



Review

The dark side of skin lightening: An international collaboration and review of a public health issue affecting dermatology



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ARTICLE INFO

Article history:

Received 29 June 2020

Received in revised form 4 September 2020

Accepted 8 September 2020

Keywords:

Skin lightening

Bleaching

Skin of color

Dyschromia

Hyperpigmentation

ABSTRACT

Skin lightening (SL) for cosmetic reasons is associated with profound negative impacts on well-being and adverse effects on the skin, resulting in immense challenges for dermatologists. Despite current regulations, lightening agents continue to dominate the cosmetic industry. In this review, our international team of dermatologists tackles the topic of SL as a global public health issue, one of great concern for both women's health and racial implications. We have examined SL in Africa, Asia, the Middle East, and the Americas. We aim to inspire a global discourse on how modern dermatologists can utilize scientific evidence and cultural competency to serve and protect patients of diverse skin types and backgrounds. In doing so, we hope to promote healthy skin and inclusive concepts of beauty in our patients and society.

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Introduction

Skin lightening (SL) for cosmetic reasons is associated with profound negative impacts on well-being and adverse effects on the skin (Charles, 2003), resulting in immense challenges for dermatologists. Despite current regulations, lightening agents continue to dominate the cosmetic industry. In this narrative review, our international team of dermatologists tackles the topic of SL as a global public health issue, one of great concern for both women's health and racial implications. We examined SL throughout Africa, Asia, the Middle East, and the Americas, and aim to inspire a global discourse to increase public education campaigns and formulate how modern dermatologists can utilize scientific evidence and cultural competency to serve and protect patients of diverse skin types and backgrounds. In doing so, we hope to promote healthy skin and inclusive concepts of beauty in our patients and society.

Regions

Africa

Skin bleaching became a popular cosmetic practice in many African countries in the 1950s (Sagoe et al., 2019). Up to 75% of women in Nigeria (Dadzie and Petit, 2009; Dlova et al., 2015), 60% in Senegal (Blay, 2011), 50% in Mali (Baxter, 2000), and 30% in Ghana are estimated to use bleaching creams regularly, with similar rates in other African countries (Lartey et al., 2017; Mckinley, 2001). Throughout the continent, both men and women are frequently targeted with marketing campaigns showing public figures who bleach their skin (Owusu-Agyei et al., 2020). Consequently, individuals claim that lighter skin makes them attractive and increases their career opportunities (Dlova et al., 2015; Yusuf et al., 2019).

Dr. Ncoza Dlova, current president of the African Women's Dermatology Society and Chief of the Dermatology Department at the University of KwaZulu Natal in South Africa, explains that 30% of

her patients request SL treatments. Of the South-African patients using SL creams, 67% are treating postinflammatory hyperpigmentation (PIH), melasma, and acne, whereas 33% use the creams with the primary goal of lightening skin (Fig. 1; Dlova et al., 2015; Lartey et al., 2017). Similarly, in regions of East Africa, 52% of patients use SL products for pigmentary disorders, 38.7% prefer a lighter skin color, and 9.7% report both reasons (Yusuf et al., 2019).

South Africa has a lower rate of SL than other African countries, likely owing to the anti-SL messages broadcasted on television for decades (Lartey et al., 2017). In the 1970s, the government began regulating active lightening ingredients and in 1990 prohibited the use of hydroquinone in cosmetic and over-the-counter (OTC) products. South Africa became the first country in the world to ban skin bleaching products and was recently joined by Rwanda, Cote d'Ivoire, Tanzania, Kenya, and Ghana (Thomas, 2012). Despite these restrictions, patients are still able to obtain products from street vendors and cosmetic shops, avoiding bans or regulatory constraints (Dadzie and Petit, 2009; Dlova et al., 2015). Because patients acquire these creams without the counsel of a physician, they are often unaware of the potential side effects and if aware, stop its use only if they personally experience such effects (Yusuf et al., 2019).

East Asia

In East-Asian culture, the fair-skinned ideal of beauty is illustrated in the proverb "a white complexion is powerful enough to hide seven faults" (Li et al., 2008). In a recent study by Li et al. (2008), advertisements in four Asian countries demonstrated that good skin was portrayed as smooth and white, whereas bad skin was dry and dark with wrinkles. SL products have shown dramatic growth during the past several decades (Ashikari, 2005), with estimates that 40% of South Koreans routinely use SL agents (Tan, 2012). Dr. Hae Shin Chung, Adjunct Professor of Dermatology at the Yonsei University College of Medicine in Seoul, South Korea, explains that although primarily a common practice among

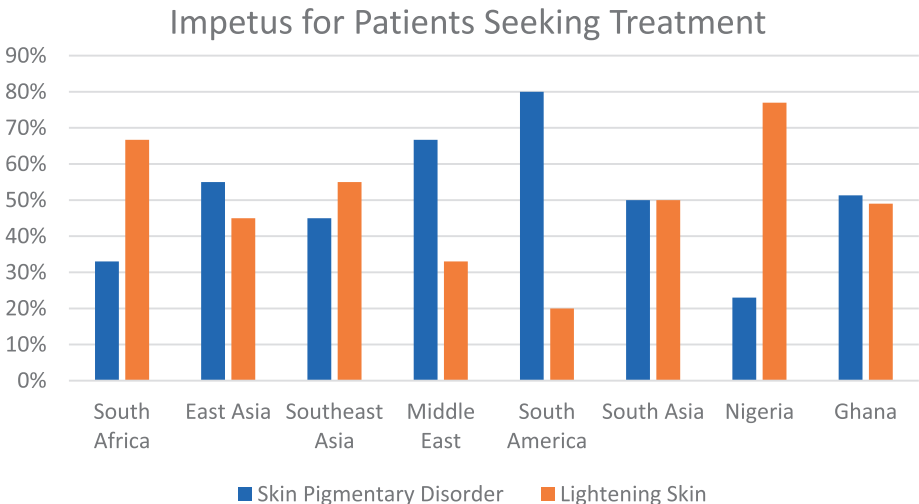


Fig. 1. Underlying Motivation of Patients Seeking Skin Lightening Treatment.

women, the desire for lighter skin exists among men as well, and has increased in recent years (Tan, 2012).

In South Korea, OTC hydroquinone has been banned by federal regulations; however, imported and online cosmetic products containing hydroquinone, mercury, and steroid agents are available. Despite the knowledge of the possible harmful side effects of lightening, trends such as glass skin (term used to describe even-toned skin like crystal clear glass) are on the rise, with advertisements of intravenous injections of glutathione (antioxidant with additional antimelanogenic properties through the inhibition of tyrosinase binding; Lee et al., 2020; Russon, 2018; Sonthalia et al., 2018). Nevertheless, Dr. Chung emphasizes campaigns that educate the community on how to adequately protect the skin at an early age and discussions to change attitudes surrounding ideal beauty standards.

South Asia

Throughout the Indian subcontinent, half of all spending in the skincare industry is for SL creams, reflecting the unrelenting prioritization of these products (Ojha, 2016). The term “fairness” is used to imply beauty and virtue, dominating the product landscape, most notably with Fair and Lovely, which is the market brand leader and household name, along with U.S. brands such as Revlon and Neutrogena (Table 1; Das, 2013; Shevde, 2008).

There are cultural and sociological associations with fairness, a distinguishing factor between castes, with higher castes (Brahmin) associated with purity, elite status, and light complexion, whereas the lowest and fifth caste (Dalit; i.e., untouchable) is associated with a darker complexion and social persecution (Sankaran et al., 2017). Although caste-based discrimination was outlawed by an independent India in 1950, the practice endures in some contexts.

Dr. Rashmi Sarkar, Founding President of the Joint Women's Dermatology Society and Indian Women's Dermatology Society and professor in Dermatology at Lady Hardinge Medical College, New Delhi, explains that SL is a common presenting concern in her practice. Approximately 50 patients per month are evaluated for this reason, of which 10% show complications related to SL use. Her experience is consistent with studies in Mumbai, where approximately 40% of the population report SL product use and 17% present with complications (Shroff et al., 2018). In North India, 60% of subjects reported SL use in their lifetime (Wong et al., 2017). These products are readily obtained from drugstores and used by both women and men alike (Shroff et al., 2018).

The Indian Association of Dermatologists, Venereologists, and Leprologists and the Pigment Disorders Society disseminate knowledge and promote restrictions on the sale of SL ingredients.

Southeast Asia

In Southeast Asia, the use of whitening agents is expanding, with recent studies estimating one in two Filipino women use SL products (Mendoza, 2014). The desire for paler skin is thought to be based in hopes of improving social acceptance and economic opportunities (Singson, 2017).

Dr. Evangeline Handog, immediate past chair of the Department of Dermatology of Asian Hospital and Medical Center in the Philippines, explains that she sees an average of three to four patients daily requesting lightening for active skin disease or cosmetic reasons. Similar practices are seen in Malaysia where 60% of subjects report SL use, with 61% perceiving lighter skin as healthier, younger, and providing higher self-esteem (Rusmadi et al., 2015).

The Food and Drug Administration (FDA) of the Philippines has issued warnings regarding the use, marketing, and sale of bleaching agents. Based on the recommendations from the EcoWaste Coalition Chemical Safety Campaign and the World Health Organi-

Table 1

Product names and marketing brands in separate regions.

Region	Names of products
Africa	Whitenicious Illuminating and Lightening Cream Caro White White Perfect White Glow White Beauty
East Asia	Snow White Cream Purifying White Waterful Cream Fine Fairness ^a Clean & Clear Fairness ^a White Stay mousse
South Asia	Fair and Lovely Men Powerlight Cream Fair Miracle 2-in-1 Fairness Cream Fair and Handsome White Perfect Clinical Light Complete White Beauty Bright Boost Clean & Clear Fairness ^a Fine Fairness ^a
Southeast Asia	Fair and Handsome Snow White Cream Purifying White Waterful Cream Fine Fairness ^a Clean & Clear Fairness ^a White Perfect Clinical Light Complete White Beauty Extra White Body Serum
Middle East	Fine Fairness ^a Clean & Clear Fairness ^a Natural Bright ^a White Perfect Clinical Light Complete White Beauty
South America	Bright Boost Blancy TX Clareador (Whitening) Gel Clear Age
North America	AMBIfade Nu Derm Clear Brightening Cream Luminate Cream Let's Get Luminous Rapid Age Spot and Pigment Lightening Serum Admire My Skin- Dark Spot Corrector

^a Removed from the market as of June 2020.

zation, the Philippines has banned lightening products with mercury levels exceeding the national regulatory limit of 1 mg/kg (Felongo, 2019). However, the sale of these products continues through smuggling (Whitehead, 2019).

Advertisements target middle to lower income groups of whom 20% to 30% buy SL products OTC, through friends, or online, without consulting a specialist (Rusmadi et al., 2015). Dr. Handog and members of the Philippine Dermatological Society have highlighted this public health issue and spoken publicly regarding these practices to educate the public through forums and live interviews.

Middle East

With estimates of 43.3% of Saudi women, >60% of Jordanians, and possibly higher usages of SL products in other Middle Eastern countries (Alrayyes et al., 2020), the demand continues to increase in the Middle East.

Dr. Hassan Galadari, Assistant Professor of Dermatology at the United Arab Emirates University and co-founder of the Galadari Derma Clinic in Dubai, explains that two-third of patients desire

lightening to even their skin tone and improve texture after suffering from dermatologic conditions. The other third have no visible skin condition and simply wish to become lighter, with the prevalence of SL use increasing with darker skin (Hamed et al., 2010).

Studies suggest 60.7% report SL use to increase self-esteem, with >30% of subjects unaware of potential side effects (Hamed et al., 2010). Similarly, Dr. Galadari reports that in Dubai, patients mix different combinations of treatments to achieve lighter skin, unaware of how they adversely affect their health. High-potency topical steroid agents in combination with other ingredients may be obtained from pharmacies without a prescription, leading to widespread topical steroid abuse with sequelae of telangiectasias and dermal atrophy. In the United Arab Emirates, OTC hydroquinone concentrations >4% are banned (Hamed et al., 2010). Although banned in many countries, a number of lightening products still contain toxic substances, such as mercury (Al-Saleh et al., 2005; Osman, 2019).

South America

Whitening (or blanqueamiento) was widely accepted in Brazil and deeply rooted in the history of the nation until 1914 (Hier and Greenberg, 2002). Although tanned skin is also common in Brazil, the trend of SL is still popular and represents a niche and growing market. Dr. Mônica Manela-Azulay, Assistant Professor of Dermatology at the Santa Casa de Misericórdia of Rio de Janeiro, Brazil, explains that approximately 50% of all patients presenting to the clinic request topical treatments or procedures to lighten the skin, a majority of which target ephelides, lentigines, and PIH (Failmezger, 1992; Martins, 2020).

In South America, the majority of individuals obtain bleaching products with a prescription; however, as the market expands, more patients are able to purchase products OTC and online. In contrast with other regions, hydroquinone has not been banned in Brazil and is available by prescription and OTC (Cestari et al., 2009). Among patients who seek and obtain SL treatments, approximately 1% have complications (Darj et al., 2015).

Dr. Azulay emphasizes that dermatologists have a significant role in disseminating reliable information about skincare to patients. She explains the importance of seeking care from a specialist because adverse events often occur when patients seek outside advice without fully understanding the impact this may have on their skin.

North America

Since the 1700s, a wide range of skin complexions arising from mixed-race children, conceived between slaves and slave masters, produced a hierarchy in America. African-Americans with lighter skin were granted some of the rights of higher classes (Talty, 2003). Some argued that lighter-skinned slaves were smarter and more civilized than their darker counterparts (Talty, 2003). After slavery was abolished, the discriminatory stratification by skin tone (or colorism) remained prevalent, affording better opportunities to those with fairer skin (Hargrove, 2019). To date, there has been no study to formally assess the prevalence of SL in the United States. Whether the practice to lighten skin is uncommon or rarely reported because of a reluctance to admit to the behaviors due to cultural stigma is unclear, leaving the sale of SL products difficult to assess (Allen, 2020).

Dr. Susan Taylor, Founding Director of the Skin of Color Center, St. Luke's-Roosevelt Hospital, and the Sandra Lazarus Professor of Dermatology at the University of Pennsylvania, explains that patients commonly request SL creams to treat PIH from acne and other dyschromias. Fewer patients in the United States than in other regions seek creams for cosmetic lightening of their natural

complexion (Allen, 2020). However, the practice is still prevalent. A study observing skin-bleaching among women of African descent in New York City found that >30% of patients were bothered by their skin's natural appearance, with 25% of patients embarrassed about their color, feeling a restricted sense of freedom (Benn et al., 2019). Nine percent of patients had persistent feelings of being unattractive due to dark complexions (Benn et al., 2019). The bleaching phenomenon may be obscured by terms such as "evening out" the skin tone and "brightening" the complexion, but the ingredients remain similar: Hydroquinone, steroid agents, and glutathione (Hilton, 2020).

In 2014, the California Department of Public Health released a warning regarding the mercury content in face creams as reports surfaced of adverse effects after prolonged use (California Department of Public Health, 2014). In 2018, the New York City Department of Health and Mental Hygiene issued an advisory for products were found to contain mercury levels up to 14,000 times the permissible limit (New York City Department of Health and Mental Hygiene, 2018). One study noted that 13% of patients used skin-bleaching products while pregnant, illuminating the public health concern given that pre- and postnatal exposure to mercury and hydroquinone may have harmful effects on a fetus (Benn et al., 2019; Weldon et al., 2000).

Complications of skin-lightening practices

Cutaneous and systemic side effects from SL agents are likely underestimated, as a full list of ingredients (particularly in products that are illegal) are seldomly disclosed. With limited use, SL agents may not have excessive side effects. However, the risk of adverse reactions is increased when used for prolonged periods of time or under occlusion (Ladizinski and Mistry, 2011). In the Caribbean, Middle East, India, and regions including Nigeria, Ghana, and South Africa, women smear creams on their bodies and wrap in dressings underneath their clothing (Smith, 2015). Individuals may cover their skin with tight compression materials after applying creams or bathe in mixtures containing a combination of steroid agents, hydroquinone, bleach, and hydrogen peroxide (Shroff et al., 2018; Bumatay, 2019). A list of commonly used SL agents and associated adverse reactions is provided in Table 2. Several agents with systemic side effects are highlighted in the following section.

Hydroquinone-containing preparations may cause exogenous ochronosis, a paradoxical blue-gray hyperpigmentation due to the deposition of homogentisic acid in the skin (Ladizinski and Mistry, 2011). Squamous cell carcinoma has also been reported. Systemic absorption may cause peripheral neuropathy, fish odor syndrome, and fetal growth retardation (Olumide et al., 2008).

Super-potent corticosteroid agents may result in a number of cutaneous effects, including local immunosuppression leading to bacterial, viral, and fungal skin infections. However, concerning side effects from systemic absorption include a disrupted hypothalamic-pituitary-adrenal axis, including Cushing syndrome, adrenal insufficiency, diabetes, and hypertension. Ophthalmologic side effects include glaucoma and cataracts (Olumide et al., 2008). For preparations containing mercury, systemic concerns may include neuropsychiatric toxicity and nephrotoxicity, as well as pneumonitis, nail dyspigmentation, and mercurial baboon syndrome (Hamann et al., 2013).

Glutathione has become a major health concern in many countries for its potential adverse sequelae. Glutathione infusions are approved in India for various alcoholic liver diseases and in the Philippines for use as adjunctive treatment in cisplatin chemotherapy; however, the FDA has not approved its use for SL (Sonthalia et al., 2018). Oral, topical, and intravenous formulations of glu-

Table 2
Common skin lightening agents, mode of use, adverse effects, and country of use.

Ingredient	Mode of use	Adverse effects ^a	Severe adverse reactions	Popular region found (past and present)
Hydroquinone (2% or 4%)	Topical	Contact dermatitis; exogenous ochronosis; corneal melanosis; conjunctival hyperpigmentation; nail hyperpigmentation	Peripheral neuropathy; fetal growth retardation; fish odor syndrome	North America; Middle East; South Asia; Southeast Asia; Africa; East Asia; South America
Class I Steroids (Clobetasol, betamethasone)	Topical	Atrophy; striae; contact dermatitis; perioral dermatitis; telangiectasias; acne; purpura; folliculitis; hypertrichosis	Hypothalamic-pituitary-adrenal axis disruption; Cushing syndrome; adrenal insufficiency; diabetes; hypertension; glaucoma and cataracts; steroid addiction syndrome	North America; Middle East; South Asia; Southeast Asia; Africa; East Asia; South America
Mercury	Topical	Gastrointestinal discomfort; dermatitis; hyperpigmentation; nail dyspigmentation	Neuropsychiatric toxicity (mad hatters disease); nephrotoxicity; pneumonitis; mercurial baboon syndrome	Middle East; South Asia; Southeast Asia Africa; East Asia
Glutathione	Topical, oral, injectable	Contact dermatitis; cramping and bloating	Hepatic, neurologic and renal toxicity; Stevens–Johnson syndrome; air emboli; thyroid dysfunction	North America; Middle East; South Asia; Southeast Asia; Africa; East Asia
Retinoids	Topical, oral	Erythema and peeling; retinoid dermatitis; Photosensitivity	Teratogenic and fetal complications; thyroid dysfunction; hepatic toxicity	North America; Middle East; Africa; East Asia; Southeast Asia; South Asia; South America
Cysteamine	Topical	Burning sensation; sulfur odor; xerosis and irritation		North America; South Asia; Southeast Asia; East Asia
Arbutin 1%	Topical	In alkaline conditions, will hydrolyze into hydroquinone; irritation and erythema; contact dermatitis; paradoxical hyperpigmentation		North America; Middle East; South Asia; Southeast Asia; East Asia; South America
Kojic acid 1%–4%	Topical	Contact dermatitis; photosensitivity		Middle East; South Asia; Southeast Asia; East Asia; South America
Camphor	Topical	Contact dermatitis; irritation	Neurotoxicity-seizures and vision loss; burns when heated; hepatic toxicity	Middle East; South Asia; Southeast Asia; East Asia; Africa
Azelaic acid	Topical	Contact dermatitis; burning and tingling		North America; Southeast Asia; East Asia; Middle East; South America
Tranexamic acid	Oral/topical	Abdominal bloating; abdominal pain Contact dermatitis (topical formulation); alopecia	Vascular thrombosis; pulmonary embolism	North America; South Asia; Southeast Asia; East Asia; South America; Africa

^a Common or less severe.

tathione have expanded across countries; however, no well-defined dose or safe duration of administration exists (Sonthalia et al., 2018). Significant complications, including hepatic, neurologic, and renal toxicity, Stevens Johnson Syndrome, and air emboli, have been reported (Dadzie, 2016).

Media and celebrity pop culture influence

As seen in every region, celebrities and the media influence the decision to use bleaching creams. In the United States and Africa, multiple celebrities publicly endorsed skin-bleaching practices as an avenue for beauty and success and highlighted that a majority of black celebrities have fairer complexions (Ashan, 2016). Celebrity attribution of SL for their success has sparked conversation and debate on media forums in a time when advocacy groups and other public figures publicly condemn the practice.

In India's influential Bollywood film industry, film stars are traditionally fair-skinned and featured in advertisements for SL products (HT, 2017; O'Neill, 2020). Korean actors and pop idols frequently lighten their skin and appear in advertisements for creams like many other celebrities across Asia. Furthermore, in Brazil, the Dominican Republic, and Puerto Rico, black Latinos or those with a darker skin are rarely protagonists in films or on magazine covers (Shroff et al., 2018; Tan, 2012).

Future directions and conclusion

As more patients with diverse backgrounds present to dermatology clinics, cultural practices (such as SL) and possible motivations must be kept in mind. Further investigation into the socioeconomical and societal factors that influence people to lighten their skin will be helpful to fully elucidate how change can occur. Globally, regulations have been enacted to address the expanding SL market and the harm these practices may cause.

In 2020, the Indian Ministry of Health and Family Welfare finalized a bill, banning the promotion of SL products throughout India (Ministry of Health and Family Welfare, 2020). In the United States, the FDA has banned mercury in cosmetic products at levels >1 ppm since 1973. In both the United States and the Philippines, the FDA publicly condemned the use of glutathione injections and issued advisory warnings against its use (Hilton, 2020). In the United Kingdom, the Southwark Trading Standards taskforce collaborates with marketplaces to block advertisements that contain suspicious product names, seizing untested products, and eliminating multiple online retailers (Davey, 2016).

Social media and nonprofit campaigns are first steps toward changing attitudes about the need for SL. The younger generation has raised public awareness about bleaching through the social media campaign, #unfairandlovely, celebrating darker-skinned people of color and empowering populations to promote the beauty of all skin tones (Pandey, 2016). A second social media campaign, #reclaimthebindi, in South Asia aimed to inspire individuals to embrace their cultures (Pandey, 2016). The nonprofit campaign, Dark is Beautiful, is based in India and was created to challenge the long-held belief that value is determined by the fairness of the skin (Tarafdar, 2015). Celebrities such as Amara La Negra, an afro-Latina singer, speak publicly against skin bleaching and advocate for increasing the number of dark-skinned Latin performers in the media (Meraji and Richmond, 2018). These campaigns have garnered national attention, with thousands of consumer petitions that have prompted companies to take note and make changes. Recently, Johnson & Johnson has stopped its sales of skin-whitening lotions (Cramer, 2020), while the popular Unilever cream Fair & Lovely has been renamed but not yet taken out of stores (Berger, 2020).

Dermatologists have an opportunity to raise public health awareness and protect patients in vulnerable communities. In India, the dermatologists' association has begun to educate general practitioners and reduce the number of improper prescriptions (Abraham, 2017). The Skin of Color Update has created panels and seminar series for continuing medical education, educating physicians on the harms of SL so they may advise and arm their patients with evidence-based knowledge (Kaufman, 2018). With continued education, online forums, and broadcasted interviews, dermatologists and the media can work together to highlight the beauty of all skin tones and promote skin health and well-being for our patients and society.

Financial disclosures

None.

Conflicts of interest

None.

Study Approval

N/A.

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