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A CLINICAL STUDY ON EPIDEMIOLOGY, ETIOLOGY, AND CLINICAL FEATURES OF MELASMA

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ABSTRACT

Background: Melasma is a highly prevalent disorder of acquired pigmentation that results in localized, chronic hypermelanosis of the skin, affecting the individual on personal and social fronts. **Aim:** The study aims to understand the epidemiology, etiology and clinical features of melasma. **Materials and Methods:** The present study was an observational study conducted on 300 patients of facial melasma presenting to the outpatient department of Dermatology, Venereology, and Leprology. **Results:** The most common age group affected was 21-30 years (48.6%), followed by 31-40years(23%), and the least affected group was 18- 20 years (10%). The mean age of patients included in the present study was 26.5 years. The youngest age of presentation was 18 years, while the oldest was 48 years. Females were more commonly affected (77.3%) compared to males(24.6%) and the male to female ratio was found to be 1:3.14. Housewives were the most commonly affected by this condition (48.3%). Fitzpatrick type IV was the most commonly seen skin type (55.3%), followed by skin type V(41.6%), and type III (1.3%).The majority of patients(51.3%) in the present study had melasma lesions for less than1 year duration. Malar was the predominant clinical pattern(63%). Epidermal type of melasma was the most common (43.3%). The majority had no family history(55%) in the present study. Out of 300 patients, 21 (70%) had sun exposure for less than1 hour every day.The most common etiological factor was sun exposure, found in 120 patients(40%). Most of the patients (60%) reported aggravation of lesions with sun

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exposure, followed by cosmetic usage in 28.3% patients(fair and lovely, ponds, vicco, miltani mitti, borolin); the least commonly found aggravating factor was drug usage (tetracycline, steroids, phenytoin, cisplatin) reported in only 5% of patients. Only 105 (35%) out of 300 patients were treatment naïve.The rest of the patients included in the study had used some form of treatment before the presentation. Hypothyroidism was observed in 55 patients (18.3%) in the present study. **Conclusion:** The pathogenic mechanism causing melasma might be heterogeneous in various ethnic groups in the population. This study approaches towards recognizing the epidemiology and etiology of melasma which in turn can provide ideas to solve the therapeutic challenges in treatment of this condition.

Keywords: Melasma, pathogenesis, melanin, Malar.

Introduction:

The color of skin has been of great concern in humans since the start of civilization. Disorders of skin pigmentation can cause cosmetic disfigurement in both men and women. One such acquired disorder of skin hyperpigmentation, commonly encountered in clinical practice is melasma.

Melasma is an acquired pigmentary disorder characterized by symmetrical hyperpigmented macules on the face. Its pathogenesis is complex and involves the interplay of various factors such as genetic predisposition, ultraviolet radiation, hormonal factors, and drugs.[1] Though benign, it can be extremely psychologically distressing and has been shown to have a significant impact on quality of life, and social and emotional well-being. Histologically, melasma may reveal enlarged melanocytes, increased dermal and/or epidermal pigmentation, increased melanosomes, dermal blood vessels, solar elastosis, and rarely perivascular lymphohistiocytic infiltrations. [2] This study is an attempt to do a comprehensive update on the present understanding of melasma epidemiology and aetiology, besides its clinical features.

MATERIALS AND METHODS:

The present study was an observational study conducted in 300 patients of facial melasma presenting to the Outpatient Department of Dermatology, Venereology, and Leprology, Osmania general hospital, Hyderabad from November 2021 to July 2023. All clinically diagnosed patients of melasma aged 18 to 60 years, of either gender, who are willing to participate in the study, were included in the study. Written informed consent was taken from all the patients.

Patients with post-inflammatory hyperpigmentation secondary to any inflammatory disorders or any other facial melanoses and patients with unrealistic expectations were excluded from the study.

After proper informed consent, a detailed history and complete clinical examination were done. Each patient's skin type was assessed using the Fitzpatrick scale. The type of melasma was categorized based on clinical and wood lamp examination, into epidermal, dermal, and mixed types of melasma. Clinical assessment of the severity of melasma was performed for all. Digital photographs were taken of all patients.

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RESULTS

Table 1: Demographics Distribution based on age, sex and occupation

Age in years	**Total**	**Percentage**
18-20	30	10
21-30	146	48.6
31-40	69	23
40-50	51	17
50-60	4	1.3
Total	300	100
Sex		0
Female	226	77.3
Male	74	24.6
Type of occupation		
Housewife	145	48.3
Student	58	19.3
Agriculture	47	19.3
Teacher	4	1.3
Others	46	15.2

Most common age group affected was 21-30 years (48.6%), followed by 31-40 years (23%) while the least affected group was 18- 20 years(10%). The mean age in the present study was 26.5 years. The youngest age of presentation was 18years, while the oldest was 48years. Females were more commonly affected (77.3%)compared to males (24.6%), Male female ratio was found to be 1:3.14

Housewives were the most commonly affected ones(48.3%), followed by students (19.3%). The least commonly affected occupations were maids and shopkeepers.

Table 2: Distribution according to clinical features and duration

Fitzpatrick skin type	**Total**	**Percentages**
I	0	0
II	0	0
III	4	1.3

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IV	166	55.3
V	125	41.7
VI	5	1.7
Duration		
<1year	154	51.3
1-5years	122	40.7
>5years	24	8
Clinical Pattern		
Malar	189	63
Centrofacial	85	28.3
Mandibular	26	8.7
Type of Melasma		
Epidermal	130	43.3
Dermal	55	18.3
Mixed	115	38.3

Fitzpatrick type IV was the most commonly seen skin type(55.3%), followed by skin type V(41.6%), and type III(1.3%).The least commonly affected was skin type VI (1.6%). The majority of patients(51.3%) in the present study had melasma lesions for less than 1-year duration, and only 5 patients (8%) had it for more than 5 years**.** Malar was the predominant clinical pattern (63%) in the present study, followed by Centro facial (28.3%). The least common was mandibular (8.6%). Epidermal type of melasma was the most common(43.3%), followed by mixed (38.3%), dermal type being least common (18.3%). Patients with epidermal and mixed types of melasma lesions showed accentuation of lesions on wood lamp examination(81.6%).

Table 3: Family history of melisma and pattern of sun exposure in study

Family history	Total	Percentages
Yes	135	45
No	165	55
Sun exposure		0
<1 hour	210	70
1-2 hrs	45	15
>2hrs	45	15

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Majority had no family history (55%) in the present study. 210 out of 300 patients(70%) had sun exposure for less than1 hour every day.

Table 4: Distribution of patients according to aetiology of melisma.

Aetiology	Total	Percentages
Sun exposure	120	40
Pregnancy	75	25
Trauma	50	16.67
Drugs	35	11.67
Stress	70	23.3
Not known	85	28.3

The most common etiological factor was sun exposure, found in 120 patients (40%), followed by past pregnancies in 75 patients (25%).The least common factor elicited was drugs(11.6%). Other causes are repeated exposure to heat as in a kitchen, parlour procedures like bleaching, facials, waxing etc

Table5: Aggravating factors in study

Aggravating Factors	**Total**	
	No.of patients	Percentage
Photoaggrevation	180	60
Drugs	15	5
Cosmetics	85	28.3
Menstrual irregularities	35	11.7
Past pregnancy	45	15

Most of the patients(60%) reported aggravation of lesions with sun exposure, followed by cosmetic usage in 28.3% patients (fair and lovely, ponds, vicco, miltani mitti, borolin); the least commonly found aggravating factor was drug usage (tetracycline, steroids, phenytoin, cisplatin) reported in 5% patients.

Table 6: Associated medical conditions

Associated medical conditions	**Total**	**Percentage**
Thyroid disease	55	18.3
PCOS	10	3.3
Hypertension	20	6.7

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Diabetes Mellitus	20	6.7
Epilepsy	5	1.7
Breast carcinoma	5	1.7

Hypothyroidism was observed in 55 patients (18.3%) in the present study.

DISCUSSION

In the present study, the Most common age group affected was 21-30 years (48.6%), followed by 31-40 years (23%), and the least affected group was 18- 20 years (10%). The mean age in the present study was 26.5 years. In a study done by Ravali Yalamanchili et al [3] study age group affected was 31-40 years (46.5%), Saeed *et* al [4] studied an age group of 26-30 years (35.5%) Raka *et al. [5]*showed similar age group of 21-30 years, Akbar Ali Shanavaz et al [6] showed 35.5% patients in 31-40 age groups with melasma which are in correlation with our study. In India, Singapore, and a global study, the average ages of disease development were higher: 30, 34, and 38 years, respectively.[7,8,9,10] Studies show a significant reduction in prevalence after 50 years of age, which may be due to menopause and the reduction in the number and activity of melanocytes that occurs with aging.

Females were more commonly affected (77.3%) compared to males(24.6%), Male female ratio was found to be 1:3.14 in the present study which is in agreement with a study conducted by Rake *et al. [5]* showing 96%, Ravali Yalamanchili et al [3] 67.9% This coincides with other studies done by Sanchez *et al*.[11] A study done by Sarkar *et al*. [12] illustrated a prevalence of 26% among Indian males. Thus, a female preponderance was observed in all these studies. This can be attributed to hormonal factors in studies pointed out that the depth of pigmentation may fluctuate in synchrony with the menstrual cycle. Women are likely to be more conscious and apprehensive about their skin condition and it may also contribute enhanced percentage of females seeking medical attention among different studies.[13]

In the present study, housewives were the most commonly affected group(48.3%) which is in agreement with Manjunath K G *et al,[14]*which showed that 64% *of* housewives, Akbar Ali Shanavaz et al[15] constituted the majority 60% of housewives as patients of melasma. Thus majority of patients with melasma seeking treatment were found to be housewives. Though they don't get exposed to sunlight much, factors such as indoor heat and cosmetic concerns can be attributed to their higher percentage among the patients taking treatment for melisma. Also, agriculturists though get exposed to sunlight consistently and have a higher incidence of melasma, they were not willing to follow up at weekly or biweekly intervals.

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The present study had Fitzpatrick type IV as the most commonly seen skin type in 55.3%, followed by skin type V in 41.6%, and type III in 1.3%.The least commonly affected was skin type VI in 1.6%. Skin types-I and II were not represented in the present study. In a split-face controlled trial conducted by N.Saki*etal* [16] type- IV was seen in 58.1%, 38.7% had skin type III and only 3.2% had skin type-II. El farand El-Maghraby *et al[17]* conducted a study in Egypt in found type-IV in 60%, type-III in 30%, and type-V in 10%. As the findings in the present study were comapred to various other studies, this study concluded that darker skin types like Fitzpatrick skin types IV and V are more predisposed to the development of melasma, compared to lighter skin types.

In the present study, 51.3% had melasma lesions for less than1-year duration, and only 8% had it for more than 5 years**.** In a study conducted by Steiner*et al.*,50% had melasma for 5-10 years, 31% of patients had it for less than 5 years and 18.75% of patients had the lesions for more than 10 years. In a study by Kalla *et al [18],* 67% of patients suffered from melasma for a duration greater than 6 months in while 67.1% of patients had melasma for a duration above 6 months in a similar study conducted by Ravali Yalamanchili et al [3]. Our study findings are consistent with these studies.

Malar was the predominant clinical pattern 63% in the present study, followed by centrofacial 28.3%.The least common was mandibular 8.6%. Epidermal type of melasma was the most common 43.3% followed by mixed38.3%. This is similar to the study conducted by Pazyar*etal*[13] where 68% had malar type, 26% had centrofacial and only 4.8%patients had mandibular type of melasma. Akbar Ali Shanavaz et al [6] study 59.1% of the patients had a centrofacial pattern. Malar pattern was seen in 40% of patients followed by only 0.9% of patients with a mandibular pattern. Hurley M E *et al*, [19] reported epidermal type of melasma in 89%, mixed type in1 1% which to the above study. In a survey of Indian patients, centrofacial melasma form was identified in 55% of cases. However, the study does not cite cases of mixed melasma.

In the present study, 45% of patients gave a history of melasma family history in comparison with the study by Manjunath K G *et al*[9] in which positive family history was seen in 38%, Hurley M E *et al [19]*also found 44% having similar lesions in first-degree relatives in his study, Ravali Yalamanchili et al [3] showed positive family history in 17.9% of the patients,

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whereas it was seen in 61% cases in the study by Handel *et al*.[20], which proved that genetic influence might play a role in the etiology of melasma.

In the present study, the (most common etiological factor was sun exposure, found in 40%) followed by past pregnancies in 25%. The least common factor elicited was drugs. In our study group,11.6% patients had repeated exposure to heat as in a kitchen, parlor procedures like bleaching, facials, waxing etc., Guinot C et al [21] showed Sun exposure as the main aggravating factor by 84% of patients, followed by the use of combined oral contraceptives by 38% and pregnancy by 50%.Ravali Yalamanchili et al [3] showed 44% had a duration of sun exposure greater than 4 hours. This was similar to other studies explaining the fact that UV radiation stimulates melanogenesis, there by playing a significant role in the etiology of melasma. Mahmoud *et al*. [22] studied the impact of long-wave length ultraviolet-A (UVA)and visible light on melanocompetent skin. They found that both UVA and visible light were able to increase pigmentation, especially in patients with dark skin (skin type IV-VI). Furthermore, pigmentation was more intense and stable after visible light compared to UVA. The study shows that visible light can also induce skin hyperpigmentation, emphasizing the need to use physical sunscreens to prevent melasma relapses.

In the present study, 60% reported aggravation of lesions with sun exposure, followed by cosmetic usage in 28.3% of patients. A study on the incidence of melasma associated with treatments with intense pulsed light (IPL) concluded that patients who have subclinical melasma may exacerbate the injury by using IPL. The epidermal-melanin unit usually responds to certain inflammatory stimuli through melanogenesis. Melasma can be triggered or aggravated by cosmetic procedures that induce skin inflammation, such as peelings and therapies with light/laser.

Hypothyroidism was observedin18.3% of the present study patients with melasma, A previous study reported that thyroid dysfunction had a rate four times higher than 58.3 in melasma patients, Achar et al[23] reported that 6.4% of melasma patients had hypothyroidism . A study by Rostami Mogaddam et al[24]. reported that 20.3% of the case group had thyroid dysfunction. A study by Huang et al[25] reported differences in prevalence rates in different ethnic groups and geographical areas, indicating the role of genetic and environmental factors in thyroid dysfunction, although the mechanism of this role is still not understood . Some of these environmental factors include alcohol consumption, smoking, iodine intake, vitamin and mineral deficiency (vitamin D and selenium), stress, infection, and use of hormonal drugs (estrogens).

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CONCLUSION:

Melasma is a clinical condition caused by multiple factors and etiopathogenetic mechanisms that are required to understand more effective management. The discovery of recent pathways and pathogenic mechanisms is essential in collocation the way for recent more effective melasma treatment agents or procedures. The pathogenic melasma mechanisms might be heterogeneous in various ethnic groups among the population. This study approaches recognizing the etiological and epidemiological factors and the clinical findings that can provide ideas to solve the therapeutic problems that connect to melasma.

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