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Melasma in Women: A Comprehensive Review of Hormonal, Environmental and Psychosocial Factors

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ABSTRACT

BACKGROUND

Melasma is an acquired disorder of facial hyperpigmentation that predominantly affects women, particularly during the reproductive years. Although the condition is clinically benign, its chronic and recurrent nature and visibility on the face can result in considerable cosmetic and psychosocial distress. Its pathogenesis is multifactorial, involving hormonal influences, ultraviolet and visible-light exposure, genetic susceptibility, oxidative stress, inflammation and alterations in the cutaneous microenvironment.

OBJECTIVE

To provide a comprehensive review of the hormonal, environmental and psychosocial factors involved in the development and persistence of melasma in women, and to discuss their relevance to clinical assessment and management.

METHODS

A narrative review of literature concerning the epidemiology, pathogenesis, hormonal associations, environmental triggers, clinical characteristics and psychosocial consequences of melasma was undertaken. Particular emphasis was placed on factors relevant to women and on the relationship between disease severity and quality of life.

RESULTS

Hormonal influences appear particularly relevant in female melasma, with pregnancy and exogenous hormonal exposure frequently associated with its onset or exacerbation. Estrogen, progesterone and melanocyte-stimulating pathways may influence melanogenesis, although melasma is not simply a hormonal disorder. Ultraviolet radiation remains an important aggravating factor, while visible light and heat may also contribute. Genetic predisposition, oxidative stress, inflammation, vascular changes and altered basement-membrane architecture further contribute to disease pathogenesis. The visible nature of facial melasma may lead to embarrassment, reduced self-confidence and impaired quality of life.

CONCLUSION

Melasma in women should be considered a multifactorial pigmentary disorder rather than a purely hormonal or cosmetic condition. Understanding hormonal, environmental and psychosocial contributors can improve patient counseling, prevention strategies and comprehensive clinical management. Future research should integrate objective pigmentation scores with patient-reported quality-of-life measures.

KEYWORDS: *Melasma; women; hyperpigmentation; estrogen; progesterone; pregnancy; ultraviolet radiation; visible light; hormones; psychosocial factors; quality of life; mMASI.*

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1. INTRODUCTION

- Melasma is a common acquired disorder of hyperpigmentation characterized clinically by symmetrical brown to grey-brown macules and patches, most commonly involving the face.
- The condition predominantly affects women and is particularly frequent during the reproductive years. The forehead, malar regions, upper lip and chin may be involved.

- Unlike many dermatological disorders, melasma is usually asymptomatic. Patients generally do not experience pain, itching or systemic illness directly attributable to the pigmentation.
- Nevertheless, its location on the face makes it highly visible.
- Consequently, the clinical importance of melasma extends beyond the pigmentary alteration itself.
- The development and persistence of melasma are considered multifactorial. Hormonal influences, ultraviolet radiation, visible light, genetic susceptibility, skin phototype, oxidative stress, inflammation and vascular factors have all been implicated.
- Among women, hormonal factors have attracted particular attention because melasma frequently occurs or becomes more prominent during pregnancy and with certain hormonal exposures.
- However, describing melasma simply as a "hormonal pigmentation disorder" is an oversimplification. Hormonal influences appear to interact with environmental and genetic factors rather than acting independently.

2. EPIDEMIOLOGY OF MELASMA

Melasma occurs across different ethnicities and geographic regions but is particularly common in individuals with darker skin phototypes. It is frequently encountered among individuals of:

- Asian ancestry;
- Hispanic/Latino populations;
- Middle Eastern populations;
- South Asian populations.

Women are affected considerably more frequently than men in many populations. The predominance among women, particularly during reproductive years, has contributed to the hypothesis that hormonal factors play an important role. However, the exact contribution of hormonal factors varies between individuals.

3. CLINICAL CLASSIFICATION

Melasma is traditionally described according to the distribution of facial pigmentation.

3.1. Centrofacial pattern

Pigmentation involves: forehead; nose; upper lip; chin.

3.2. Malar pattern

Pigmentation predominantly affects: cheeks; malar regions; nose.

3.3. Mandibular pattern:

Pigmentation is predominantly located over the mandibular region. The distribution pattern may provide useful clinical information but does not independently establish the underlying mechanism.

4. MAJOR FACTORS INVOLVED IN MELASMA

The pathogenesis of melasma can be conceptualized as an interaction between several major factors:

Internal factors

- Hormonal influences
- Genetic predisposition
- Skin phototype
- Age
- Individual melanogenic tendency

External factors

- Ultraviolet radiation
- Visible light
- Heat
- Environmental exposure
- Certain medications or hormonal preparations

Cutaneous biological factors

- Oxidative stress
- Inflammation
- Vascular changes
- Basement membrane abnormalities
- Altered melanocyte activity

Psychosocial factors

- Self-perception
- Social confidence
- Quality of life
- Treatment expectations

5. HORMONAL FACTORS IN MELASMA

Several observations support a hormonal contribution to melasma:

- Predominant occurrence in women.
- Frequent onset during reproductive years.
- Association with pregnancy.
- Occurrence with exogenous hormonal exposure in some individuals.
- Hormonal responsiveness of melanocytes.

These observations suggest that hormonal signaling may influence melanogenesis. However, not every woman with hormonal exposure develops melasma, indicating that other factors are also necessary.

6. ESTROGEN AND MELANOGENESIS:

Estrogen has been investigated extensively in relation to melasma. Melanocytes possess hormone-responsive pathways, and estrogen may influence melanocyte activity and melanin production.

Potential effects include:

- stimulation of melanogenic activity;
- alteration of tyrosinase-related pathways;
- increased melanin synthesis;

- modification of melanocyte responsiveness to environmental stimuli.

7. PROGESTERONE:

Progesterone has also been investigated in relation to pigmentation. Its role appears less clearly established than that of estrogen. Hormonal fluctuations involving both estrogen and progesterone may influence melanocyte behavior, particularly during reproductive events.

8. PREGNANCY-ASSOCIATED MELASMA

Pregnancy is one of the most recognized physiological settings associated with melasma.

Melasma occurring during pregnancy is commonly referred to as chloasma or the "mask of pregnancy." Hormonal changes during pregnancy may increase melanogenic activity.

However, pregnancy-associated melasma also demonstrates the importance of environmental factors because increased pigmentation may be particularly noticeable in women with substantial sun exposure.

Therefore:
Pregnancy + hormonal changes + UV exposure + genetic susceptibility

may collectively contribute to development or exacerbation.

9. ORAL CONTRACEPTIVES AND HORMONAL THERAPY

Exogenous hormonal exposure has been associated with melasma in some individuals.

Examples include:
- combined oral contraceptives;
- hormonal replacement therapy;
- other estrogen/progestin-containing preparations.

However, hormonal exposure does not invariably produce melasma.

10. THYROID AND OTHER ENDOCRINE ASSOCIATIONS

Various studies have investigated associations between melasma and thyroid dysfunction. The relationship remains an area of ongoing research.

A history of:
- Thyroid disease;
- menstrual irregularity;
- pregnancy;
- hormonal medication;
- endocrine disorders

11. ULTRAVIOLET RADIATION

Ultraviolet radiation is one of the most important environmental factors in melasma. UV exposure can stimulate melanogenesis through activation of melanocytes and melanogenic pathways.

Repeated exposure may therefore:
- increase pigmentation;
- worsen existing melasma;
- contribute to recurrence after treatment.

12. UVA AND UVB

Both UVA and UVB can contribute to pigmentation.

UVB: UVB has greater energy and can induce epidermal biological responses, including stimulation of melanogenesis.

UVA: UVA penetrates deeper into the skin and can contribute to oxidative stress and pigmentation.

13. VISIBLE LIGHT

More recent research has highlighted the potential role of visible light, particularly in individuals with darker skin phototypes. Visible light may stimulate pigmentation through pathways involving melanocyte activation.

This has implications for photoprotection because conventional sunscreen strategies primarily designed around UV protection may not completely address visible-light-induced pigmentation. Tinted sunscreens containing pigments such as iron oxides may provide additional protection against portions of visible light.

14. HEAT AND INFRARED EXPOSURE

Heat has also been proposed as a potential aggravating factor.

Occupational or environmental exposure to:
- high temperatures;
- intense sunlight;
- cooking heat;
- hot environments

15. GENETIC PREDISPOSITION

Genetic susceptibility appears to influence the development of melasma.

Evidence supporting genetic contribution includes:
- familial occurrence in some patients;
- variation in prevalence among ethnic populations;
- differences in susceptibility among individuals with similar environmental exposure.

Genetic predisposition may influence:
- melanocyte activity;
- response to UV radiation;
- pigmentation pathways;
- hormonal responsiveness.

16. SKIN PHOTOTYPE

Melasma is particularly prevalent among individuals with intermediate to darker skin phototypes.

Higher baseline melanin activity and greater melanogenic responsiveness may contribute to increased susceptibility. This does not mean that melasma occurs exclusively in darker skin; it can affect individuals across a broad range of skin types.

17. OXIDATIVE STRESS

Oxidative stress has emerged as an important component of melasma pathogenesis. Reactive oxygen species generated by environmental exposure may influence melanocyte activity. Potential mechanisms include:

UV/visible-light exposure
↓
Reactive oxygen species
↓
Cellular signaling
↓
Melanogenic pathway activation
↓
Increased melanin production

18. INFLAMMATORY PATHWAYS :

Although melasma is not classically considered an inflammatory disease, inflammatory mediators may contribute to its pathogenesis.

Environmental exposure may stimulate signaling pathways that influence:

- melanocyte activity;
- melanogenesis;
- epidermal changes;
- dermal alterations.

19. VASCULAR FACTORS

Some studies have suggested increased vascularity or vascular changes in melasma-affected skin.

The interaction between vascular factors and melanogenesis is an emerging area of research.

Vascular mediators may potentially influence melanocyte activity.

This reinforces the concept that melasma involves more than simply increased epidermal melanin.

20. BASEMENT MEMBRANE AND DERMAL CHANGES

Histological studies have demonstrated alterations extending beyond the epidermis.

Reported changes may include:

- basement membrane disruption;
- dermal melanophages;
- altered extracellular matrix;
- vascular changes.

These findings may help explain why melasma can be persistent and why complete clearance may be difficult.

21. PSYCHOSOCIAL FACTORS

Although melasma is physically asymptomatic in most cases, it can have substantial psychosocial consequences.

The face is central to:

- personal identity;
- communication;
- social interaction;
- perceived attractiveness.

Consequently, facial pigmentation may influence:

- self-confidence;
- self-esteem;
- social participation;
- emotional well-being;
- quality of life.

22. SELF-PERCEPTION AND BODY IMAGE

Patients may become highly conscious of their facial appearance.

Common concerns include:

- frequent examination of pigmentation;
- dissatisfaction with photographs;
- reliance on makeup;
- concern about comments from others;
- comparison with individuals with clearer skin.

The psychological burden is highly individual.

23. QUALITY OF LIFE

The Melasma Quality of Life Scale (MELASQoL) was developed to specifically assess the impact of melasma on quality of life.

It addresses domains related to:

- emotional well-being;
- social relationships;
- leisure;
- appearance;
- dissatisfaction with the skin.

Quality-of-life assessment can therefore complement objective clinical measures such as mMASI.

24. INTERACTION BETWEEN HORMONAL AND ENVIRONMENTAL FACTORS

The most useful model of melasma is not a single-cause model. Instead: Genetic susceptibility + Hormonal influence + UV/visible-light exposure

Oxidative and inflammatory pathways
↓
Melanocyte activation
↓
Increased melanogenesis
↓
Melasma

This explains why not every pregnant woman develops melasma and why some women develop melasma without obvious hormonal triggers.

25. CLINICAL HISTORY TAKING

A detailed history should include:

Dermatological history
- Age at onset
- Distribution
- Progression
- Previous episodes
- Previous treatment
- Recurrence

Hormonal history
- Pregnancy
- Number of pregnancies
- Postpartum status
- Menstrual history
- Oral contraceptive use
- Hormone therapy

Environmental history
- Sun exposure
- Occupation
- Outdoor activities
- Heat exposure
- Use of photoprotection

Family history
- Similar pigmentation in relatives

Psychosocial history
- Effect on confidence
- Social avoidance
- Makeup use
- Treatment expectations
- Quality of life

This comprehensive history is particularly useful in women with recurrent or treatment-resistant melasma.

26. CLINICAL ASSESSMENT

Clinical assessment may include:

Visual examination assessment of:
- distribution;
- symmetry;
- pigmentation intensity;
- facial sites involved.

Wood's lamp examination: May assist in characterization of pigmentation depth in selected patients, although its utility varies with skin phototype.

Dermoscopy: May provide additional information regarding:
- pigment pattern;
- vascular structures;
- distribution of melanin.

Standardized photography: Useful for longitudinal assessment.

27. MMASI SCORE

The modified Melasma Area and Severity Index provides a structured clinical score.

It considers:
- affected area;
- pigmentation intensity;
- facial region.

The use of mMASI can help quantify treatment response over time. For research studies, consistent assessment methodology and standardized photographs are important to reduce measurement variability.

28. DIFFERENTIAL DIAGNOSIS

Conditions that may resemble melasma include:
- post-inflammatory hyperpigmentation;
- drug-induced pigmentation;
- lentigines;
- ephelides;
- acanthosis nigricans in appropriate locations;
- exogenous ochronosis;
- other facial pigmentary disorders.

A careful clinical history and examination are therefore important.

29. MANAGEMENT PRINCIPLES

Management generally requires a multifactorial approach.

29.1. Photoprotection: Patients should be counseled regarding:
- broad-spectrum sunscreen;
- regular application;
- protective clothing;
- hats/umbrellas when appropriate;
- avoidance of excessive sunlight.

29.2. Topical Treatment: Conventional topical options include agents that influence melanogenesis or epidermal turnover.

Examples include:
- hydroquinone;
- retinoids;
- azelaic acid;
- tranexamic acid preparations;
- combination therapies.

29.3. Procedures: Selected patients may undergo:
- chemical peels;
- laser-based procedures;
- light-based therapies.

These require careful patient selection because some procedures can themselves induce or worsen pigmentation, particularly in darker skin types.

30. RECURRENCE

One of the major challenges in melasma is recurrence. Even after substantial improvement, pigmentation may return following:

- increased sun exposure;
- hormonal changes;
- pregnancy;
- discontinuation of preventive measures.

31. PATIENT EDUCATION

Patients should be informed that:

1.Melasma is generally benign.
2.It is chronic and may recur.
3.Improvement may be gradual.
4.Environmental exposure can worsen pigmentation.
5.Hormonal factors may contribute.
6.Treatment response varies between individuals.
7.Long-term photoprotection is important.

32. RELEVANCE TO HOMOEOPATHIC RESEARCH

For individualized homoeopathic research involving women with melasma, the multifactorial nature of the disease has methodological implications.

A clinical study may record: Disease-specific parameters

- mMASI;
- distribution;
- pigmentation intensity.

- Patient-specific parameters
- mental symptoms;
- general symptoms;
- hormonal history;
- environmental exposures;
- quality of life.

This permits assessment of both the dermatological manifestation and the individual patient profile. In a study involving Sepia officinalis, these factors could be documented systematically without assuming beforehand that hormonal factors alone explain the patient's pigmentation.

33. PROPOSED CONCEPTUAL FRAMEWORK

A useful conceptual framework for female melasma is:

Predisposing factors:

- Genetic susceptibility
- Skin phototype
- Hormonal susceptibility
- Pregnancy
- Hormonal therapy
- UV radiation
- Visible light
- Heat
- Oxidative stress
- Inflammatory signaling
- Melanocyte activation
- Altered vascular factors
- Basement membrane changes
- Psychosocial consequences
- Self-consciousness
- Reduced confidence
- Appearance dissatisfaction
- Social distress
- Reduced quality of life

34. CONCLUSION

Melasma in women is a multifactorial pigmentary disorder in which hormonal, environmental, biological and psychosocial factors interact.

Hormonal influences are supported by the strong association of melasma with female reproductive physiology, particularly pregnancy and certain hormonal exposures. Nevertheless, hormones alone cannot explain the condition.

Environmental factors—particularly ultraviolet radiation and, increasingly recognized, visible light—play an important role in triggering and aggravating pigmentation. Genetic susceptibility, skin phototype, oxidative stress, inflammatory pathways, vascular changes and alterations of the dermal microenvironment may further contribute.

The psychosocial consequences of facial melasma should not be underestimated. Despite its benign physical nature, the condition can affect self-perception, confidence, social interaction and quality of life.

Consequently, comprehensive assessment should extend beyond pigmentation alone. Objective measures such as mMASI can be combined with patient-reported measures such as MELASQoL to provide a more complete picture of disease burden and treatment response.

For women with melasma, effective long-term management therefore requires not only reduction of pigmentation but also appropriate counseling, realistic expectations, photoprotection and recognition of the individual's psychosocial experience.

REFERENCES

[1] Handel AC, Miot LDB, Miot HA. Melasma: a clinical and epidemiological review. Anais Brasileiros de Dermatologia. 2014; 89(5):771–782.

[2] Ogbechie-Godec OA, Elbuluk N. Melasma: an up-to-date comprehensive review. Dermatology and Therapy. 2017; 7:305–318.

[3] Kang HY, Ortonne JP. What should be considered in treatment of melasma. Annals of Dermatology. 2010; 22(4):373–378.

[4] Balkrishnan R, McMichael AJ, Camacho FT, et al. Development and validation of a health-related quality of life instrument for women with melasma. British Journal of Dermatology. 2003; 149(3):572–577.

[5] Pandya AG, Hynan LS, Bhore R, et al. Reliability assessment and validation of the Melasma Area and Severity Index (MASI) and a new modified MASI scoring method. Journal of the American Academy of Dermatology. 2011; 64(1):78–83.

[6] Rodrigues M, Ayala-Cortés AS, Rodríguez-Arámbula A, Hynan LS, Pandya AG. Interpretability of the Modified Melasma Area and Severity Index (mMASI). JAMA Dermatology. 2016; 152(9):1051–1052.

[7] Pichardo R, Vallejos Q, Feldman SR, et al. The prevalence of melasma and its impact on quality of life in Hispanic women. Journal of Drugs in Dermatology. 2009.

[8] Passeron T, Picardo M. Melasma, a photoaging disorder. Pigment Cell & Melanoma Research. 2018; 31(4):461–465.

[9] Freitag FM, Cestari TF. What causes melasma? An Bras Dermatol. 2006; 81(2):195–202.

[10] Esposito ACC, Brianezi G, de Souza Pessenda F, et al. Exploring facial melasma: clinical, dermoscopic, and histopathological aspects. Clinical and Experimental Dermatology. 2020.