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FREQUENCY OF FACTORS LEADING TO THE DEVELOPMENT OF MELASMA IN FEMALE PATIENTS AT TERTIARY CARE HOSPITAL

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ABSTRACT

Adult women often develop melasma, an acquired symmetrical dyschromia affecting photo exposed areas. Dermatology clinics see it often, and its lesions affect patient quality of life.

Objective: To assess the frequency of factors leading to the melasma development in female patients at tertiary care hospital, Karachi.

Place and Duration: This Descriptive Cross-Sectional study was held at the Dermatology Department, Dr. Ruth K.M Pfau Civil Hospital, Karachi - Pakistan for Six months from May 31, 2021 to November 30, 2021.

Methods: Every patient who met the requirements and visited Civil Hospital, Karachi was studied. After discussing the study's process, hazards, and benefits, informed consent was obtained. Brief history about demographic information and duration of melasma was taken. The researcher asked the patients about the factors leading to melasma. The designed proforma was used for data collection and entered electronically for research purpose.

Results: The age of the patients ranged from 20 to 45 years with a median of 31 with interquartile range 14. In distribution of factors leading to melasma, pregnancy was noted in 25 (19.7%), oral contraceptive 18 (14.2%), sunlight exposure 31 (24.4%) while family history of melasma was noted in 44 (34.6%) patients.

Conclusion: It is to be concluded that family history of melasma was found noted as most common factor leading to melasma followed by sunlight exposure and pregnancy. More well-controlled and prospective trials are required to authenticate the current results.

Keywords: Clinical Patterns, Factors, Melasma, Pregnancy

INTRODUCTION

Melasma is an acquired, chronic and recurrent facial hyper melanosis with symmetrical distribution that affects the forehead, cheeks, upper lip, and chin. Light to dark brown hyperpigmentation occurs[1-2]. The most common pigmentary dermatoses are found in darker skin types. Women in reproductive age group account for most cases, with men accounting for 10%[3-4]. Before puberty, melasma is infrequent. Melanin pigment synthesis increases in melasma due to an increase in melanosomes, membrane-bound cell organelles in melanocytes that synthesize and transfer melanin to keratinocytes. Melanocytes and dendrites will grow[5-6]. Only rarely will melanocytes increase. Melasma is recurrent and has an unknown cause. High familial incidence in particular racial groupings suggests a genetic susceptibility. UV and visible light exposure are the major environmental concern. Melasma that starts or worsens during pregnancy and after taking hormonal oral contraceptives suggests hormonal causes[7]. Many patients have clinically appreciable telangiectatic erythema confined to the melasma lesional skin, which is supported by upregulated vascular endothelial growth factor expression and dermatoscopic evaluation. This suggests a role for cutaneous vasculature in its pathogenesis. Thyroid disorders, medicines, cosmetics, and stress may worsen melasma in some patients[8-9]. The molecular pathogenesis of melasma is unknown, but upregulation of many melanogenesis-related genes, inducible nitric oxide synthase and melanocyte markers like MITF, TYR, TYRP1, SILV, prostaglandin metabolic genes, Wnt pathway modulator genes and lipid metabolism genes appear to be involved[10-11]. Melasma impacts patients' quality of life because most lesions are on the face. Melasma Quality of Life scale measures how melasma impacts patient emotions, social relationships, and everyday activities. The prevalence of pregnancy 18.7% (15/80), oral contraceptive pill uses 13.7% (11/80), sunshine exposure 23.7% (19/80), and family history of melasma 33.75% (27/80) was examined by Jagannathan et al[12]. The study aims to assess the frequency of melasma-causing factors to build a local viewpoint as environmental, sociodemographic, and genetic variables may affect control. Preventing recurrence requires identifying and avoiding aggravating variables[13]. This investigation may reveal new melasma risk variables that could inform clinical practice and preventive actions. It will assist provide early detection and management guidelines for these issues. Our tertiary care hospital serves many patients from across the nation. This study will set the standard for other health care facilities.

METHODS

This Cross-Sectional Descriptive study was held at the Dermatology Department, Dr. Ruth K.M Pfau Civil Hospital, Karachi, Pakistan for Six months after the approval of synopsis from May 31, 2021 to November 30, 2021. The required sample size came out to be 127 patients. By taking frequency of oral contraceptive pill use 13.7% margin of error =6% and confidence level 'C.I'=95%. This sample size was calculated using the WHO software and Non-Probability, Consecutive Sampling technique was used for sample selection.

Inclusion Criteria

- Patients presented with melasma for more than one month were included as per operational definition.
- Age 20-45 years

Exclusion Criteria

- Patients with history of taking hormone replacement therapy, tetracyclines, retinoids and antiepileptics.
- Patients with history of corticosteroids for > 1 month (chronic corticoid therapy). ▪ Patients with history of eczema of face.
- Patients with history of post-inflammatory hyperpigmentation like acne scarring. ▪ Patients with history of diabetes mellitus and Addison's disease.

▪ Patients with history of hyperthyroidism or hypothyroidism.

With permission from the College of Physicians and Surgeons Pakistan, this study was carried out. Enrollment in the study took place from the Civil Hospital, Karachi Outpatient Department of Dermatology for patients who met the criteria of inclusion and had a history of melasma and presented for regular follow-up as specified in the operational definition. All patients gave their informed consent before being assigned to a sample or having their data used in research. A brief medical history was obtained, including age, residency status, and the length of the melasma. According to the operation definition, the researcher questioned the patients about the causes of melasma, which included pregnancy, using oral contraceptives, being in the sun, and having a family history of the condition. The results of the quantitative variables (age and length of melasma) and qualitative variables (type of house, employment status, educational attainment, family monthly income status, residential status, sunscreen use (>2 times per week over the previous six months), and veil status) were recorded in the performa.
With SPSS Version 20, data analysis was done. For the quantitative data, such as age and length of melasma, mean and standard deviations were computed. For regularly distributed quantitative data, mean±SD was published, whereas for non-normally distributed quantitative variables, median (IQR) was supplied. Frequencies and percentages for the qualitative variables such as the type of home, occupation, educational attainment, family monthly income, sunscreen and veil use, and the factors that contribute to melasma (pregnancy, use of oral contraceptives, sun exposure, and family history of melasma). To see how effect modifiers (pregnancy, oral contraceptive pill use, sunlight exposure, and family history of melasma) affected the outcome, effect modifiers were controlled through stratification of residential status, age, family monthly income status, occupational status, educational status, type of house, sunscreen use, veil status, and duration of melasma. Following stratification, the Chi square test and Fischer test were applied, and a p-value of less than 0.05 was taken as significant.

RESULTS

In this study 127 patients were included to assess the factors leading to the development of melasma in female patients and the results were analyzed as: The distribution of continuous variables was tested by applying Shapiro-Wilk test for age (P=0.0001) and duration of melasma (P=0.0001) as shown in TABLE 1.

TABLE # 1 DESCRIPTIVE STATISTICS FOR DISTRIBUTION OF CONTINUOUS VARIABLE n=127

VARIABLES	MEAN±SD	P-VALUE
Age (years)	29.83±7.18	0.0001
Duration of melasma (months)	47.95±15.84	0.0001

The patients age ranged from 20 to 45 years with a median of 31 with interquartile range 14 and C.I (28.57----31.09) as shown in TABLE 2.

TABLE # 2: DESCRIPTIVE STATISTICS OF AGE n=127

DESCRIPTIVE			Statistic	Std. Error
AGE (Years)	Mean		29.83	0.638
	95% Confidence Interval for Mean	Lower Bound	28.57	
		Upper Bound	31.09	
	5% Trimmed Mean		29.66	
	Median		31.00	
	Variance		51.621	
	Std. Deviation		7.185	
	Minimum		20	
	Maximum		45	
	Range		25	

	Interquartile Range		14	
	Skewness		0.048	0.215
	Kurtosis		-1.197	0.427

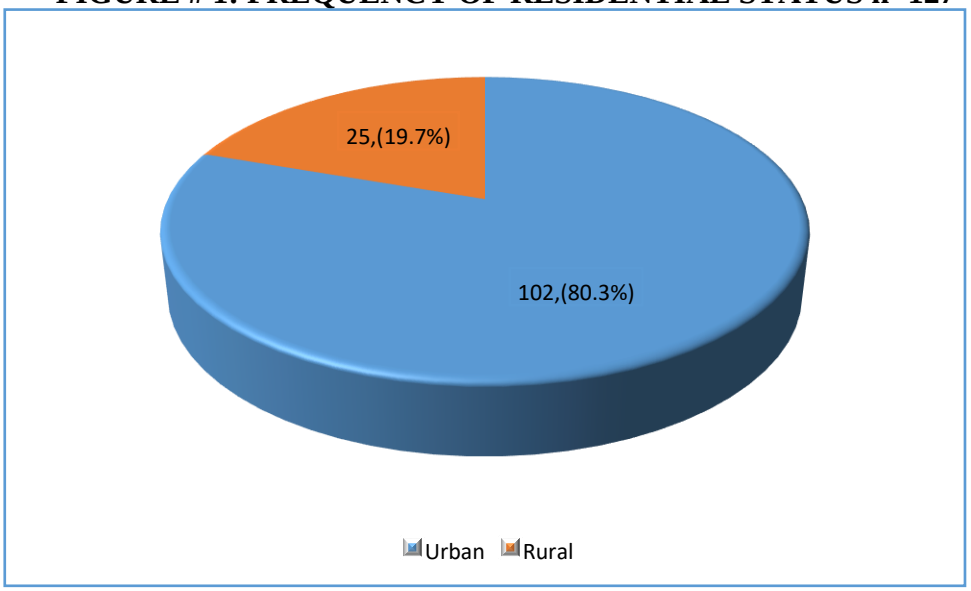
The duration of melasma of the patients ranged from 3 to 60 months with a median of 55 with interquartile range 15 and C.I (45.17---- 50.74) as shown in TABLE 3.

TABLE # 3: DESCRIPTIVE STATISTICS FOR DURATION OF MELASMA n=127

DESCRIPTIVE			Statistic	Std. Error
DURATION (months)	Mean		47.95	1.406
	95% Confidence Interval for Mean	Lower Bound	45.17	
		Upper Bound	50.74	
	5% Trimmed Mean		49.56	
	Median		55.00	
	Variance		251.061	
	Std. Deviation		15.845	
	Minimum		3	
	Maximum		60	
	Range		57	
	Interquartile Range		15	
	Skewness		-1.498	0.215
	Kurtosis		1.036	0.427

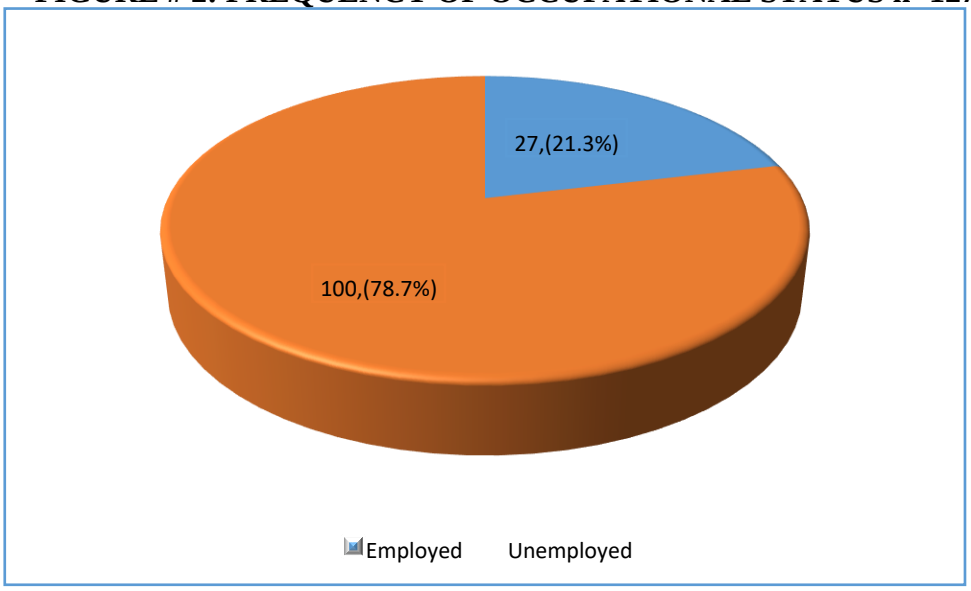
In distribution of residential status, 102 (80.3%) were residence of urban area while 25 (19.7%) were rural as shown in FIGURE 1.

FIGURE # 1: FREQUENCY OF RESIDENTIAL STATUS n=127



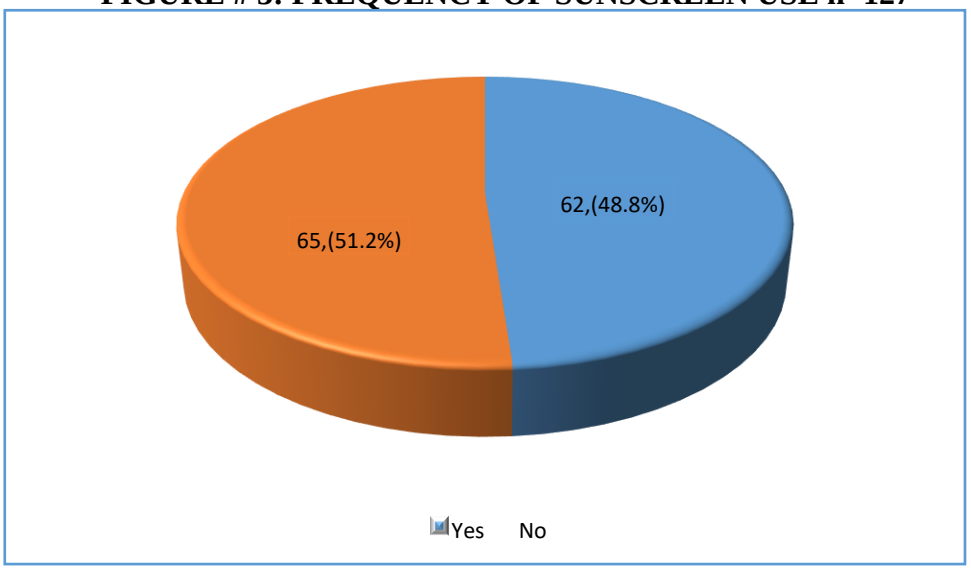
In distribution of Family monthly income ≤ 25,000 PKR was documented in 26 (20.5%), 25,000---50,000 was noted in 76 (59.8%) while family income ≥ 50,000 PKR was noted in 25 (19.7%) patients. Out of 127 patients, 27 (21.3%) were employed while 100 (78.7%) patients were unemployed as shown in FIGURE 2.

FIGURE # 2: FREQUENCY OF OCCUPATIONAL STATUS n=127



In distribution of educational status, illiterate was 7 (5.5%) patients, primary education was noted in 20 (15.7%), secondary education in 61 (48.0%) while higher level education was noted in 39 (30.7%) patients. In distribution of type of house, 84 (66.1%) patients were living in apartment while 43 (33.9%) were resident of bungalows. Out of 127 patients 62 (48.8%) were user of sunscreen as shown in FIGURE 3.

FIGURE # 3: FREQUENCY OF SUNSCREEN USE n=127



Veil status was noted in 46 (36.2%) patients. In distribution of factors leading to melasma, pregnancy was noted in 25 (19.7%) patients, oral contraceptive 18 (14.2%), sunlight exposure 31 (24.4%) while family history of melasma was noted in 44 (34.6%) patients as shown in TABLE 4.

TABLE # 4: FREQUENCY OF FACTORS LEADING TO MELASMA n=127

FACTORS LEADING TO MELASMA	FREQUENCY (%)	
	YES	NO
Pregnancy	25 (19.7%)	102 (80.3%)
Oral Contraceptive	18 (14.2%)	109 (85.8%)
Sunlight Exposure	31 (24.4%)	96 (75.6%)
Family History of Melasma	44 (34.6%)	83 (65.4%)

Stratification of age, residential status, occupational status, type of house, sunscreen use and duration of melasmas were done with respect to factors leading to melasma i.e., (Pregnancy, oral contraceptive pill use, sunlight exposure and family history of melasma) for statistical difference from TABLE [5-10].

TABLE # 5: STRATIFICATION OF AGE GROUP WITH FACTORS LEADING TO MELASMA n=127

FACTORS LEADING TO MELASMA		**AGE GROUP** [years]		**P-VALUE**
		20 – 30	**>30**	
Pregnancy	Yes	10 (7.9%)	15 (11.8%)	0.370
	No	51 (40.2%)	51 (40.2%)	
Oral Contraceptive	Yes	7 (5.5%)	11 (8.7%)	0.402
	No	54 (42.5%)	55 (43.3%)	
Sunlight Exposure	Yes	17 (13.4%)	14 (11.0%)	0.383
	No	44 (34.6%)	52 (40.9%)	
Family History of Melasma	Yes	21 (16.5%)	23 (18.1%)	0.960
	No	40 (31.5%)	43 (33.9%)	

TABLE # 6: STRATIFICATION OF RESIDENTIAL STATUS WITH FACTORS LEADING TO MELASMA n=127

FACTORS LEADING TO MELASMA		**RESIDENTIAL STATUS**		**P-VALUE**
		URBAN	**RURAL**	
Pregnancy	Yes	19 (15.0%)	6 (4.7%)	0.545
	No	83 (65.4%)	19 (15.0%)	
Oral Contraceptive	Yes	12 (9.4%)	6 (4.7%)	0.116
	No	90 (70.9%)	19 (15.0%)	
Sunlight Exposure	Yes	26 (20.5%)	5 (3.9%)	0.387

TABLE # 7: STRATIFICATION OF OCCUPATIONAL STATUS WITH FACTORS LEADING TO MELASMA n=127

FACTORS LEADING TO MELASMA		**OCCUPATIONAL STATUS**		**P-VALUE**
		EMPLOYED	**UNEMPLOYED**	
Pregnancy	Yes	6 (4.7%)	19 (15.0%)	0.709
	No	21 (16.5%)	81 (63.8%)	
Oral Contraceptive	Yes	3 (2.4%)	15 (11.8%)	0.437
	No	24 (18.9%)	85 (66.9%)	
Sunlight Exposure	Yes	4 (3.1%)	27 (21.3%)	0.145
	No	23 (18.1%)	73 (57.5%)	
Family History of Melasma	Yes	7 (5.5%)	37 (29.1%)	0.283
	No	20 (15.7%)	63 (49.6%)	

TABLE # 8: STRATIFICATION FOR TYPE OF HOUSE WITH FACTORS LEADING TO MELASMA n=127

FACTORS LEADING TO MELASMA		**TYPE OF HOUSE**		**P-VALUE**
		APARTMENT	**BUNGLOW**	
Pregnancy	Yes	15 (11.8%)	10 (7.9%)	0.469
	No	69 (54.3%)	33 (26.0%)	
Oral Contraceptive	Yes	12 (9.4%)	6 (4.7%)	0.959
	No	72 (56.7%)	37 (29.1%)	
Sunlight Exposure	Yes	18 (14.2%)	13 (10.2%)	0.274
	No	66 (52.0%)	30 (23.6%)	

TABLE # 9: STRATIFICATION OF SUNSCREEN USE WITH FACTORS LEADING TO MELASMA n=127

FACTORS LEADING TO MELASMA		SUNSCREEN USE		P-VALUE
		YES	NO	
Pregnancy	Yes	12 (9.4%)	13 (10.2%)	0.927
	No	50 (39.4%)	52 (40.2%)	
Oral Contraceptive	Yes	10 (7.9%)	8 (6.3%)	0.537
	No	52 (40.9%)	57 (44.9%)	
Sunlight Exposure	Yes	16 (12.6%)	15 (11.8%)	0.720
	No	46 (36.2%)	50 (39.4%)	

TABLE # 10: STRATIFICATION FOR DURATION OF MELASMA GROUP WITH FACTORS LEADING TO MELASMA n=127

FACTORS LEADING TO MELASMA		DURATION [months]		P-VALUE
		3 – 50	>50	
Pregnancy	Yes	6 (4.7%)	19 (15.0%)	0.066
	No	45 (35.4%)	57 (44.9%)	
Oral Contraceptive	Yes	7 (5.5%)	11 (8.7%)	0.906
	No	44 (34.9%)	65 (51.2%)	
Sunlight Exposure	Yes	15 (11.8%)	16 (12.6%)	0.282
	No	36 (28.3%)	60 (47.2%)	
Family History of Melasma	Yes	17 (13.4%)	27 (21.3%)	0.799
	No	34 (26.8%)	49 (38.6%)	

DISCUSSION

Melasma, a frequent chronic acquired hypermelanosis, affects aesthetics and quality of life. It causes irregular brown homogeneous, symmetrical macules in sun-exposed areas, mainly on the face, in adult females of reproductive age from all ethnicities[14]. Melasma epidermis shows local melanocytic hyperactivity without melanocyte hyperplasia. Increased melanosome quantity and maturity cause all epidermal layer's hyperpigmentation. Mild lymphocytic infiltration and dermal elastosis are seen in many cases. Though, exact pathophysiology is still unclear. Melasma formation is linked to several causes, however none are solely responsible[15]. Pregnancy, oral contraceptive pills, hormonal therapy, photosensitizing drugs, cosmetics, mental stress, endocrinopathies, genetic susceptibility, anticonvulsants and sunlight exposure are the main causes of melasma. Population-based studies in pregnant women found prevalence of melasma of 10–75%, suggesting ethnicity and sun exposure are determinants. Melasma, a common macular hyperpigmentation condition, affects sun-exposed face and neck. Genetics, UV exposure, pregnancy, hormonal therapy, and cosmetics can cause melasma. Three clinical patterns are centrofacial, malar, and mandibular. Although anyone can get melasma, it's more common in women, dark-skinned persons, and people in high UV-index regions. Melasma is one of the most common dermatology consultations for dark-skinned patients due to its disfiguring character. Emotional and psychological effects are important. Melasma treatment inhibits melanocyte activity, stops melanosome production, and promotes breakdown[16-17]. Melasma treatment commonly includes sunscreen and skin lighteners. Dermatologists struggle to treat melasma because there is no gold standard and recurrences are common. Melasma, the most frequent acquired hypermelanosis in women, with brownish and grey black, bilaterally symmetrical facial macules and patches[18] Mostly over the top lips, nose, cheeks, forehead, and chin. Most melasma is epidermal, followed by dermal and mixed kinds. It affects women more than males. Many researches have examined the causes of melasma, including pregnancy, oral contraceptives, sun exposure, and iron deficiency. The patients were 20–45 years old with a median of 31 and interquartile range 14. Amin et al. found a mean age of 30±5.5 years.

Pregnancy was seen in 25 (19.7%) patients, oral contraceptive in 18 (14.2%), sunshine exposure in 31 (24.4%), and family history in 44 (34.6%). Guinot C, et al. found 51% sun exposure, 51% pregnancy, and 38% oral contraceptive use[19-20]. Jagannathan M, et al. found 13.7% oral contraceptive pill use[21]. Another study reported contraceptive pills (16.2%), pregnancy (36.4%) and exposure to sun (26.9%), whereas Amin N, et al. discovered 50 out of 88 patients had pregnancy (56.8%), 24.8% had sun exposure, and 1.1% had oral conceptive use[22]. The Epidermal-melanin unit hyperactivates locally, causing melasma. Many factors affect lesion development and maintenance due to environmental and hormonal interactions. Sun exposure, pregnancy, sexual hormones, photosensitive drugs, and genetic predisposition are known triggers, but its pathophysiology is unknown[23-24]. The study of melasma risk factors allows statistical risk models to be created to identify those at risk and plan primary prevention strategies like strong photoprotection, less sex hormone exposure, and earlier treatments. Although the actual pathophysiology of melasma is unknown, genetic predisposition and environmental variables including sun exposure may contribute to its greater occurrence in summer on exposed body parts[25]. Female hormones contribute to melasma's increased prevalence in women, especially during pregnancy. Since melasma requires long-term treatment and its aetiology is unknown, study has focused on underlying and contributing factors to better understand the condition.

CONCLUSION

It is to be concluded that family history of melasma was found noted as most common factor leading to melasma followed by sunlight exposure and pregnancy. More prospective and well-controlled trials are needed to validate the current findings.

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