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 ORIGINAL ARTICLE

Evolving Concepts in Psoriasis: Special Considerations for Patients With Skin of Color, Skin Barrier Dysfunction, and the Role of Adjunctive Skin Care

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ABSTRACT

Background: Despite considerable advances in our understanding of the pathogenesis and treatment of psoriasis, data pertaining to racial/ethnic variations, effects on barrier function, and the potential role of adjunctive skin care are relatively limited. Knowledge gaps in the clinical presentation, quality-of-life impact, and approach to treating psoriasis in patients with skin color contribute to disparities in care. In addition, small studies suggest that using skincare products can reduce psoriasis symptoms, improve barrier function, and result in higher patient satisfaction, yet patients with psoriasis may underuse skincare products. This manuscript seeks to offer insights into these knowledge gaps and their potential treatment implications.

Methods: A structured literature search followed by a panel discussion and an online review process explored best clinical practices in treating psoriasis patients with skin of color and providing expert guidance for skincare use, including gentle cleansers and moisturizers.

Results: Racial/ethnic differences in genetic factors, clinical presentation, and disease burden in psoriasis have been reported. Underrecognition of these differences contributes to racial/ethnic health disparities for psoriasis patients in the US. Several studies have shown a greater quality-of-life impact with psoriasis among patients with skin of color. Although the published data are limited, some studies have identified differences in skin barrier properties and suggest a role for adjunctive skin care in the management of psoriasis.

Conclusion: Further study is needed to understand racial/ethnic population variations in psoriasis and develop strategies to reduce disparities in care. Addressing alterations in skin barrier function observed in psoriasis may help to improve treatment outcomes and patient satisfaction.

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INTRODUCTION

Psoriasis is a chronic, immune-mediated, multisystemic skin disease with an estimated prevalence rate of over 2% of the US population.[1] Although the exact pathophysiology is not fully understood, a combination of genetic, environmental, and immunologic factors is thought to be involved.[2] Psoriatic lesions are characterized by inflammation, epidermal hyperproliferation, abnormal keratinocyte differentiation, and skin barrier dysfunction.[3] Psoriasis can severely impact a patient's quality of life (QoL), with variations reported in different ethnic/racial populations.[1,2,4-6]

Genetic differences between racial/ethnic populations have also been described.[4,5] In patients with skin of color (SOC), nuances in psoriasis morphology and clinical presentation can include varied hues of erythema (which may be less conspicuous compared to lighter phototypes) and associated postinflammatory pigment alteration in higher skin phototypes.[5]

In comparison to other inflammatory skin conditions like acne, rosacea, and atopic dermatitis, the role of skin care in psoriasis is less frequently addressed. Skin care is rarely mentioned in published guidelines and algorithms to treat psoriasis.[7-9]

Adjunctive gentle skin care is sometimes mentioned in the pediatric psoriasis literature, possibly due to the general focus on gentle skin care in children.[10,11] This review aims to summarize distinct features of psoriasis in populations with SOC and provide recommendations on the role of skin care in treating psoriasis across a broad spectrum of diverse populations.

MATERIALS AND METHODS

The present review involved using the Delphi communication technique for interactive decision-making for medical projects.[12,13] On February 12, 2022, an expert panel composed of 6 dermatologists who commonly treat psoriasis patients with SOC was convened in Miami Beach, Florida. In preparation for the meeting, a literature review was conducted on the management of psoriasis in patients with SOC, and the potential role of skin care in psoriasis treatment.

Literature Review

A structured search of the English-language literature on skin care in psoriasis and psoriasis in patients with SOC was performed on April 7, 2022, using PubMed, with Google Scholar as a secondary source. The search included literature on current best practices in the management of psoriasis patients with SOC, skin barrier function in psoriasis, and the use of non-prescription skin care, including cleansers and moisturizers as adjuncts to prescription treatment. Guidelines, consensus papers, and reviews published in the English language from 2010 to 2022 were included in the search. Publications from various regions with predominant SOC populations were also identified.

Articles with no original data (except in cases where a review was the best available evidence); articles on prescription therapy alone (without discussion of non-prescription skin care); and publication language other than English were excluded from the search.

Search terms used: *Psoriasis and racial/ethnic skin; OR Psoriasis and SOC; OR sequela of psoriasis and SOC; OR Psoriasis and SOC barrier structure and function(s); OR Psoriasis and skin lipids and ceramides; OR SOC and treatment tolerance; OR SOC and psoriasis treatment outcomes; OR SOC and cleansers; OR SOC and moisturizers; OR SOC and cleanser and moisturizer ingredients; OR SOC psoriasis and OTC skincare; OR SOC psoriasis and skincare efficacy, safety, tolerability; OR SOC psoriasis and irritation from skincare.*

The searches yielded 33 clinically relevant papers to inform current best practices in psoriasis patients with SOC and skincare use. Unfortunately, robust comparative studies on skin care used as monotherapies or adjuncts to prescription therapies are scarce and did not allow for a systematic review. However, the recommendations on skin care given in clinical guidelines, consensus papers, and algorithms providing valuable clinical information were summarized. Similarly, there was a paucity of studies involving psoriasis in specific populations with SOC.

RESULTS

The advisors developed and adopted ten statements for key insights and recommendations on the role of skincare for psoriasis as well as nuances for treating psoriasis patients with SOC. A summary of key data and expert opinion for each statement is included.

Statement 1

Psoriasis is a chronic immune-mediated dermatologic disorder with multisystemic comorbidities. In the US, the psoriasis prevalence in adults between ages 20 and 59 years was highest in White individuals at 3.6%, followed by African American individuals (1.9%), Hispanic individuals (1.6%), and others (1.4%).

Psoriasis is a chronic immune-mediated dermatologic disorder that is associated with multisystem comorbidities, such as psoriatic arthritis, metabolic syndrome, diabetes, and cardiovascular disease.[1] Psoriasis can substantially impact morbidity, mortality, and QoL. Recent studies indicate that psoriasis is more common in people with SOC than was previously thought. In a cross-sectional study using National Health and Nutrition Examination Survey data from 2009 to 2010, the prevalence of psoriasis among adults aged 20 to 59 years was highest in White individuals at 3.6% (95% CI: 2.7%–4.4%), followed by African American individuals (1.9%; 95% CI: 1.0%–2.8%), Hispanic individuals (1.6%; 95% CI 0.5% 2.8%), and others (1.4%; 95% CI 0.3% 2.6%).[1] Further data is needed to help clarify the burden of psoriatic disease in our diverse population.

Statement 2

Epidermal barrier abnormalities in lesional skin of psoriasis have been reported.

Inflammatory skin diseases such as psoriasis are often associated with defects in epidermal barrier function, although the cause-and-effect relationship is unclear.[14]

Alterations to epidermal differentiation complex genes and several structures in the epidermal barrier in psoriasis may be responsible for barrier dysfunction, leading to hyperproliferation of the epidermis in an attempt to repair the skin barrier.[15] There is an association between psoriasis and gene mutations within the epidermal differentiation complex, which are crucial for epidermal development, maturation, cornification, cross-linking, and terminal differentiation (Table 1). Genetic associations linked to psoriasis may differ among races and ethnicities. PSORS1–PSORS9 have been confirmed as psoriasis susceptibility loci in independent genetic studies on

TABLE 1.

Psoriasis and Skin Barrier Dysfunction	
Reference	**Psoriasis and skin barrier dysfunction**
Thomas L, 2014	Inflammatory skin diseases such as psoriasis are often associated with barrier defects
Wolf R, 2012[15]	Alterations to several structures in the epidermal barrier in psoriasis might be responsible for barrier dysfunction • Leading to hyperproliferation of the epidermis in an attempt to repair the barrier
Capon F, 2001[16]	Association of psoriasis and mutations of genes within the epidermal differentiation complex, which are crucial for epidermal • Development • Maturation • Cornification • Cross-linking • Terminal differentiation PSORS4 psoriasis susceptibility region
Nakajima K, 2013[27]	Barrier abnormality due to ceramide deficiency leads to psoriasiform inflammation in a mouse model.
Cho Y, 2004[28]	An inverse relationship between ceramide synthesis and clinical severity in Korean patients with psoriasis.
Hong KK, 2007[29]	A study on altered expression of serine palmitoyltransferase and ceramidase in psoriatic skin lesions in Korean patients.

predominantly White populations.[16] The association of PSORS4 with psoriasis has also been demonstrated in Singaporean Chinese, although it is unknown whether this association is present in other ethnic populations.[17]

Statement 3

Post-inflammatory pigment alteration is a common associated feature of psoriasis in patients with skin of color.

An important sequela of psoriasis in patients with SOC is a postinflammatory pigmentary alteration that can appear while a psoriasis lesion is resolving and persist after psoriatic lesions have cleared (Figure 1).[5] Postinflammatory pigmentary alterations in patients with SOC are not captured by measurements of psoriasis severity and may contribute to a greater negative impact on QoL.[4] Hyper- or hypopigmented patches resulting from postinflammatory pigmentary alterations can take 12 months or more to resolve and become a source of considerable distress for the patient.[5] Furthermore, erythema can be mistaken for postinflammatory hyperpigmentation in richly pigmented skin, which may cause undertreatment during active inflammation. Phototherapy-associated burns can also cause postinflammatory hyperpigmentation during treatment.

Statement 4

The desired treatment endpoint in patients with skin of color is the reduction of erythema/scaling/elevation of plaques and the clearance of the pigmentary sequelae.

The PASI score is a validated scoring system commonly used in clinical trials to measure psoriasis severity. It takes into account BSA involvement, erythema, induration, and scaling.[2,4] Using PASI to measure psoriasis severity in patients with SOC may present challenges. The assessment of erythema in patients with SOC is nuanced, with areas appearing as dark brown, violaceous, or hyperchromic versus pink or red as seen in patients with lighter complexions (Figure 2).[5] The PASI score does not consider postinflammatory pigmentary sequelae,

FIGURE 1. Black 26-year-old male with psoriasis on the back. *Photo RBC collection.*

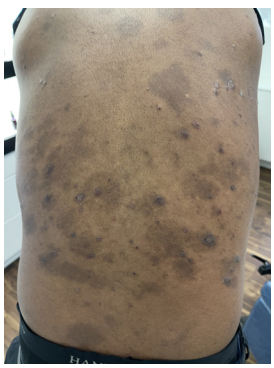
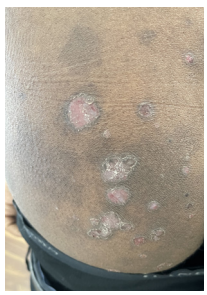


FIGURE 2. Black 36-year-old male with psoriasis on the left buttock. *Photo RBC collection.*



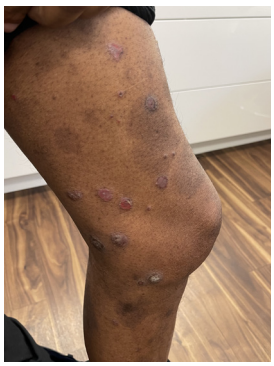
which can be a major concern and may disproportionately affect patients with SOC.[4] Another challenge with using PASI as the primary treatment endpoint is that it does not consider QoL in the measurement of disease severity. Psoriasis has been reported to have a greater impact on QoL in patients with SOC.[6,18] To accurately reflect the entire burden of disease in SOC patients, treatment endpoints should take into account the broad range of factors that influence QoL, ranging from the physical symptoms of psoriasis to its psychosocial impacts.[5,19]

Statement 5

Racial/ethnic differences in clinical presentation, sequelae, and the desired treatment outcomes for psoriasis have been reported, particularly post-inflammatory pigment alteration.

Visible manifestations of psoriasis in patients with SOC can go unrecognized by clinicians as plaques in darkly pigmented skin can have violaceous, grayish, or red-brown hues, unlike the salmon pink plaques typical of lighter skin types (Figure 3). These differences may present challenges in differentiating psoriasis from other papulosquamous disorders, leading to misdiagnosis or delayed diagnosis.[5] An increased likelihood of undiagnosed psoriasis has been reported in African American individuals,[20] which may be influenced in part by persistent racial disparities affecting access to dermatologic care and educational gaps among healthcare providers.

FIGURE 3. Black 24-year-old male with psoriasis on the left inner leg. *Photo RBC collection.*



In a survey of 29 leading dermatologists, two-thirds of respondents reported notable clinical differences (including dyspigmentation, thicker plaques, less erythema) in African American patients with psoriasis.[21]

The prevalence of specific psoriasis subtypes may vary across racial/ethnic populations. In a cross-sectional, patient-reported, physician-reviewed survey from 882 adult and 16 pediatric patients with psoriasis between 2006 and 2016,22 Asian patients and Hispanic/Latino patients had a higher likelihood of having pustular psoriasis than White patients (OR = 4.36 [95% CI: 1.24–17.62], *P*=.026; OR = 5.94 [95%CI: 1.03–31.03], *P*= .036, respectively). Asian patients also had a higher frequency of erythrodermic psoriasis (OR = 5.56 [95%CI: 1.41–27.17], *P*=.018) and a lower frequency of inverse psoriasis compared to White patients (OR = 0.26 [95% CI: 0.06–0.80], *P*=.036). These findings may be related to racial/ethnic variations in genetic or environmental factors or access to care in the US, but further studies are needed to investigate this question.

In a patient survey (n = 4725) conducted by the National Psoriasis Foundation between 2004 and 2009, a greater psychosocial burden of psoriasis was reported in African American patients, with 72% stating that psoriasis interfered with their capacity to enjoy life versus 54% of White patients.19 Consistent with this finding, African-American patients with psoriasis often have a more severe disease (23% of African American respondents had very severe psoriasis versus 8% of White respondents).

Statement 6

Moisturizers used for psoriasis may help normalize hyperproliferation, differentiation, and apoptosis and have anti-inflammatory effects. Moreover, they can reduce scaling and itching, soften cracks, and improve the penetration of topical drugs.

Basic skin care products are well-known for their role in hydration, moisture retention, and symptom control in psoriasis;[14] however, these products may be underused.

Published treatment guidance on adjunctive skin care for psoriasis recommends emollients/moisturizers, keratolytic agents, thermal water, and skincare products (eg, gentle cleansers with low pH).[8,139,14] Some authors suggest using keratolytic agents in the initial phase of treating psoriasis plaques, switching to moisturizing products and emollients in the intermediate and chronic/remission phase of psoriasis.[23]

In a study of 30 patients with psoriasis who received a moisturizing cream for 4 weeks, an increase in skin hydration was observed with no change in transepidermal water loss.[24] A significant percentage of patients showed skin improvements in desquamation measurements from very dry to dry or normal (*P*=.0001 for all time points). Two skincare products containing ceramides, salicylic acid, and urea (the first a body cleanser and the second a body cream) showed efficacy in a study of 33 patients with psoriasis.[25] Overall improvement in the appearance of the skin was reported in 72.7% of patients with the body cream product alone and 75.8% of patients with the combination regimen of the body cream and the body cleanser. For the combined regimen, 84.8% reported that it provided relief from psoriasis, and 90.9% reported that their skin felt soft and smooth.

A main function of the stratum corneum is to serve as an effective barrier against moisture loss.[3,26] Depletion of ceramides in the stratum corneum, which can result in increased moisture loss, has been reported in patients with psoriasis.[3] Animal studies and skin biopsies from human patients with psoriasis have suggested that ceramides play a relevant role in the pathophysiology of psoriasis.[27-29] However, data on the use of emollients containing ceramides for psoriasis, either alone or in combination with other topical therapies, are limited, possibly contributing to the lack of reimbursement by health care insurances and underuse of these products.[23]

Statement 7

Using pH-balanced, non-irritating cleansers and ceramide-containing moisturizers may help minimize xerosis and pruritus in patients with psoriasis.

A common clinical feature of psoriasis is the scaling typically associated with hyperkeratosis, pruritus, inflammation, and xerosis.[2,23] Emollients and moisturizers retain moisture in the stratum corneum and can be useful in treating patients with psoriasis to help reduce itching and desquamation (Table 2).[9]

In a study of psoriasis treatment with ceramide-based adjunctive skin care, 106 patients were randomized to receive either the combination of linoleic acid-ceramide moisturizer (LA-Cer) and mometasone furoate 0.1% cream (T1; treatment group) or mometasone furoate monotherapy (C1; control group).[30] Improvement in pruritus was seen in both groups after 4 weeks. The treatment group using the moisturizer reported superior Psoriasis Area and Severity Index (PASI)-50 results at week 8 compared with the control group. Higher capacitance (indicating increased skin hydration/water content) was observed, and an

TABLE 2.

Psoriasis and Skincare With Gentle Cleansers and Moisturizers			
Reference	**Psoriasis and skin barrier dysfunction**	**Psoriasis and skin barrier dysfunction**	**Psoriasis and skin barrier dysfunction**
Menter A , 2008[6]	Guideline	Psoriasis and psoriatic arthritis	Non-medicated moisturizers are applied 1 to 3 times a day.
Luger T, 2014[14]	Recommendations for adjunctive basic skincare	Psoriasis	--
Fluhr JW, 2008[23]	Recommendations for adjunctive emollients, moisturizers, and keratolytic agents	Psoriasis	--
Drealos ZD, 2008[24]	Open-label 4 week study of a moisturizing cream in patients receiving topical psoriasis treatment	Mild-to-moderate plaque psoriasis (N=30)	NS TEWL change, increase skin hydration. Desquamation assessments improved from very dry to dry or normal ($p<0.0001$ for all time points)
Del Rosso JQ, 2019[25]	Consumer usage study	Psoriasis	Ceramide- and keratolytic-containing body cleanser and cream application relieved psoriasis (84.8% of patients) and softened/smoothed skin (90.9%)
Liu M, 2015[30]	Randomized controlled trial T1: Combination of linoleic acid-ceramide moisturizer (LA-CER) and mometasone furoate 0.1% cream (TCS) T2: Mometasone furoate monotherapy	Psoriasis Vulgaris (N=106)	Topical application of a linoleic acid-ceramide containing moisturizer showed benefits. Pruritus improved in both T1 and T2. T1 better PASI-50 results at week 8 versus T2. T1 continued for another year with half of the patients with moisturizer and half only TCS. Less rebound and better skin condition in the TCS and moisturizer group.
Lueangarun S, 2019[31]	The 24-hr, 28-day, and 7-day post-moisturizing efficacy of ceramides 1, 3, 6-II containing moisturizing cream compared with hydrophilic cream on xerosis	Senile xerosis	Significant improvement in skin hydration, barrier function, and skin pH at all timepoints (24-hr, 28-day, and 7-day post-moisturizing).
Li X, 2020[32]	Multicenter, randomized, controlled trial on the efficacy and safety of a topical moisturizer containing linoleic acid and ceramide in combination with TCS	Mild-to-moderate Psoriasis Vulgaris (N=178)	After 4 weeks, improved skin condition. Maintenance with the moisturizer achieved a continuous improvement of BSA involvement, PASI score, investigators' assessment of skin dryness and desquamation, Physician Global Assessment of Psoriasis score, and patient QoL.

Salicylic acid (SA), Not significant (NS), Transepidermal water loss (TEWL), Body surface area (BSA), Topical corticosteroids (TCS), Quality of life (QoL) , Ceramides (CER)

earlier reduction of lesional transepidermal water loss was achieved in the treatment group versus the control group. Subsequently, T1 patients were randomized for another year to 2 groups: the LA-Cer group (T2) maintained the use of moisturizer, and the control group (C2) discontinued the use of the moisturizer. Less relapse and rebound were observed in the T2 group than in the C2 group at year 1. Capacitance, lesional transepidermal water loss, and PASI remained stable in the T2 group.

Statement 8

The management of scalp psoriasis in patients with skin of color requires consideration of hair texture, styling practices, and washing frequency (which in turn, may be influenced by cultural, religious, or social factors).

Although scalp psoriasis occurs in all ethnic groups, greater severity may be seen in African American patients.[4,5] Cultural/traditional therapies may be used before patients seek dermatological consultation. Factors such as hair texture, styling practices, and washing frequency can affect the severity and should be considered in the selection of topical therapy. The treatment regimen should be compatible with the patient's hair care practices. Less frequent hair washing (typically ranging from once per week to once per month, depending on the style) is common in women of African descent. Daily hair washing is very time-consuming for most women of African descent due to common styling practices.[5] Also, most prescription shampoos are often associated with increased hair dryness and breakage in patients with SOC who have textured hair. Ketoconazole shampoo, although effective, can be particularly drying in textured hair. Clinicians should recommend adjunctive use of a hydrating conditioner to help ameliorate the drying effects of ketoconazole shampoo when prescribing it for their patients with SOC who have textured hair.

Statement 9

Some moisturizers have been shown to have direct biological functions, including barrier repair.

Patients may benefit from emollients as an adjuvant treatment with psoriasis to restore barrier function and reduce transepidermal water loss, desquamation, and pruritus.[3,9] Guidelines recommend the use of emollients in combination with topical corticosteroids to help reduce itching, desquamation, and body surface area (BSA) involvement and prevent relapse of psoriasis following discontinuation of topical corticosteroids.[9]

In a multicenter, randomized, controlled trial of 178 patients with psoriasis, treatment with a linoleic acid-ceramide-containing moisturizer in combination with mometasone furoate for 4 weeks resulted in decreased rates of relapse after topical glucocorticoid administration.[32] Maintenance therapy with linoleic acid-ceramide-containing moisturizer achieved continuous improvement in BSA involvement, PASI score, investigators' skin dryness and desquamation assessment, Physician Global Assessment of Psoriasis score, and patient QoL.

Statement 10

Patients with psoriasis may underuse skin care as a tool in the management of their disease. Topical moisturizers in psoriasis have been reported to increase hydration, decrease desquamation, improve the overall appearance of the skin, improve PASI-50 in conjunction with topical steroids, and delay relapse.

Clinicians and patients would benefit from increased awareness of the importance of skin care in psoriasis. Early initiation and maintenance of well-tolerated treatment regimens and the use of carefully selected adjunctive skin care are recommended approaches to increase patient compliance and outcomes.

Moisturization has been demonstrated in small psoriasis studies to help restore the skin barrier, impact gene expression, and cytokine profile, and even alter the skin microbiome.[30,32] Patients with mild plaque psoriasis, seborrheic dermatitis, sebopsoriasis, or persistent post-psoriasis sequelae may experience some symptom improvement even without prescription therapy when compliant with a rigorous moisturization regimen.

In a study of psoriasis relapse prevention with ceramide-based adjunctive skin care, 2 cohorts of patients with psoriasis (n=30 and n=60) were treated topically with a proprietary emollient ceramide-based cream applied twice daily to one forearm.[33] The same sites on the contralateral arm served as the untreated control. Epidermal function on both arms was assessed prior to and at the end of the trials. A delayed relapse on the treated arm was seen in 54.5% of patients in the first cohort (20 days of use) and 71% of patients in the second cohort (30 days of use). The time to relapse of psoriasis correlated with the severity of baseline epidermal barrier dysfunction. These results suggest that improvements in epidermal function with topical emollients may prevent or attenuate psoriasis flares.

LIMITATIONS

A detailed discussion on the myriad of factors that contribute to racial disparities in psoriasis outcomes is beyond the scope of this review. These factors described elsewhere in the literature include genetics, environmental influences, cultural variations, and social determinants of health.[4,22,34,35] However, studies on racial differences in skin properties have yielded inconclusive results.[26] Despite the widespread availability of over-the-counter skincare products, robust evidence-based studies on skin care for patients with psoriasis who have SOC are lacking. The available data suggest that skincare strategies should consider

racial/ethnic differences when selecting treatment regimens in patients with psoriasis.

CONCLUSION

The available literature published on skin care in psoriasis is limited compared to other common skin conditions with known barrier defects. Patients with psoriasis, including those with SOC, may underuse effective skin care as a management tool for their disease. The most commonly recommended skin care for psoriasis includes emollients/moisturizers, keratolytic agents, thermal water, and skincare products (eg, gentle cleansers with low pH). Topical moisturizers have shown a number of benefits in psoriasis, such as improvements in hydration, overall skin appearance, increased attainment of PASI-50, decreased desquamation, and delayed relapse. As demonstrated by the underuse of skin care in the management of psoriasis, increased awareness of the importance of skin care and appropriate hair care in patients with SOC is needed among clinicians and patients to improve outcomes.

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