

Side Effects and Complications of Skin Lightening Products Used by Females Attending Khartoum Dermatology Teaching Hospital

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Abstract

Background: The use of skin lightening products has been a widely spread practice, over the past decade, in Sudan, as well as worldwide. This is probably due to the unfortunate social and cultural pressure that is placed upon women to believe that being fair skinned is the epitome of beauty.

Methodology: This study was an observational cross-sectional study that took place in Khartoum Dermatology Teaching Hospital, Sudan, from August 2019 to March 2020.

Results: It included 240 females with a mean age of 29.35 ± 10 SD, mainly single (49.2%) and live in Khartoum (77.1%). Prevalence of lightening products use was 85.8%, the most common used type were topical creams (74.6%). Participants used them for a period of more than a year (26.7%) and mostly interrupted use (48.3%). Local side effects were reported more than general complications (71.7% and 48.3%) respectively, and mainly included skin redness (53.3%) and sun sensitivity (50%). The main reason behind usage of lightening product was to look prettier (50.4%).

Conclusion: skin lightening products are a major health hazard and the prevalence in Sudan is high as in other countries. Distorted beauty image is the main motivation.

Keywords: Skin Lightening Products; Beauty Image; Health Hazard

Introduction and Literature Review

Skin Lightening Products (SLP), also known as skin whitening, skin bleaching or depigmenting agents are rapidly becoming a real public health issue affecting women of all age groups around the globe [1].

Skin Lightening (SL) refers to the use of products to lighten dark areas of the skin or achieve an overall lighter complexion. These products include bleaching creams, soaps, and tablets, as well as professional treatments like chemical peels, laser therapy and injections [2].

There is no medical benefit to skin lightening. Results are not always permanent and most importantly skin lightening can result in serious side effects and complications [2].

Studies have documented, in India 2018, the use of skin fairness products, sometimes referred to as “skin whitening products,” “skin bleaching products,” “depigmenting agents,” in Africa, Europe, North America, and Asia, with prevalence of use ranging from 27 to 77% among community samples [1].

The use of skin fairness products that frequently contain toxic ingredients is associated with significant adverse health side effects. Due to the high prevalence of use in Asian and African countries, skin fairness product use is recognized as a growing public health concern. The multi-million-dollar skin fairness product industry has also been criticized for perpetuating racism and social inequalities by reinforcing beliefs about the benefits of skin fairness for cultural capital [1].

In many societies around the world, light skin is branded as the ideal sign of beauty, grace and high social status. Use of these products by celebrities may encourage young ladies who want to imitate them. Competing in employment chances and interviews may show bias towards fair-skinned individuals. This perception encourages most women to engage in skin lightening leading to use that has reached epidemic levels in many nations worldwide especially in African and Asian countries. Now production of skin-bleaching products is high to supply the overwhelming rise in demand [3].

Many of these skin lightening products contain toxic/harmful components such as Hydroquinone, Mercury, Kojic acid and Tretinoin, which can adversely affect health. Some of these creams also contain steroids while Dexamethasone tablets are popularly used.

Mercury (mercury II chloride/ammoniated mercury) is a toxic metal that is used to lighten skin by suppressing melanin synthesis by the skin. Mercury can be absorbed through the skin and accumulate in body organs giving rise to severe toxicity. Local side effects include: skin rashes and dermatitis. Generalized complications include: mood swings, memory loss, mental disturbances, numbness of hands and feet, muscles weakness.

Long-lasting exposure to mercury at very low concentration can still lead to neurological and renal impairment due to mercury poisoning. This is why it is banned in many countries.

Hydroquinone is an aromatic organic compound that can be potentially carcinogenic, used for skin lightening and treatment of allergic skin reactions such as eczema and psoriasis. Mechanism of skin lightening is by strongly inhibiting melanin production. Hydroquinone when used excessively can lead to skin thinning, acne, stinging and burning sensations, irritation, dryness, redness and stretch marks. Generalized complications include nausea, abdominal pain, heartburn, abnormal hair growth, headache, dizziness, trouble sleeping, lowered immunity, renal and liver impairment, convulsions and coma [3].

Tretinoin, all trans retinoic acid active metabolite of vitamin A, used for skin discolorations and treatment of acne but can cause local side effects such as increased skin sensitivity to sunlight therefore patients not being able to go out in the day light and is also carcinogenic.

Kojic acid is used as an anti-aging and skin lightening product, which also inhibits melanin production. Local side effects include allergic contact dermatitis, skin irritation and is also carcinogenic.

Steroids have a number of side-effects extending from local to systemic. Local effects include striae, skin thinning, telangiectasia, fluid retention with moon-faced appearance. Long term effects include diabetes, hypertension, osteoporosis, proximal myopathy, reduced immunity, cataract and glaucoma. Sudden cessation of steroids will cause adrenal crisis that can be fatal.

Many unjudicial skin lightening products are being sold with no legal or medical regulations of any kind. It is important to measure the scope of the problem and understand the reasons and concepts pertaining to the usage of skin lightening products to hopefully start the movement of prevention and early cessation of use by women before any side effects and complications occur.

In Sudan a few studies have been conducted and reflect the magnitude of the problem.

In 2010, Yousif AK., et al. studied the use of bleaching creams containing Hydroquinone, Corticosteroids and Mercury for skin lightening among higher secondary school students in central Sudan. A cross-sectional epidemiological study was conducted at 19 different girls' schools. A total of 1187 young students aged 16 - 19 years old were randomly selected and approached, using a well-structured questionnaire. Results revealed that, 55.4% of the respondents misused this product, whilst 51.6% of girls used cosmetics to lighten their skin for 1 - 3 years with skin irritations prevalence of 3.3%, and the face was reported as main application site (35.4%). In conclusion, the lack of health awareness and ignorance was a main factor, and education, awareness and prescription restrictions were highly recommended [4].

Osama HM., et al. carried out a study in Khartoum State in April to May 2014 to assess the awareness of Sudanese women about using Hydroquinone and its probable risks. Data was collected via a questionnaire from 69 female participants. The results revealed that, highly using cosmetics containing Hydroquinone by women aged between 20 - 29 years (78.3%) as well as by those classified as single (69.6%). The results also showed that a high percentage of them was using it for skin lightening (65.2%). Consequently, (50.7%) of women have had sides effects, (44.9%) used more than one and (44.1%) used it regularly. The study can conclude that the awareness of Sudanese women about this was poor and needs to be raised [5].

A cross-sectional study was also conducted in 2017 by Ahmed AE and Hamid ME at the University of Gezira, Sudan, on the use of skin-whitening products among a sample of Sudanese undergraduate females (ages 16 - 33 years).

It was estimated that a majority (7 out of 10) of Sudanese undergraduate females have tried skin-whitening products. However, because the University population is an elite group, a population-based survey is warranted to address the use of skin-whitening products among the general population of Sudanese women [6].

International data is also available as strong evidence of this diverse practice.

A study conducted in West Africa and Canada in the year 2016 showed that, skin lightening products are types of cosmetics (creams, gels, lotions and soaps) applied voluntarily on skin. Several of these products contain a variety of active ingredients that are highly toxic. Among those toxic agents, the present study focuses on mercury, hydroquinone, and clobetasol propionate. Out of the 93 lightening soaps and 98 creams purchased in large city markets in sub-Saharan West Africa and in small ethnic shops in Canada, 68 - 84% of all creams and 7.5 - 65% of all soaps exceeded regulatory guidelines for at least one active ingredient when considering different regulations. Mercury was found in high concentrations mainly in soaps, while hydroquinone and clobetasol propionate concentrations exceeded US FDA standards in some creams for all countries included in our study. Concentrations of the three compounds declared on labels of soaps and creams usually did not correspond to concentrations actually measured, particularly for mercury and hydroquinone. Overall, these results indicate that most studied skin-lightening products are potentially toxic and that product labels are frequently inaccurate with respect to the presence of toxic agents [7].

A study that was conducted in the Caribbean in the year 2017 found that skin lightening is very popular among women and some men of the Caribbean, and its popularity appears to be growing. The lightening of skin color is done to produce a lighter complexion which is believed to increase attractiveness, social standing and improves one's potential of being successful [8]. All the samples analyzed contained significant amounts of Mercury and Arsenic and none of them can be considered safe for prolonged human use. The samples that contained Mercury levels which were lower than the USFDA limit contained Arsenic levels which exceeded the EU standard of 0.1 µg/g in cosmetics. The popularity of these skin lightening creams in the Caribbean region places the population at elevated risk of chronic Mercury and Arsenic poisoning and possibly acute Mercury Poisoning [8].

A study was conducted in Ghana in 2017 that found that the practice of skin lightening has been reported from North America, Europe, Asia, and Africa. In the literature, some prevalence rates exceed 50%, and both sexes are involved. Common agents used include hydroquinone, mercury, corticosteroids, and caustic agents. The agents are easily accessible and affordable with very little regulation. Cutaneous and systemic side effects occur but do not appear to be a deterrent, as the notion of light skin as a surrogate for beauty is strong. They concluded that the prevalence of skin bleaching was 50.3% in these communities, which is high considering the adverse effects from the practice. We recommend regulation of products by enforcing the law, more education, and a population prevalence study [9].

A study was conducted in 2018 by January J., et al. to explore the prevalence and beliefs around use of skin lighteners among female university students at the University of Zimbabwe. They conducted a descriptive cross-sectional survey to ascertain the prevalence and correlates of use of skin lightening creams. Among a sample of 138 female university students (mean age 22 years, SD = 1.73) who responded, the prevalence of use of skin lightening creams was 20%. Most of the women (83.3%) preferred lighter skin tone, and 93.3% perceived light skin as a symbol of beauty, 65% as a sign of wealth and 23.3% as symbolizing power [10].

A study that was conducted in a high school in Ghana in the 2018 found that the practice of skin lightening (SL) persists despite warnings about its harmful health effects. Adolescents are particularly vulnerable and at risk of prolonged use of SL products. The study concluded that the practice of SL among female students in this study is high, and about the same as reported among adults in Ghana and other parts of sub-Saharan Africa. This suggests that the practice is well entrenched. A ban on the sale of SL products to adolescents in Ghana should be considered [11].

A study that was conducted at a university in Saudi Arabia in 2018 found that, out of the 1626 students that responded, only 56 responded as they have used topical steroids on the face in the previous 5y. At least 189 had used one of the presented photos (which contained steroids) and 637 said that they did not know that they contained steroids. Sources of prescription included dermatologists, other doctors, pharmacists, friends and relatives, beauticians or saloon staff and others. Different recognized side effects were reported. Conclusion: Considerable number of university students use topical steroids on the face without knowing its nature. Additionally, Topical steroids are being prescribed and advised by non-medical personnel. Public awareness actions can be implemented to warn against the use of topical steroids without proper medical consultation [12,13].

All of these potentially life-threatening complications could be easily prevented if medical professionals started to regulate prescriptions of these products and also counseled patients on the misuse of such products and their harmful components. Moreover, if the society also started to celebrate different types of skin colors, the concept that 'black is beauty', rather than shame people into unrealistic views of beauty as to be fair skinned and force them into actions to fit into the narrow definition of beauty even if it costs them their health.

We hope this study will add to stress the seriousness of the problems caused by skin lightening products in Sudan and all over the world.

Objectives of the Study

We aimed to study the side effects and complications of skin lightening products used by females attending Khartoum Dermatology Teaching Hospital. We also looked to determine the frequency of use of skin lightening products, to identify the reasons behind their usage and to describe the most common side effects and complications afflicting patients.

Materials and Methods

This was an observational cross-sectional hospital-based study conducted at Khartoum Dermatology Teaching Hospital which is one of the largest and easily accessed dermatology hospitals in the center of Khartoum State, Sudan. It has a large array of patients present-

ing with the simplest to serious conditions as it is regarded as a tertiary referral center in the country. Female patients who attended the outpatient clinic between August 2019 to December 2019 were randomly interviewed and 240 were included in the study.

Data was collected using self-administered questionnaires which included questions structured to target the study objectives. Data was then computed using Microsoft Excel '17 and analyzed with statistical package for social science (SPSS23); Chi square test for significance was done and yielded data is presented in frequency tables and graphs.

Ethical consideration

Ethical clearance was obtained from the University of Medical Sciences and Technology Institutional Review Board, Khartoum State Ministry of Health Research Department and Khartoum Dermatology Teaching Hospital administration.

Results

Demographics of population studied

This study included 240 females with a mean age of 29.35 ± 10 SD. Marital status. There was almost equal subjective perception of skin color, 42.9% perceived their skin color as light and 57.1% as being dark (Table 1).

	Number	Percentage (%)	P-value
Age groups			
20 - 25			
25.1 - 30			
30.1 - 35			
Marital status			
Married	109	45.6	
Single	118	49.4	
Separated	8	3	
Widowed	5	2	
Perceived skin color			
Dark	137	57.1	
Light	103	42.9	

Table 1: Demographics of population studied.

Use of lightening products among the study population

The majority of females in this study used lightening products at some point in their lives; the prevalence was estimated to be (85.8%). Types of lightening product were also reported (topical creams, injections and tablets). The majority used topical creams (74.6%) and only a few used tablets (7.9%) and even less used injections (3.3%). Regarding the duration of usage, results showed that most of them used it for more than a year followed by those who used it for a period from a month to six months (26.7%, 23.3%) respectively. Moreover, they used it in an interrupted fashion (48.3%) (Table 2).

		Number	Percentage (%)	P-value
Using lightening products	Yes	206	85.8	
	No	34	14.2	
Type of products used	Creams	179	74.6	
	Tablets	19	7.9	
	Injections	8	3.3	
Duration of use	< 1 month	42	17.5	
	1 - 6 months	56	23.3	
	6 - 12 months	44	18.3	
	> 12 months	64	26.7	
Adherence to used product	Continuous	90	37.5	
	Interrupted	116	48.3	

Table 2: The prevalence of lightening products uses, types, duration and adherence to products among the study population.

Complications of lightening products among participants

Participants were asked about local side effects (redness, burning sensation, stinging, sensitivity to sun and acne). Out of the 206 who used lightening products, 172 reported complications (71.7%); redness and sensitivity to sun were the most reported side effects (53.3%, 50%) respectively, 39% had a stinging sensation (Table 3).

Local side effects list		Number	Percentage %
Redness	No	78	32.5
	Yes	128	53.3
Burning sensation	No	111	46.3
	Yes	95	39.6
Stinging sensation	No	141	58.8
	yes	65	27.1
Sun sensitivity	No	86	35.8
	yes	120	50.0
Acne	No	130	54.2
	Yes	76	31.7

Table 3: Frequency of local side effects among users of lightening products.

General side effects were reported in this study. The list included: nausea, weight gain, menstrual cycle disturbance, abnormal hair growth, and memory loss, numbness in hands and feet and muscle weakness. We did not include systemic side effects here. About 116 participants reported experiencing general side effects (48.3%). The majority (37.1%) reported weight gain, abnormal hair growth, menstrual cycle disturbances and nausea were reported among many as well (25%, 24.6%, 22.5%) respectively (Table 4).

General side effects list		Number	Percentage %
Weight gain	No	117	48.8
	Yes	89	37.1
Abnormal hair growth	No	146	60.8
	Yes	60	25.0
Menstrual cycle disturbance	No	147	61.3
	yes	59	24.6
Nausea	No	152	63.3
	yes	54	22.5
Memory loss	No	185	77.1
	Yes	21	8.8
Numbness	No	171	71.3
	Yes	35	14.6
Muscle weakness	No	172	71.7
	yes	34	14.2

Table 4: Frequency of general side effects among users of lightening products.

Table 5 illustrates the duration of use till the complications appeared. Most of the participants reported that they developed complications after a period of weeks and months of use (30.4%, 26.7%) respectively.

Duration till side effects appeared	Number	Percentage %	p-value
< 7 days	31	12.9	
7 - 30 days	73	30.4	
1 - 12 months	64	26.7	
> 12 months	38	15.8	

Table 5: Duration of use until appearance of side effects.

Type of lightening product in relation to side effects

Chi square test was used to study the relationship between type of lightening product and development of side effects with a level of significance below 0.05 at 95% CI.

Results showed that females who used lightening cream reported local side effects mainly (153 out of 179), in contrast to those who used tablets as they reported general side effects (16 out of 19); nevertheless, the relationship was not statistically significant (p value = 0.156, 0.077) for local and general side effects respectively (Table 6).

Variable		Type of lightening product			Number	r	P-value
		Cream(n = 179)	Injection (n = 8)	Pills (n = 19)			
Local side effects	Present	153	5	14	172	3.720	0.156
	Absent	26	3	5	34		
General side effects	Present	97	3	16	116	8.426	0.077
	Absent	81	5	3	89		

Table 6: Type of used lightening product (cream, injection and pills) in relation to developing side effects (local and general). *r for likelihood ratio.

Reasons behind usage of lightening products

In this study we tried to identify the main reasons for usage of lightening products, we provided the participants with a list of reasons; the list included the following statements: I want to look prettier, friends/family use lightening products, society pressure, I want to get married and none of the above. They were allowed to tick more than one answer. The majority used lightening creams to look prettier (50.4%), followed by girls who used out of society pressure (22.5%). a minority of 10% claimed to use lightening cream in order to get married (Table 7).

List of reasons	Number	Percentage %
Want to look pretty and beautiful	121	50.4%
friends / family use lightening products	43	17.9%
Social pressure	54	22.5%
Preparation for marriage	26	10.8%
None of the above	28	11.7%

Table 7: Reasons for usage of lighting products among study population.

Discussion

Lightening products are becoming a major health problem. In this study the prevalence of lightening products use was extremely high (85.8%); this is higher than all the reviewed studies that stated a prevalence ranging from 27 to 77% in Africa, Europe, North America, and Asia among community samples [1]. Perhaps because this study was carried out in a dermatological center and some of the participants were there because of lightening products side effects while the reviewed were community-based studies among apparently healthy individuals.

Many types of lightening products have been identified; topical creams are the comments type mentioned in the literature. In a study conducted in Saudi Arabia in 2018 among university students, out of the 1626 students that responded, 56 reported uses of topical steroids on the face in the previous 5y [5]. In this study the majority used creams (179 out of 206); that can be attributed to the fact that

creams and topical products in general are more accessible and cheaper and they seem harmless when compared to injection and pills. Nevertheless, topical products are harmful as; 68 - 84% of all creams and 7.5 - 65% of all soaps exceeded regulatory guidelines and they contained hydroquinone and clobetasol propionate concentrations exceeded US FDA standards, it is worth mentioning that these substances were not listed in the product leaflet [5]. This study also shed light on other types that have different root of administration; injection and pills. Although only a minority used them, pills and injections are considered health concern as much as creams, putting in mind the local side effects injections can cause in the needle site.

Complications and side effects of lightening products depends on the active ingredient in the product and the duration of use. For example, Caribbean region residents are at elevated risk of chronic Mercury and Arsenic poisoning and possibly acute Mercury Poisoning because the most used lightening products there contain higher percentages of mercury and arsenic [4]. A study among 1000 adults; (61.2%) of them used steroid containing creams. The duration of the usage of these creams varied from 1 day to 10 years. Around 383 (62.5%) had used these creams for a duration varying from 1 week to 3 months. One hundred and seven (17.4%) patients had used these creams from 3 months to 2 years. On the contrary, most of the females in this study used lightening product for more than a year, and the use was in an interrupted fashion mainly. While in this study 71.7% experiences local side effects and 48.3% reported general complications, another study reported side effects among only (51.9%) of the participants who used topical steroids they listed aggravation of symptoms, increased pigmentation, pimples, redness and irritation. Some added striate, patches and burning sensation. This was similar to our study as the main reported local side effects included redness, sun sensitivity and burning sensation; the only difference is that acne was reported less in our study. This study screened for general side effects as well; weight gain, abnormal hair growth and menstrual cycle disturbance were the most reported general complications. It is worth mentioning that this study concluded that all lightening products can cause complications equally whether they were topical creams, pills or injections (p value > 0.05).

Reasons behind using lightening products can vary from self-doubts and insecurities to family advice or society pressure. In this study, half of the participants claimed that they used these products to look prettier as a lighter skin color is equal to better looking in many cultures [4] and the majority in this study think they have a dark skin color; society pressure and family and friend's advice has their effect as well. One of the limitations in this study that is done in a dermatological clinic; perhaps better results would've been yielded if it was community based. Another limitation is that bleaching cream is considered a stigmatizing issue, some participants with clearly visible side effects would not admit to the use of any skin lightening products due to feelings of embarrassment and perhaps a private interview with the subject as part of a qualitative study would make us understand them more.

Conclusion

In conclusion, the prevalence of skin lightening products use was found to be high in this study especially topical creams; the majority used it for considerably a long period in an interrupted fashion. The main reasons were to look prettier and the influence of family and friends. Moreover, local complications were reported more than general and they were likely to appear after weeks of use. Lightening products have the same ability to cause complications regardless to the route of administration.

Authors Contribution

The main author, Dr. Asjad, drafted the main idea, proposal and questionnaire, as well as the literature review, and data presentation. The second author, Dr Shamad, supervised the whole process and work. Dr. Sulaf revised the scientific writing and final editing. Both first and third authors reviewed the manuscript and approved the final version.

Conflict of Interest

None of the authors have any conflict of interest.

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