



# Self-Esteem, Depression, Anxiety and Quality of Life in Patients with Melasma Living in a Sunny Mediterranean Area: Results from a Prospective Cross-Sectional Study

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## ABSTRACT

**Introduction:** Melasma is a common acquired disorder of hyperpigmentation and has a significant effect on quality of life. The aim of this prospective cross-sectional study was to assess the effect of melasma on depression, social anxiety and self-esteem in the Greek population.

**Methods:** The study included a total of 254 participants: 127 patients with melasma and an equal sample of healthy controls. Both participant groups completed the following psychometric measures: the Hospital Anxiety and Depression Scale (HADS) to assess anxiety and depression and Rosenberg's Self-esteem Scale (RSES) for self-esteem. Furthermore, in patients with melasma, quality of life was assessed using Melasma Quality of Life (MELASQoL).

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**Results:** Melasma patients ( $7.47 \pm 4.53$ ) presented statistically significantly higher anxiety compared to healthy controls ( $6.06 \pm 3.59$ ,  $p = 0.006$ ), while no differences emerged with regard to depression or self-esteem. It is important to note that the difference regarding anxiety remained significant ( $b = 1.25$ ,  $p = 0.003$ ) even after adjusting for age, depression and self-esteem. A higher disease severity (MASI) correlated statistically significantly with longer disease duration ( $r = 0.24$ ,  $p < 0.001$ ), higher depression ( $r = 0.28$ ,  $p = 0.002$ ), and a more impaired health-related quality of life (MelasQoL;  $r = 0.29$ ,  $p < 0.001$ ). Notably, a more impaired health-related quality of life was also correlated with higher depression ( $r = 0.19$ ,  $p = 0.027$ ) and lower self-esteem ( $r = -0.31$ ,  $p < 0.001$ ).

**Conclusion:** The results of this study highlight the importance of evaluating quality of life, anxiety and depression in patients with melasma. The therapeutic approach should not be based solely on clinical findings; it should also include an evaluation of the patient's psychological aspects. Dermatologists can further improve their patient care by being supportive or requesting psychological intervention when needed, resulting in better compliance with treatment and an improved social and psychological status.

**Keywords:** Melasma; Depression; Quality of life; Anxiety; Self-esteem

## Key Summary Points

### *Why carry out this study?*

This study aimed to assess the effect of melasma on depression, social anxiety and self-esteem in a population living in a sunny Mediterranean area.

Dermatologists have considered possible psychological intervention when needed in order to further improve their patient care.

### *What was learned from the study?*

Melasma patients presented statistically significantly higher anxiety compared to healthy controls.

A higher disease severity (MASI) correlated statistically significantly with longer disease duration, higher depression, and a more impaired health-related quality of life.

A more impaired health-related quality of life was also correlated with higher depression and lower self-esteem.

## INTRODUCTION

Skin disorders affect patients' appearance, influencing their self-esteem, personality development and social relationships, leading to stress and psychological comorbidities [1]. About one-third of the patients attending skin clinics suffer from psychological disorders, resulting in an increased prevalence of comorbidities when compared to the general population [2]. Assessing quality of life (QOL) is important when determining a treatment plan and its efficacy, particularly because health status may occasionally be affected beyond the severity of the disease. In skin conditions such as atopic dermatitis and psoriasis psychological comorbidities might even affect the reimbursing treatment algorithm [3].

Melasma is a common acquired disorder of hyperpigmentation that affects men and

women of all ethnicities and skin types, but is especially prevalent in women with darker complexions [4]. It is currently considered a complex epidermal–dermal dynamic interaction with various cell types, inflammation, oxidative stress, and photodamage [5]. Although its precise cause is unknown, several etiologic factors have been identified, including exposure to ultraviolet (UV) radiation and visible light, pregnancy, exogenous hormone use and genetics. Clinically, it presents as bilateral, light brown or dark brown patches symmetrically distributed on the cheeks, forehead, upper lip and mandible with unclear borders [6]. Histologically, it is characterized by increased melanin in the epidermis and/or dermis, as well as basement membrane disruption, pendulous melanocytes, melanophages, mast cells, solar elastosis, and neovascularization [7]. Although various therapeutic modalities are available, melasma comprises a therapeutic challenge due to its refractory and recurrent nature.

A monotonous skin color has historically been considered the essence of a vibrant skin [8]. Melasma may significantly affect quality of life and self-esteem due to its frequent facial involvement and chronic course [9]. Very little has been published on the impact of melasma on the self-esteem of affected individuals, or on their perceived stress. The aim of this prospective cross-sectional study was to assess the effect of melasma on depression, social anxiety and self-esteem in the Greek population.

## METHODS

The study included a total of 254 participants: 127 patients with melasma and an equal sample of healthy controls. In particular, 127 patients with melasma who were referred to the Andreas Sygros Skin Hospital for treatment of their skin condition were enrolled in the study. Patients were considered eligible for inclusion if they were 18 years of age or older and were able to comprehend the Greek language. Patients with a psychiatric history or a history of psychiatric drug use were excluded from the study. Furthermore, the study included a control group of 127 healthy, age- and sex matched adults with

no personal history of skin disease, psychiatric history, or history of psychiatric drug use who were enrolled during the same time period.

All individuals were informed regarding the objectives of the study, and they were assured confidentiality and anonymity. Moreover, they were all assured the right to withdraw at any time and, especially for patients, that participation in the study would not affect their treatment. Informed consent was obtained from all participants, and the study protocol was approved by the Ethics Committee of the Andreas Sygros Skin Hospital. The study complied with the principles laid down in the Declaration of Helsinki.

Both participant groups completed the following psychometric measures: the Hospital Anxiety and Depression Scale (HADS) to assess anxiety and depression [10, 11] and Rosenberg's Self-esteem Scale (RSES) for self-esteem [12, 13]. Furthermore, in patients with melasma, quality of life was assessed using Melasma Quality of Life (MELASQoL) [14].

HADS is a validated self-report rating scale of 14 items that is designed to measure and depression, with each subscale comprising 7 items. It is of note that items referring to symptoms of depression related to somatic aspects, such as insomnia or weight loss, are not included in the scale, and thus HADS is often used for the assessment of depression and anxiety in patients with physical illnesses. Responses to items are indicated on a 4-point Likert scale from 0 to 3 (score range 0–21 for each subscale), with a higher score indicating more symptoms. In this study, a cutoff score of 8 is used to indicate the possible presence of anxiety or depression; this cutoff has been suggested for detecting possible anxiety or depression in the general population and in somatic patient samples [15].

RSES is a 10-item questionnaire which evaluates feelings of self-worth and self-esteem, with items answered on a 4-point scale from 0 "strongly agree" to 3 "strongly disagree." Scores range from 0 to 30, with higher scores indicating higher self-esteem.

MELASQoL comprises 10 questions scored from 1 (not bothered at all) to 7 (bothered all the time), with a higher total score indicating a

lower quality of life in patients with melasma. MELASQoL assesses a number of domains, including work, family relationships, social life, sexual relationships, recreation–leisure, physical health, money matters, and emotional well-being [16].

Furthermore, all patients with melasma were evaluated by a specialized dermatologist using the Melasma Area and Severity Index (MASI). MASI is widely used to evaluate a melasma-affected area and its severity. The MASI score is calculated by visual inspection of the face, assessing the affected area, hyperpigmentation and the homogeneity of pigmentation, while the face is divided into four regions: the forehead, right malar region, left malar region and chin [17, 18].

### Statistical Analysis

Descriptive statistics were measured and presented as mean  $\pm$  standard deviation for quantitative variables and as absolute and relative (%) frequencies for qualitative variables. The significance of differences was examined using the independent samples (Student's) *t* test or one-way ANOVA (when comparing more than two means) for quantitative variables and the chi-square test for qualitative variables. Correlations between quantitative variables were measured by Pearson's *r* correlation coefficient. A multiple linear regression analysis was performed in order to control the comparison of anxiety between patients with melasma and healthy controls for possible confounders. The statistical significance level was set at  $p < 0.05$ .

## RESULTS

One hundred twenty-seven patients with melasma (121 females), a mean age of  $48.33 \pm 18.39$  years, a mean disease length of  $5.35 \pm 4.45$  years and who were educated at least up to secondary school level (100%) participated in this study. More than half of the patients (51.97%) had a type III skin phototype, followed by type II (23.62%) and type IV (22.05%), while only 3 patients had other types (i.e., 0.79% type I and 1.57% type V).

Furthermore, an equal sample of healthy controls matched for sex (121 females,  $p > 0.99$ ) and age ( $48.67 \pm 19.60$ ,  $p = 0.976$ ) was included in the study for comparison purposes.

With a view to investigating the possible association of melasma with depression, anxiety and self-esteem, the mean scores of the two participant groups were compared. As shown in Table 1, patients with melasma ( $7.47 \pm 4.53$ ) presented statistically significantly higher anxiety compared to healthy controls ( $6.06 \pm 3.59$ ,  $p = 0.006$ ), while no differences emerged with regard to depression or self-esteem (Fig. 1). It is important to note that the difference regarding anxiety remained significant ( $b = 1.25$ ,  $p = 0.003$ ) even after adjusting for age, depression and self-esteem.

Moreover, when using the suggested HADS cutoff (i.e., a cutoff point of 8/21 for anxiety or depression) [15], it emerged that anxiety was statistically significantly more common among the group of patients; in particular, 58 (45.67%) patients were identified as probable cases of anxiety, in comparison to 38 (29.92%) controls ( $p = 0.010$ ). On the other hand, no difference was noted regarding depression, as 44 (34.65%) patients were identified as probable depression cases, compared to 32 (25.20%) controls ( $p = 0.100$ ) (Fig. 2).

Patients' severity of melasma was assessed using MASI; it ranged from 0.3 to 10.8, with a mean score of  $4.12 \pm 2.06$ . As shown in Table 2, a higher disease severity (MASI) correlated statistically significantly with longer disease duration ( $r = 0.24$ ,  $p < 0.001$ ), whereas no difference was found between the skin phototypes ( $F = 2.62$ ,  $p = 0.08$ ; One-way ANOVA was used

for the comparison of types II, III and IV, as only 3 patients were recorded as types I and V and were thus not included in the analysis.

A higher disease severity (MASI) was statistically significantly correlated with higher depression ( $r = 0.28$ ,  $p = 0.002$ ) and a more impaired health-related quality of life (MelasQoL;  $r = 0.29$ ,  $p < 0.001$ ), but not with anxiety ( $r = 0.16$ ,  $p = 0.079$ ) or self-esteem ( $r = -0.01$ ,  $p = 0.894$ ). Notably, apart from disease severity (MASI), a more impaired health-related quality of life was also correlated with higher depression ( $r = 0.19$ ,  $p = 0.027$ ) and lower self-esteem ( $r = -0.31$ ,  $p < 0.001$ ), but not with anxiety. Apart from MASI, disease length did not correlate with any of the psychological variables ( $p > 0.05$ ), as shown in Table 2.

## DISCUSSION

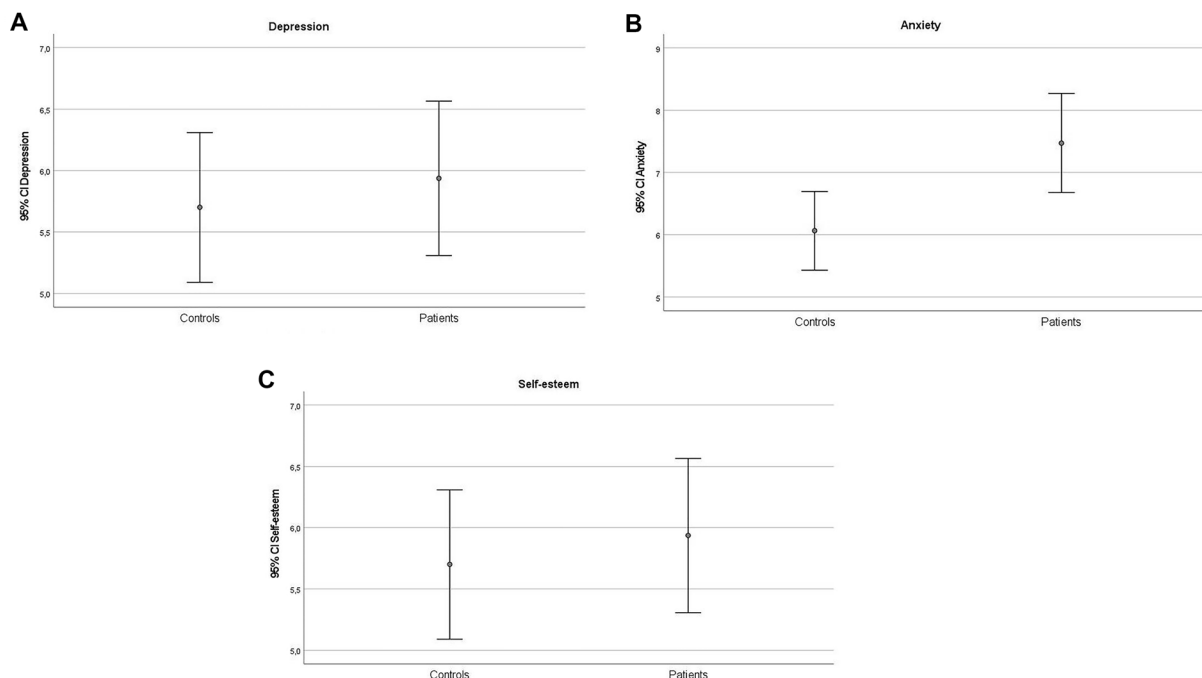
Melasma has not been classified as a psychocutaneous disorder according to various classifications; however, a similar management approach is nowadays considered useful [19]. Recent publications report that melasma cases that were followed in psychodermatology clinics demonstrated high psychiatric comorbidity of depressive and stress disorders compared to controls [20, 21]. Studies from India have estimated a prevalence of anxiety and depression of up to 84% in patients with melasma [22, 23]. A strong emotional impact on quality of life has been also reported in the literature [24].

We report similar results in a Greek population with melasma, as anxiety and quality of life were also significantly impaired in our study. The prevalence of these comorbidities in the

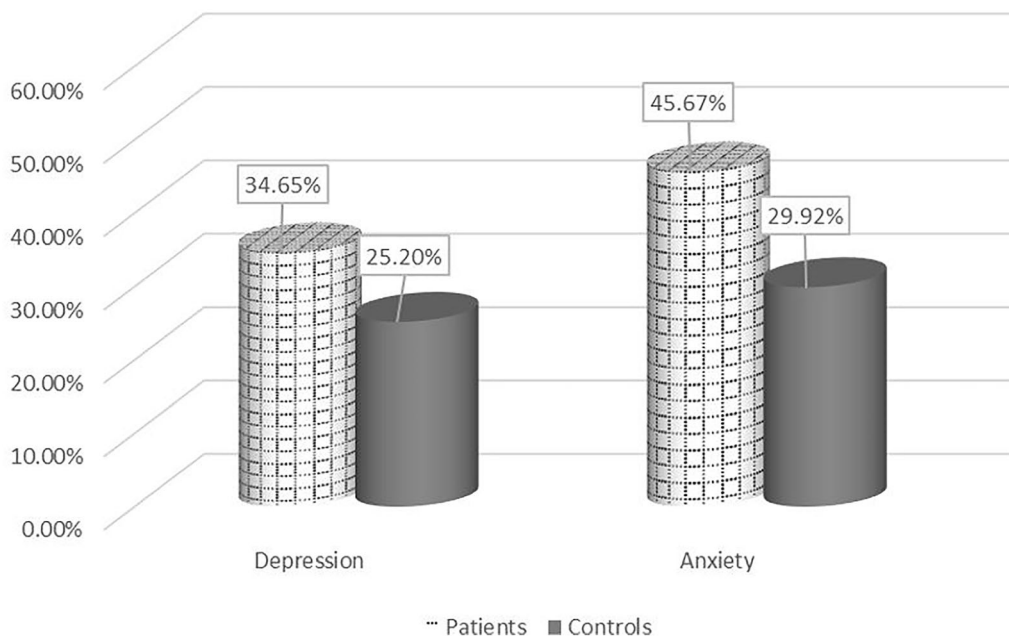
**Table 1** Depression, anxiety and self-esteem in patients with melasma and healthy controls

Psychological variable	Participant group		<i>t</i>	<i>p</i>
	Controls M ± SD	Patients with melasma M ± SD		
Depression	5.70 ± 3.47	5.93 ± 3.58	− 0.53	0.594
Anxiety	6.06 ± 3.59	7.47 ± 4.53	− 2.75	0.006
Self-esteem	22.31 ± 4.69	22.02 ± 4.48	0.52	0.603

Comparisons were conducted using independent samples *t* tests



**Fig. 1** Comparison between patients with melasma and healthy controls in terms of **A** depression, **B** anxiety, and **C** self-esteem scores, presented through error bars



**Fig. 2** Probable cases of depression and anxiety among patients with melasma and healthy controls

population studied was more evident in melasma patients compared to the control group, and this could be explained by the fact that

melasma predominately affects women, who have skin lesions in visible areas and often experience frustration due to costly and

**Table 2** Correlation of patients' characteristics and psychological variables

	1	2	3	4	5	6
1. Disease severity (MASI)	1.00					
2. Disease length (years)	0.24***	1.00				
3. Quality of life	0.29***	− 0.10	1.00			
4. Anxiety (HADS-A)	0.16	0.08	0.16	1.00		
5. Depression (HADS-D)	0.28**	0.09	0.19*	0.54***	1.00	
6. Self-esteem (Rosenberg)	− 0.01	0.14	− 0.31***	− 0.18*	− 0.24***	1.00
7. Age (years)	− 0.11	0.17	− 0.11	− 0.04	− 0.01	0.14

\* $p < 0.05$ \*\* $p < 0.01$ \*\*\* $p < 0.001$ 

ineffective treatments [25]. As melasma is considered a highly recurrent condition, long-term therapies are often necessary [17]. The results are often unsatisfactory, topical agents may sometimes cause significant adverse reactions, and relapses are seen after stopping treatment [26]. On the other hand, stress raises the levels of cortisol and pro-opiomelanocortin, the precursor to adrenocorticotrophic hormone (ACTH) and melanocyte-stimulating hormone (MSH), which have melanogenic potential, provoking increased melanin granules in melanocytes [27]. An earlier recent study showed that stressful events triggered and exacerbated melasma in 7% and 26% of cases, respectively [28]. Although melasma patients with more severe disease as measured by the MASI score could be considered to be more emotionally affected, statistical analysis did not reveal any correlation with melasma severity. Similarly, Deshpande et al. showed that there was no positive correlation between the severity of disease and the point prevalence of anxiety and depression in melasma patients [2]. The same study demonstrated that depression was more common in patients suffering from melasma for more than 2 years, while stress was observed sooner [2]. This could be because persistent stress due to melasma leads to depressive disorders or because melanin production is affected as part of the local response to stress by the same

hypothalamo-pituitary axis related to depression [17]. Both pathways highlight the biological stress-related origin of depression in melasma.

Melasma patients often feel unattractive, frustrated and embarrassed due to the highly visible nature of the lesions. In some cases, that could be considered a social stigma [24]. Furthermore, the fear that the melasma would get worse with sun exposure affects their social lives even further, as outdoor activities such as riding a bicycle, outdoor jogging, and going to the swimming pool are often avoided. Dominguez et al. and Sarkar et al. showed a correlation between a lower level of education (< 8 years of formal education) and poor psychological functioning with a lower MelasQoL score [29, 30]. This might be attributed to misinformation being more common among the less-educated patient population. However, in our study, all patients were educated up to at least secondary school level.

Quality of life among melasma patients might be expected to be positively correlated with the severity of the disease. However, this was not identified in our study. Contradictory findings are found in the literature with regard to this correlation, suggesting that the effect of melasma on QoL is not solely dependent on disease severity; it is multifactorial [31]. In a study by Jusuf et al., no statistical relationship



between MASI score and quality of life was found in subjects with melasma [32]. Similarly, research performed by Harumi et al. and Freitag et al. in Singapore and southern Brazil, respectively, found that there was no such correlation [33, 34]. On the contrary, Cestari et al. and Balkrishnan et al. revealed that the patient's skin condition had a major impact on their quality of life, with the majority of the patients reporting frustration and embarrassment [35, 36]. We can conclude that clinical severity is a criterion that patients use to evaluate the impact that their skin condition has on their quality of life, but it is not the only one. Misery et al. showed that the MELASQOL score was higher in women who had had melasma for a longer duration, suggesting that the condition is less tolerated by women as time goes by, rather than following an acceptance-over-time pattern as observed in other chronic diseases [37]. We consider that evaluation of the patient's quality of life should be an indispensable part of the dermatological follow-up, regardless of disease severity or duration, particularly for patients with a long-lasting history of melasma. The therapeutic approach should not be based solely on clinical findings; it should also include an evaluation of the patient's psychological aspects [38].

Chronic contingencies of melasma might also include impaired self-esteem [31]. The noticeability of the condition, as melasma mostly occurs on the face and not in another easily concealable area, results in decreased self-confidence. Several patients admitted to negativity about their melasma; they thought about their skin condition every day and felt that people questioned them about it, leading them to feel inferior to others [31]. In the same study, Jiang et al. revealed that several patients admitted to self-obsession and negativity about their skin disease; they mentioned looking in the mirror at their lesions several times a day and thinking about their melasma every day. However, only a few investigations have studied melasma patients to ascertain their self-esteem and psychological stressors that are associated with the condition. A recent cross-sectional internet-based study revealed an important impairment of self-esteem [39]. Impaired self-

esteem necessitates the optimal management of melasma patients. As it is a pigmentation disorder, melasma disfigures the skin. This disfiguring skin disease often results in poor satisfaction, leading to poor adherence to treatment [40]. A therapeutic approach that includes aiming to facilitate social interactions and reduce social stigmas could be of benefit to the patients. Balkrishnan et al. stated that social life, recreation/leisure and emotional well-being are three areas of life that melasma patients believe would improve the most if they were no longer affected by the disease [14]. Patients in our study did not report such an impact on their self-esteem. This could be due to possible recall bias, as the patients had already been treated for melasma and questions were answered retrospectively, or it could be due to a potential for bias in the answers that were obtained, despite the best efforts of the interviewer to maintain neutrality.

### Limitations

A limitation of our study is that we used a Mediterranean sample; hence, our findings are not generalizable to a broader Hispanic population.

### CONCLUSIONS

The results of this study highlight the importance of evaluating quality of life, anxiety and depression in patients with melasma. Dermatologists can further improve their patient care by being supportive or requesting psychological intervention when needed, resulting in better compliance with treatment and an improved social and psychological status. Additionally, including the patients' views when determining core outcomes for efficacy in the clinical trials could provide a more complete perspective on the ideal properties of novel melasma treatments [41].

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**Author Contributions.** Eftychia Platsidaki: concept and design, interpretation of data, drafting the manuscript. Vasiliki Efstathiou: statistical analysis. Vasiliki Markantoni: acquisition of data. Anargyros Kouris: acquisition of data. Georgios Kontochristopoulos: concept and design. Electra Nikolaidou: concept and design. Dimitrios Rigopoulos: drafting the manuscript. Alexandros Stratigos: drafting the manuscript. Stamatios Gregoriou: concept and design, drafting the manuscript, revising it critically for important intellectual content.

**Disclosures.** Eftychia Platsidaki, Vasiliki Efstathiou, Vasiliki Markantoni, Anargyros Kouris, Georgios Kontochristopoulos, Electra Nikolaidou, Dimitrios Rigopoulos, Alexandros Stratigos and Stamatios Gregoriou have nothing to disclose.

**Compliance with Ethics Guidelines.** The study protocol was approved by the Ethics Committee of the Andreas Sygros Skin Hospital. The study complied with the principles laid down in the Declaration of Helsinki. Informed consent was obtained from all participants.

**Data Availability.** The datasets generated during and analyzed during the current study are not publicly available due to hospital policy.

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