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ASSOCIATION BETWEEN LIFESTYLE HABITS AND THE CLINICAL SEVERITY OF MELASMA IN WOMEN

QUALIDADE DE VIDA E ESTILO DE VIDA, EM PACIENTES PORTADORES DE MELASMA

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ABSTRACT: Melasma is a skin disorder caused by dysfunction in melanogenesis, and this study aimed to investigate the influence of lifestyle on the severity of melasma. This was a cross-sectional study involving 75 patients of both sexes diagnosed with melasma, who answered three questionnaires: the Melasma Quality of Life Scale (MelasQoL), the Individual Lifestyle Profile Scale, and the EAS-40 scale, in addition to being evaluated using the Melasma Area and Severity Index (MASI). The mean age was 37.5 years, 33% were undergoing medical treatment, 58% used cosmetic products, and 77% were exposed to sunlight at least once a week, while only 40% regularly used sunscreen, 17% were smokers, 40% reported alcohol consumption, and 21% used oral contraceptives. A significant association was found between lifestyle and MASI scores ($r = -0.62$; $p < 0.0001$), as well as with the EAS-40 scale ($r = 0.59$; $p < 0.0001$), and the odds ratio for smoking was 2.4. It is concluded that a negative lifestyle may contribute to greater severity of melasma.
KEYWORDS: Melasma, Lifestyle, Smoking.

RESUMO: O Melasma é uma doença cutânea, causada pela disfunção da melanogênese. Objetivos: verificar a influência do estilo de vida na gravidade do Melasma. Estudo transversal, 75 pacientes, de ambos os sexos, diagnosticada com melasma. Todos responderam a três questionários. O MelasQol, a Escala Perfil de Estilo de Vida Individual e a Escala EAS-40, também utilizou a escala Melasma Area Severity Index. A média da idade 37,5 anos, 33% faziam tratamento médico, 58% usavam cosméticos, e 77% se expunham ao sol ao menos uma vez por semana. 40% faziam uso de protetor solar, 17% eram tabagistas, 40% eram alcoolistas e 21% faziam uso de anticoncepcional. Houve associação entre o estilo de vida e a escala MASI, r=-0,62 (p<0,0001), com o EAS- 40, r=0,59 (p<0,0001), o odds ratio para tabagismo foi de 2,4. Conclui-se que o estilo de vida negativo pode contribuir para maior gravidade do Melasma.
PALAVRAS-CHAVE: Melasma, estilo de vida, tabagismo.

INTRODUCTION

Melasma derives from the Greek word *melas*, meaning "black." It is a cutaneous disorder resulting from dysfunction in melanogenesis. Areas with hyperfunctional melanocytes are clinically characterized by the presence of brownish macules, symmetrically distributed, predominantly on the face, although they may also occur on other sites such as the neck, chest, and arms[1].

Although melasma affects all ethnic groups, epidemiological studies have shown a higher prevalence among individuals with more pigmented phenotypes, such as Asians, Hispanics, Indians, Pakistanis, and Latinos populations commonly residing in intertropical regions with high sun exposure[2].

Considering the racial admixture, it is estimated that approximately 35% of women are affected by melasma between the second and fourth decades of life[3]. Skin types are classified according to Fitzpatrick based on pigmentation intensity, ranging from type I (lightest) to type VI (darkest). The most frequently affected skin types are III and IV in this classification[4].

Risk factors for the development of melasma among men include sun exposure and family history, whereas in women, oral contraceptive use, pregnancy, and sunlight exposure are predominant triggers[5]. Lifestyle factors may also contribute to the onset and severity of melasma[6].

Despite being a cutaneous condition without systemic repercussions, the complaint of facial hyperpigmentation is often underestimated. However, its facial predominance frequently causes aesthetic dissatisfaction and psychological discomfort, leading patients to seek dermatological care. The visibility of lesions may contribute to social withdrawal, reduced self-esteem, and decreased occupational productivity[7].

Lifestyle has been extensively studied due to its association with the development of chronic diseases such as diabetes, hypertension, cardiovascular diseases, and some types of cancer. Nevertheless, melasma although a chronic, non-communicable disease has not yet been sufficiently explored in relation to lifestyle factors. It is plausible that individual lifestyle habits may influence melasma severity, just as the disease itself may impact patients' quality of life. In light of this, the present study aims to assess whether unhealthy lifestyle habits may affect disease severity[8].

Therefore, the objective of this study is to evaluate the influence of lifestyle on melasma severity, as well as the impact of the condition on patients' quality of life. Additionally, the study aims to analyze risk factors such as oral contraceptive use, sun exposure, and smoking in relation to melasma development.

METHODOLOGY

This is a cross-sectional study that evaluated 75 patients with a previous diagnosis of melasma. The primary outcome of this study was the relationship between lifestyle and melasma severity, as well as its impact on quality of life. The secondary objective was to identify potential risk factors associated with the development of this condition.

Patients of both sexes, aged 18 years or older, diagnosed with melasma and treated at a dermatology service in São Paulo, Brazil, were invited to participate. Only individuals who agreed to participate and signed the informed consent form were included. Participants were excluded if the clinical diagnosis of melasma could not be confirmed during the baseline dermatological assessment.

All participants underwent a comprehensive medical evaluation, including photographic documentation and examination under a Wood's lamp, which allows visualization of melanocytic hyperpigmentation not detectable to the naked eye. Based on this evaluation, the diagnosis and classification of melasma were determined according to pigmentation characteristics: dark brown

indicated melanin deposition in the stratum corneum (superficial layer); light brown indicated deposition in deeper layers; and grayish blue to bluish hues indicated dermal melanin deposition, which is generally associated with greater therapeutic difficulty[9].

After anamnesis and diagnostic confirmation, participants completed three validated questionnaires:

1. Melasma Quality of Life Scale (MelasQoL)[10] assesses the impact of melasma on quality of life. Higher scores indicate greater impairment.
2. Individual Lifestyle Profile Scale[11] evaluates lifestyle habits. Scores between 17–25 points were classified as a *fair lifestyle*, whereas scores above 26 points indicated a *healthy lifestyle*.
3. EAS-40 Scale[12] measures psychopathological symptoms using a 3-point Likert scale (0 = none, 1 = mild, 2 = severe). The Global Severity Index (GSI) was calculated as an overall indicator of psychological distress.

In addition to the questionnaires, melasma severity was quantified using the Melasma Area and Severity Index (MASI)[13], which ranges from 0 to 48, with higher scores representing more severe disease.

This study was reviewed and approved by the Research Ethics Committee of the Adventist University Center of São Paulo (Centro Universitário Adventista de São Paulo – UNASP) under approval number 4.905.110.

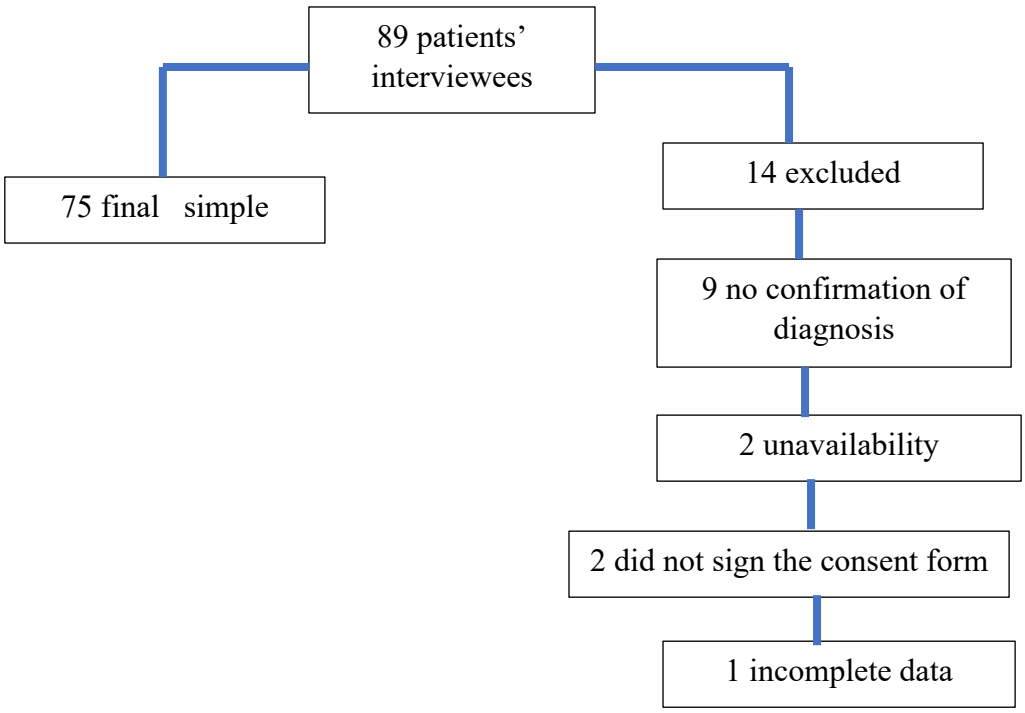

Figure 1. Flowchart of patient inclusion and exclusion in the study.

Data were collected between May and December 2023 and recorded in specific spreadsheets for subsequent analysis.

STATISTICAL ANALYSIS

Data are presented as mean ± standard deviation or as absolute and relative values when referring to proportions. The Pearson correlation coefficient was applied to assess potential associations between melasma severity, quality of life, and lifestyle.

The Student's t-test or analysis of variance (ANOVA) was used to compare MelasQoL and MASI scores according to lifestyle categories, quality of life levels, and baseline characteristics.

The risk associated with factors such as sun exposure, use of oral contraceptives, and smoking in the development of melasma was calculated using relative risk (RR). A p-value < 0.05 was considered statistically significant.

All statistical analyses were performed using the GraphPad Prism software, version 5.0 (GraphPad Software Inc., San Diego, CA, USA).

RESULTS

Initially, 89 patients agreed to participate in the study; however, only 75 individuals met the inclusion criteria after the anamnesis. All participants had a confirmed diagnosis of melasma. The majority were female (88%), with a mean age of 37.5 years. Only 33% were undergoing medically supervised treatment, whereas 58% reported using cosmetic products, and 77% reported sun exposure at least once per week.

Additionally, 40% of participants reported regular use of sunscreen, 17% were smokers, 40% were alcohol consumers, and 21% were oral contraceptive users. Among female participants, 61% reported a history of previous pregnancy, with an average of 1.21 pregnancies per woman.

Participants were categorized according to melasma severity. It was observed that individuals with milder forms of the disease presented lower EAS-40 scores, higher lifestyle (PEVI) scores, lower prevalence of smoking, and less frequent sun exposure. The corresponding data are summarized in Table 1.

Table 1. Characteristics of the sample studied.

Variables	MASI > 9 ponts	MAIS < 9 ponts	p
Age (years)	43.1±6.9	44.8±11.8	0.77
Man (%)	6	20	0.08
Woman (%)	94	80	0.09
total score Melascol	37.3±14.9	36.95±14.1	0.4
total Score eAS-40	16.2±11.6	14.4±9.1	0.02
PAVI Total	24.2±7.8	29.1±7.8	0.05
Exp. Sol (%)			
Up to two/week	20	45	0.004
Three and four/week	35	15	0.002
More than four/week	45	40	0.32
Use of sunscreen (%)	25	20	0.25
Smokers (%)	27	15	0.045
Alcoholic	35	30	0.54
Use of contraceptives	37	35	0.9

The association between the domains of the Lifestyle Profile Questionnaire (PEVI) and the MelasQoL, EAS-40, and MASI scales was evaluated.Four significant associations were identified: A correlation between EAS-40 scores and the Stress Control domain of the PEVI; Associations between MASI scores and both the Nutrition and Preventive Behavior domains of the PEVI; An additional association between MASI scores and sleep duration. These results are presented in Table 2.

Table 2. Correlation between the domains of the Lifestyle Profile Questionnaire (PEVI) and the MelasQoL, EAS-40, and MASI scales.

Variables	Melacol (r)	Melacol (p)	eAS 40 (r)	eAS 40 (p)	Massi (r)	Massi (p)
PEVI	-0.017	0.906	-0.066	0.654	-0.06357	0.661
Nutrition	0.082	0.906	-0.050	0.734	-0.5563	0.012
Physical activity	0.085	0.570	-0.043	0.769	0.04732	0.7442
Preventive behavior	0.001	0.558	-0.040	0.786	0.7957	0.03755
Relationship	-0.204	0.996	-0.075	0.611	-0.1254	0.3905
Stress Management	0.080	0.850	0.40	0.020	0.04	0.54
Sleep Hours	-0.080	0.579	0.138	0.345	-0.2511	0.0286
Alcoholism	0.056	0.698	0.100	0.496	0.09473	0.5129

The association between the MASI scale and serum vitamin C levels was evaluated in patients with melasma, revealing an inverse correlation ($r = -0.53$, $p < 0.0001$), indicating that lower serum vitamin C levels are associated with greater melasma severity (Figure 2).

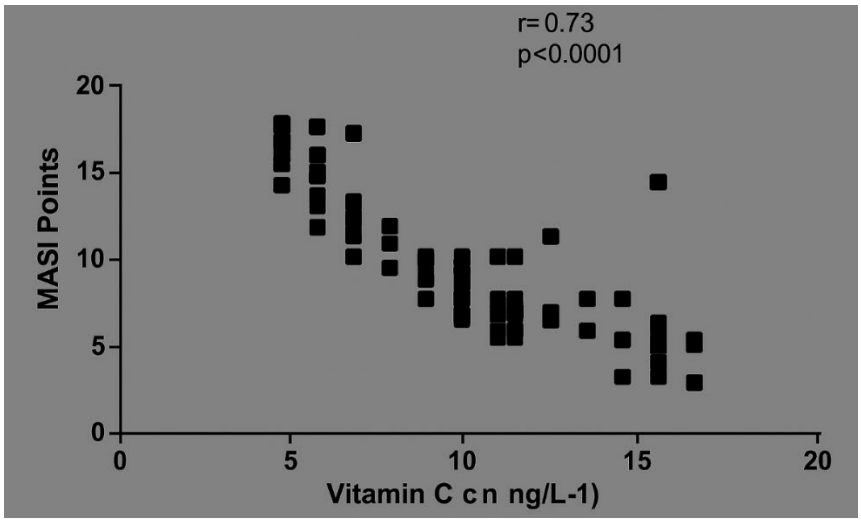

Figure 2. Correlation between Vitamin C levels and MASI scores showing an inverse association ($r = 0.73$, $p < 0.0001$).

Quality of life, psychological aspects, and melasma severity were analyzed in smokers and non-smokers. A statistically significant difference between groups was found for quality of life and melasma severity; however, no significant difference was observed in psychological aspects ($p = 0.01$) (Figure 3).

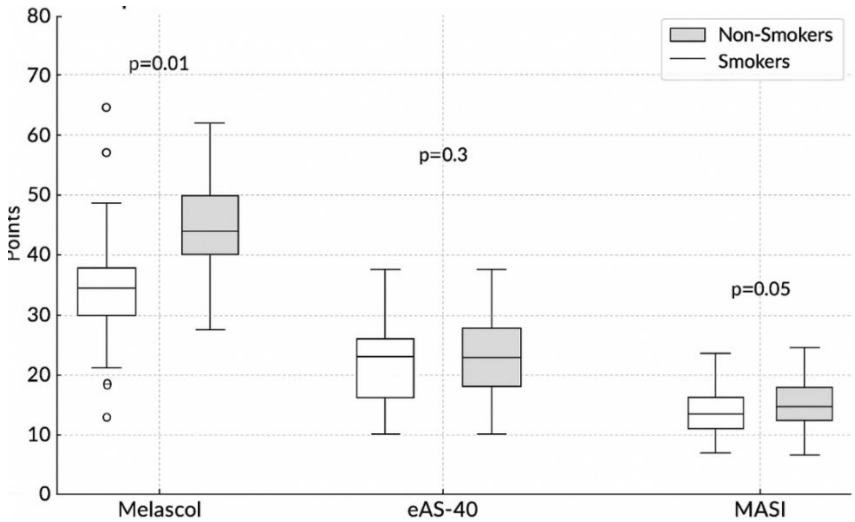

Figure 3. Analysis of quality of life, psychological factors and severity of melasma for smokers and non-smokers.

The risk of severe melasma was evaluated in smokers versus non-smokers. The odds ratio was 2.6 (95% CI: 1.8 – 4.3). For individuals with sun exposure greater than four days per week, the odds ratio was 2.5 (95% CI: 2.1 – 3.9), and for contraceptive users versus non-users, the odds ratio was 2.1 (95% CI: 0.5 – 3.9) (Figure 4).

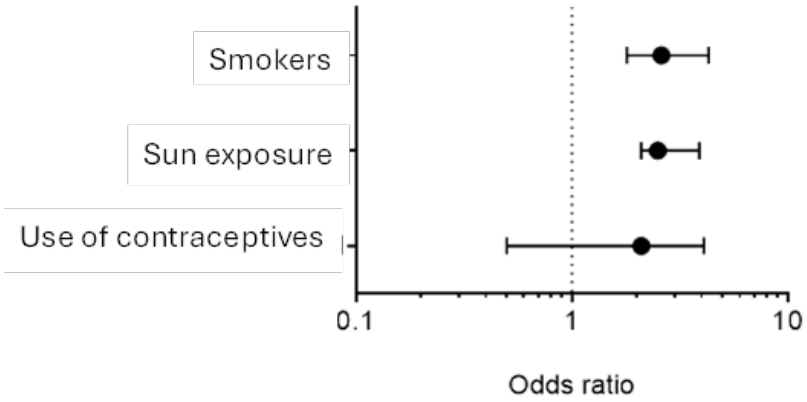

Figure 4. Analyses of risk of severe melasma for smokers, sun exposure and use of contraceptives.

DISCUSSION

Among the main findings, it was observed a strong association between lifestyle and the severity of melasma. Smoking and sun exposure were variables directly related to disease severity. A strong association was also found between melasma severity, serum vitamin C levels, and lifestyle factors.

Melasma is a common hyper melanosis that more frequently affects women and has a negative impact on quality of life[4]. It is a chronic condition with a multifactorial and not fully established etiopathogenesis, in which genetic, hormonal, cosmetic, and photo exposure factors are considered contributors to the disease[1]. Because it is chronic, recurrent, and primarily affects the face an easily visible area melasma often causes significant discomfort to patients. In this context, it can negatively affect quality of life, impacting psychological and emotional well-being, and interfering with productivity and social relationships[14].

The results of this study indicated a strong association between lifestyle and melasma severity, suggesting that behavioral and environmental factors may play a crucial role in the progression of the condition. This is consistent with previous studies reporting that excessive sun exposure and lifestyle-related factors, such as diet and stress, may contribute to the development and worsening of melasma[15,16].

When comparing the PEVI lifestyle questionnaire scores with the MASI scale (melasma severity), a worse presentation of facial hyperpigmentation was observed in individuals with a negative lifestyle profile.

The findings confirm the study hypothesis that an unhealthy lifestyle is associated with greater psychological distress, poorer quality of life, and more severe disease presentation. It is possible that individuals who maintain a healthy lifestyle may have a certain degree of protection against disease severity. People engaged in group activities and who feel a sense of belonging are less likely to experience loneliness, reinforcing the importance of social relationships as a basic human need[17].

This study also found a strong association between the lifestyle questionnaire scores and the EAS-40 scale, which evaluates the psychological aspects of patients with melasma. It was observed that individuals who maintain unhealthy habits across several domains such as poor nutrition, low or absent

physical activity, social disengagement, lack of appropriate interpersonal relationship management, and inadequate stress-coping behaviors showed higher EAS-40 scores, indicating worse psychological symptoms[18–20].

A relevant finding of this study was the strong association between smoking and the severity of melasma. Smoking is a well-known risk factor for several dermatological conditions, and its relationship with the worsening of melasma was highlighted in this research. Factors such as reduced cutaneous blood flow and exposure to cigarette toxins may have a direct impact on skin health, exacerbating already sensitive conditions like melasma. Furthermore, smoking is associated with decreased collagen synthesis, which can compromise skin structure and potentially worsen the hyperpigmentation observed in melasma.

Tobacco also promotes the release of superoxide ions and free radicals that cause tissue damage, which are normally inactivated by retinol, beta-carotene, and tocopherol. However, in smokers, serum and cutaneous levels of these antioxidant substances are reduced. This mechanism may explain the association found in the present study between smoking and severe cases of melasma, characterized by greater pigmentation intensity[21].

The findings of this study also suggest that the presence of melasma especially in its more severe forms has a specific negative impact on the psychological well-being of affected individuals, interfering with self-esteem and self-image perception. Previous studies have shown that visible dermatological conditions such as melasma are often associated with symptoms of depression, anxiety, and stress, particularly among women. Aesthetic concerns related to appearance can lead to significant emotional distress, impairing patients' quality of life and hindering social adaptation [19,20].

Melasma generates considerable socioemotional discomfort[1]. In the present study, the overall mean MelasQoL score was 36.8, indicating a substantial negative impact on quality of life. The most affected domains were those related to emotional well-being, such as dissatisfaction with skin appearance, frustration, and depressive feelings about the skin condition. Facial lesions caused by melasma often lead to dissatisfaction, low self-esteem, social withdrawal, and reduced productivity at work [22]. Leisure and social activities may also be affected, as individuals tend to believe that their skin spots draw more attention than their words or actions. Based on these findings, it can be stated that melasma is a dermatological disorder that significantly impairs patients' quality of life. Similar studies using the MelasQoL questionnaire have also identified emotional well-being as one of the most affected quality-of-life domains [23,24].

Although this study focused mainly on the association between lifestyle and smoking, it is also important to consider other well-known risk factors, such as the use of hormonal contraceptives and sun exposure. Hormonal contraceptive use has been widely associated with an increased prevalence of melasma due to the effects of hormones on melanin production. Sun exposure is universally recognized as one of the main factors exacerbating hyperpigmentation in melasma, as ultraviolet radiation stimulates melanogenesis and worsens the condition[25,26].

Another important finding was the relationship between melasma severity and serum vitamin C levels. It was observed that the lower the serum concentration of vitamin C, the more severe the melasma. Vitamin C inhibits melanogenesis, leading to skin lightening and promoting collagen synthesis protection. Additionally, Polypodium leucotomos provides some degree of protection against the harmful effects of UV radiation, helping to minimize photoaging-related skin damage such as hyperpigmentation and texture alterations. It also has antioxidant properties, counteracting free radicals responsible for solar damage and preventing premature skin aging[27].

Regarding the study's limitations, it is important to note that data collection related to sun exposure did not measure the specific time of day or total duration of exposure. Critical sun exposure periods between 10 a.m. and 4 p.m. are known to have a higher risk for skin damage and hyperpigmentation, but these were not assessed due to the structure of the questionnaire. Some data were collected dichotomously, without quantifying exposure or duration, which may have limited the ability to establish causal associations, particularly regarding sun exposure and contraceptive use both recognized etiological factors according to the literature[22].

The clinical applicability of this study lies in the observation that both quality of life and lifestyle are compromised among individuals with melasma. This justifies therapeutic approaches aimed at restoring previously affected psychological and social functions. Therefore, maintaining a healthy lifestyle may serve as a protective factor against the worsening of melasma.

CONCLUSION

This study reinforces the importance of considering lifestyle factors, including smoking and sun exposure, as key determinants of melasma severity. Furthermore, it highlights the need for a holistic approach to the management of this condition, addressing not only the physical aspects of the disease but also its psychological and social impacts on patients. Raising awareness about the risks associated with smoking and implementing preventive measures against excessive sun exposure may play a fundamental role in reducing melasma severity and improving the quality of life of those affected.

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