



REVIEW

Unmet Need in People with Psoriasis and Skin of Color in Canada and the United States

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Received: August 12, 2022 / Accepted: September 5, 2022
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ABSTRACT

The experience of dermatological conditions such as psoriasis is different for people with skin of color (SoC) than for white individuals. The objective of this literature review was to understand challenges and unmet needs associated with access to care, diagnosis, and treatment of psoriasis among people with SoC in Canada and the United States. The review focused on studies published in the last 5 years. After screening 919 unique records, 26 studies were included. Importantly, lack of culturally competent care was identified as a key unmet need for psoriasis among people with SoC. In

addition, cost of care and cultural views of psoriasis may influence decisions to seek care among people with SoC. Baseline patient characteristics in psoriasis studies and the prevalence/incidence of psoriasis vary across racial/ethnic groups, which may reflect differences in the rate and/or timing of diagnosis. The presentation of psoriasis differs across racial/ethnic groups, which may contribute to challenges in proper and timely diagnosis. Compared with white patients with psoriasis, individuals with SoC may be less familiar with and have different rates of treatment with biologic therapies for psoriasis, are more likely to be hospitalized for psoriasis, and their access to physicians may differ. Further, people with SoC are underrepresented in clinical trials of psoriasis therapies. Overall, the results of this literature review suggest that people with psoriasis and SoC face unique challenges in their disease experience. It

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s13555-022-00811-0>.

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is essential that clinicians and other stakeholders recognize and address these disparities to ensure equitable care.

PLAIN LANGUAGE SUMMARY

Skin conditions such as psoriasis are experienced differently by people with skin of color (SoC) compared with white individuals. Although it is known that psoriasis can vary in how it appears between these groups, other factors that affect care for patients with SoC are not well understood. For this review, we focused on challenges associated with accessing healthcare, receiving a diagnosis, and receiving treatment for psoriasis among people with SoC. A search of the academic literature identified several such challenges for people with SoC in Canada and the United States. A major challenge for people with psoriasis and SoC is having access to care that is compatible with their cultural values and practices. The cost of healthcare and cultural views of psoriasis may influence whether individuals with SoC decide to seek care. People with SoC are more likely to be hospitalized for psoriasis, and their access to physicians may differ compared with white individuals. In addition, differences in how psoriasis appears across racial/ethnic groups may hinder diagnosis. Psoriasis treatments that patients with SoC receive may differ from those that white individuals receive, and people with SoC may be less likely to be properly represented in clinical trials evaluating psoriasis therapies. Taken together, the findings of our review indicate that people with psoriasis and SoC face unique challenges in how they receive medical care for their condition. It is essential that clinicians and other stakeholders in the healthcare system recognize these challenges and work to address them.

Keywords: Access to care; Diagnosis; Health equity; Psoriasis; Skin of color; Treatment; Unmet need

Key Summary Points

In Canada and the United States, lack of culturally competent care is a key unmet need for individuals with psoriasis and skin of color (SoC).

Cost of care and cultural views of psoriasis may influence decisions by individuals with SoC to seek care, and their access to physicians may differ compared with white individuals.

The clinical presentation of psoriasis can differ across racial/ethnic groups, which may hinder diagnosis; in addition, people with SoC may have different rates of treatment with biologic therapies for psoriasis and may be more likely to be hospitalized for psoriasis than white individuals, and people with SoC are underrepresented in clinical trials of psoriasis therapies.

It is essential that clinicians and other stakeholders recognize and address disparities in care for people with psoriasis to ensure equitable care.

INTRODUCTION

Disparities in healthcare exist between people with skin of color (SoC; i.e., non-white racial or ethnic groups) and white individuals in Canada and the United States (US) [1, 2]. These disparities can take the form of differences in health status and access to or affordability of healthcare. For example, poor or fair health status was reported more frequently among Black and Latino/Hispanic adults than among white adults surveyed in the US between 1999 and 2018 [1]. Over the same time frame in the US, access to a usual source of care or seeing/speaking to a healthcare professional were less frequently reported among Latino/Hispanic adults than among white adults. Further, Black

adults more frequently reported forgoing or delaying medical care due to cost than white adults [1].

Although racial/ethnic health disparities exist in many areas of medicine, they are particularly pertinent to dermatology [3–6]. Skin color is a key determinant of the pathophysiology, epidemiology, presentation, and management of many dermatological conditions, and cultural views related to such conditions vary across racial/ethnic groups [7–11]. Differences in how people with SoC experience dermatological conditions are intertwined with the barriers to healthcare they encounter.

Psoriasis is a chronic immune-mediated inflammatory dermatological condition that is an important contributor to skin-related disability worldwide and can be complex and time consuming in terms of clinical management [12, 13]. Psoriasis is experienced differently by individuals of various racial/ethnic groups, in part because of unique challenges associated with appropriate and timely diagnosis and treatment among people with SoC [14]. For example, reduced access to care in non-white groups may result in people with psoriasis and SoC being less likely to receive a diagnosis than white individuals [15]. Additionally, the treatment of psoriasis may be viewed differently across racial/ethnic groups, reflecting specific cultural practices and preferences [14].

Although certain aspects of unmet need related to psoriasis in people with SoC have been discussed previously [14, 15], there remains an opportunity for a focused, updated review of the literature on specific components of unmet need among this population in Canada and the US. For example, challenges associated with access to care have been less of a focus than differences in disease presentation and treatment across ethnic groups in previous reviews. The use of a carefully designed and conducted targeted literature review process and a focus on recent studies that explore unmet need in people with psoriasis and SoC could address gaps in the existing literature and highlight actionable unmet needs for clinicians and other stakeholders.

Therefore, the aim of this review was to describe key unmet needs in the management and patient experience of psoriasis among

people with SoC in Canada and the US, with a focus on challenges associated with access to care, diagnosis, and treatment.

LITERATURE REVIEW

We conducted a targeted literature review to identify studies describing unmet need in people with psoriasis and SoC in Canada and the US, specifically regarding challenges associated with access to care, diagnosis, or treatment. Our search strategy included psoriasis-specific terms (e.g., “psoriasis,” “psoriatic,” “psoriasiform”), terms to describe people with SoC overall (e.g., “people of color,” “BIPOC,” “skin of color”), and terms to describe specific groups among people with SoC (e.g., ethnic, cultural, or ancestry groups). Only English-language studies published in the last 5 years (January 1, 2016–October 19, 2021) were included. No study design or geographic limits were applied at the search stage. The full search strategy is provided in Table S1 in the Supplementary Material.

Studies of interest were those that included patients with plaque psoriasis or psoriasis in general (i.e., those that did not only include patients with a specific psoriasis morphology other than plaque psoriasis); included, at minimum, a subgroup of patients with SoC in Canada or the US; and described information relevant to unmet need in access to care, diagnosis, and/or treatment. We excluded records if they (1) were conducted entirely outside of Canada and the US, (2) were focused on traditional medicine interventions, (3) did not report data specific to plaque psoriasis or psoriasis in general, (4) did not report data for people with SoC, or (5) did not report data relevant to unmet need as it relates to access to care, diagnosis, or treatment. We did not exclude records based solely on study design.

One researcher reviewed the titles and abstracts of all records identified from the electronic database search. The researcher then reviewed the full texts of the potentially relevant articles to identify those that met the eligibility criteria. The following data were extracted from the included studies: study type, summary of objectives and methods (where applicable), study dates and locations, study

population (separated by race/ethnicity, where reported), and reported data relevant to the three topics of interest (challenges associated with access to care, diagnosis, and treatment).

Of 919 unique records identified through the MEDLINE search, 873 were excluded during title and abstract review based on eligibility criteria. The remaining 46 articles were assessed at the full-text level, and 20 were excluded. A total of 26 unique studies were included in the targeted literature review, including 17 observational studies, 4 narrative reviews, 4 randomized controlled trials (RCTs), and 1 systematic review. The PRISMA flow diagram and a list of included studies are provided in Figs. S1 and S2, respectively, in the Supplementary Material. Across the included studies, multiple themes were identified for each of the three topics of interest (Fig. 1). This article is based on previously conducted studies and does not contain any new studies with human participants or animals performed by any of the authors.

CHALLENGES ASSOCIATED WITH ACCESS TO CARE FOR PEOPLE WITH PSORIASIS AND SKIN OF COLOR

Differences in Healthcare Utilization

The evidence captured in this review suggests that healthcare is less accessible for people with

psoriasis and SoC than white individuals. As described in previous reviews, people with SoC are less likely to have access to a dermatologist, and to healthcare more broadly, than white patients [14, 16]. For psoriasis in particular, access to general care and specialist physicians may differ among people with SoC. A study of healthcare utilization in Alberta, Canada, found that primary care visits for psoriatic disease (including psoriasis and psoriatic arthritis) were 1.5 times higher and specialist visits were 0.6 times lower (based on standardized rate ratios) in First Nations people than in non-First Nations people, indicating that this group mostly receives care from primary care physicians [17]. In addition, people with psoriasis and SoC are more likely to be hospitalized for psoriasis than white patients [17, 18]. In the Canadian study described above, First Nations people with psoriatic disease were 3.0 and 3.6 times as likely to be hospitalized for any cause or psoriatic disease, respectively, compared with non-First Nations people [17]. A study of risk factors for hospitalizations in the US found that patients hospitalized for psoriasis were more likely to be Hispanic, Asian, Black, or multiracial/other than white [18]. Further, Asian race was associated with increased cost of care compared with white race in patients hospitalized for psoriasis [18]. Increased hospitalization rates among people with psoriasis and SoC are typically indicative of severe disease in this group that is inadequately managed in an ambulatory care setting [18]. It should be noted

| Challenges associated with access to care | Challenges associated with diagnosis | Challenges associated with treatment |
|---|--|--|
| <ul style="list-style-type: none"> Differences in healthcare utilization <ul style="list-style-type: none"> Hospitalizations Physician visits Differences in seeking and receiving care <ul style="list-style-type: none"> Differences in economic burden Lack of culturally competent care | <ul style="list-style-type: none"> Differences in baseline patient characteristics Differences in clinical presentation <ul style="list-style-type: none"> Morphology Body site distribution Severity Exacerbating factors Differences in prevalence and incidence | <ul style="list-style-type: none"> Cultural differences influencing treatment preferences Differences in treatment patterns <ul style="list-style-type: none"> Differences in familiarity with treatments Differences in prescribed treatment type Differences in clinical research <ul style="list-style-type: none"> Underrepresentation in clinical trials Underreporting in clinical trials Differences in treatment efficacy in clinical trials |

Fig. 1 Identified themes by topic of interest

that the findings regarding differences in healthcare utilization for people with SoC are based on a limited number of observational studies; therefore, more research is needed to better characterize the extent of this unmet need among people with psoriasis and SoC.

Differences in Seeking and Receiving Care

Barriers to care for people with psoriasis and SoC include the cost of care and cultural views about psoriasis. These factors may differentially influence decisions to seek care among people with SoC compared with white patients. A review of studies focusing on Latinos with psoriasis in the US noted that although the economic burden of psoriasis is not well known, it may be disproportionately high in this group because of substantial productivity loss and out-of-pocket costs, as well as likely increased disease severity and decreased health insurance coverage [14]. These factors may influence whether Latinos (and possibly other people with SoC) decide to seek care. Latinos in the US are less likely to seek and receive medical care than other racial/ethnic groups, although no studies to date have specifically investigated Latinos with psoriasis [14]. Notably, the extent to which cost of care represents a barrier for people with psoriasis and SoC may vary between the US and Canada, as well as between these two countries and other regions, because of important differences in healthcare systems. Whereas most health care in Canada is covered by public insurance (exceptions are prescription drugs and non-emergency dental and vision care, albeit with government coverage in some cases), private health insurance (often via employers) is predominant in the US (with public insurance available for low-income and elderly individuals). However, such differences are not discussed herein given the geographical focus of this literature review.

A randomized online survey of people with self-reported psoriasis found that more than 70% of participants identified the high cost of care as one of the three largest barriers to seeking medical care for psoriasis, although this did not differ significantly between white ($n = 151$)

and non-white ($n = 151$) groups ($P = 0.56$) [19]. However, the perceived severity (i.e., impact) of the high cost of care as a barrier varied significantly across racial/ethnic groups ($P = 0.02$) and was most pronounced for Black ($n = 54$) versus white ($n = 151$) participants (mean ranking of perceived severity on a 1–10 scale: 6.38 vs. 4.7; $P = 0.004$) [19]. In addition, as described in a case series of people with psoriasis and SoC in a dermatology clinic in Toronto, Ontario, Canada, cultural views about psoriasis may influence decisions whether to seek care in certain ethnic/racial groups [20]. An example of such cultural views is the stigma attached to psoriasis specifically among Black patients [20]. In the Canadian case series, one patient reported they had been told that the disease does not affect Black people, which may have led to a delay in seeking care [20].

A lack of culturally competent care is a particularly important barrier to seeking and receiving care for psoriasis among people with SoC. In the randomized online survey of people with self-reported psoriasis discussed above, non-white participants ($n = 151$) were more likely than white participants ($n = 151$) to report lack of culturally competent care as an important barrier to seeking care for psoriasis (28% vs. 16%; $P = 0.01$) [19]. However, a significant difference between non-white and white participants was not found for any of the other barriers included in the survey (e.g., lack of understanding of treatment options, lack of availability of services, high cost of care) [19]. A lack of culturally competent care may take the form of limited access to specialists who are experienced with the nuances of psoriasis in this group, as described in a previous narrative review [16]. This is an important point highlighting a broader issue—the underrepresentation of people with psoriasis and SoC in dermatology teaching and reference materials. Teaching in dermatology residency programs predominantly focuses on examples of skin disease in white patients [20], and there remains an important unmet need for additional education regarding the management of psoriasis in patients with SoC in medical and dermatology curricula.

CHALLENGES ASSOCIATED WITH THE DIAGNOSIS OF PSORIASIS IN PEOPLE WITH SKIN OF COLOR

Studies of patients with psoriasis suggest several potential challenges in diagnosing the condition in people with SoC. These challenges can be broadly separated into differences in baseline patient characteristics, clinical presentation, and prevalence and incidence of psoriasis between people with SoC and white patients.

Differences in Baseline Patient Characteristics

In observational studies of patients with psoriasis, baseline characteristics are often significantly different across racial/ethnic groups [21–25]. A longer disease duration was observed for white patients with psoriasis ($n = 21$) than for Latino patients ($n = 21$; mean duration: 24.9 vs. 15.7 years; $P = 0.01$) in a cross-sectional study of patients screened for psoriasis clinical trials at an academic medical center in California [21]. An analysis of electronic health records (EHRs) in the US found that Hispanic/Latino patients with psoriasis ($n = 201$) were older at diagnosis than white patients ($n = 3604$; expected median age: 58 vs. 56 years; $P = 0.04$), but other non-white patients (i.e., not Black or Hispanic/Latino; $n = 198$) were younger than white patients (54 vs. 56 years; $P < 0.001$) [22]. Average age also varied across racial groups (white [$n = 4016$]: 56.2, Black [$n = 291$]: 54.8, other race [$n = 106$]: 53.4 years; $P = 0.07$) in a study of medication use in patients with psoriasis at an academic medical center in Missouri [23]. A cross-sectional study of exacerbating factors of psoriasis at an academic medical center in California reported that the mean age at baseline differed across racial/ethnic groups (white [$n = 549$]: 48.49, Asian [$n = 227$]: 44.23, Hispanic [$n = 75$]: 46.16 years; $P = 0.006$), as did body mass index (white: 26.28, Asian: 26.80, Hispanic: 29.42; $P = 0.013$) [25]. Finally, in a qualitative study to identify racial differences in perceptions of psoriasis therapies in the US,

more Black participants ($n = 32$) were of lower income ($P = 0.005$) and education levels ($P < 0.001$) than white participants ($n = 36$) [24].

Baseline characteristics (i.e., demographics, measures of disease severity, and prior therapy experience) also often vary numerically across racial/ethnic groups in RCTs of psoriasis therapies [26–29], consistent with the observational studies discussed above. These differences in participant characteristics suggest that the timing and rate of diagnosis may vary across racial/ethnic groups. However, further research is needed to clarify whether variations in participant characteristics across racial/ethnic groups are reflective of challenges with diagnosis in people with psoriasis and SoC.

Differences in Clinical Presentation

Diagnosing psoriasis in people with SoC may be challenging because of differences in how the disease can present across the skin spectrum, coupled with limitations related to culturally competent care. As described in previous reviews, the clinical presentation of psoriasis can vary across racial/ethnic groups [30, 31]. People with SoC tend to have psoriasis plaques with different coloration, less noticeable inflammation, and greater postinflammatory pigmentation changes than white patients.

The body site distribution of psoriasis (e.g., scalp psoriasis), its overall severity, and the factors that exacerbate it (e.g., stress) can also differ across racial/ethnic groups [14–16, 20, 21, 25, 26, 32]. Scalp psoriasis may be more common in Asian and Black patients than in white patients [15, 20], and can be more severe in Black women, at least in part because of differences in hair care practices [15]. Disease presentation may also differ across other body areas. A cross-sectional study conducted at an academic medical center in California found that measures of disease severity (i.e., Psoriasis Area and Severity Index [PASI] score and % body surface area [BSA] involved) differed across body locations in Latino ($n = 21$) versus white ($n = 21$) patients [21]. The mean PASI score for the trunk/axilla/groin region was lower in

Latino patients than in white patients (4.74 vs. 9.73, $P = 0.02$), whereas upper limb BSA involvement was higher in Latino patients than white patients (4.78% vs. 1.85%, $P = 0.004$) [21].

In the same study, overall disease severity was greater in Latino patients than in white patients (Investigator's Global Assessment [IGA] 'severe' patients: 42.9% vs. 28.6%, $P = 0.10$; total BSA: 20.50% vs. 10.03%, $P = 0.02$) [21]. Similarly, higher disease severity was observed in Asian patients ($n = 203$) than in white patients ($n = 499$; severe to very severe psoriasis: 54.2% vs. 36.3%; $P < 0.0001$) in a cross-sectional study of psoriasis severity at another academic medical center in California [32]. In this study, psoriasis was also more severe among Hispanic patients ($n = 60$) than among white patients (severe to very severe psoriasis: 51.7% vs. 36.3%; $P = 0.016$), but other racial/ethnic groups (i.e., African American and Middle Eastern) were not adequately powered for comparison [32]. In line with these findings, an analysis of four phase III trials of biologic therapies in patients with psoriasis found that baseline PASI scores, IGA 'severe' proportion, and involved BSA were numerically greater in Hispanic patients than in non-Hispanic patients [21]. Finally, previous reviews have noted that thicker/more scaly psoriasis plaques and extensive BSA involvement are often observed more frequently in people with SoC than in white individuals [15, 16].

Environmental factors contributing to disease exacerbation may also differ across racial/ethnic groups, as observed in a cross-sectional study conducted at an academic medical center in California [25]. Stress was more often reported as an exacerbating factor for Asian patients ($n = 227$; odds ratio [OR]: 2.05; $P = 0.0135$) and Hispanic patients ($n = 75$; OR: 2.27; $P = 0.073$) compared with white patients ($n = 549$). Medication (e.g., topical/systemic corticosteroids, beta-blockers/other anti-hypertensives, and antibiotics/antifungals) was more often reported as an exacerbating factor for Asian patients than for white patients (OR: 0.137; $P = 0.056$) [25]. Notably, the number of studies that have investigated the distribution of psoriasis and

exacerbating factors is limited in people with SoC.

Differences in the presentation of psoriasis among people with SoC, which are often poorly described in dermatology training and reference materials (see [Differences in Seeking and Receiving Care](#)) [20], can contribute to underdiagnosis and misdiagnosis in this group. Consequently, the differing characteristics of psoriasis among people with SoC are generally not well understood in clinical practice, and these individuals may have limited access to specialists who are adept at diagnosing psoriasis in racially/ethnically diverse patients.

Differences in Prevalence and Incidence

The prevalence and incidence of psoriasis appear to differ across racial/ethnic groups based on epidemiological surveys. An analysis of National Health and Nutrition Examination Survey data from 2011 to 2014 found that the psoriasis prevalence rate in the US differed among racial/ethnic groups (non-Hispanic white: 3.6%, non-Hispanic Black: 1.5%, non-Hispanic Asian: 2.5%, Hispanic: 1.9%, and non-Hispanic other: 3.1%) [30]. In terms of incidence, an analysis of EHRs in the US found that the standardized incidence rate per 100,000 person-years was greater for white patients (75.3) than for Hispanic/Latino patients (52.2), Black patients (24.9), and patients of other race groups (54.3) ($P < 0.001$ for each comparison) [22]. It is unclear whether these observed differences truly reflect the prevalence and incidence of psoriasis across racial/ethnic groups, or if they reflect systemic underreporting and selection bias (i.e., prevalence and incidence being underestimated in non-white groups) resulting in the misperception of a reduced rate of psoriasis in people with SoC. Notably, this finding may not be consistent across racial/ethnic groups and locations. An analysis of health data in Alberta, Canada, found that the prevalence of psoriatic disease (including psoriasis and psoriatic arthritis) was 1.5 times higher in First Nations people than in non-First Nations people (based on standardized rate ratio) [17]. Given the variable and limited

amount of evidence available, this is an area where additional research is critical to better understand the epidemiology of psoriasis in people with SoC. As is the case for several of the topics described in this review, epidemiological information likely differs between the US and Canada and between these regions and others. Therefore, interpretation of the published literature summarized above should be considered with this geographical focus in mind.

CHALLENGES ASSOCIATED WITH THE TREATMENT OF PEOPLE WITH PSORIASIS AND SKIN OF COLOR

There are several challenges associated with providing appropriate and timely treatment for people with psoriasis and SoC, which can be broadly separated into cultural differences influencing treatment preferences, differences in treatment patterns, and differences in clinical research.

Cultural Differences Influencing Treatment Preferences

As discussed in previous reviews, a key challenge associated with treating people with SoC is appropriately considering the influence of cultural differences regarding treatment preferences. The choice of vehicle for topical therapies is important to consider when treating people with SoC, as therapies that are compatible with hair texture and cultural styles are more likely to be adhered to than a generalized approach [15, 20]. Specifically, scalp psoriasis may pose unique treatment challenges for individuals with Afro-textured hair because of hair care practices/preferences with which certain treatment approaches may not be compatible (e.g., a preference for oil-based suspensions, lotions, and foams instead of shampoos because less-than-weekly hair washing may be impractical) [15, 20]. A review of psoriasis in the US Latino population noted that Latino patients prefer physicians with whom they can communicate in Spanish, who

understand Latino culture and beliefs, and who they perceive as kind, compassionate, and considerate [14]. Further, Latina women communicated a preference for gender concordance with physicians [14]. Studies in the US of patient experience with and perceptions of psoriasis therapies found that Black patients were more likely than white or Hispanic patients to prefer intravenous over subcutaneous injection treatments because of the perceived pain and safety of self-injection, a dislike or fear of needles, and the perceived efficacy of intravenous treatments [24, 33]. Collectively, this evidence highlights that culturally competent care is important for ensuring effective treatment of psoriasis in people with SoC because it promotes satisfaction with treatment options, adherence to treatment, and trust in physicians [14, 15].

Differences in Treatment Patterns

Several studies have reported differences across racial/ethnic groups with respect to their familiarity with different therapy types and what treatments they ultimately receive. People with SoC may be less likely to be familiar with biologic therapies for psoriasis [24] and may be less likely to receive treatment with these therapies [16, 23]. As biologics are extremely important therapeutic options for patients with moderate-to-severe psoriasis [23], their reduced usage in people with SoC may contribute to undertreatment and/or mistreatment in this group. In one qualitative observational study, Black patients with psoriasis had less familiarity with self-injectable biologics as a treatment option than white patients [24]. This observation was not explained by differences in education or income levels.

People with psoriasis and SoC may be less likely to receive treatment with biologic therapies than white patients. In a study of medication use in patients with psoriasis at an academic medical center in Missouri, biologic utilization was lower among Black patients ($n = 291$) than among white patients ($n = 4016$; 51.9% vs. 62.2%; $P < 0.05$) and lower among other racial minority groups ($n = 106$) than

among white patients (46.2% vs. 62.2%; $P < 0.05$) [23]. Similarly, a study of patients with psoriasis at an academic center in Baltimore found that Black and Hispanic patients were less likely to receive various biologic and non-biologic therapies than white patients [34].

In contrast, an analysis of National Ambulatory Medical Care Survey data from 2003 to 2016 found that Latino patients with psoriasis in the US were significantly more likely to be treated with biologics than non-Latino patients [35]. In terms of other types of psoriasis therapies, some single-center and registry-based observational studies suggest that Black patients are more likely to receive combination therapy (i.e., biologic and non-biologic systemic therapy; based on registry data from centers in the US and Canada) [36], non-biologic systemic therapy (for patients at an academic center in Missouri) [23], and topical therapy [23] than non-Black patients. These findings of different trends among groups of people with psoriasis and SoC compared with white patients highlight the importance of considering different ethnic/racial groups individually as opposed to grouping together non-white patient populations.

As noted for other topics above, the published literature for treatment patterns described herein includes findings from the US and Canada. This geographical focus should be considered given important differences in healthcare systems of other regions and the impact such differences may have on treatment patterns among patients with psoriasis and SoC.

Differences in Clinical Research

Limitations in the clinical evidence supporting the use of psoriasis therapies specifically in people with SoC present another challenge in the real-world treatment of psoriasis in this patient population. People with SoC have historically been underrepresented in clinical trials, and psoriasis studies are the least diverse among clinical trials for dermatologic conditions [14, 15, 37–39]. In a systematic review of 626 RCTs for dermatologic conditions including psoriasis (2010–2015), 74.4% of all trial

participants were white [37]. Of the conditions investigated, psoriasis trials were the least diverse, with 84.3% of participants being white [37]. The same review identified that only 6/20 (30.0%) RCTs of psoriasis conducted exclusively in the US had $\geq 20\%$ non-white representation, whereas 17/23 (73.9%) acne trials and 11/12 (91.7%) eczema trials met this threshold [37]. Another study of clinical trial data for dermatological drugs that received FDA approval from 2015 onwards found that all six drugs for plaque psoriasis had low participation to prevalence ratio scores, indicating substantial underrepresentation of Black participants [38]. Further, in a globally scoped cross-sectional study of 82 phase III trials for plaque psoriasis (trials completed prior to May 2020), non-white individuals constituted only 14.2% of enrolled participants and Black individuals accounted for only 3.09% of participants when this group was reported [39]. Finally, a narrative review noted that phase III pivotal trials for biologic psoriasis therapies have enrolled 67–95.4% white participants, and trial results for Hispanic and Black populations are particularly lacking [15].

In addition to the issue of underrepresentation, publications of clinical trial results for dermatological conditions overall and specifically for plaque psoriasis do not consistently report comprehensive racial/ethnic data [37, 39]. In the systematic review of 626 RCTs for dermatologic conditions discussed above, race/ethnicity of participants was reported by only 58/97 trials (59.8%) conducted exclusively in the US and 97/164 trials (59.1%) conducted exclusively or partially in the US [37]. Further, in the global cross-sectional study of 82 phase III trials for plaque psoriasis, only 65% of the 62 trials reporting racial/ethnic data reported comprehensive data (i.e., more detail than only % white and % one other group) [39]. The underrepresentation and underreporting of people with SoC in RCTs for psoriasis therapies likely contributes to the challenge of effective management of the disease in non-white racial/ethnic groups [14, 15].

The characteristics of clinical trials for psoriasis therapies conducted at least partly in Canada and the US that report comparisons

across racial/ethnic groups suggest that there are differences in treatment effects among people with psoriasis and SoC [14, 15, 20]. Reduced or unclear treatment efficacy or safety has been noted for RCT participants with SoC [14, 15, 20, 26–29]. Previous narrative reviews have provided a comprehensive description of clinical trial outcomes in patients with psoriasis across racial/ethnic groups [14, 15, 20]; therefore, we have included only a brief overview of relevant RCTs herein to describe how treatment efficacy may vary by patient population. Non-white participants did not achieve statistically significant treatment success with a topical halobetasol propionate and tazarotene lotion in two phase III clinical trials [27]. In the phase III AMAGINE-2/-3 trials, Black patients receiving ustekinumab had lower rates of skin clearance than other racial/ethnic subgroups at 52 weeks [28]. In the phase III REVEAL trial, the efficacy (PASI 75 at week 12) of adalimumab was better in white patients than in non-white patients [15]. In the phase III VOYAGE 1/2 trials, guselkumab was associated with a better treatment response than adalimumab at week 24 in white and Asian, but not Black, patients [15]. Also in the VOYAGE 1/2 trials, only Hispanic patients experienced more frequent adverse events with adalimumab than with guselkumab [29]. However, all the trials discussed above also reported other outcomes that were similar for non-white and white participants [15, 27–29], so these selected findings should be interpreted with caution.

On the other hand, the results of some RCTs have shown better treatment outcomes for non-white participants than for white participants, although few studies have reported such findings. In a pooled analysis of four phase III trials, the efficacy of secukinumab was better than that of etanercept in both Hispanic and non-Hispanic patients; further, Hispanic patients achieved greater treatment responses overall [26]. As described in a previous narrative review, differences in treatment efficacy and safety across racial/ethnic groups may reflect genetic differences that influence response to treatment and risk of adverse events [15]; however, this topic was not broadly explored or captured in the current literature review. The genetic drivers

of variable treatment response across racial/ethnic groups and the potential for these genetic variations to lead to more targeted therapies are an important topic for future consideration.

Taken together, the limited availability of data on the efficacies of psoriasis therapies in people with SoC and findings that the efficacies of some therapies may differ across racial/ethnic groups in clinical trial settings suggest that people with SoC may be more likely to be undertreated or mistreated than white patients.

STRENGTHS AND LIMITATIONS

There are several important strengths of this review. The focus on three key topics related to unmet need among people with psoriasis and SoC allowed for a comprehensive review of this area. In addition, many studies published in 2020 and 2021 that have not been considered in the scope of previous reviews were captured. Most included studies examined multiple racial/ethnic groups, and multiple study types and data sources were covered. This review was limited in that although the literature review was carefully designed and conducted, it was not systematic and only one database was searched. In addition, the literature search was restricted to the last 5 years of published evidence. Although this approach could have resulted in a non-comprehensive capture of the themes of interest, it allowed for focus to be placed on recent publications, many of which have not been covered by prior reviews on this topic. Finally, studies conducted entirely outside of Canada and the US were excluded from this review, which limits the generalizability beyond the specific populations/regions discussed herein, especially considering the substantially different healthcare systems (including health insurance types) and patient demographics in other regions.

CONCLUSIONS

Overall, the evidence identified in this literature review is strongly supportive of the notion that

people with psoriasis and SoC have a substantially different experience with their condition than white individuals, including meaningful challenges and limitations related to access to care, diagnosis, and treatment. One of the most important challenges identified was a lack of culturally competent care for people with SoC, a limitation that spans across the full patient journey. Several steps should be taken to reduce the unmet needs among patients with psoriasis and SoC. There is a need for assessment tools that do not rely on erythema as a marker for inflammation. Additional studies and treatment guidelines are also needed to aid in the effective treatment or prevention of postinflammatory pigmentation. Importantly, larger populations with SoC must be included in future psoriasis clinical trials and other studies relevant to improving care to ensure they are representative of the base populations where the studies are conducted. Data for different ethnic/racial groups should also be more granularly reported in these studies. In addition, future research is required to better understand how genetics influence treatment response. It is crucial that dermatologists and other stakeholders in the healthcare system recognize and act on health disparities affecting people with psoriasis and SoC to ensure equitable care. Further, it is essential to address the poor representation of patients with brown and black skin in mainstream dermatology textbooks and atlases, and promote education within SoC communities regarding the recognition of psoriasis and the safety and efficacy of current treatments, to decrease unmet needs.

ACKNOWLEDGEMENTS

The authors thank Becky Skidmore, MLS, an independent information specialist contracted by EVERSANA™, for assistance with the literature search.

Funding. The authors disclose receipt of financial support from Janssen Inc. for the research, authorship, and publication of this

article. The journal's Rapid Service Fee was funded by Janssen Inc.

Authorship. All named authors meet the International Committee of Medical Journal Editors (ICMJE) criteria for authorship for this article, take responsibility for the integrity of the work as a whole, and have given their approval for this version to be published.

Author Contributions. Omair Lakhani, Ari Mendell, and Laura Park-Wyllie were responsible for study conception and design. All authors were responsible for the acquisition, analysis, and interpretation of data. Christopher Drudge, Samantha Craigie, and Ari Mendell were responsible for drafting the manuscript, and all authors were responsible for critically revising/reviewing the manuscript and for providing final approval.

Disclosures. Geeta Yadav has been a speaker, consultant, and/or trialist for and received honoraria from Abbvie, Amgen, Bausch, BMS, Celgene, Galderma, Janssen, Leo, Novartis, Pfizer, Sanofi Genzyme, Sun Pharma, and UCB. Jensen Yeung has been a speaker, consultant, and/or trialist for and received honoraria from AbbVie, Amgen, Anacor, Arcutis, Astella, Bausch, Baxalta, Boehringer Ingelheim, BMS, Celgene, Centocor, Coherus, Dermira, Eli Lilly, Forward, Galderma, Janssen, Leo, Medimmune, Novartis, Pfizer, Regeneron, Roche, Sanofi Genzyme, Sun Pharma, Takeda, UCB, and Xenon. In the past 5 years, Yvette Miller-Monthrope received honoraria for consultant meetings and advisory boards from AbbVie, Janssen, SunPharma, and UCB. Christopher Drudge, Samantha Craigie, and Ari Mendell have disclosed that they are salaried employees of EVERSANA™, a paid consultant of Janssen Inc. Omair Lakhani and Laura Park-Wyllie have disclosed that they are salaried employees of Janssen Inc.

Compliance with Ethics Guidelines. This article is based on previously conducted studies and does not contain any new studies with human participants or animals performed by any of the authors.

Data Availability. Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

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