Impact of Melasma Severity on Quality of Life: A Cross-Sectional Study

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Abstract

Melasma is a chronic facial hyperpigmentation disorder that can negatively affect a patient's quality of life. However, the relationship between clinical severity and quality of life remains inconsistent across populations. This study aimed to evaluate the association between melasma severity and quality of life, and to identify factors associated with quality of life among Thai patients with melasma. A cross-sectional study was conducted among 100 Thai adults diagnosed with melasma. Clinical severity was assessed using the modified Melasma Area and Severity Index (mMASI), and quality of life was evaluated utilizing the Thai version of the Melasma Quality of Life (MelasQoL) questionnaire. Demographic and clinical characteristics were also collected. The correlation between mMASI and MelasQoL scores was analyzed using Spearman's correlation coefficient. The mean age of the participants was 42.6 ± 10.7 years, and 84% were female. The mean mMASI score was 7.32 ± 3.10, with the majority of participants classified as having moderate severity (66%), followed by mild (31%) and severe (3%) cases. The mean MelasQoL score was 32.07 ± 16.17. Most participants reported mild quality-of-life impairment (72%), while 18% and 10% reported moderate and severe impairment, respectively. Across all mMASI severity groups, the majority reported mild impairment. Correlation analysis demonstrated a very weak and non-significant association between the mMASI and MelasQoL scores (rho = 0.0963, p = 0.3404). These findings suggest that clinical severity alone may not accurately reflect the quality-of-life burden. Incorporating patient-reported outcomes could provide a more patient-centered approach to melasma management. Further analysis with a full sample size may clarify the associated factors.

Keywords: *MASI; Melasma; MelasQoL; Quality of Life*

1. Introduction

Melasma is an acquired hyperpigmentation disorder characterized by symmetrical brown to gray-brown macules on sun-exposed areas of the face (Doolan & Gupta, 2021; Majid & Aleem, 2022). The condition is particularly prevalent among individuals with darker skin phototypes and within Asian populations (Wu et al., 2021). Epidemiological studies indicate that melasma predominantly affects women of reproductive age (Sarkar et al., 2019).

Although melasma is not physically harmful, its visible facial distribution frequently leads to cosmetic concerns and psychological distress (Freitag et al., 2008; Jivon et al., 2015). Patients often report embarrassment, reduced self-confidence, and social withdrawal, highlighting that the burden of the disease extends beyond pigmentation changes alone. Consequently, melasma is increasingly recognized as a dermatologic condition with significant psychosocial implications rather than solely a pigmentary disorder.

The pathogenesis of melasma is complex and multifactorial, involving genetic predisposition, ultraviolet radiation, hormonal influences, and the dysregulation of melanogenesis pathways (Liu et al., 2023; Serre et al., 2018). Additional evidence suggests that visible light exposure and photoprotection behaviors may contribute to disease persistence (Passeron & Picardo, 2018; Morgado-Carrasco et al., 2022). Established risk factors include sun exposure, pregnancy, hormonal therapy, and a family history of the condition (Handel et al., 2014). Histopathological studies have also demonstrated epidermal and dermal alterations, including increased melanocyte activity and related dermal changes, which may contribute to disease chronicity and treatment resistance (Grimes et al., 2005; Phansuk et al., 2022).

To standardize the clinical assessment of disease severity, the Melasma Area and Severity Index (MASI) has been widely utilized in both clinical practice and research. A modified version of this index (mMASI) was subsequently developed to improve scoring feasibility and interobserver reliability while maintaining clinical relevance in assessing severity. However, clinical severity scores such as the MASI or

mMASI primarily evaluate pigmentary changes and may not fully reflect the psychosocial burden experienced by patients.

To capture the patient-centered impact of the disease, the Melasma Quality of Life (MelasQoL) questionnaire was developed and validated as a disease-specific instrument to measure how melasma affects emotional well-being, social functioning, and daily life (Balkrishnan et al., 2003; Lieu & Pandya, 2012). Several studies have demonstrated an association between melasma severity and impaired quality of life, although the strength of this relationship varies across populations (Jusuf et al., 2019; Zhu et al., 2022). Cultural context, coping mechanisms, and individual perception may influence how patients experience the disease burden (Sivayathorn, 1995; Sarkar et al., 2018). For instance, some individuals may psychologically adapt to long-standing pigmentation, whereas others might experience considerable distress even with relatively mild clinical severity. As a result, clinical severity does not always correspond directly to a patient's perceived quality-of-life impact.

Despite the high prevalence of melasma in Asian populations, limited published evidence has examined the relationship between clinical severity and quality of life among Thai patients using both the modified MASI (mMASI) and the validated MelasQoL questionnaire. Understanding this relationship may help clinicians better appreciate the multidimensional burden of melasma and support more patient-centered management strategies.

Therefore, this study aimed to evaluate the association between the clinical severity of melasma, measured using the mMASI, and quality of life, assessed utilizing the MelasQoL questionnaire, among Thai patients with the condition. We hypothesized that higher mMASI scores would be associated with greater impairment in quality of life.

2. Objectives

To evaluate the correlation between melasma severity, measured using the modified Melasma Area and Severity Index (mMASI), and quality of life, assessed utilizing the MelasQoL-Thai questionnaire, among Thai patients with melasma.

3. Materials and Methods

This cross-sectional study was conducted among Thai adult patients diagnosed with melasma. Data were collected from the dermatology outpatient clinics at Benchakitti Park Hospital and Rajavithi Hospital. The study period was from November 2025 to January 2026. This study was approved by the Human Research Ethics Committee of Thammasat University (Medicine) (Certificate of Approval No. 241/2568).

Participants were recruited using consecutive sampling from eligible patients attending the participating clinics during the study period. Inclusion criteria were adults aged 18 years or older with a clinical diagnosis of melasma who were able to read and understand Thai. Patients with other facial dermatoses, those unable to complete the questionnaire, and individuals unable to read Thai were excluded. All participants provided written informed consent prior to participation.

Using the Yamane formula for sample size calculation, the target sample size was determined to be approximately 400 participants. This calculation was based on a 5% margin of error and a 39.9% prevalence of melasma (Sivayathorn, 1995) within an adult Thai population of approximately 54.1 million. However, the present manuscript reports preliminary findings from the currently available dataset, which includes the first 100 participants enrolled in the ongoing study. Data collection is continuing to reach the planned sample size.

Melasma severity was independently assessed by a single dermatologist using the modified Melasma Area and Severity Index (mMASI). The mMASI score evaluates four facial regions (forehead, right malar, left malar, and chin) by assessing the area of involvement and pigmentation darkness, with total scores ranging from 0 to 24.

Quality of life was assessed utilizing the Thai version of the Melasma Quality of Life (MelasQoL-Thai) questionnaire, a disease-specific instrument designed to evaluate the psychosocial impact of melasma. The questionnaire consists of 10 items scored on a 7-point Likert scale, with total scores ranging from 10 to 70; higher scores indicate greater impairment in quality of life. The MelasQoL questionnaire has been

previously validated and demonstrated good internal consistency (Cronbach's α = 0.947) within melasma populations. According to Dodmani and Deshmukh (2020), three categories of impairment (mild, moderate, and severe) were classified and analyzed.

Statistical analyses were performed utilizing Stata version 14.2. Descriptive statistics were utilized to summarize demographic and clinical characteristics. Continuous variables are presented as the mean ± standard deviation, while categorical variables are expressed as frequencies and percentages.

Prior to the correlation analysis, the distribution of the mMASI and MelasQoL scores was assessed for normality using graphical and statistical methods. Spearman's rank correlation coefficient was employed due to a non-normal distribution of the data. A two-sided p-value < 0.05 was considered statistically significant.

As this manuscript presents preliminary findings from an ongoing study, analyses of the demographic and clinical factors associated with MelasQoL scores will be performed in the final study using regression-based methods upon completion of the planned sample size.

4.1 Results

A total of 100 participants were included in the study. The mean age of the participants was 42.6 ± 10.7 years, with the vast majority being female (n = 84, 84%). The mean duration of the disease was 51.9 ± 57.0 months. Half of the participants held a bachelor's degree (n = 50, 50%), while 32% (n = 32) had completed high school. Regarding monthly income, the majority reported earnings of below 50,000 baht (n = 58, 58%). A family history of melasma was reported by 70% of the participants (n = 70).

Additionally, most participants reported applying sunscreen daily (n = 71, 71%). At the time of the study, 24 participants (24%) were actively undergoing treatment for the condition (Table 1).

Table 1 Demographic characteristics of the participants

	N=100
Age (Mean ± SD), yr	42.6 ± 10.67
Female, N (%)	84 (84%)
Duration of melasma (Mean ± SD), month	51.95 (57.01)
Family history of melasma, N (%)	70 (70%)
Marital status, N (%)	
● Single	46 (46%)
● Married	43 (43%)
● Divorced	9 (9%)
● Separated	0
● Others	2 (2%)
Education, N (%)	
● Highschool	32 (32%)
● Bachelor's degree	50 (50%)
● Master's degree	16 (16%)
● Higher than Master's degree	2 (2%)
Family income per month, N (%)	
● Less than 50,000 Baht	58 (58%)
● 50,001-100,000 Baht	25 (25%)
● More than 100,000 Baht	17 (17%)
Sunscreen use, N (%)	
● Every day	71 (71%)
● Almost every day	10 (10%)
● Sometimes	10 (10%)
● Never	9 (9%)
Current melasma treatment, N (%)	24 (24%)

The mean mMASI score was 7.32 ± 3.10. Most participants presented with moderate melasma severity (66%), while fewer had mild disease (31%) and only a small proportion had severe melasma (3%). Overall, the majority exhibited clinically noticeable but not extreme pigmentation (Table 2).

Table 2 Severity of melasma of the participants

mMASI scores	N = 100
Mean ± SD	7.32 ± 3.10
Severity, N (%)	
• Mild (mMASI <6)	31 (31%)
• Moderate (mMASI 6-12)	66 (66%)
• Severe (mMASI >12)	3 (3%)

The mean MelasQoL score was 32.07 ± 16.17. Most participants reported mild quality-of-life impairment (72%), while 18% and 10% experienced moderate and severe impairment, respectively. These findings indicate that although melasma affected the participants' quality of life, the overall impact was generally mild within this cohort (Table 3).

Table 3 MelasQoL of the participants

MelasQoL scores	N = 100
Mean ± SD	32.07 ± 16.17
Severity, N (%)	
• Mild impairment (MelasQoL 10-39)	72 (72%)
• Moderate impairment (MelasQoL 40-54)	18 (18%)
• Severe impairment (MelasQoL 55-70)	10 (10%)

Among participants with mild mMASI scores, 71% reported mild quality-of-life impairment, while 16.1% and 12.9% reported moderate and severe impairment, respectively. In the moderate mMASI group, 72.7% experienced mild impairment, 19.7% had moderate impairment, and 7.6% reported severe impairment. Among those with severe mMASI scores, two-thirds reported mild impairment, and one-third reported severe impairment. Overall, the majority of participants across all mMASI severity levels reported only mild quality-of-life impairment (Table 4).

Table 4 Cross-tabulation of mMASI severity category and MelasQoL impairment

mMASI scores	MelasQoL Scores			Total
	Mild impairment	Moderate impairment	Severe impairment	
Mild	22 (71%)	5 (16.1%)	4 (12.9%)	31 (100%)
Moderate	48 (72.7%)	13 (19.7%)	5 (7.6%)	66 (100%)
Severe	2 (66.7%)	0 (0%)	1 (33.3%)	3 (100%)
Total	72 (72%)	18 (18%)	10 (10%)	100 (100%)

Most participants had moderate melasma severity (66%), followed by mild (31%) and severe disease (3%). The mean MelasQoL score was 32.07 ± 16.17. Overall, 72% of participants reported mild quality-of-life impairment, while 18% and 10% reported moderate and severe impairment, respectively. A cross-tabulation analysis confirmed that most participants across all mMASI severity categories reported mild quality-of-life impairment (Table 4). Notably, because only three participants were classified as having severe melasma, subgroup interpretations involving this category should be approached with caution. Furthermore, Spearman's rank correlation analysis demonstrated a very weak and non-significant association between the mMASI and MelasQoL scores (rho = 0.0963, p = 0.3404) (Table 5). Because the MelasQoL instrument assesses the impact of the condition on emotions, appearance, social life, and daily functioning, this weak clinical correlation likely reflects the strong, independent influence of psychosocial factors on a patient's melasma-related quality of life.

Table 5 Association between mMASI scores and MelasQoL

	Spearman's	P-value
mMASI score with MelasQoL	0.0963	0.3404

Table 6 Group comparison table with mean MelasQoL scores across demographic and clinical subgroups

Demographic and clinical variable	Sub-categories	MelasQoL mean scores	P-value
Age (years)	19-29	29.31	0.4307
	30-39	36.95	
	40-49	31.64	
	50-59	30.56	
Sex	Male	30.19	0.6140
	Female	32.43	
Duration of melasma (years)	<= 1	27.46	0.0741
	1.1 to 3	30.17	
	3.1 to 5	33.85	
	> 5	38.91	
Family history of melasma	No	27.57	0.0681
	Yes	34	
Sunscreen frequency	Never	26.22	0.6622
	1-2 days/ week	38.83	
	3-4 days/ week	31.25	
	5-6 days/ week	34.4	
	Everyday	31.96	
Taking melasma treatment	Current	36.58	0.0047*
	Previous	40	
	Never	27.74	

When comparing the mean MelasQoL scores across various demographic and clinical subgroups (age group, sex, disease duration, family history, and sunscreen frequency), a statistically significant difference was observed only within the melasma treatment category ($p = 0.0047$). Specifically, the mean MelasQoL score was 27.74 for those who had never received treatment, 36.58 for those currently undergoing treatment, and 40.00 for those who had previously received treatment (Table 6).

4.2 Discussion

This study examined the relationship between the clinical severity of melasma and the quality of life among Thai patients. Overall, melasma was associated with some degree of impact on a patient's well-being, but the relationship between clinical severity (mMASI) and quality of life (MelasQoL) was weak and not statistically significant. This suggests that having more visible or extensive pigmentation does not inherently mean that patients feel more affected in their daily lives.

The demographic characteristics of our participants aligned with those reported in previous studies. Melasma was predominantly observed in adult women and often exhibited a long disease duration (Sarkar et al., 2019; Wu et al., 2021). Living with a chronic facial condition for many years may gradually affect how patients perceive their appearance, frequently leading to ongoing stress, frustration, or reduced self-confidence (Freitag et al., 2008).

In this study, most patients presented with moderate clinical severity based on the mMASI, yet the majority reported only mild impairment in their quality of life. This discrepancy highlights an essential point: clinical severity and patient experience do not always strictly correlate. While the mMASI measures the extent and darkness of facial pigmentation, the MelasQoL instrument reflects how patients feel emotionally and socially. Factors such as personal perception, self-confidence, and coping styles may influence how strongly the condition affects an individual (Ikino et al., 2015; Lieu & Pandya, 2012).

The weak correlation between the mMASI and MelasQoL scores observed in this study supports findings from earlier research (Jusuf et al., 2019; Zhu et al., 2022). Some patients may feel significantly distressed even with mild pigmentation, particularly when the lesions are located in highly visible areas. Conversely, patients with more noticeable pigmentation may adapt over time and ultimately feel less affected. This variation demonstrates that melasma is not solely a pigmentary condition but also a complex psychological and social one.

Cultural perception may also play a significant role. For some individuals, facial pigmentation may be viewed primarily as a cosmetic issue rather than a severe health problem, which could explain why the overall quality-of-life impairment remained mild among many participants. Additionally, patients who have lived with melasma for a long time may gradually psychologically adjust to their condition, leading to a lower reported impact despite persistent pigmentation.

These findings directly relate to the primary study objective. Although clinical severity was expected to strongly correlate with quality of life, the observed relationship was remarkably weak. This indicates that factors beyond pigmentation severity, such as disease duration, personal perception, and emotional response, are critical in determining how melasma truly affects patients.

From a clinical perspective, this highlights the critical importance of looking beyond standardized severity scores alone. Relying exclusively on diagnostic tools like the mMASI may overlook patients who are deeply emotionally affected despite having only mild or moderate disease. Incorporating patient-reported measures such as the MelasQoL questionnaire can help provide a more comprehensive understanding of the disease burden and actively support more patient-centered care (Balkrishnan et al., 2003; Lieu & Pandya, 2012).

While interpreting these findings, several limitations must be considered. This study utilized a cross-sectional design; therefore, causal relationships between melasma severity and quality-of-life impairment cannot be definitively determined. Furthermore, participants were recruited from tertiary hospitals in Bangkok, which may limit how accurately these findings can be generalized to the broader population. The sample was predominantly female, reflecting the usual epidemiological pattern of melasma, but consequently limiting the ability to draw comparisons between sexes. In addition, only a small number of participants were clinically diagnosed with severe melasma, which makes any statistical conclusions within this specific subgroup less reliable. Finally, other potential confounding factors such as treatment status, coping styles, and baseline psychological aspects were not fully explored and may significantly influence how patients perceive their condition.

5. Conclusion

Melasma demonstrates a measurable impact on the quality of life of Thai patients, although the statistical correlation between clinical severity and quality-of-life impairment remains weak. Patients presenting with moderate pigmentation frequently reported only mild impairment, suggesting that clinical severity alone does not adequately reflect the holistic patient experience.

These findings indicate that factors such as disease duration, personal perception, and emotional response play a critical role in determining the true quality-of-life impact. Consequently, the comprehensive assessment of melasma should integrate both clinical severity metrics and patient-reported outcomes.

Adopting a patient-centered approach that addresses both the clinical and psychosocial dimensions of the disease will likely improve overall management strategies and enhance patient satisfaction.

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