Journal of Pakistan Association of Dermatologists. 2024;**34(4)**:985-995.

Original Article

A clinico-epidemiological study and quality of life assessment in melasma at a tertiary care centre in South India

Kannan Gopalan, Indhumathi Gunasegaran, Attar Aliya Anjum, Seethalakshmi Ganga Vellaisamy, Navakumar Manickam

Department of Skin & STD, Vinayaka Mission's Kirupanandha Variyar Medical College & Hospital, Vinayaka Mission's Research Foundation (Deemed to be University), Salem, Tamilnadu, India.

Abstract

Objective To study the clinico-epidemiological features and the effect of melasma on the QOL of patients in a tertiary care hospital.

Methods Hundred patients with melasma was studied and the Quality of life was determined by melasma quality of life (MELASQOL) questionnaire.

Results Mean age of the study population was 41.8±7.1 years. Regarding MASI (melasma area severity index), 85 % had a score of 0-5, followed by 13% who had a MASI score of 6-10. The mean value of MASI is 3.563±2.7. In this study, 30% had a MELASQOL score of 10-20, 47% had a score of 21-30, 10% had a score of 31-40, 26% between 41-50, 6% had a score of 51-60, and 1% showed a score of 61-70. The mean value of the MELASQOL score is 30.86. There was no statistically significant association between MelasQoL and sex, education, marital status, duration of melasma, pattern of melasma, and severity of melasma.

Conclusion Negative effect of melasma on the quality of life is not captured by MASI. Therefore, QOL should be assessed, and treatment should be planned by taking in to account the psychosocial and emotional stress.

Key words
Melasma; Epidemiology; Melasma Area Severity Index; Melasma quality of life.

Introduction

Melasma is one of the most common acquired symmetrical pigmentary dermatoses characterized by confluent grey- brown macules or patches that occur most commonly on the face. Reported prevalence of melasma ranges from 9 to 40% in Hispanic populations in the southern part of United States and Southeast Asians respectively.[1] It is cited as the most common pigmentary dermatoses in Indian women.[2] Various etiological factors which have been linked in the pathogenesis are ultraviolet radiation exposure, pregnancy, oral contraceptive pills, hormonal replacement therapy and cosmetic products, phototoxic and anti-epileptic drugs.[3]

Facial melasma lesions can be classified in to three types such as (i) centrofacial pattern (ii) malar pattern and (iii) mandibular pattern. Kimbrough-Green *et al;* devised the Melasma Area Severity Index score (MASI) to assess the

Manuscript: Received on: January 18, 2024
Revision on: February 29, 2024
Accepted: April 22, 2024
Address for correspondence
Dr. G.V. Seethalakshmi MD (DVL)
11, Mullai Nagar, Near Chandra Mahal,
Seelanaickenpatty, Salem- 636201,Tamilnadu, India.
Ph: 91-98434 66486
Email: dr.seethalakshmiyadav@gmail.com

severity of melasma.[4] Hyperpigmentation, Affected Area and homogeneity of pigmentation was taken in to account for calculating MASI.[5]

The unsightly appearance of the melasma is having a significant impact on life quality, thereby having notable psychosocial repercussions. Even though the MASI score is used to assess the severity of melasma clinically, but it was not able to evaluate the effect of the melasma on the quality of life (QOL) which is very important in deciding the treatment protocol.

In 2003, Balkrishnan *et al*. formulated a new tool called the melasma quality of life (MELASQOL) questionnaire which measured the health-related QOL of people suffering from melasma.[6] In melasma patients, public life, emotive well-being, recreation, and leisure activities were the most commonly impacted areas of QOL as per his observation.[6] In this back drop, our study is aimed to shed light on the clinical profile of melasma and also to ascertain the QOL in such patients.

Methods

After obtaining permission from the ethical committee (VMKVMCH/IEC/20/23), we conducted this cross- sectional study in our department. Hundred patients with melasma who came to our department during the study period were included. Pregnant patients were excluded from the study.

Baseline demographic details was recorded on a questionnaire after getting consent from the participants. The data on precipitating factors, seasonal variation, stress, cosmetics, pregnancy, oral contraceptives, anti-epilepsy drugs, topical steroids, sunscreen usage, endocrine disorders and nutritional deficiency were taken into account. A detailed dermatological examination was performed, which included Fitzpatrick's skin type, pattern of melasma, and color of melasma. To identify whether its epidermal or dermal melasma, Wood's lamp examination was carried out in all the participants.

MASI score was used to assess the severity of melasma as follows:[4] The severity of the disease in each of the four quadrants (forehead, right malar region, left malar region, and chin) was measured centred on three parameters: percentage of the total area involved (A), darkness (D), and homogeneity (H). The effect of melasma on QOL was judged using the MELASQOL score with a questionnaire of 10 questions using a Likert scale of 1 to 7, in which score one signified not bothered at all and score seven signified bothered all the time. The MELASQOL score ranges from 7 to 70, with a higher score indicating a worse quality of life.[6]

All the collected data were compiled and analysis was done with IBM SPSS 27.0 software. Chi-square test was used to study the association between various factors. The level of significance was estimated with 95% confidence intervals and a P value of <0.05.

Results

The majority of the study subjects were of 31–40 years (44%), followed by 41–50 years (41%), 51–60 years (8%), 21–30 years (6%), and 61–70 years (1%). Mean age was 41.8±7.1 years. Most of them had their age of onset at 31–40 years (50%), followed by 41–50 years (36%), 21–30 years (8%), and >50 years (6%). Mean age of onset was 39.61±6.975. As melasma is mainly a disease of the female gender, 98 (98.0%) patients were females in this study **(Table 1)**. Most of the patients were from urban areas (61%). The majority of patients were literate (70%), and most were housewives (39%). Mean duration of the Melasma was 2.412±1.6133 years **(Table 1)**.

Table 1 Age, sex, residence, education and duration of melasma.

Mean age	41.8±7.1
Age	
21-30 yrs.	6
31-40 yrs.	44
41-50 yrs.	41
51- 60 yrs.	8
61-70 yrs.	1
Total	100
Age of onset	
21- 30 yrs.	8
31- 40 yrs.	50
41- 50 yrs.	36
>50 yrs.	8
Total	100
Sex	
Male	2
Female	98
Total	100
Residence	
Rural	39
Urban	61
Total	100
Education	
Literate	70
Illiterate	30
Total	100
Mean duration	2.412±1.6133
Duration of the disease	
< 3 months	4
3-6 months	14
6 months – 1 year	16
1-2 years	28
2-3 years	15
>3 years	23
Total	100

A family history of melasma was seen in 6% (n=6) of patients. Out of the 100 cases, most of the cases (82%) had a history of some exacerbating factors. In this study, 63% (n=63) gave a history of sun exposure duration greater than 1 hour, whereas the remaining 37% gave a history of sun exposure less than 1 hour. Out of the 100 cases, only 13% gave a history of using cosmetics. In the study population, 3% were taking treatment for hypothyroidism. Regarding associated systemic diseases, 8% of the patients had diabetes mellitus, 2% had systemic hypertension, 2% had bronchial asthma, and 1% had connective tissue disease (scleroderma) **(Table 2)**.

Among the 98 female patients, only 2 patients gave a history of the onset during pregnancy. In this study, 47% gave a history of stress and 16% gave a history of summer exacerbation, and 5% had winter exacerbations. Regarding Fitzpatrick skin type, 53% had Type V and 41% had Type IV **(Table 2)**.

Malar melasma (52%) was the common type followed centrofacial melasma (46%) and mandibular melasma (2%). Regarding the color of melasma, 73% had a light brown color, followed by 26% who had a dark brown color, and 1% had a bluish gray color. In Wood's lamp examination, 71% showed epidermal melasma, followed by dermal melasma (22%), and 7% showed mixed type. Regarding the clinical severity of melasma, majority had a MASI score of 0-5 (85%). The mean value of the MASI score is 3.563±2.7755 **(Table 2)**.

Out of the 100 cases in this study, 30% showed a

Table 2 Family history, aggravating factors, skin type, pattern, subtypes based on Wood's lamp and MASI score of Melasma

Variable	*Parameter*	*n*
Family history	Yes	6
	No	94
	Total	100
	Pregnancy	2
	Stress	47
	No aggravating factors	
Fitzpatrick skin type	Type III	4%
	Type IV	41%
	Type V	53%
	Type VI	2
	Total	100
Pattern of melasma	Malar	52
	Centrofacial	46
	Mandibular	2
	Total	84
Subtypes of melasma based on Woods lamp findings	Epidermal	71
	Dermal	22
	Mixed	7
	Total	100
MASI score	0-5	85
	6- 10	13
	>10	2
	Total	100

MELASQOL score 10-20, 47% had a score of 21-30, 10% had a MELASQOL score of 31-40, 26% had a MELASQOL score of 41-50, 6% had a MELASQOL score of 51-60, and 1% had a MELASQOL score of 61-70. The mean value of the MELASQOL score in our study population is 30.86.

In our study population for structured questions on the MelasQoL, in reply to the question about whether the appearance of their skin made them embarrassing, 48% told that they were sometimes bothered. The question of whether they were frustrated due to their skin condition was replied with sometimes worried by 42% of patients. The question of embarrassment due to their skin condition was replied with sometimes concerned by 35% whereas 30% stated not bothered or sometimes bothered. Feeling of depression and worried about their skin was replied as sometimes bothered by 34%. For the question does their skin condition impaired their societal relations, 28 % stated they were sometimes bothered, 26% replied not bothered at all. The question does their skin condition distresses their wish to be with others was replied as sometimes bothered by 25% of the people. In reply to the question does their skin condition is preventing them showing interest in other people, 39% said they not bothered at all and 22% stated sometimes bothered. For the question of feeling less attractive due to change in colour of their skin was replied as sometimes bothered by 22% of patients. In reply to the question do they feel less lively and creative due to their skin condition, 41% answered they were not bothered at all, while 23% stated sometimes bothered. The question of whether it impaired their feeling of freedom was replied with not bothered at all by 41%, while 24% stated not bothered at all. **Table 3** Shows the percentage distribution of individual domains of MelasQoL in the study population. Regarding the association between age of onset and MELASQOL, it was at a higher level in the study population who had their age of onset in the range of 31-40 years with a p-value of 0.398. The malar type of melasma has a higher

Table 3 Percentage distribution of individual domains of MELASQOL in the study population.

Individual domain	*Not bothered at all*	*Not bothered most of the time*	*Not bothered (or) sometimes bothered*	*No feelings either way*	*Sometimes bothered*	*Bothered most of the time*	*Bothered all the time*
Skin appearance	14%	5%	24%	0	48%	8%	1%
Frustration due to skin condition	21%	8%	22%	1%	42%	5%	1%
Embarrassment at skin condition	23%	7%	30%	0	35%	4%	1%
Depressed by the skin condition	27%	9%	23%	1%	34%	5%	1%
Effects of the skin condition on relations with other people	26%	11%	28%	2%	24%	7%	2%
Effects of the skin condition on the desire to be with other people	32%	12%	22%	2%	25%	6%	1%
Difficulty in showing affection	39%	10%	23%	2%	22%	3%	1%
Sensation of not being attractive to others due to skin blemishes	41%	9%	22%	2%	22%	3%	1%
Reduced sense of importance/productivity	41%	11%	23%	1%	21%	2%	1%
Restricted sense of freedom	41%	11%	24%	2%	19%	2%	1%

Table 4 Association between MASI and MELASQOL in the study population.

Melasquol	*MASI*			*Total*
	0-5	*6-10*	*>10*	
10-20	25(25%)	4(4%)	1 (1%)	30(30%)
20-30	26(26%)	1(1%)	0	27(27%)
31-40	9(9%)	1(1%)	0	10(10%)
41-50	20(20%)	5(5%)	1	26(26%)
51-60	4(4%)	2(2%)	0	6(6%)
61-70	1(1%)	0	0	1(1%)
	85	13(13%)	2(2%)	100(100%)

The p-value for the chi-square statistic is 0.708, which is greater than the alpha level of 0.05. Therefore, there is not enough evidence to reject the null hypothesis. Evidence from the sample shows that there is no significant association between MASI and Melasqol.

MELASQOL score, but there was no statistical significance (p-value=0.560). The epidermal type of melasma was associated with higher MELASQOL scores when compared with dermal and mixed types of melasma, but it was not significant statistically (p-value=0.705). A MASI score of 0–5 was associated with higher MELASQOL scores, but there was no statistical significance (p-value = 0.708) **(Table 4)**.

Discussion

Flawless and blemish-free skin has been the ultimate desire of all human beings since the beginning of the human race. Melasma, despite being an asymptomatic condition, continues to be a complex disorder to treat, and the assessment of the QOL in melasma patients has gained increasing importance because of its negative impact on psychosocial health.

Most of the patients were of 31–40 years (44.0%) in this study. The mean age of the study population was 41.8±7.16. This was analogous to studies conducted by Sevda onder *et al;*[7] Ortonne JP *et al*;[8] Jusuf NK *et al*;[9] Pooja Arora *et al*;[10] Krupa Shankar *et al*;[11] Achar and Rathi;[12] Yalamanchili *et al*;[13] Jagannathan *et al.*[14] and Dogramaci *et al*.[15] This depicts that melasma is more commonly seen in middle-aged people. The mean age of onset was 39.61±6.975 in the study population. This was higher than most of the similar studies conducted by other researchers.[7,11-18.]

Our study showed a female preponderance for melasma, comparable to studies by Yalamanchili *et al*;[13] Krupa Shankar *et al*;[11] Achar and Rathi *et al*;[12] Jagannathan *et al*;[14] and Sanchez *et al*.[19] A female majority was seen in all these studies, thereby substantiating the fact that melasma is a disease of females and can be ascribed to hormonal influences. Johnstson *et al.*[20] observed that the profundity of skin-color may oscillate in synchrony with the menstrual cycle; however, Grimes pointed out that female sex hormones might not be an fundamental issue for the occurrence of melasma.[21] It was also pointed out by Johnstson *et al.*[20] that females are more likely to be cognizant and anxious about their dermatological condition, thereby contributing to an boosted percent of women in search of medical attention among different studies. But to be precise, it's because of hormonal factors that melasma is more commonly seen in women.

Housewives (39%) constituted the most important part of the study group, which is similar to Arora *et al;* study.[10] Even though the housewives stay indoors most of the time, they are also exposed to maximum sunlight because of their housekeeping work, like washing clothes and vessels outdoors and cooking, thereby exposing themselves to UV irradiation. Most of the other studies done elsewhere showed mainly

agricultural workers as the major part of their study population[13] because of their more amount of sun exposure, which is one of the contributing factors to melasma. Most of the patients in our study (82%) had the disease more than 6 months, which is likely similar to Yalamanchili *et al*;[13] Kalla *et al*;[22] Krupa Shankar *et al*[11] and Achar and Rathi.[12] The fact that most of the patients have been suffering from melasma for a long period makes them consider it a chronic disease, thereby leading to significant psychosocial repercussions.

In our study population, only 6% had a positive family history, whereas other researchers showed positivity ranging from 18% to 61%.[7,11-14,23,24] which proves that genetic factors may also play some role in the etiology of melasma. But further multicentric studies in various ethnic groups are needed to confirm this fact. Multiple causative factors have been identified for the etiology of melasma, which include ultraviolet light (sunlight), hormones (OCP), pregnancy, stress, and cosmetics.

Exposure to sun seems to be the most common precipitating issue in various studies.[7,12,13] Majority (63%) of our patients had sunlight exposure for more than one hour, but only 16% felt sunlight was an exacerbating factor, which is closer to Jagannathan et al's[14] study, where 22% of their study population stated sun exposure as a precipitating factor. A multicentric study done by Krupa Shankar *et al.*[11] showed significant sun exposure in 70% of their study population. In Sevda Onder *et al;* study,[7] sun exacerbations were recognized in 91.5% of patients, and 52.1% of their study population did not use sunscreen properly. In Anderson L *et al;* study[16] appropriate sunscreen usage was seen in 57.3% of patients, while Rashmi Sarkar *et al.* in her study found only 19.6% of patients used sunscreen.[17] Sunscreen usage was not seen in any of our patients. In our study, 30% of the patients were illiterate, and 23% were primary school finishers, who may not have awareness regarding sunscreen usage and the cost of sunscreen products also would have prevented them from using sunscreen.

In this study, only 2% of the females had onset of melasma in pregnancy, which contrasts with the study conducted by Jagannathan *et al.*[14] where 28.7% had onset during pregnancy and 18.7% of women pointed pregnancy as an exasperating factor. In Sevda Onder *et al;* study,[7] 45.1% of women had pregnancy associated with melasma. Many studies display that pregnancy triggers melasma varying from 16% to 45%.[8] Among our patients, none used OCP, which is comparable to Yalamanchili *et al;*[13] study. In Jagannathan *et al.*[14] and Krupa Shankar *et al;*[11] study 13.75% and 2–23%, respectively, used OCP which contrasts with our study. Wu *et al*. and Resnik stated that 8% and 34%, respectively, of their patients developed melasma during the use of OCP.[25,26]

We noticed 3% of our patients having thyroid dysfunction, which is closer to the study by Achar and Rathi[12] who reported 6.41%, whereas Jagannathan *et al.*[14] and Krupa Shankar *et al.*[11] reported hypothyroidism in 10% and 11%, respectively, in their study population. In Sevda Onder *et al;* study,[7] thyroid disease was seen in 11.3% of the patients . Normal thyroid hormonal levels, prolactin, and gonadotrophin levels were found in Sacre *et al;*[27] study population. Due to the variable outcomes in the literature, the association between melasma and thyroid diseases is still an enigma. The variable association of pregnancy, OCP, and other hormonal conditions with melasma can be ascribed to the variations in the ethnicity of the patients in various studies.

In our study, only 13% of patients used cosmetics on a regular basis. In Jagannathan *et*

al; study[14] 21% used cosmetics for 5 days per week, comparing with the study by Grim *et al*.[21] Reports of melasma occuring in people with habitual cosmetic use and those who take phototoxic as well as photosensitizing drugs were there in the literature.[28] Achar and Rathi[12] *et al.* in their study that 23% of their patients confirmed the association between cosmetics and melasma. They have also informed that more sun exposure, pregnancy, OCP, and cosmetic use habitually can intensify melasma.

Stress was reported as aggravating in 47% of the patients, which was the second most common exacerbating factor for melasma in our study after sun exposure. Stress could lead to more frequent and common applications of over-the-counter drugs, leading to more hyperpigmentation. The cortisol and other hormones secreted during stress could also be explanatory, especially the adrenocorticotropic hormone and the melanocyte-stimulating hormone.[29]

Most of the people in our study, had the Fitzpatrick skin type V (53%), followed by IV (41%), which is comparable to Guinot *et al.*[30] and another study conducted in male melasma patients.[31] In Sevda Onder *et al;* study[7] 38% of the patients had Fitzpatrick skin type IV followed by III (35.2%).

Most of the patients in this study, had a malar pattern (52%), followed by a centrofacial (46%), and a mandibular pattern, which was similar to Yalamanchili *et al*;[13] Jagannathan *et al*;14 Goh and Dlova *et al*;[3] Vidyadhar R. Sardesai *et al.*[32] and Bhattarai S *et al;* study[24] who also reported malar type as the common pattern in their studies.

Achar and Rathi[12] *et al.* from West Bengal, Jusuf NK *et al.*[9] and Krupa shankar *et al.*[11] which is a multicentric study, reported the centrofacial pattern as the most common pattern in their patients. Multiple patterns of melasma were observed in Krupa shankar *et al;*[11] study, especially in the southern region, as it's a multicentric study. This correlates well with our study, as we are from the southern part of India, and multiple patterns were also seen in our study. In the northern and eastern parts of India, centrofacial melasma is common. These variations in pattern of melasma is attributed to environmental or regional differences.

As per Woods lamp examination, epidermal type (71%) was the most common type followed by dermal (22%), and mixed (7%), which was comparable to the researches by Jagannathan *et al.*[14] Jusuf NK *et al.*[9] and Bhattarai S *et al.*[24] where Achar and Rathi[12] *et al.* and Yalamanchili *et al.*[13] exhibited dermal type as the most common type in their study.

In our study group, 85% of the patients had a MASI score of 0–5, with a mean score of 3.563±2.775. This is in agreement with studies by Arora *et al.*[10] and Yalamanchili *et al.*[13] who reported mean MASI of 4.7 and 5.7, respectively. However, the mean MASI score in an Indian study by Sarkar *et al.*[17] was 20.0±7.5, and in an Indonesian study by Jusuf NK *et al.*[9] it was 13.07+4.99. Pandya *et al.*[5] specified that MASI has face validity as it tries to measure the size and darkness of the pigmentation associated with melasma. This score is mainly used to measure clinical severity and to monitor changes after treatment.

Overall, in our study, the domains most affected by melasma were skin appearance and frustration due to the skin condition, which was comparable to Dogramaci *et al*.[15] The mean value of the MelasQOL score in our study population was 30.86, which is slightly comparable to the study conducted by Dogramaci *et al*.[15] Few researchers, for example,

Misery *et al.*[33] and Purim KS *et al.*[34] in their studies, found to have a lesser MelasQOL score when compared to our study, whereas higher MelasQOL scores were reported in Sarkar R *et al.*[35] Balkrishnan *et al*;[6] Ikino JK *et al*;[36] Freitag FM *et al*;[37] Sevda onder *et al*;[7] Anderson L;[16] Cestari TF *et al*;[38] Dominguez AR *et al.*[39] and Aghaei S *et al;* study.[40] These variations in the MelasQOL scores among the different researchers are attributed to the differences in the study population, skin type, variations in latitude, exposure to UV light, occupation, disease severity, and cultural factors **(Table 5)**.

In our study, statistically significant association was not found between MelasQoL and sex, marital status, Literacy level, duration of melasma, age of onset, pattern of melasma, or severity of melasma (*P*>0.05). Studies by Balkrishnan *et al;*[6] in Spain[39] and Singapore[3] could not find statistically significant correlation between demographic characteristics and MelasQoL. In Sevda Onder *et al;* study;[7] MelasQoL was affected more for those who were less than 40 years old compared to those above 40 years(P = 0.037). In Misery *et al*;[33] study, MelasQoL scores were higher for those patients above 45 years and with melasma for a longer duration. Balkrishnan *et al.*[6] found that patients in the 20–30 age group had significantly higher MelasQOL scores than patients in the 31-40 and >41 age groups.

In our study, there was no statistical significant association between melasQoL and disease duration which was comparable to Sevda Onder *et al;* study;[7] which clues to the deliberation that QOL is affected independently of disease duration. Different results are displayed by various studies in the Literature. Mexican[38] and French[33] studies showed a significant correlation between MelasQoL and disease duration whereas an Australian study found no statistical significant correlation between disease duration and MelasQoL.[16]

Table 5 Comparison of MelasQOL with similar studies done elsewhere.

Researcher	*Study population Year of conduct of study*	*Mean Melasqol score*	*Domains most affected by melasma*	*Correlation between the QOL and disease severity*
Our study	Salem, Tamilnadu, 2021	30.86	Skin appearance Frustration	No correlation between the QOL and disease severity (MASI)
Misery *et al.*[33]	France, 2010	20.9	Family relationships, social Life	
Purim KS *et al.*[34]	Brazil, 2012	27.2±13.4		
Dogramaci *et al.*[15]	Turkey, 2008	29.9	Appearance of the skin, frustration, feeling unattractive to others, having a restricted sense of freedom	Statistically significant correlation between the QOL *and MASI score*
Sarkar R, *et al.*[17]	India, 2016	37.19±18.5		
Balkrishnan *et al.*[6]	2003	36	Social life, recreation and leisure. Emotional well -being	Moderate correlation between the QOL and disease severity (MASI)
Ikino JK *et al.*[15]	Brazil, 2015	34.40±13.50		
Freitag FM *et al.*[37]	Southern Brazil, 2008	37.5±15.2	Emotional well-being	No correlation between the QOL and disease severity (MASI)
Sevda onder *et al.*[7]	Turkey, 2020	38.6±15.2		
Anderson L[16]	Australia, 2019	55 ± 10.6		
Cestari TF *et al.*[38]	Brazil, 2006	44.4±14.9		
Dominguez AR *et al.*[39]	Spain, 2006	42	Social life, emotional wellbeing, physical health, money matters	Moderate correlation between the QOL and MASI score (MASI score-10 and MELASQOL score-42)
Aghaei S *et al.*[40]	Iran, 2005	52.85	Social life, recreation and leisure, emotional well-being	Statistically significant correlation between the QOL and MASI score

In Freitag *et al.*[37] and Dominguez *et al;*[39] study, patients with low literacy levels had MelasQoL scores at a higher level when equated to patients with higher literacy levels. In this study, there was no statistically significant difference in terms of MelasQoL when explored in terms of literacy level, which is comparable to Sevda Onder *et al;*[7] and Dogramaci *et al;*[15] study.

There was no significant statistical association between the MASI score (severity of melasma) and MelasQol in this study which is comparable to Harumi *et al;*[41] study in Singapore and Freitag *et al;* research in southern Brazil.[37] It enforces and substantiates that clinical severity is not the only criterion used by patients to evaluate the disfigurement caused by their dermatological condition. We may inaccurately consider a patient to have a mild form of disease based on the MASI score, but the patient may be apprehensive about the unappealing appearance of the disease, thereby causing a noteworthy impact on their life.

Limitations: Small sample size; Single centre study.

Conclusion

Melasma, with its blemishing discoloration over face and chronic nature, has a significant impact on the quality of life, which is not captured by MASI. This circumstances obviously states the necessity to treat patients based not only on clinical facets but also on emotional aspects of the disease. Therefore, quality of life should be assessed in all the patients with melasma, and the treatment should be planned by taking into account the psychosocial and emotional stress.

Declaration of patient consent The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship None.

Conflict of interest Authors declared no conflict of interest.

Author's contribution

KG,IG: Substantial contribution to conception and design, drafting the manuscript, has given final approval of the version to be published.

AAA,SGV,NM: Substantial contributions to analysis and interpretation of data, revising critically for important intellectual content, has given final approval of the version to be published.

References

1. Rodrigues M, Pandya AG. Melasma: clinical diagnosis and management options. *Australas J Dermatol*. 2015;**56(3)**:151-63.
2. Michelle Rodrigues, Amit G. Pandya. Hypermelanoses. In: SewonKang, editor. Fitzpatrick's Dermatology, 9thed. New York:McGraw–Hill Education; 2019. p.1380.
3. Goh CL, Dlova CN. A retrospective study on the clinical presentation and treatment outcome of melasma in a tertiary dermatological referral center in Singapore. *Singapore Med J*. 1999;**40**:455-8.
4. Kimbrough-Green CK, Griffiths CE, Finkel LJ, Hamilton TA, Bulengo-Ransby SM, Ellis CN, *et al*. Topical retinoic acid (tretinoin) for melasma in black patients. A vehicle-controlled clinical trial. *Arch Dermatol*. 1994;**130**:727-33.
5. Pandya AG, Hynan LS, Bhore R, Riley FC, Guevara IL, Grimes P, *et al*. Reliability assessment and validation of the Melasma Area and Severity Index (MASI) and a new modified MASI scoring method. *J Am Acad Dermatol.* 2011;**64**:78-83.
6. Balkrishnan R, McMichael AJ, Camacho FT, Saltzberg F, Housman TS, Grummer S, *et al*. Development and validation of a health-related quality of life instrument for women with melasma. *Br J Dermatol*. 2003;**149**:572-75.
7. Önder S, Demircan YT, Aksaç SE, Ozturk M, Etgü F. Examining the effects of melasma on women's quality of life: A study from eastern black sea region of Turkey. *Turk J Dermatol*. 2021;**15**:55-60.
8. Ortonne JP, Arellano I, Berneburg M, Cestari T, Chan H, Grimes P, *et al*. A global survey of the role of ultraviolet radiation and hormonal influences in the development of melasma. *J Eur Acad Dermatol Venereol*. 2009;**23**:1254-62.

9. Jusuf NK, Putra IB, Mahdalena M. Is There a Correlation between Severity of Melasma and Quality of Life? *Open Access Maced Med Sci*. 2019;**7(16)**:2615-18.
10. Arora P, Meena N, Sharma PK, Raihan M. Impact of melasma on quality of life in Indian patients. *Pigment Int*. 2017;**4**:92-7.
11. Krupa Shankar DS, Somani VK, Kohli M, Sharad J, Ganjoo A, Kandhari S, *et al*. A cross-sectional, multicentric clinico-epidemiological study of melasma in India. *Dermatol Ther (Heidelb)*. 2014;**4**:71-81.
12. Achar A, Rathi SK. Melasma: a clinico-epidemiological study of 312 cases. *Indian J Dermatol*. 2011;**56**:380-2.
13. Yalamanchili R, Shastry V, Betkerur J. Clinico-epidemiological study and quality of life assessment in melasma. *Indian J Dermatol*. 2015;**60**:519.
14. 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**:117-20.
15. Dogramaci AC, Havlucu DY, Inandi T, Balkrishnan R. Validation of a melasma quality of life questionnaire for the Turkish language: the MelasQoL-TR study. *J Dermatol Treat*. 2009;**20(2)**:95–9.
16. Anderson L, Rodrigues M. Quality of life in a cohort of melasma patients in Australia. *Australas J Dermatol*. 2019;**60**:160-2.
17. Sarkar R, Jagadeesan S, Basavapura Madegowda S, Verma S, Hassan I, Bhat Y, et al. Clinical and epidemiologic features of melasma: A multicentric cross-sectional study from India. *Int J Dermatol*. 2019;**58**:1305-10.
18. Tamegade A, Miot LDB, Bonfietti C, Gige TC, Marques MEA, Miot HA. Clinical patterns and epidemiological characteristics of facial melasma in Brazilian women. *J Eur Acad Dermatol Venereol*. 2013;**27**:151–6.
19. Sanchez MR. Cutaneous diseases in Latinos. *Dermatol Clin*. 2003; 21:689 97.
20. Johnston GA, Sviland L, McLelland J. Melasma of the arms associated with hormone replacement therapy. *Br J Dermatol*. 1988;**139**:932.
21. Grimes PE. Melasma : Etiologic and therapeutic considerations. *Arch Dermtol*. 1995;**131**:1453-7.
22. Kalla G, Garg A, Kachhawa D. Chemical peeling–Glycolic acid versus trichloroacetic acid in melasma. *Indian J Dermatol Venereol Leprol*. 2001;**67**:82-4.
23. Handel AC, Lima PB, Tonolli VM, Miot LD, Miot HA. Risk factors for facial melasma in women: A case control study. *Br J Dermatol*. 2014;**171**:588-94.
24. Bhattarai S, Pradhan K, Sharma S, Rajouria EA. Clinical patterns and epidemiological characteristics of melasma in a tertiary care hospital of Nepal. *Pigment Int*. 2017;**4**:35-8.
25. Wu S, Shi H, Wu H, Yan S, Guo J, Sun Y, *et al*. Treatment of melasma with oral administration of tranexamic acid. *Aesthetic Plas Surg*. 2012;**36**:964–70.
26. Resnik S. Melasma induced by oral contraceptive drugs. *J Am Med Assoc*. 1967;**199**:601-5.
27. Sacre RC, Fernandes NC, Vaisman M, Tendrich M. Melasma idiopático: Avaliação das funções tireoidiana, prolactínica e gonadal feminina. *An Bras Dermatol*. 1996;**71**:195-8.
28. 28. Duarte I, Campos Lage AC. Frequency of dermatoses associated with cosmetics. *Contact Dermatitis*. 2007;**56**:211-3.
29. Wolf R, Wolf D, Tamir A, Politi Y. Melasma: A mask of stress. *Br J Dermatol*. 1991;**125**:192-3.
30. Guinot C, Cheffai S, Latreille J, Dhaoui MA, Youssef S, Jaber K, *et al*. Aggravating factors for melasma: A prospective study in 197 Tunisian patients. *J Eur Acad Dermatol Venereol*. 2010;**24**:1060-9.
31. Vachiramon V, Suchonwanit P, Thadanipon K. Melasma in men. *J Cosmet Dermatol*. 2012;**11**:151-7.
32. Sardesai VR, Kolte JN, Srinivas BN. A clinical study of melasma and a comparison of the therapeutic effect of certain currently available topical modalities for its treatment. *Indian J Dermatol*. 2013;**58**:239.
33. Misery L, Schmitt AM, Boussetta S, Rahhali N, Taieb C. Melasma: measure of the impact on quality of life using the French version of MELASQOL after cross-cultural adaptation. *Acta Derm Venereol*. 2010;**90(3)**:331-2.
34. Purim KS, Avelar MF. Photoprotection, melasma and quality of life in pregnant women. *Rev Bras Ginecol Obstet*. 2012;**34**:228-34.
35. Sarkar R, Garg S, Dominguez A, Balkrishnan R, Jain RK, Pandya AG. Development and validation of a Hindi language health-related quality of life questionnaire for melasma in Indian patients. *Indian J Dermatol Venereol Leprol.* 2016;**82**:16-22.

36. Ikino JK, Nunes DH, Silva VP, Fröde TS, Sens MM. Melasma and assessment of the quality of life in Brazilian women. *An Bras Dermatol*. 2015;**90**:196-200.
37. Freitag FM, Cestari TF, Leopoldo LR, Paludo P, Boza JC. Effect of melasma on quality of life in a sample of women living in southern Brazil. *J Eur Acad Dermatol Venereol*. 2008;**22**:655–62.
38. Cestari TF, Hexsel D, Viegas ML, Azulay L, Hassun K, Almeida AR, et al. Validation of a melasma quality of life questionnaire for Brazilian Portuguese language: The MelasQoL-BP study and improvement of QoL of melasma patients after triple combination therapy. *Br J Dermatol*. 2006;**156 Suppl 1**:13-20.
39. Dominguez AR, Balkrishnan R, Ellzey AR, Pandya AG. Melasma in Latina patients: crosscultural adaptation and validation of a quality-of-life questionnaire in Spanish language. *J Am Acad Dermatol*. 2006;**55(1)**:59-66.
40. Aghaei S, Moradi A, Mazharinia N, Abbasfard Z. The Melasma Quality of Life scale (MELASQOL) in Iranian patients: A reliability and validity study. *J Eur Acad Dermatol Venereol*. 2005;**19 Suppl 2**:39.
41. Harumi O, Goh CL. The effect of melasma on the quality of life in a sample of women living in Singapore. *J Clin Aesthet Dermatol*. 2016;**9**:21-4.