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Review Article

The psychosocial burden of hyperpigmentation in fitzpatrick skin types IV to VI

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ABSTRACT

Hyperpigmentation, which includes conditions like post-inflammatory hyperpigmentation (PIH) and melasma, disproportionately affects individuals with Fitzpatrick skin types IV-VI. Although medically benign, hyperpigmentation can cause significant emotional and social distress. Despite growing awareness of dermatologic disparities, research exploring the psychosocial burden of hyperpigmentation among individuals with Fitzpatrick skin types IV-VI remains limited. This review synthesizes existing literature on the psychosocial impacts associated with hyperpigmentation, focusing on individuals with melanin-rich skin. Studies reveal consistent associations between hyperpigmentation and diminished self-esteem, anxiety, depression, and social withdrawal. In many cases, the psychosocial toll was disproportionately greater than the clinical severity of the hyperpigmentation. Cultural beliefs, including colorism and societal beauty standards that favor fair skin, were found to influence how patients perceive their hyperpigmentation, pursue treatment and engage with healthcare providers. There was a notable lack of inclusive clinical studies, culturally sensitive care models and dermatological mental health care. In addition, physicians receive limited medical training on skin of color, further contributing to misdiagnosis and inappropriate treatment. Addressing these gaps involves a multifactorial approach including increasing representation amongst dermatological research, developing inclusive educational resources for physicians, incorporating culturally sensitive care, and launching public health campaigns promoting skin health and inclusivity. Recognizing both the clinical and psychological severity associated with hyperpigmentation allows for greater patient-centered care, fostering patient trust, engagement, and treatment compliance.

Keywords: Hyperpigmentation, Skin of color, Psychosocial, Quality of life, PIH, Melasma

INTRODUCTION

Hyperpigmentation disorders are common dermatologic conditions that are characterized by abnormal melanin deposition, often leading to persistent skin discoloration.[1] Common examples of hyperpigmentation disorders include melasma and post-inflammatory hyperpigmentation (PIH). By classifying skin types based on their response to UV radiation, the Fitzpatrick scale is commonly used to characterize skin phenotype to help guide understanding of disease risk and treatment approaches.[2] Disorders of hyperpigmentation disproportionately affect those with skin of color (SOC), particularly individuals with Fitzpatrick types IV-VI where pigmentary changes are often more visible and persistent despite treatments. For example, in an analysis of National Ambulatory Medical Care Survey (NAMCS) data from 1993 to 2009, dyschromia was identified as one of the five most common diagnoses among African American patients, although dyschromia was not among the top five diagnoses in Caucasian patients.[3] Similarly, other studies have found that PIH and melasma are more prevalent among patients with Fitzpatrick skin types III-VI.[4,5] These differences may reflect increased disease burden or differences in healthcare utilization among patients with SOC. Although pigmentary disorders are typically considered medically benign, they often lead to significant cosmetic concern and psychological distress. However, despite the high prevalence in SOC patients, disorders of hyperpigmentation are historically underexplored in research and clinical practice, which contribute to continued unmet needs among affected patients.

Psychosocial dermatology is an emerging field which focuses on the psychological, emotional, and social aspects of dermatologic diseases. Although psychodermatology has an extensive history, it has recently gained popularity over the 21st century.[6] The relationship between psychiatric factors and dermatologic disease is widely regarded as bidirectional. Psychological factors, such as stress, have been identified as potential triggers for conditions including atopic dermatitis and psoriasis.[7] Conversely, the visibility of skin conditions can cause anxiety and emotional distress, thereby reducing quality of life. In addition, these psychological burdens are often compounded by social media and societal beauty standards.[8] The framework of psychodermatology is particularly relevant in disorders of hyperpigmentation, where the visibility of pigmentary changes intersects with cultural beauty standards and experiences of colorism. For SOC patients, the psychological impact of visible dermatologic diseases may be exacerbated by limited access to culturally competent care and a history of marginalization in research and medicine. To deliver more equitable and comprehensive care, it is important to address the psychosocial aspects of skin conditions, particularly for patients who may experience barriers in accessing both dermatologic and mental health services.

MECHANISMS AND CLINICAL CONSIDERATIONS IN HYPERPIGMENTATION

Melanocyte biology and pathophysiology

Melanocytes, derived from neural crest cells during embryological development, are pigment producing cells responsible for producing melanin in the human body. Melanin is distributed to neighboring keratinocytes, giving skin its color. Melanin is produced and stored in melanosomes which are intracellular lysosome-like organelles.[9] Within a melanosome, the melanogenesis pathway leads to the production of either black-brown eumelanin or yellow-red pheomelanin. Eumelanin, which provides greater UV protection, is predominant in individuals with darker skin, brown eyes, and dark hair. On the other hand, pheomelanin is more dominant in individuals with fair skin, red or blonde hair, and lighter-colored eyes.[10] In individuals with Fitzpatrick skin types IV–VI, melanin biosynthesis is preferentially directed towards eumelanin production. This process is mediated by the Raper-Mason pathway, a biochemical cascade essential for melanin synthesis in human melanocytes. The amino acid L-tyrosine acts as the precursor for melanin biosynthesis and stimulates melanosome production, while downstream intermediates such as L-dopachrome are formed. L- tyrosine is hydroxylated to L-DOPA and subsequently oxidized to DOPAquinone by tyrosinase, the rate-limiting enzyme in melanogenesis. Regulation of L-tyrosine and L-DOPA levels play a key role in maintaining homeostasis within melanogenic systems.[10] Individuals with Fitzpatrick skin types IV-VI are more prone to post-inflammatory hyperpigmentation due to higher baseline melanocyte activity. Increased levels of inflammatory mediators such as prostaglandins and leukotrienes further enhance melanin production by upregulating tyrosinase activity.[11] Therefore, disruptions to skin integrity from acne, eczema, or trauma result in disproportionately pronounced hyperpigmentation in individuals with darker skin. These biochemical pathways help explain the reasoning as to how even mild inflammatory conditions can lead to persistent discoloration in patients with melanin-rich skin.

Diagnostic and therapeutic considerations

Hyperpigmentation is a dermatological condition characterized by areas of the skin becoming visibly darker, which can be a result of various internal and external factors. These factors include hormonal changes, inflammation, injury, acne, eczema, certain medications, and UV exposure.[12] Fluctuations in hormones due to pregnancy or contraceptive use increase estrogen and progesterone levels, which in turn stimulate melanogenesis, leading to hyperpigmentation. UV radiation is a potent trigger for hyperpigmentation, as DNA damage in keratinocytes leads to the release of inflammatory cytokines particularly in individuals with melanin-rich skin.

Skin phototyping refers to the classification of skin according to its sensitivity to UV radiation. This eventually led to the development of the Fitzpatrick classification system.[13] Fitzpatrick skin types IV-VI include individuals with more melanin-rich and less prone to sunburn but more susceptible to pigmentation abnormalities. The increased melanin levels can provide some protection against UV-induced DNA damage and photoaging, but this protection is often misunderstood. A common misconception is that individuals with darker skin tones cannot experience sunburn or develop melanoma. UV rays can still produce reactive oxygen species that lead to mutations directly affecting DNA, resulting in damage to regulatory genes that control the cell cycle.[14] The variability in pigmentation response is determined not only by the quantity of melanin but also by melanosome behavior. In SOC, hyperpigmentation tends to be more pronounced due to the greater number and size of melanosomes dispersed throughout keratinocytes.[15] As a result, hyperpigmentation tends to be more pronounced and persistent in these individuals, creating both diagnostic and therapeutic challenges.

Alterations in melanocyte production or distribution can result in various skin pigmentation disorders such as melasma, post-inflammatory hyperpigmentation, drug induced hyperpigmentation and acanthosis nigricans. These diverse manifestations of hyperpigmentation can often lead to misdiagnosis in individuals with Fitzpatrick types IV-VI due to overlapping features, such as dark macules and uneven patches of brown discoloration.[16] Melanoma, though less common overall in darker-skinned individuals, is often diagnosed at a later stage, as it is often mistaken for benign hyperpigmentation. This delay in diagnosis can increase the risk of metastasis, necessitate more extensive and aggressive treatment, such as chemotherapy, and cause significant psychological distress. Another reason for frequent misdiagnosis is the lack of dermatological tools that can reliably differentiate between dermal pigment and hyperpigmentation in patients with Fitzpatrick types IV-VI. Additionally, there is a lack of educational resources dedicated to Fitzpatrick types IV-VI available for physicians to accurately diagnose and manage hyperpigmentation in these patients. This knowledge gap can often lead to inappropriate or ineffective therapies. For example, individuals can undergo thermal damage during laser therapy if the laser is not adjusted for darker skin.[17] Lasers are widely used as a treatment of hyperpigmentation but melanin in the epidermis acts as a chromophore, absorbing more laser energy. This increases the risk of adverse events, making longer wavelength lasers, the preferred recommendation for deeper skin tones. To reduce the risk of thermal injury to the epidermis, lower fluences, longer pulse durations or reduced treatment densities are suggested for treatment.[18] The use of inappropriate laser wavelengths can lead to the destruction of melanocytes, causing hypopigmentation, hyperpigmentation and compromised photoprotection. Not only does this disrupt pigment distribution, but it also increases susceptibility to further UV-induced damage, leading to additional DNA mutations in keratinocytes.

PSYCHOSOCIAL IMPACT OF HYPERPIGMENTATION

Psychological distress associated with hyperpigmentation

Hyperpigmentation is strongly associated with lower self-esteem and poor mental health outcomes. One study found that individuals who experience post-inflammatory hyperpigmentation after healing acne reported a worse quality of life as compared to patients with acne alone, emphasizing the psychological toll hyperpigmentation can exert.[19] The Melasma Quality of Life Scale (MELASQOL), a 10-item scale devised from the Health Related Quality of Life (HRQoL), quantifies which domains of a patient's life are most affected by melasma. In a cross-sectional study, MELASQOL was administered to 102 women with melasma and included a self-assessment of their perceived quality of life without melasma. The scores on the MELASQOL reflect that patients face distress in three domains: social life, recreation and leisure and emotional well-being.[20] The effect on these core domains reinforces that hyperpigmentation is more than a cosmetic concern. Another cross-sectional study found that patients with melasma presented with significantly higher levels of anxiety compared to those without the condition.[21] The duration of pigmentation plays a role in the psychosocial burden of melasma; for example, patients with melasma for over two years were more likely to experience depression whereas patients who were more recently diagnosed reported elevated levels of anxiety and stress.[22] These concerns are often long-lasting due to the recurrent nature of hyperpigmentation. More often than not, outcomes from topical treatments are unsatisfactory as many patients experience adverse effects or relapse upon discontinuation of treatment. These findings reinforce the notion that hyperpigmentation, while non-life threatening, can significantly impact mental health and over time, their self-esteem and self-worth. Thus, there is a significant need for a holistic approach to dermatologic care including integrated mental health support, especially in SOC.

Sociocultural influences and colorism

A patient's perception of their own hyperpigmentation is often shaped by their culture, beliefs and societal expectations, especially in communities where lighter skin is seen as more ideal. In regions such as South Asia, Africa and Latin America, lighter skin is associated with beauty and social status.[23] These beliefs are thought to be inherited across generations dating back to class- based social hierarchies and colonialism. These societal expectations can further add to the psychosocial burden experienced by patients with skin of color who develop hyperpigmentation. As a result, hyperpigmentation can carry a heavier emotional weight, not just due to their own expectations but also due to the way society may view them. This pressure from society is intertwined with colorism, a bias that favors light skin tones over darker tones within the same racial or ethnic groups. Within dermatologic practice, patients with skin of color may feel compelled to pursue lightening treatments, not only to improve their condition but to align with societal ideals. In a cross-sectional study with 455 participants, 97 individuals used skin-lightening products with 71 using the product to lighten hyperpigmentation, while the other 26 utilized the products for general skin lightening.[24] Most of these individuals agreed with statements that reflected a colorism bias as well, further emphasizing how culture can shape views of hyperpigmentation. However, awareness of the heavy metals that are involved in skin lighteners is limited, posing additional health risks.[25] This places dermatologists in a unique position, both managing skin lightening requests and educating their patients of the risks associated with skin lighteners. Although dermatologists may help minimize these dangerous practices, change must occur on a societal level.

Social media also plays a significant role in shaping beauty ideals. South African and Indian women have reported that television and magazines, which often promote fair and flawless skin, negatively influence their own perceptions of their skin. As a result, the main goal behind the use of lightening agents is not only to treat hyperpigmentation, but also to achieve an overall lighter complexion.[26] With social media being widely accessible, it is urgent to convey both the toxicity of the heavy metals found within bleaching products and to promote diverse beauty representation on these platforms. Billboards and celebrity endorsements have reinforced the association between light skin and perceived status and success.[27] These external pressures are often so overwhelming that even awareness of the heavy metals in bleaching agents is not enough to deter individuals from using them. This suggests that the drivers behind skin lightening go beyond intrinsic motivation but are very deeply rooted in societal expectations. An effective public health response should include stronger warnings about product safety and actively promote inclusive beauty standards that celebrate all skin tones.

Emotional toll and barriers to effective treatment

Patients being treated for hyperpigmentation constantly cycle through multiple treatment regimens, leading to frustration and disappointment over treatment failures. It can take weeks or months to notice visible results for conditions like PIH and melasma, and rebound pigmentation is common. In a study where laser treatment was utilized to treat PIH, 26.0% of patients saw complete reduction over the span of 140 days, but later experienced rebound pigmentation, while 33.0% of patients noticed no change in discoloration at all.[14] These results can leave patients feeling discouraged and fatigued, especially when they are hoping for a reduction in pigment, if not full correction. Because of the variability in outcomes, it is critical that dermatologists set realistic expectations at the beginning of the treatment process to avoid patient distress.[28] Given that hyperpigmentation affects quality of life, especially in women, it is not surprising that many patients voice their frustrations over persistent pigmentation and desire a long-term solution rather than a temporary one. It has been reported that women of color often feel self-conscious in social settings due to hyperpigmentation, even when the discoloration is clinically mild.[29] The impact on quality of life is frequently disproportionate to clinical severity, especially after perceived treatment failure, highlighting a disconnect between patient and provider perspectives. This sense of failure and emotional exhaustion has led many women to retreat from daily interactions, not because the pigmentation is medically severe, but due to the psychological burden. These findings reinforce that the emotional toll of treatment, in addition to disease severity, is a significant barrier to effective treatment.

CURRENT LIMITATIONS AND FUTURE DIRECTIONS

Gaps in current research

Despite emerging evidence for the psychosocial consequences of dermatologic conditions, several gaps remain, especially among skin of color populations. A recent study found that the percentage of publications related to skin of color from 52 dermatology journals was low, ranging from 2.0% to 16.8%, with an average of less than 5.0% for journals from North America and Europe.[30] Another study that analyzed clinical trial data in the United States (US) from 2017 to 2021 revealed that only 7.9% of total participants were black, while 13.6% of the US population is black.[31] These findings highlight the underrepresentation of SOC within dermatologic studies. This underrepresentation limits the ability to generalize results of existing studies, emphasizing the urgent need for studies that represent the diverse patient populations impacted by hyperpigmentation disorders.

Validated psychodermatologic metrics, including both clinimetric and psychometric measures, for darker skin tones are scarce. Quality of life (QoL) is a commonly assessed variable in psychodermatology studies used to evaluate the psychological impact of a dermatologic disease. One widely used instrument for measuring QoL is Skindex-16, a questionnaire that consists of three subscales, symptoms, emotions, and functioning, to provide a quantitative measurement of how any skin condition affects patients' lives.[32] While several studies have tested the validity of this instrument and other similar instruments, they often do not include SOC patient populations and do not compare performance across different skin tones, especially Fitzpatrick skin types IV-VI. For instance, one study evaluated the validity of an Arabic Skindex-16 in a Moroccan population, which focused on the linguistic translation rather than the unique psychosocial experiences of darker skin patients.[33] Similarly, other psychodermatologic metrics, such as Dermatology Life Quality Index (DLQI), Patient Health Questionnaire-9 (PHQ-9), and Generalized Anxiety Disorder-7 (GAD-7), have also been validated in lighter skin tone populations. Further research is necessary to ensure that these types of psychodermatologic assessment tools accurately reflect the experiences of this patient population.

Recommendations for clinical practice

Several important recommendations are necessary to enhance care and equity in the treatment of hyperpigmentation in patients with Fitzpatrick skin types IV-VI. For instance, communication with this patient population should be culturally sensitive. Culturally, sensitive care is a patient-centered approach in which healthcare providers respect and acknowledge patients' values, goals, and cultural backgrounds.[34] Providing culturally competent care improves patient experience and strengthens trust between patients and providers. A cross-sectional study that assessed the dermatologic care experiences of African American patients found that satisfaction was greatly influenced by their perception of their provider's depth of knowledge of disorders of African American skin and hair.[35] Similarly, in another study that surveyed 264 SOC patients, 66.7% of participants indicated that they would prefer to be seen in a SOC clinic rather than a general dermatology clinic.[36] The top reasons reported were wishing to be seen in a clinic that considers a patient's skin and hair type (79.0%), seeking a dermatologist with more training in managing their particularly skin color and hair (77.8%), and seeking a dermatologist with relevant research experience in managing their particular skin color and hair type (72.7%).[36] One cultural factor that further supports the need for informed, sensitive care is colorism, which, as discussed earlier, may influence patients with hyperpigmentation to pursue unregulated skin lightening agents. The study by Daftary et al, previously discussed detailed this behavior in a SOC patient population. These findings reinforce the importance of training physicians, especially dermatology residents, in the clinical and psychosocial needs of patients of SOC. Clinically, an awareness of colorism is critical, as patients may present with unrealistic expectations regarding pigmentation or desire overly aggressive treatment. This highlights the need for culturally sensitive counseling in SOC patients to explore patients' motivations of treatment. Further, specialized training in skin of color enables clinicians to provide individualized treatment plans, which is particularly critical in the treatment of hyperpigmentation in Fitzpatrick skin types IV-VI, given that inappropriate therapies can lead to undesired depigmentation.

Integrating mental health screenings with dermatologic care of hyperpigmentation disorders in Fitzpatrick skin types IV-VI may aid in mitigating the psychosocial burden associated with these conditions. Managing both mental health and dermatologic conditions can improve patient satisfaction and treatment adherence. A study demonstrated that a group of patients with acne vulgaris who were experiencing depressive symptoms were less satisfied with their treatment and less likely to follow prescribed regimens, which could hinder clinical improvement.[37] This finding highlights the importance of implementing a holistic approach in treating dermatologic conditions that includes both mental health screenings and referrals when needed. Such an approach is especially beneficial in dermatologic care for patients with Fitzpatrick skin types IV-VI, who may experience stigma related to both skin appearance but also mental health concerns.

Directions for future research

Future research should prioritize longitudinal studies to better understand the chronic psychosocial impacts of hyperpigmentation disorders, especially in patients with Fitzpatrick skin types IV-VI. These studies would offer insight into how such conditions affect self-esteem, mental health, and social interactions over time. Additionally, there is a need for large-scale clinical studies with diverse patient populations that investigate psychosocial outcomes. To further support these patients, research should also focus on creating culturally appropriate patient education programs. These programs may address cultural values, stigma, and misinformation pertaining to hyperpigmentation treatment. By developing educational resources for patients of SOC, clinicians can empower patients and encourage active participation in the treatment of their hyperpigmentation.

CONCLUSION

This literature review highlights the disproportionate psychosocial burden experienced by patients with Fitzpatrick skin types IV-VI who suffer from hyperpigmentation disorders. Despite advancements in dermatological treatment, education, and research, there is a limited understanding of how these disorders affect individuals beyond the clinical diagnosis. Emotional distress, societal judgment and internalized biases are often found to accompany pigment disorders, making it vital to raise awareness around their psychological impact. This burden contributes to low self-esteem, anxiety, and a sense of social exclusion, as patients struggle with the emotional toll of visible discoloration. Even if medically benign, hyperpigmentation can significantly influence self-perception and overall well-being. Improving awareness to the psychosocial effects of hyperpigmentation is essential to providing equitable care. This requires not only utilizing social media platforms to relay messages and broadening diagnostic tools but also integrating mental health support into dermatologic practice to fully support individuals affected by hyperpigmentation.

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