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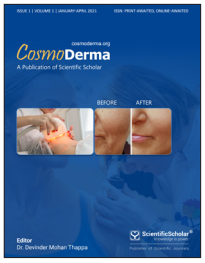

*Editorial*

# Fairness creams unfairness

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The human obsession with fair skin, dating back centuries, has deep cultural, social, and economic roots. Lighter and fair skin has been associated with higher social status, beauty, and personal and professional success. This perception is particularly prevalent in Asia, Africa, the Middle East, and Caribbean nations, where colonial histories and societal structures, reinforced by aggressive marketing and advertising strategies that manipulate consumer insecurities and aspirations, have promoted colorism – a preference for lighter skin tones. According to the World Health Organization, 25–80% of women in these regions regularly use skin-lightening products. The global market for skin-lightening products is a multibillion-dollar industry. It accounts for >60% of the dermatology product market in India.

Skin-lightening creams contain ingredients to decrease the melanin concentration or production in the skin. Mercury, hydroquinone (long-term use of skin-lightening creams that contain hydroquinone cause exogenous ochronosis), corticosteroids (the irrational, indiscriminate, unsupervised or prolonged use of topical corticosteroids over the face for fairness by the victims of the wave of fairness craze sweeping across the Indian land causing topical steroid damaged/dependent face, and kojic acid are believed to inhibit the enzyme tyrosinase, essential for melanin formation. Natural extracts, such as licorice extract, niacinamide, and Vitamin C, exert their effect through antioxidant properties and chemical inhibition of melanin synthesis. These natural extracts are generally considered safer than their chemical counterparts; however, they may not provide results as quickly and are not as widely used.

Mercury, the heavy metal, was administered therapeutically in the European syphilis pandemic of the late 1400s. Industrial exposure to methylmercury was responsible for numerous deaths in the late 19$^{th}$ and early 20$^{th}$ centuries. Two physicians noted the constellation of symptoms caused by the poisoning, and the syndrome now bears their name: Hunter-Russell syndrome. In the 1950s, more than 2500 persons were affected in and around Minimata Bay, Japan, after consuming seafood contaminated by methylmercury pollution from nearby paper mills. A large outbreak of mercury poisoning in Iraq reported in 1973 occurred after people ate grain treated with mercury-containing fungicides.

Mercury-containing compounds have historically been used in germicidal soaps, teething powders, medications for psoriasis and syphilis, Chinese patent medicines, and skin preparations, including skin-lightening creams. Mercurial compounds can be absorbed through intact skin. Toxic renal, neurologic, and dermal effects related to the use of topically applied products have been documented in the literature since the early 20$^{th}$ century. Chronic mercury-containing skin lightening cream use may cause hyperpigmentation and cutaneous mercury granulomas.

Mercury poses the most significant health risks of all the skin-lightening cream ingredients. Jean-Martin Charcot (1889) attributed oscillatory tremors to mercury exposure. In 1961,

Japanese researchers correlated elevated urinary mercury levels with Minamata disease, a chronic neurologic disorder caused by methylmercury poisoning from fish and shellfish contaminated by wastewater from a chemical plant. In the meantime, mercury was widely used in remedies, including laxatives, antibacterial agents, antiseptics, and diuretic agents. Physicians should consider mercury poisoning in any patient presenting with neurologic symptoms of unclear cause and should be reminded to use their health departments to investigate the causes of unusual illnesses.

The first documented case of nephrotic syndrome caused by mercury-containing therapeutic ointment was reported in the early 1960s by Becker *et al*., and the first association of this condition with skin-lightening cream among young English-speaking African women was reported in Kenya in 1972. Since then, cases of nephrotic syndrome in association with fairness creams have been reported regularly, most notably from China and India.

Given that females constitute the bulk of fairness cream users, they are likely to be at a greater risk for the development of kidney/neurologic complications. Indeed, 80–100% of subjects with nephrotic syndrome caused by mercury-containing cosmetics are females. After topical application, mercury is absorbed from the skin. The absorption of mercury depends on the lipid solubility of the vehicle, as well as the skin's integrity and hydration status. Mercury has a half-life of 4–8 weeks in circulation and is mainly eliminated through urinary excretion.

Metallic mercury and organic mercuric compounds tend to be lipophilic, displaying neurotoxic properties, whereas inorganic mercurial compounds are hydrophilic and predispose to nephrotoxicity. Symptoms of poisoning with inorganic mercurial compounds are slow and insidious. They include neurologic sequelae such as dementia and tremor, but renal failure is often the terminal event. Unlike the toxicity of inorganic mercurial compounds, the toxicity of organic mercurial compounds is more fulminant. It includes neurologic decompensation with mental deterioration, ataxia, spasms, paresthesia, deafness, and eventually coma.

A high index of suspicion is critical for diagnosis. A careful probe into the history of relevant environmental triggers, such as cosmetic agents and indigenous medicine, is essential. Mercury-containing skin creams affect the individuals who use these products and the broader ecosystem, indirectly affecting others who may not have used these products. Mercury vapor released from the creams permeates household items that come into contact with them. Moreover, mercury is concentrated in the soil, water, and earth, where it is converted into organic methylmercury that accumulates in fish and shellfish, ultimately entering the human food chain. Most cosmetic cream users had increased urine or blood mercury concentrations but remained asymptomatic, implying that the incidence of overt symptomatic mercury poisoning is low. Doctors should take a history of the use of cosmetics if patients have clinical or laboratory evidence of mercury exposure in the presence of either nephrotic syndrome or neurologic disorder; such cases should be reported to public health authorities.

John Turk and Harvey Baker said in 1968, "There remain no reasons for ever prescribing mercury for topical use." Because the toxicity of mercurial compounds in skin products far overshadowed their antibacterial and other purported clinical benefits, in 1973, the US Food and Drug Administration banned using the compounds in over-the-counter skin preparations, except in exceptional circumstances as a preservative in low concentrations. It was only in 2013 that governments of >140 countries adopted a global environmental agreement, the Minamata Convention on Mercury, to protect human health and the environment from mercury. The deal mandates a ban on manufacturing, importing, and exporting products, including creams and soaps with a mercury content >1 mg/g.

Mercury-containing skin preparations, however, continue to be un-regulated and available in many countries around the world with scarce regard for public health and the environment. A recent systematic review found that mercury-containing skin-lightening products are manufactured in many countries, including Europe and the United States. Products manufactured in Mexico, Pakistan, and Thailand had the highest mercury content. None of the products mentioned mercury on the label.

The recent reports reinforce the critical need for increased consumer awareness and stricter enforcement of existing regulations to mitigate the risks associated with these products and to eradicate the use of dangerous chemicals in cosmetics.

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