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RESEARCH ARTICLE **OPEN ACCESS**

Clinical and Epidemiological Features of Melasma in Women of Iran: A Cross-sectional Study

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Abstract:

Background: Melasma is a chronic skin disorder that is characterized by the accumulation of irregular brown pigments in the skin. Lesions are usually seen on the forehead, temples, upper lip, and cheeks. This disease is one of the most common reasons for women to visit dermatologists.

Aim: The present study was conducted to determine the clinical and epidemiological characteristics of melasma in women referred to the dermatology clinic.

Methods: This is a cross-sectional study that was conducted on 100 women who were referred to the dermatology clinic of Imam Khomeini Hospital in Jiroft City in the first half of 2021 using a convenient sampling method. Data were collected using a researcher-made checklist and analyzed using SPSS-v20 statistical software and descriptive and inferential tests at a significance level of $p<0.05$.

Results: The average age of women with melasma was 32.8±0.64 years. The majority of clients had skin type four (57%) and skin type three (30%). The spread of pigmentation was mainly centro facial (62%), and there was a positive family history in 43% of cases. Moreover, it was found that melasma is not related to any of the variables of age, number of children, duration of the disease, marital status, family history, history of hormonal treatment, history of pregnancy and subsequent exacerbation, thyroid disease and polycystic ovary syndrome, and use of night creams and sunscreen.

Conclusion: Melasma is a relatively common disease in Iran. Additional studies are needed to find the epidemiological and underlying variables and treatment of melasma.

Keywords: Melasma, Epidemiology, Skin, Women, Dermatology, Clinical.

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1. INTRODUCTION

Facial spots or melasma is a chronic skin disorder that leads to the accumulation of pigments in the skin tissue. This disorder appears as symmetrical, spot-like, and brown spots on the skin. This type of accumulation of pigments on the face is sometimes called chloasma, but because this word means green skin, the term melasma, meaning brown skin, is preferred [1, 2].

Melasma is more common in women than men. Depending on the population studied, only 1 out of 4 or even 1 out of 20 people with melasma are men. In general, this disease starts between the ages of 20 and 40, but it may also start in childhood or before reaching middle age [3, 4].

Melasma is more common in people whose skin is tan or have naturally brown skin (skin types 3 and 4). People who have light skin (skin types 1 and 2) or black people (skin types 5 or 6) are less exposed to melasma [5, 6].

The skin consists of three layers. The outer layer of the epidermis is the middle layer or dermis, and the deepest layer is the hypodermis. The skin is the largest organ of the body and accounts for approximately one-seventh of the body's weight. The skin is responsible for protecting the body. It protects bones, muscles, organs, *etc*., from cold and against germs, sunlight, moisture, toxins, injuries, and other substances. Moreover, the skin helps regulate the body temperature and prevents the loss of moisture and hydration [7, 8].

The epidermis layer of the skin contains cells called melanocytes that store and produce melanin (pigment). Melanocytes, in response to light, heat, or ultraviolet rays or with any type of hormonal stimulation, produce more melanin or pigment. For this reason, the skin becomes darker or darkens in areas that are called spots [8, 9].

There are three types of melasma based on the depth of pigmentation. Wood's lamp emits black light and is used to determine the depth of skin pigmentation and type of melasma spot. The three types of melasma spots are 1) epidermal (superficial); epidermal melasma has a dark brown color. This type of spot has a clearly defined and clear border and is visible under black light, and in many cases, it is easily treatable. 2) Dermal (intermediate): dermal melasma is light brown or bluish, has a blurred border, is not easily visible under a black light, and does not usually respond well to treatment. 3) Mixed melasma: Mixed or combined melasma, which is the most common type among these three types, has blue and brown spots, shows a mixed pattern under black light, and responds to treatment to some extent [10, 11].

The cause of melasma is complex. The accumulation of pigments in the skin tissue is due to the excessive production of melanin by pigment cells (melanocytes). Melanocytes are absorbed by keratinocytes (epidermal melanosis) or stored in the dermis (dermal melanosis) [12, 13].

The distribution patterns of lesions in different areas of the face are: Centro facial pattern: distribution in the forehead, nose, cheeks, upper lip, and chin; Malar pattern: distribution in the nose and cheeks, and Mandibular pattern: distribution in the ramus of the mandible [14].

Risk factors of melasma can be sunlight, ultraviolet rays, visible or infrared light (heat), hormonal changes in the body, taking drugs, anticonvulsants, contraceptives, estrogen/diethyl acetyl bestrol, genetics, low thyroid curry, pregnancy, soaps and cosmetic products [15, 16].

Studies reported that a genetic background can play a role in developing melasma, as at least one-third of patients report that other family members also have melasma. Melasma is a chronic disorder for many people [17, 18].

Another risk factor associated with melasma may be pregnancy because in the third trimester of pregnancy, more estrogen, progesterone, and melanocyte-stimulating hormones are secreted, and this can cause skin spots during pregnancy. In addition to these studies, it has been shown that postmenopausal women who use progesterone hormone therapy have a significantly increased chance of melasma on their skin [6].

Changes in the level of hormones during pregnancy, hormonal treatment or the use of birth control pills, exposure to sunlight, and some skin products can be the causes of melasma. It is also possible that a genetic component causes this disease because people whose relatives have had skin melasma at least once are more likely to develop melasma spots than others [19, 20].

Since melasma occurs in open areas of the body, especially on the face, it affects the appearance of the sufferers. Although skin lesions rarely affect the physical health of the patient, due to the psychological and social aspects of the disease, it almost always affects the general health of the patient and has an obvious effect on the quality of life of the sufferer, as well as the self-concept and self-confidence of the patient. Despite the importance of melasma and the many problems it causes for women in terms of beauty and cost of treatment, so far, limited studies have been conducted on the clinical and epidemiological characteristics of melasma and its prevalence only in pregnancy. Therefore, in this study, we decided to determine the clinical and epidemiological characteristics of melasma in women referred to the dermatology clinic of Imam Khomeini Hospital in Jiroft City.

2. MATERIALS AND METHODS

This is a cross-sectional (descriptive) study that was conducted using available sampling on 100 women with melasma who were referred to the dermatology clinic of Imam Khomeini Hospital in Jiroft City in the first 6 months of 2021.

One hundred patients referred to the Dermatology Clinic of Imam Khomeini Hospital in Jiroft were evaluated. Female gender, age 15-50 years, absence of concomitant skin disease when referring to inclusion criteria, unwillingness to participate in the study, presence of skin disease or new skin disease were considered as exclusion criteria.

The data collection tool was a checklist made by the researcher. The data was collected by taking the history of the participants and completing a checklist containing demographic information, skin condition, and questions about the previous records of the client. First, women with melasma were identified based on the criteria of the Dermatology Association. After setting the time, a face-to-face meeting was held. In this meeting, the objectives of the research were explained to women with melasma, and those eligible to enter the study were informed about the conditions and details of the study by the attending physician. If they wanted to participate in this research, a written consent form was obtained from them, then the necessary questions were asked from the applicants based on the checklist, and the necessary examinations were performed on them.

To check the validity of the content, the checklist was given to 6 faculty members related to the topic of the research, and they were asked about the relevance of each item from the checklist to a four-choice question, including 1) irrelevant, 2) relevant but needs serious revision, 3) is relevant but needs partial revision, and 4) is completely relevant to answer so that the Content Validity Index (CVI) can be calculated to check the validity of the content and they were also asked to rate each item that should answer a three-choice question, including 1) necessary, 2) useful but unnecessary, and 3) unnecessary so that the Content Validity Ratio (CVR) index can be calculated. Considering that the CVI score was 0.86 and the CVR score was 0.58, the content validity of the checklist was confirmed. Cronbach's alpha was used to measure reliability, which was 0.85.

To consider ethical considerations, data was collected after obtaining the code of ethics and making the necessary arrangements. The data were collected without the names and characteristics of the patients, and all the information of the patients, including the name and national information, remained confidential both during the study and after the study was completed, and the results were reported in general. SPSS version 22 software was used for data analysis. The Kolmogorov-Smirnov test was used to test whether the data followed a normal distribution, and the Quantitative data were expressed as Mean and Standard deviation. An Independent t-test was used to compare the involvement profiles between skin type groups. ANCOVA test was used to check the confounding effects. A significance level of less than 0.05 was considered.

3. RESULTS

In this study, 100 women with melasma were referred to the dermatology clinic of Imam Khomeini Hospital, affiliated with Jiroft University of Medical Sciences, during the first six months of 2019.

The average age of the studied women was 32.8 ± 0.64 years, and 84% were married. The average number of children was 1.53±0.12, and the average duration of melasma was 4.63±0.38 years (Table **1**).

Table **2** presents the distribution of the statistical population according to skin type, family history, history of baking bread, history of long exposure to the sun, history of pregnancy in terms of exacerbation or occurrence of symptoms after pregnancy, history of hormonal treatment, history of thyroid disease, history of syndrome polycystic ovary, use of night cream, use of sunscreen, and melasma distribution pattern on the face (Table **2**).

Table 1. Distribution of the statistical population according to demographic variables.

Total Number of People	100
Age [years] [mean ± standard deviation]	32.8±0.64
Number of children [number] [mean ± standard deviation]	1.53±0.12
Duration of infection [years] [mean ± standard deviation]	4.63±0.38
Marriage [married] [number] [percentage]	84 (84 percent)

Table 2. Distribution of statistical population according to skin type.

Variables		Frequency	Percent
Skin type	2	2	2.0
	3	30	30.0
	4	57	57.0
	5	11	11.0
	Sum	100	100.0
Historical family	Yes	43	43.0
	No	57	57.0
	Total	100	100.0
History of baking bread	Yes	20	20.0
	No	80	80.0
	Total	100	100.0

(Table 2) contd.....

Variables		Frequency	Percent
Sun exposure history	Yes	40	40.0
	No	60	60.0
	Total	100	100.0
History of exacerbation or occurrence of symptoms after pregnancy	Yes	43	43.0
	No	57	57.0
	Total	100	100.0
History of hormone therapy	Yes	43	43.0
	No	57	57.0
	Total	100	100.0
History of thyroid disease	Yes	11	11.0
	No	89	89.0
	Total	100	100.0
History of polycystic ovary syndrome	Yes	22	22.0
	No	78	78.0
	Total	100	100.0
Use night cream	Yes	39	39.0
	No	61	61.0
	Total	100	100.0
Use of sunscreen	Yes	36	36.0
	No	64	64.0
	Total	100	100.0
Dispersion pattern of melasma on the face	Malar	34	34.0
	Centrofacial	62	62.0
	Mandibular	4	4.0
	Total	100	100.0

Table 3. Distribution of melasma on the face according to marital status, skin type, family history, history of baking bread, history of long exposure to the sun, occurrence or exacerbation of symptoms after pregnancy, and use of hormonal drugs.

Variables			Marital Status		Sum
			Single	Married	
Conflict pattern	Malar	Number	6	28	34
		Percentage in disease pattern	17.6%	82.4%	100.0%
	Centrofacial	Number	9	53	62
		Percentage in disease pattern	14.5%	85.5%	100.0%
	mandibular	Number	1	3	4
		Percentage in disease pattern	25.0%	75.0%	100.0%
Sum		Number	16	84	100
		Percentage in disease pattern	16.0%	84.0%	100.0%

Variables			Skin Type				Sum
			-	2	3	4	5	
Conflict pattern	Malar	Number	2	10	16	6	34
		Percentage in disease pattern	5.9%	29.4%	47.1%	17.6%	100.0%
	Centrofacial	Number	0	20	38	4	62
		Percentage in disease pattern	0.0%	32.3%	61.3%	6.5%	100.0%
	Mandibular	Number	0	0	3	1	4
		Percentage in disease pattern	0.0%	0.0%	75.0%	25.0%	100.0%
Sum		Number	2	30	57	11	100
		Percentage in disease pattern	2%	30.0%	57.0%	11.0%	100.0%

(Table 3) contd.....

Variables			Family History		Sum
			Yes	No	
Conflict pattern	Malar	Number	13	21	34
		Percentage in disease pattern	38.2%	61.8%	100.0%
	Centrofacial	Number	28	34	62
		Percentage in disease pattern	45.2%	54.8%	100.0%
	Mandibular	Number	2	2	4
		Percentage in disease pattern	50.0%	50.0%	100.0%
Sum		Number	43	57	100
		Percentage in disease pattern	43.0%	57.0%	100.0%

Variables			History of Baking Bread		Sum
			Yes	No	
Conflict pattern	Malar	Number	7	27	34
		Percentage in disease pattern	20.6%	79.4%	100.0%
	Centrofacial	Number	13	49	62
		Percentage in disease pattern	21.0%	79.0%	100.0%
	Mandibular	Number	0	4	4
		Percentage in disease pattern	0.0%	100.0%	100.0%
Sum		Number	20	80	100
		Percentage in disease pattern	20.0%	80.0%	100.0%

Variables			History of Baking Bread		Sum
			Yes	No	
Conflict pattern	Malar	Number	15	19	34
		Percentage in disease pattern	44.1%	55.9%	100.0%
	Centrofacial	Number	24	38	62
		Percentage in disease pattern	38.7%	61.3%	100.0%
	Mandibular	Number	1	3	4
		Percentage in disease pattern	25.0%	75.0%	100.0%
Sum		Number	40	60	100
		Percentage in disease pattern	40%	60.0%	100.0%

Variables			History of Baking Bread		Sum
			Yes	No	
Conflict pattern	Malar	Number	17	17	34
		Percentage in disease pattern	50.0%	50.0%	100.0%
	Centrofacial	Number	26	36	62
		Percentage in disease pattern	41.9%	58.1%	100.0%
	Mandibular	Number	0	4	4
		Percentage in disease pattern	0.0%	100%	100.0%
Sum		Number	43	57	100
		Percentage in disease pattern	43%	57%	100.0%

Regarding age, the sum of squares between groups was 103.67, the sum of squares within the group was 3916.33, and the total sum of squares was 0.4020. The F value for age was equal to 1.28, and it was not statistically significant (P-value=0.35). In other words, the hypothesis was not accepted and age has no effect on the different groups of the conflict pattern.

Regarding the number of children, the sum of squares between groups was 5.27, the sum of squares within groups was 129.64, and the total sum of squares was 134.91. The F value for the number of children was equal to 1.97, and it was not statistically significant at the $P<0.05$ level. In other words, the hypothesis was not accepted. The number of children did not affect the different groups of the conflict pattern.

Regarding the years of disease, the sum of squares

between groups was 55.67, the sum of squares within groups was 1353.64, and the sum of squares was 1409.31. The F value for the years of infection was equal to 1.99 and was not statistically significant (P-value=0.38). In other words, the hypothesis was not accepted. The years of infection did not affect the different groups of the conflict pattern.

The relationship between marriage and melasma of the patients was investigated using a cross table. According to the chi-square test, there was no statistically significant relationship between marriage, skin type, family history, history of baking bread, history of long-term exposure to the sun, occurrence or exacerbation of symptoms after pregnancy, and the use of hormonal drugs and melasma in patients (P-value=0.25) (Table **3**).

The relationship between the history of thyroid disease and melasma was investigated using a cross table. According to the chi-square test, there was no statistically significant relationship between the history of polycystic ovary syndrome, history of thyroid disease, and history of using night cream, sunscreen, and melasma (P-value=0.31) (Table **4**).

4. DISCUSSION

Melasma is an acquired hypomelanosis that occurs in the form of irregular light to dark-brown macules and patches in sun-exposed areas of the body. Lesions are usually seen on the forehead, temples, upper lip, and cheeks [21].

The findings of the present study showed that the women with melasma had no history of specific underlying disease or skin disease, and the majority were in their fourth decade of life. This research finding is in line with the study by Sarkar *et al*. [22], but it was significantly different from the study by Handa *et al*. [23]. This difference in the findings could be due to the selection of age groups, gender, and different geographical conditions.

Table 4. Distribution of melasma according to history of polycystic ovary syndrome, history of thyroid disease, and history of using night cream and sunscreen.

Variables			History of Polycystic Ovary Syndrome		Sum
			Yes	No	
Conflict pattern	Malar	Number	7	27	34
		Percentage in disease pattern	20.6%	79.4%	100.0%
	Centrofacial	Number	15	47	62
		Percentage in disease pattern	24.2%	75.8%	100.0%
	Mandibular	Number	0	4	4
		Percentage in disease pattern	0.0%	100.0%	100.0%
Sum		Number	22	78	100
		Percentage in disease pattern	22.0%	78.0%	100.0%

Variables			History of Thyroid Disease		Sum
			Yes	No	
Conflict pattern	Malar	Number	2	32	34
		Percentage in disease pattern	5.9%	94.1%	100.0%
	Centrofacial	Number	9	53	62
		Percentage in disease pattern	14.5%	85.5%	100.0%
	Mandibular	Number	0	4	4
		Percentage in disease pattern	0.0%	100.0%	100.0%
Sum		Number	11	89	100
		Percentage in disease pattern	11.0%	89.0%	100.0%

Variables			History of using a Night Cream		Sum
			Yes	No	
Conflict patterns	Malar	Number	9	25	34
		Percentage in disease pattern	26.5%	73.5%	100.0%
	Centrofacial	Number	28	34	62
		Percentage in disease pattern	45.2%	54.8%	100.0%
	Mandibular	Number	2	2	4
		Percentage in disease pattern	50.0%	50.0%	100.0%
Sum		Number	39	61	100
		Percentage in disease pattern	39.0%	61.0%	100.0%

(Table 4) contd.....

Variables			History of using sunscreen		Sum
			Yes	No	
Conflict pattern	Malar	Number	10	24	34
		Percentage in disease pattern	29.4%	70.6%	100.0%
	Centrofacial	Number	23	39	62
		Percentage in disease pattern	37.1%	62.9%	100.0%
	Mandibular	Number	3	1	4
		Percentage in disease pattern	75.0%	25.0%	100.0%
Sum		Number	36	64	100
		Percentage in disease pattern	36.0%	64.0%	100.0%

The findings of the present study showed that the majority of clients had skin type three and four. This type of melasma is common among Iranians. In a study by Sarkar *et al*., most of the studied cases had medium skin type [22]. Moreover, the issue of ethnicity and race living in the study area should also be taken into account, which can be a confounding factor in the results of the study, especially in terms of skin type.

The findings of the present study showed that the majority of patients did not have long exposure to the sun, which was in line with the results of a study by Handa *et al*. [23].

The findings of the present study showed that among the studied patients, family history did not affect the disease. This finding was contradictory to the findings of studies by Lee *et al*. [24] and Adalatkhah *et al*. [25]. This difference in findings could be due to ethnic and racial differences in different research environments.

The findings of the present study showed that most of the affected people had no history of baking bread, which was contrary to the study by Sarkar *et al*. [22]. The results of their study showed that the duration of exposure to fire and cooking, as well as exposure to occupational heat, may be related to the severity of melasma. This difference in research findings can be related to the selection of different study groups in terms of age, sex, occupation, and different geographical conditions.

The findings of the present study showed that the majority of clients did not have a positive history of long-term exposure to the sun. This finding was in agreement with the study by Handa *et al*. [23] and contrary to the study by Lee *et al*. [24] and Sarkar *et al*. [22]. This difference could be due to the selection of different groups in terms of age, gender, occupation, and geographical conditions.

The findings of the present study regarding the occurrence or exacerbation of symptoms after pregnancy showed that among the studied patients, the history of pregnancy did not affect the occurrence or exacerbation of disease symptoms. This issue is largely contradictory to the existing studies and knowledge regarding the exacerbation of disease symptoms during and after pregnancy. The results of studies show that melasma has a significant relationship with pregnancy, and pregnancy is known as one of the underlying factors of melasma [5, 24, 26].

The findings of the present study showed that the history of taking hormonal drugs was not related to the occurrence or exacerbation of disease symptoms, and this finding was in line with the findings of a study by Farnaghi *et al*. [27]. This finding of the present study was inconsistent with the results of a study by Athar *et al*. [5], demonstrating that the use of hormonal drugs and contraceptives has a significant relationship with melasma.

The findings of the present study showed that the majority of clients (melasma sufferers) had no history of thyroid problems and polycystic ovary syndrome. This finding of the present study was in line with the results of a study by Athar *et al*., which reported no significant relationship between suffering from melasma and thyroid problems in the studied subjects [5].

The findings of the present study showed that about two-thirds of the affected patients did not use night cream or sunscreen. This finding agreed with the study by Sarkar *et al*. [22]. Moreover, in this regard, the results of a study by Athar *et al*. reported no significant relationship between melasma and the use of sunscreen.

he findings of the present study were examined in terms of the conflict pattern. The melasma in the majority of clients was centrofacial. This finding of the current research was in line with two studies that were conducted in our country by Farnaghi *et al*. [27] and Adalatkhah *et al*. This finding of the current study was inconsistent with the results of the study by Handa *et al*. [23], in which the predominant pattern of conflict in the studied subjects was malar.

CONCLUSION AND RECOMMENDATIONS

he results of the present study showed that melasma is not related to any of the variables of age, number of children, duration of the disease, marital status, family history, history of hormonal treatment, history of pregnancy and subsequent exacerbation, thyroid disease and polycystic ovary syndrome, and use of creams. No significant relationship was found between nighttime and sunscreen. Therefore, considering that melasma is a relatively common disease in Iran, it is necessary to conduct complementary and systematic studies to find its epidemiological and underlying variables and treatment.

LIMITATIONS OF THE STUDY

This study had limitations. Among the several limitations of the current research, the following can be mentioned:

1- This research was limited to comparing the results with other related studies. This limitation has been due to the lack of resources and related studies.

2- This research is cross-sectional in nature. This makes it difficult to draw conclusions about causality. It is suggested that researchers design and implement future studies related to case-control type.

3- The results of the present study can be generalized to women referring to the skin clinic of Imam Khomeini Hospital in Jiroft. Therefore, the generalization of the findings of the present study is limited and caution should be taken in generalizing the results.

AUTHORS' CONTRIBUTIONS

It is hereby acknowledged that all authors have accepted responsibility for the manuscript's content and consented to its submission. They have meticulously reviewed all results and unanimously approved the final version of the manuscript.

ABBREVIATION

CVR = Content Validity Ratio

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study reports the results of a research project approved by the Jiroft University of Medical Sciences with the code of ethics (IR.JMU.REC.1400.063).

HUMAN AND ANIMAL RIGHTS

All procedures performed in the study involving human participants were according to the ethical standards of the institutional and national research committee and with the 1975 Helsinki Declaration and its later amendments or comparable ethical standards.

CONSENT FOR PUBLICATION

Written informed consent has been taken from the patients.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data and supportive information are available within the article.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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