients diagnosed as a case of melasma. There were 80 females and 20 males (age range of 12-65 years), with a mean age of 40.53 years. Bulk of our study population comprised females, with a female-to-male ratio of 4:1. The mean age of onset was

31.22 years, presenting mostly after the third decade of life. Most of them sought medical treatment only 6.43 years after the appearance of their melasma. Most of the patients were from lower socioeconomic status accounting for 59% of the study population.

A definite family history was present in 33% of the patients. Out of the total 100 patients, exacerbation after sun exposure was evident in 22 patients, but the remaining 78 patients did not notice any exacerbation of their disease. About 80 female patients were enrolled in this study, of which 23 of them reported that their disease started during pregnancy and 15 patients explained that their disease got exacerbated during pregnancy, accounting for 28.7% and 18.7%, respectively. Oral contraceptive pills (OCPs) intake was in only 13.75% of female patients (Table 1).

Use of cosmetics was found in a significant number of patients. Nearly 18% of females and 3% of males gave a history of use of cosmetics at least 5 days in a week. Enquiry in association with any autoimmune disease led to the finding that 10% of the study population was on treatment for hypothyroidism.

On clinical examination, 61% of patients showed a malar type of distribution of lesion while centrofacial type was noticed in 30% and mandibular type in 9% of patients. With the help of Wood's lamp examination, patients were categorized into 4 types, of which 47% of the patients showed an epidermal pattern of pigmentation, and in 21% of cases and 30 cases, the patterns were dermal and mixed type, respectively. Nearly 2% of the patients showed an indeterminate pattern (Table 2).

**Table 1: Distribution of various characteristics of the study patients**

Characteristics	Females	Males	Total
Demographic distribution			
Number	80	20	100
Mean age	38.27	42.8	40.53
Mean duration	5.67	7.19	6.43
Mean age of onset	28.5	32.95	31.22
Socioeconomic status			
High class	4	1	5
Middle class	27	9	36
Low class	49	10	59
Genetic factors			
Family history	27	5	38
Endocrinological problems	9	1	10
Hormonal factors			
OCP/HRT use	11	-	11
Pregnancy exacerbation	15	-	15
External factors			
Sun exacerbation	19	3	22
Use of cosmetics	18	3	21
Use of sunscreen	5	1	6

OCP: Oral contraceptive pill

**Table 2: Distribution of clinical examination of the study patients**

Examination	Females	Males	Total
Distribution of melasma			
Malar	52	9	61
Centrofacial	21	9	30
Mandibular	7	2	9
Wood's lamp examination			
Epidermal	39	8	47
Dermal	16	5	21
Mixed	23	7	30
Indeterminate	2		2

## DISCUSSION

Melasma is an acquired, localized, usually symmetrical hyperpigmentation of the face, especially the forehead, malar areas, upper lip, and chin, occurring in women, particularly Fitzpatrick skin Types III and IV.<sup>1</sup> Men represent approximately 10% of the cases. In a study conducted in Brazil, the average prevalence of melasma in different parts of countries varied from 5.9% to 9.1%.<sup>9</sup> A study by Walker *et al.* in Nepal showed that melasma was the most commonly reported pigmentary dermatosis.<sup>10</sup> Melasma prevalence study among paddy field workers in India showed a prevalence of 41% by Shenoi *et al.*<sup>11</sup> The average age of patients with melasma was 40.53 years in our study compared to  $37.2 \pm 9.3$  years by Achar and Rathi<sup>12</sup> and 33.45 years by KrupaShankar *et al.*<sup>13</sup> from India, and from Singapore by Goh and Dlova, it was 42.3 years.<sup>14</sup> Most patients (59%) in our study population belong to lower socioeconomic status. Melasma occurs more commonly with women. Our study showed a female-to-male ratio of 4:1, concordant with studies by Achar and Rathi<sup>12</sup> (4:1) and KrupaShankar *et al.*<sup>13</sup> (4:1). Hexsel *et al.* from Brazil and Sivayathorn from Malaysia reported higher female-to-male ratio than our study of about 39:1 and 6:1, respectively.<sup>15,16</sup> In our study, we found that about 80% of women and 20% of men have melasma. Most studies conducted in India showed almost similar results. Studies by Achar and Rathi,<sup>12</sup> KrupaShankar *et al.*,<sup>13</sup> and Sarkar *et al.*<sup>17</sup> showed 24.4%, 19.9%, and 25.8% involvement of Indian males with melasma, respectively. Pichardo *et al.* noticed a higher prevalence of melasma in Latino men up to 36%.<sup>18</sup> The mean age of onset in our study was found to be 31.22 years similar to 29.9 years reported by Achar and Rathi.<sup>12</sup> An average age of onset of melasma of 34.1 years was reported by KrupaShankar *et al.*<sup>13</sup> and 38 years by Halder *et al.* which was later than the onset of melasma noticed in our study.<sup>19</sup> Most of the patients were of Fitzpatrick skin Types III or IV. Evidence for genetic factors is the occurrence of familial cases. Nearly 38% of the study population had a positive family history, correlating with an earlier study by Resnik<sup>20</sup> and Vazquez *et al.*,<sup>21</sup> in which it varied from 20% to 70%. Achar and Rathi<sup>12</sup> reported a

familial tendency of 33.3% and KrupaShankar *et al.* reported it to be 31.1%.<sup>13</sup> Several factors have been attributed in the etiopathogenesis, notably ultraviolet light or sun exposure, hormones including oral contraceptives and hormone replacement therapy, and pregnancy. Almost 22% of our patients reported sun exposure as an aggravating factor. This is in contrast to Pathak's report,<sup>22</sup> which suggests that sunlight exacerbates melasma in all the patients, 72% as reported by Sivayathorn,<sup>16</sup> and an Indian study by Achar and Rathi<sup>12</sup> showed 55.1%. Only 6% of the study population was found to use sunscreens. Melasma is rarely reported before the onset of puberty and hormonal influence is suggested by onset or exacerbation during pregnancy.<sup>23</sup> In our study, 28.7% of the total female patients gave a history of onset during pregnancy and 18.7% of females noted pregnancy as an aggravating factor. Nearly 13.75% of females in our study population were on OCPs which is lower than those reported by Bandyopadhyay.<sup>24</sup> Other studies have reported a similar lower incidence of melasma in relation with either pregnancy or oral contraceptives. In a study by KrupaShankar, the use of oral contraceptives ranged from 2% to 23%.<sup>13</sup> Wu *et al.* and Resnik reported 8% and 34% of female patients, respectively, on OCP developing melasma.<sup>20,25</sup> Another significant association was the presence of hypothyroidism and melasma in about 10% of cases. In Achar and Rathi's study of melasma, 6% of people were suffering from thyroid disorders whereas KrupaShankar *et al.*'s. study reported 11%.<sup>12,13</sup> Almost 21% of patients used cosmetics on regular basis for at least 5 days/week, correlating with the study by Grim *et al.*<sup>23</sup> There are reports of melasma developing in patients on regular cosmetic use and those who take photo toxic as well as photosensitizing drugs.<sup>26</sup> Achar and Rathi<sup>12</sup> in their study reported that increased sun, pregnancy, OCP, and cosmetic use for almost 5 times in a week can exacerbate melasma. According to the area of distribution, three main clinical patterns are seen. In the present study, malar area was most commonly involved, consistent with other studies from India, Goh and Dlova from Singapore, and Tamega from Brazil.<sup>12,14,27-29</sup> Centrofacial pattern is common in northern and eastern parts of India. This variation of results might be due to environmental or regional differences.<sup>13</sup> With the help of Wood's lamp examination, melasma is classified into four histological types depending on the depth of melanin deposition. Epidermal type where pigmentation is accentuated was found to be the most common type in which increased melanin is present in all the layers of epidermis. Dermal type has many melanophages throughout dermis and the pigmentation is not intensified. In mixed type, pigmentation is more apparent in some areas, with no change in other areas. Indeterminate type is described in individuals with skin Type VI where pigment is apparent with Wood's light examination.

## CONCLUSION

Even though the exact cause of melasma could not be identified by our study, an epidemiological view of melasma was made in our study. Among the various etiological or predisposing factors, long-term sun exposure, pregnancy, and intake of contraceptive pills definitely play a role in exacerbation and sometimes onset of melasma. Genetic factors also seem to play a role, evidence for which is the increased incidence of family history, increased incidence in certain races, and association with autoimmune disease, mainly thyroid dysfunction. Thus, melasma is a common facial melanosis with genetic predisposition and multiple environmental triggers. Sun protection definitely has a role in preventing further damage. Quality of life assessment and counseling the patient is an important aspect in the treatment of melasma.

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**How to cite this article:** Jagannathan M, Sadagopan K, Ekkarakudy J, Anandan H. Clinico-epidemiological Study of Patients with Melasma in a Tertiary Care Hospital - A Prospective Study. *Int J Sci Stud* 2017;4(11):117-120.

**Source of Support:** Nil, **Conflict of Interest:** None declared.