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THE EFFECT OF DEMOGRAPHIC AND CLINICAL CHARACTERISTICS ON SUN PROTECTION ATTITUDES OF THE FEMALE PATIENTS WITH MELASMA: A CROSS-SECTIONAL STUDY

MELAZMALI KADIN HASTALARIN DEMOGRAFİK VE KLİNİK ÖZELLİKLERİNİN GÜNEŞTEN KORUNMA TUTUMLARINA ETKİSİ: KESİTSEL BİR ÇALIŞMA

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ABSTRACT

Objective: Melasma is a common chronic hyperpigmentation disorder that predominantly affects women. Photoprotection plays a crucial role in both treatment and prevention of relapses. This study aimed to evaluate the demographic characteristics, clinical features, and sun protection behaviors of female patients diagnosed with melasma.

Methods: Female patients aged ≥18 years diagnosed with melasma who attended the dermatology outpatient clinic between April and July 2023 were included in this cross-sectional study. Demographic data, clinical characteristics, and attitudes toward sunscreen use and sun protection were recorded and analyzed.

Results: A total of 116 female patients were included. Seventy-two patients (62.1%) reported using broad-spectrum sunscreen. Significant associations were found between sunscreen use and education level, monthly income, disease onset, Fitzpatrick skin type, and melanin accumulation depth (p=0.001, p=0.049, p=0.001, p=0.001, and p=0.035, respectively). Univariate analysis identified education level, monthly income, disease onset, Fitzpatrick skin type III, and melanin accumulation depth as significant predictors of sunscreen use. Multivariate analysis demonstrated that higher education level, Fitzpatrick skin type III, and mixed-type melanin accumulation depth were independent predictors of sunscreen use (p=0.001, p=0.007, and p=0.036, respectively).

Conclusion: Female melasma patients with higher education levels, Fitzpatrick skin type III, and mixed-type melanin accumulation use sunscreen more frequently. Comprehensive education regarding photoprotection should be provided to all patients with melasma.

Keywords: Melasma, photoprotection, sunscreen, behavior

ÖZ

Amaç: Melazma, ağırlıklı olarak kadınları etkileyen, kronik seyirli yaygın bir hiperpigmentasyon bozukluğudur. Fotokorunma, hem tedavi sürecinde hem de nükslerin önlenmesinde kritik bir rol oynamaktadır. Bu çalışmada, melazma tanısı almış kadın hastaların demografik özellikleri, klinik bulguları ve güneşten korunma davranışlarının değerlendirilmesi amaçlanmıştır.

Yöntem: Bu kesitsel çalışmaya, Nisan–Temmuz 2023 tarihleri arasında dermatoloji polikliniğine başvuran ve melazma tanısı almış, 18 yaş ve üzeri kadın hastalar dahil edilmiştir. Hastaların demografik verileri, klinik özellikleri ve güneş kremi kullanımı ile güneşten korunmaya yönelik tutumları kaydedilmiş ve analiz edilmiştir.

Bulgular: Çalışmaya toplam 116 kadın hasta dahil edilmiştir. Hastaların 72'si (%62,1) geniş spektrumlu güneş koruyucu kullandığını bildirmiştir. Güneş kremi kullanımı ile eğitim düzeyi, aylık gelir, hastalığın başlangıç zamanı, Fitzpatrick deri tipi ve melanin birikim derinliği arasında istatistiksel olarak anlamlı ilişki saptanmıştır (sırasıyla p=0,001; p=0,049; p=0,001; p=0,001 ve p=0,035). Tek değişkenli analizde; eğitim düzeyi, aylık gelir, hastalığın başlangıç zamanı, Fitzpatrick deri tipi III ve melanin birikim derinliği güneş kremi kullanımının anlamlı belirleyicileri olarak bulunmuştur. Çok değişkenli analizde ise yüksek eğitim düzeyi, Fitzpatrick deri tipi III ve mikst tip melanin birikim derinliği güneş kremi kullanımında bağımsız belirleyici faktörler olarak saptanmıştır (sırasıyla p=0,001; p=0,007 ve p=0,036).

Sonuç: Eğitim düzeyi daha yüksek olan, Fitzpatrick deri tipi III'e sahip ve mikst tip melanin birikimi bulunan kadın melazma hastalarında güneş kremi kullanım oranı daha yüksektir. Tüm melazma hastalarına fotokorunma konusunda kapsamlı eğitim verilmesi gerekmektedir.

Anahtar Kelimeler: Melazma, fotokorunma, güneş koruyucu, davranış

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Introduction

Melasma is a common acquired hyperpigmentation disorder that negatively affects quality of life. It predominantly affects women with darker skin types but may occur in all phototypes. Its development is multifactorial and involves hormonal influences (such as pregnancy and oral contraceptive use), genetic predisposition, and ultraviolet (UV) exposure.[1] Clinically, melasma presents as sharply demarcated brown-to-gray macules and patches on sun-exposed areas, most commonly the face. Melasma can be classified according to distribution pattern (centrofacial, malar, mandibular) or based on the depth of melanin accumulation (epidermal, dermal, or mixed).[2]

Melasma is characterized by a chronic course with a high rate of recurrence. Ultraviolet A (UVA) and ultraviolet B (UVB) radiation play key roles in relapse by stimulating melanocyte activity and melanogenesis. Experimental studies have shown that although minimal melanogenic doses of UVA, UVB, and visible light induce similar increases in epidermal melanin in both melasma and adjacent skin, UVA irradiation results in coarser epidermal melanin granulation and increased upper dermal melanin in melasma, contributing to pigment persistence.[3] In addition, visible light exacerbates pigmentation through melanocyte activation and dermal inflammation, particularly in individuals with darker skin types.[4] Persistent inflammation, vascular alterations, and basement membrane disruption further promote the chronic and recurrent nature of the disease.[5] Therefore, continuous photoprotection against UVA, UVB, and visible light is essential to prevent relapses and maintain treatment response in patients with melasma.[6]

General photoprotective measures include seeking shade, using sunscreen, and wearing protective clothing such as hats and sunglasses. Sunscreens contain chemical and/or inorganic filters and are commonly classified by their sun protection factor (SPF), which reflects protection against UVB-induced erythema.[7] However, as UVA and visible light also contribute to pigmentary disorders, particularly in darker skin types, broad-spectrum sunscreens providing protection against UVA, UVB, and visible light are recommended for patients with melasma.[8]

In our study, we aimed to evaluate the demographic features, clinical findings, and sun protection attitudes of the patients with melasma.

Methods

Study design and participants

This study is a descriptive, cross-sectional study. It was carried out in a tertiary dermatology center after the ethics committee's approval. (Approval number: 2023/04-07). A hundred-sixteen female patients aged older than 18 years with melasma admitted to the dermatology outpatient clinic between April and July 2023 were included in the study. All patients who participated in the study gave an informed consent form.

Inclusion criteria:

- Female patients aged ≥18 years
- Clinical diagnosis of melasma confirmed by dermatological examination and Wood lamp evaluation
- Admission to the dermatology outpatient clinic between April and July 2023
- Provision of written informed consent

Exclusion criteria:

- Male patients
- Patients younger than 18 years
- Patients who refused to participate or did not provide written informed consent
- Patients with concomitant pigmentary disorders that could interfere with clinical evaluation
- Presence of a history of prior sunburn, laser treatment, and solarium use
- Presence of smoking and alcohol consumption habits

Data collection

All patients were examined by dermatologists. The diagnosis was made after an evaluation of the history of the disease, clinical features, and Wood lamp examination. All patients' age, level of education, occupation, monthly income, disease characteristics (onset of disease and disease duration), clinical features (Fitzpatrick skin type, clinical type of melasma, depth of melanin accumulation, modified melasma area severity index (mMASI) were recorded in the case report files. Afterward, patients' traits and behavior toward sunscreen usage and sun exposure in their daily routines to assess knowledge, attitude, and practices were evaluated and recorded in the case report files.

Statistical Analysis

Statistical analysis was done with IBM SPSS 25.0 (IBM Corp., Armonk, NY, USA) package program. Numerical variables were given as mean ± standard deviation or median (25th-75th percentile). Categorical variables were given as frequency (percentage). Authors performed logistic regression test for univariate and multivariate analysis. Inferential analyses were used for any possible association between the different variables wherein a p-value of less than 0.05 was considered statistically significant.

Results

The study included 116 female patients with a mean age of 35.41 ± 6.60 years. Patients' demographic and clinical characteristics, as well as their attitudes and practices toward sun protection and sunscreen use, are presented in Tables 1 and 2.

Table 1. Demographic and clinical features of the patients.

	Patient number (n=116)
Mean age of patients (mean ± SD) (years) (range)	35.41 ± 6.60 (32-40)
Mean duration of the disease (mean ±SD) (years) (range)	3.1 ± 1.8 (1-10)
Level of education, n (%)	
Primary school	16 (13.8%)
Secondary school	12 (10.3%)
High school	36 (31%)
University	52 (44.8%)
Occupation, n (%)	
Indoor	96 (82.8%)
Outdoor	20 (17.2%)
Monthly income, n (%)	
<5000 TL	52 (44.8%)
5000-10000 TL	16 (13.8%)
>10000TL	48 (41.4%)
Onset of the disease, n (%)	
Before pregnancy	48 (41.4%)
During pregnancy	36 (31%)
After pregnancy	32 (27.6%)
Fitzpatrick skin type, n (%)	
Type 3	88 (75.9%)
Type 4	28 (24.1%)
Accumulation depth of melanin, n (%)	
Superficial	48 (41.4%)
Deep	8 (6.9%)
Mix	60 (51.7%)
Distrubution pattern of hyperpigmented patches n (%)	
Centrofacial	68 (58.6%)
Malar	40 (34.4%)
Mandibular	8 (6.9%)
Mean of mMASI, (mean± SD)	7.07 ± 3.02

Abbreviations: MASI: Modified melasma area severity index, SD: Standard deviation, TL: Turkish Lira

Table 2. Patients' attitudes and practices about sun protection and usage of sunscreen.

	Patient number (n=116)
Hours spent in the sun on weekdays	
1-2 h	36 (31%)
3-5 h	44 (37.9%)
>5 h	36 (31%)
Hours spent in the sun on weekends	
1-2 h	24 (20.7%)
3-5 h	64 (55.2%)
>5 h	28 (24.1%)
Using broad-spectrum sunscreen	
Present	72 (62.1%)
Not using sunscreen	44 (37.9%)
Formulation	
Tinted	8 (6.9%)
Not tinted	64 (55.2%)
How often apply sunscreen	
Every 2 hours	32 (27.6%)
Occasionally	40 (34.4%)
Using a hat	
Yes	16 (13.8%)
No	100 (86.2%)
Using a sunglass	
Yes	56 (48.3%)
No	60 (51.7%)
Seeking the shade	
Yes	104 (89.7%)
No	12 (10.3%)

Abbreviations: h: Hours

Chi-square analysis demonstrated that sunscreen use was significantly associated with education level, monthly income, disease onset, Fitzpatrick skin type, and melanin accumulation depth ($p<0.05$ for all). Sunscreen use was more frequent among university-educated patients, those with higher income, patients with pre-pregnancy disease onset, Fitzpatrick skin type III, and mixed-type melasma. No significant associations were observed between sunscreen use and occupation or clinical type of melasma ($p=0.834$ and $p=0.757$, respectively) (Table 3).

Table 3. The relationship between sunscreen use and selected demographic and clinical variables. Education level, monthly income, disease onset, Fitzpatrick skin type, and melanin accumulation depth were significantly associated with sunscreen use.

	Patients using sunscreen (n=72)	Patients not using sunscreen (n=44)	P value (X^2)
Level of education			
Primary school	8[a] (11.1%)	8[a] (18.2%)	**0.001***
Secondary school	0[a] (0%)	12[b] (27.3%)	
High school	20[a] (27.8%)	16[a] (36.4%)	
University	44[a] (61.1%)	8[b] (18.2%)	
Occupation			
Indoor	12 (16.7%)	8 (18.2%)	0.834
Outdoor	60 (83.3%)	36 (81.1%)	
Monthly income			
<5000 TL	28[a] (38.9%)	24[a] (54.5%)	**0.049***
5-10000 TL	8[a] (11.1%)	8[a] (18.2%)	
>10000TL	36[a] (50%)	12[b] (27.3%)	
Onset of the disease			
Before pregnancy	40[a] (55.6%)	8[b] (18.2%)	**0.001***
During pregnancy	16[a] (22.2%)	20[b] (45.5%)	
After pregnancy	16[a] (22.2%)	16[a] (36.4%)	
Fitzpatrick skin type			
Type 3	60 (83.3%)	24 (54.5%)	**0.001***
Type 4	12 (16.7%)	20 (45.5%)	
Accumulation depth of melanin			
Superficial	24[a] (33.3%)	24[b] (54.5%)	**0.035***
Deep	4[a] (5.6%)	4[a] (9.1%)	
Mix	44[a] (61.1%)	16[b] (36.4%)	
Clinical type			
Centrofacial	44 (61.1%)	24 (54.5%)	0.757
Malar	23 (31.9%)	17 (38.6%)	
Mandibular	5 (6.9%)	3 (6.8%)	

*Abbreviations: TL: Turkish Lira, *: p<0.05, statistically significant*

Univariate logistic regression analysis demonstrated that education level, monthly income, disease onset, Fitzpatrick skin type, and accumulation depth of melanin were significant predictors of sunscreen use ($p=0.001$, $p=0.032$, $p=0.001$, $p=0.001$, and $p=0.013$, respectively). In the multivariate logistic regression model, higher education level remained an independent predictor of sunscreen use compared with lower education levels (OR=0.443, 95% CI: 0.288–0.680, $p=0.001$). Fitzpatrick skin type III also remained independently associated with sunscreen use (OR=3.737, 95% CI: 1.446–9.661, $p=0.007$). Compared with superficial melasma, mixed-type melanin accumulation remained independently associated with increased sunscreen use (OR=0.616, 95% CI: 0.392–0.969, $p=0.036$). In contrast, monthly income

and disease onset lost statistical significance after adjustment for confounding variables (Table 4).

Table 4. The results of univariate and multivariate logistic regression analyses. In logistic regression analyses, primary and secondary education levels were used as the reference category for education level, and superficial-type melanin accumulation was used as the reference category for melanin depth.

	Univariate analysis			Multivariate analysis		
	O.R	C.I 95%	P value	O.R	C.I. 95%	P value
Education level	0.445	0.297-0.667	0.001	0.443	0.288-0.680	0.001
Monthly income	0.634	0.417-0.962	0.032			
Onset of disease	2.216	1.361-3.609	0.001			
Fitzpatrick skin type	4.167	1.767-9.827	0.001	3.737	1.446-9.661	0.007
Accumulation depth of melanin	0.603	0.404-0.900	0.013	0.616	0.392-0.969	0.036

Among patients not using sunscreen, the most common reason was lack of habitual use (55%), followed by concerns about local side effects (18%), lack of time (18%), and high cost (9%) (Figure 1).

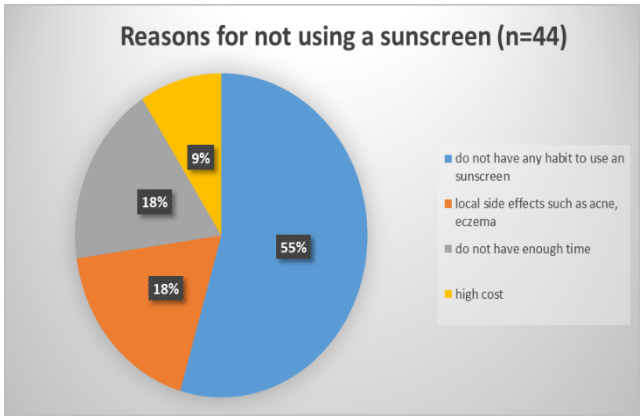

Figure 1. Reasons for not using sunscreen.

Discussion

This study found that university-level education, higher income, pre-pregnancy disease onset, Fitzpatrick skin type III, and mixed melanin depth were associated with increased sunscreen use. Multivariate analysis identified education level, skin type, and melanin depth as independent predictors.

Sunscreen usage rates among melasma patients vary across studies. Seetan et al.[9] reported this rate as 61.2% in their study. In another study from our country[10], this rate was determined as high as 64%. However, Agarwal et al.[11] and Almuqati et al.[12] reported lower rates as 18% and 23% respectively. Our study found a usage rate of 62.1%. Variations may stem from regional, cultural, or socioeconomic differences, and future meta-analyses could explore this further.

Previous studies suggest multiple influencing factors of sunscreen usage.[10,13,14] Maymone et al.[13] reported that sunscreen usage could differ via ethnicity. They declared that African Americans use sunscreen less frequently than White and Hispanic counterparts. They also determined that women were more likely to adopt sun protective behaviours. In another study from our country, Ermertcan et al.[14] found no significant associations between demographic or clinical factors and sunscreen use. Our findings, however, suggest Fitzpatrick skin type and melanin depth are important factors, highlighting the role of education in influencing habits. The association between mixed-type melanin accumulation and higher sunscreen use may reflect increased disease awareness and prior treatment experience among these patients. Even patients with darker skin and superficial melasma should be educated on proper sun protection.

Among non-users, the primary reason was a lack of established habits, followed by concerns about side effects, time constraints, and cost. Similar barriers were reported by Al-Qarqaz et al.[15] Shetty et al.[16] introduced the concept of "personalized photoprotection," emphasizing individualized approaches based on patient preferences and needs. Personalized photoprotection strategies may improve patient compliance and treatment outcomes. Our findings emphasize the need for individualized photoprotection counseling tailored to patients' educational background and clinical characteristics to improve long-term adherence and prevent melasma recurrences.

The main limitation of this study is its cross-sectional design, which prevents causality assessment. Additionally, the study only included female participants, limiting generalizability. Self-reported sunscreen use may be subject to recall bias. However, the study's main strength lies in its relatively large sample size. Furthermore, it comprehensively evaluated both demographic and clinical factors influencing sun protection behavior.

Photoprotection is a cornerstone in the management of melasma. Various personal, environmental, and socioeconomic factors may influence adherence to sun protection measures. Dermatologists should consider not only the demographic and clinical characteristics of their patients but also individual preferences and needs. Patients must be thoroughly educated about all aspects of sun protection, and their adherence should be reassessed at every clinical visit to ensure long-term disease control and prevention of relapses.

Compliance with Ethical Standards

None

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Author Contributions

DK; Study concept, DK, NDD; Design: data collection, analysis and interpretation of results, literature search, draft manuscript preparation**.** All authors reviewed the results and approved the final version of the manuscript.

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