Original Research

Skin lightening practices, beliefs, and self-reported adverse effects among female health science students in Borama, Somaliland: A cross-sectional survey

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Abstract

Background: Skin-lightening (SL) products are common, especially in Africa. Adverse effects from these products represent a public health concern. Use of these products in Somaliland is unknown.

Objective: This study aimed to determine the prevalence of use of SL products among female health science students, beliefs about these products and practices, and adverse effects experienced.

Methods: This was a cross-sectional survey of a convenience sample of female health science students at Amoud University in Borama, Somaliland.

Results: Of the 400 students who were invited to participate, 265 completed the survey (response rate: 66%). Mean participant age was 21.1 years (standard deviation: 2.0 years). The majority of students were single (91.2%) with a Fitzpatrick skin type of 3 or darker (94.2%). Past or present use of SL products was reported by 25.6% of participants, and 52.2% admitted to current use. Compared with non-users, more SL product users agreed that lighter skin color gives a woman more confidence, helps a woman have better job opportunities, and increases chances of getting married. They also agreed that advertisements on television for SL products influence a women’s preference for a lighter skin tone (p < .05). More than 60% of participants were unsure what active ingredients were in their SL products. Only 9% denied any undesirable adverse effects, and the remainder reported an array of local and systemic adverse effects. The vast majority realize that SL products may cause undesirable local (92%) and systemic (89%) adverse effects.

Limitations: Generalizability is limited because a nonrandomized convenience sample from one university was studied. Response bias also may have skewed results.

Conclusion: Use of SL products among female health science students in Somaliland is common, and causes cutaneous and systemic adverse reactions. Use appears influenced by beliefs about the benefits of lighter skin color. Education is needed on the proper use of these products, how to avoid harmful products, and how to prevent complications.

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Introduction

Skin lightening (SL), also known as skin bleaching and skin whitening, involves the use of topical products that contain corticosteroids, hydroquinone, mercury, and/or a variety of other agents to attain a lighter skin color. The motivation for SL may be to treat a pigmented disorder, such as melasma, but is often simply for cosmetic enhancement.

The cosmetic use of SL products is common in Africa, Asia, and many other parts of the world. A recent meta-analysis reported a global pooled lifetime prevalence of use of skin bleaching agents of 27.7%, and Africa specifically had an estimated prevalence of 27.1%. The authors warned that these results represent a serious global public health problem and stressed the need for epidemiologic studies in underrepresented regions (Sagoe et al., 2019).

Numerous cutaneous adverse effects (e.g., atrophy, striae, telangiectasias, acne vulgaris, allergic and irritant contact
dermatitis, hirsutism, hypertrichosis, perioral dermatitis, steroid rosacea, dyschromias, ochronosis, and infections) and even systemic complications (e.g., Cushing’s syndrome, diabetes, hypertension, and ocular changes [cataract and glaucoma]) have been associated with the use of these products (Ajose, 2005; Dadzie and Petit, 2009; Giudice and Yves, 2002; Ladizinski et al., 2011; Lu et al., 2010; Mahé et al., 2003, 2007; Mistry et al., 2011; Petit et al., 2006; Vashi et al., 2018). Even if consumers are educated on and advised to avoid potentially harmful components of SL agents, the packaging of SL products is often misleading (Petit et al., 2006).

With the increase in travel and immigration, patients with adverse effects from SL agents can present to health care professionals worldwide. Furthermore, unregulated SL products are accessible in many countries worldwide, including in North America and Europe (Mistry et al., 2011).

To our knowledge, studies have not been published on the use of SL in greater Somalia or Somaliland (self-governing region in northwestern Somalia). The importation and sale of SL products has been banned or strongly regulated in many African, Asian, European, and North American countries, but we are not aware of any such regulations by the government or other agencies in Somaliland (Sagoe et al., 2019). As such, there are few barriers to the widespread use of SL in this population.

Borama, a city in western Somaliland, is home to Amoud University. At the outpatient dermatology clinic within the family medicine residency program at a regional hospital affiliated with Amoud University, we frequently see patients with complications from the cosmetic use of SL products. Health care professionals and members of the local community widely believe that the use of these products is extremely common in the female population of Borama, although many women seem reluctant to report use. SL products are readily available and relatively inexpensive without a prescription in cosmetic shops, pharmacies, and supermarkets.

At the outset of a public education campaign about the potential dangers of SL products in Borama, our program sought to collect data on SL use in the local population. Enlisting the assistance of health care professionals in this educational initiative is imperative; thus, we believed surveying health care professionals about their own personal use of and beliefs about SL products would be informative because they may be expected to counsel patients on the potential benefits and harms of these products in the future. Specifically, we sought to determine the prevalence of female students who use or have used SL products, their beliefs about SL products and practices, and the specific adverse effects experienced.

We hypothesized that the cosmetic use of SL products and associated complications are common among female health science students at Amoud University. We further hypothesized that underlying, firmly held beliefs about skin color perpetuate this practice despite awareness of potential adverse effects.

Methods

The Institutional Review Board at Amoud University School of Postgraduate Studies and Research approved this cross-sectional survey study. A 44-question multiple-choice survey was created by the researchers. Item types included demographic parameters, beliefs regarding lighter skin color, and the use of SL products. Fifteen of the items used Likert scales. To establish content validity, an expert in pigmentary disorders was asked to review the survey, which was refined accordingly. Face validity was also sought through a pilot study with 15 female public health students from a local private university. Subsequently, the survey was modified for clarity based on evaluation of the results and feedback from participants.

Two of the authors (N.M. and J.M.) visited two cosmetic stores, two pharmacies, and two supermarkets in the main market area of Borama and asked to see what SL products were available. Fifty-six products were identified and purchased, including 12 containing clobetasol.

Photographs were taken of the products, and a large poster board was created showing each product. This was used as an aid for the participants for the question that asked what SL products they have used/are using (Fig. 1). Another poster board was
constructed showing a photograph of various local and systemic adverse effects, numbered in order of the question on the survey that asked “What undesirable side effects have you personally experienced?” Both poster boards were used for all surveys.

The study took place at Amoud University College of Health Sciences in Borama, Somaliland. The eligibility criteria included female students at this university, aged ≥18 years, who wished to participate in the study. Men were not eligible to participate because the study focused on women. Approximately 400 female students from all faculties (i.e., dentistry, laboratory, medicine and surgery, midwifery, nursing, pharmacy, and public health) were invited to participate in a voluntary survey about SL on 3 days between November 29 and December 3, 2018. The surveys took place in a classroom on campus. After providing written consent, 265 participants (response rate: 66%) completed the self-administered anonymous questionnaire. Both the consent form and questionnaire were in Somali (originally written in English and translated into Somali).

The statistical analyses were performed in SAS, version 9.4, with descriptive statistics applied to all survey items by frequency and percentage for categorical variables and summary statistics for numerical variables. The comparison between Yes and No for SL-ever-used was carried out by the parametric (analysis of variance, \( \chi^2 \)) or non-parametric (Fisher’s exact, Kruskal-Wallis) tests wherever appropriate upon assumption checks.

### Results

Three participants were excluded at the beginning of the data analysis because of incorrectly completing the survey. Therefore, 262 participants were included in the data analysis, and 67 participants (25.6%) reported that they had ever used SL products.

The demographic data are summarized in Table 1. The mean participant age was 21.1 years (standard deviation [SD]: 2.0 years; range, 18–30 years). There was no significant difference (20.7 vs. 21.2; \( p = .123 \)) in age between those who reported using SL products and those who reported no use. The vast majority of participants were single (91.2%). Most participants were from Borama (73.7%), and the remainder were either from other locations in Somaliland (12.2%) or were not from Somaliland (14.1%). No significant difference (23.5% vs. 26.2%; \( p = .696 \)) was detected in SL use between those who had and had not lived outside of Somaliland. Fitzpatrick type 4 skin type was the most common (60.8%), and

| Survey item | Level | Total n = 262 | Have you ever used any skin-lightening products? |
|-------------|-------|--------------|-----------------------------------------------|
| Age, years  | Mean (standard deviation) | 21.1 (2) | 21.2 (2.1) | 20.7 (1.8) | 0.123 |
| Marital status | Median (range) | 21 (18–30) | 21 (18–25) | 0.044 |
| Where from  | Married | 23 (8.8) | 19 (7.4) | 4 (5.97) | 0.346 |
|  | Single | 239 (91.2) | 176 (90.26) | 63 (94.03) |
|  | Borama | 193 (73.7) | 148 (75.9) | 45 (76.17) | 0.340 |
|  | Awdal, Marodigeex, Saahil, Togdheer, Sanag, Sool | 32 (12.2) | 21 (10.77) | 11 (16.42) |
| Lived in a country outside Somaliland for >1 year? | No | 210 (80.5) | 155 (73.8) | 55 (26.2) | 0.696 |
|  | Yes | 51 (19.5) | 39 (67.5) | 12 (23.5) |
| Fitzpatrick skin type before using any products? | 6 | 25 (9.8) | 22 (11.7) | 5 (4.48) | 0.448 |
|  | 5 | 22 (8.6) | 15 (7.98) | 7 (10.45) |
|  | 4 | 155 (60.8) | 114 (60.4) | 41 (61.19) |
|  | 3 | 38 (14.9) | 25 (13.3) | 13 (19.4) |
|  | 2 | 7 (2.7) | 6 (3.19) | 1 (1.49) |
| Lighter skin color makes a woman look younger. | No | 37 (14.1) | 26 (13.33) | 11 (16.42) |
|  | Yes | 210 (80.5) | 155 (73.8) | 55 (26.2) |
| Lighter skin color implies that a woman belongs to a high social class. | Neutral | 84 (32.2) | 67 (34.54) | 17 (25.37) |
|  | Agree | 87 (33.3) | 64 (32.99) | 23 (34.33) |
| Lighter skin color helps a woman have better job opportunities. | Neutral | 164 (62.6) | 131 (67.18) | 33 (49.25) |
|  | Agree | 31 (11.8) | 24 (12.13) | 7 (10.45) |
| Lighter skin color makes a woman look younger. | Neutral | 67 (25.6) | 40 (20.51) | 27 (40.3) |
|  | Agree | 209 (80.1) | 161 (82.56) | 48 (72.73) | 0.216 |
| Lighter skin color gives a woman more confidence. | Neutral | 19 (7.3) | 12 (6.15) | 7 (10.61) |
|  | Agree | 33 (12.6) | 22 (11.28) | 11 (16.67) |
| Lighter skin color helps a woman have better job opportunities. | Neutral | 203 (78.1) | 157 (80.93) | 46 (69.2) |
|  | Agree | 37 (14.2) | 22 (11.34) | 15 (22.39) |
| Lighter skin color increases a woman's chances of getting married. | Neutral | 220 (84.0) | 171 (87.69) | 49 (73.13) | <0.001 |
|  | Agree | 17 (6.5) | 14 (7.18) | 3 (4.48) |
| Lighter skin color makes a woman look younger. | Neutral | 177 (67.8) | 138 (70.77) | 39 (59.09) | 0.022 |
|  | Agree | 28 (10.7) | 23 (11.79) | 5 (7.58) |
| Lighter skin color makes a woman look younger. | Neutral | 56 (21.5) | 34 (17.44) | 22 (33.33) |
|  | Agree | 100 (38.2) | 81 (41.54) | 19 (28.36) |
| Lighter skin color gives a woman more confidence. | Neutral | 24 (9.2) | 18 (9.23) | 6 (8.96) |
|  | Agree | 138 (52.7) | 96 (49.23) | 42 (62.69) |
| Lighter skin color helps a woman have better job opportunities. | Neutral | 66 (25.2) | 57 (29.23) | 9 (13.43) | 0.015 |
|  | Agree | 16 (6.1) | 9 (4.62) | 7 (10.45) |
| Lighter skin color makes a woman look younger. | Neutral | 180 (68.7) | 129 (66.15) | 51 (76.12) |
94.2% of participants had type 3 skin type or darker. There was no significant difference ($p = .448$) in skin types between those who reported using SL products and those who reported no use.

With regard to beliefs about lighter skin color, in comparing SL users with non-users, more SL users agreed that a lighter skin color gives a woman more confidence (40.3% vs. 20.5%; $p = .006$), helps a woman have better job opportunities (22.4% vs. 5.1%; $p < .001$), and increases a woman’s chances of getting married (33.3% vs. 17.4%; $p = .022$) and that advertisements on television for SL products influence a woman’s preference for lighter skin tone (76.1% vs. 66.1%; $p = .015$). More SL users than non-users also thought that a lighter skin color makes a woman look younger (16.7% vs. 11.3%) and implies that a woman belongs to a high social class, and that men consider women with a lighter skin color more beautiful (22.7% vs. 11.3%), but these differences did not reach statistical significance. Interestingly, 21 of participants (8%) have a family member who owns a business that sells SL products.

In Table 2, the survey items for the 67 SL users (25.6%) are summarized. More than half of SL users (52.2%) admitted to current use of SL products. The average age when use was initiated was 17.1 years (SD: 2.5 years), and the mean number of years of product use was 3.4 years (SD: 2.2 years). Just over half of SL users (52.3%) answered that no one had encouraged them to use SL products, a third (35.4%) said that friends had encouraged them, and fewer SL users (12.3%) were encouraged by family members. The majority of SL users purchased the products at a supermarket.

| Survey item                                                                 | Level       | Total n = 262 | No n = 195 | Yes n = 67 | p-value |
|-----------------------------------------------------------------------------|-------------|---------------|------------|------------|---------|
| Family owns a business that sells skin-lightening products                   | No          | 222 (85.1)    | 168 (86.15)| 54 (81.82) | 0.642   |
|                                                                             | Yes         | 21 (8.0)      | 14 (7.18)  | 7 (10.6)   |         |
|                                                                             | Not sure    | 18 (6.9)      | 13 (6.67)  | 5 (7.58)   |         |
| Skin-lightening products may cause undesirable side effects for the skin.   | Disagree    | 18 (6.9)      | 16 (8.21)  | 2 (2.99)   | 0.028   |
|                                                                             | Neutral     | 4 (1.5)       | 1 (0.51)   | 3 (4.48)   |         |
|                                                                             | Agree       | 240 (91.6)    | 178 (91.28)| 62 (92.54) |         |
| Skin-lightening products may cause undesirable side effects to the inside   | Disagree    | 22 (8.5)      | 16 (8.33)  | 6 (8.96)   | 0.569   |
|                                                                             | Neutral     | 7 (2.7)       | 4 (2.08)   | 3 (4.48)   |         |
|                                                                             | Agree       | 230 (88.8)    | 172 (89.58)| 58 (86.57) |         |

Table 1 (continued)
Many SL users (34.8%) chose their particular SL product based on the advice of a friend, and fewer took advice from a cosmetic store, pharmacist, or physician. When asked for the reason for using SL, about half of SL users (51.6%) said they had a pigment disorder, such as melasma, 38.7% prefer a light skin color, and 9.7% reported both reasons. Most participants reported using only one product at a time, but 35.9% of participants reported using two or more products at a time. The mean number of products used was 1.5 (SD: 0.8). Half of SL users (50.8%) apply their product(s) once a day or more. Most apply the product to the face only (84.4%), and the remainder apply the products to various parts of the body in addition to the face.

The majority of SL users (61.7%) were unsure what active ingredients were in their SL products. Active ingredients reported included clobetasol, betamethasone, vitamin C, hydrogen peroxide, alpha-hydroxy acids, aleosin, tretinoin, vitamin A, calomel and ammoniated mercury chloride, and sunscreen.

Most participants (70.3%) spent less than U.S. $3 monthly on SL products, 18.5% spent U.S. $3 to $5, and 10.9% spent U.S. $6 or more. The gross domestic product per capita is estimated at U.S. $347 (per year) by the World Bank (The World Bank, 2014). The most commonly self-reported undesirable side effects from use of SL products were skin atrophy, acne vulgaris, allergic contact dermatitis, and inability to cook due to skin irritation (Table 3).

Of the 56 SL products purchased at the market by the authors, 22 listed a corticosteroid as one of the main ingredients, of which 12 were clobetasol. Five products listed hydroquinone, and no products listed mercury-related agents. Twenty products listed sunscreen as one of the ingredients, and all but two of these products listed other SL agents in addition to sunscreen. Two products did not list any ingredients. Other commonly listed agents included kojic acid, vitamin A, ascorbic acid, niacinamide, and licorice extract. Many different SL products are/were used by the participants (Table 4).

Most SL users (62.6%) thought stopping use of SL products would be somewhat or very easy, and 21.9% thought it would be somewhat difficult or very difficult. About half of current SL users (52.3%) plan to stop using SL products in the future. When asked who has talked with them about stopping their use of SL products, most (60.0%) said no one, but 20.0% said their mothers or another family member and 16.9% said their doctors or another health care professional. Of all participants, 91.6% agreed that SL products may cause undesirable side effects for the skin, and 88.8% agreed that SL products may cause undesirable side effects to the inside of the body.
### Table 3
Self-reported undesirable side effects from use of skin lightening products.

| Side effect                  | n = 67 (%) |
|------------------------------|------------|
| Skin atrophy                 | 7 (10.4)   |
| Acne vulgaris                | 4 (5.9)    |
| Allergic contact dermatitis  | 4 (5.9)    |
| Unable to cook due to skin irritation | 4 (5.9) |
| Impaired wound healing       | 3 (4.5)    |
| Flushing, redness of the skin| 3 (4.5)    |
| Erythroderma                 | 3 (4.5)    |
| Hypopigmentation             | 2 (2.9)    |
| Striae                       | 2 (2.9)    |
| Hypertrichosis               | 1 (1.5)    |
| Ochronosis                   | 1 (1.5)    |
| Telangiectasias              | 1 (1.5)    |
| Excessive weight gain        | 1 (1.5)    |
| Mental problems              | 1 (1.5)    |
| Kidney damage                | 1 (1.5)    |
| Peripheral neuropathy        | 1 (1.5)    |
| High blood pressure          | 1 (1.5)    |

*Participants could select >1 side effect. Six participants (8.9%) reported that they had no undesirable side effects.

### Table 4
Products and main skin-lightening ingredients.

| Skin-lightening products used by participants | Main skin-lightening ingredient(s) |
|----------------------------------------------|-----------------------------------|
| White Express                                | Clobetasol                        |
| Moovate Cream                                | Clobetasol                        |
| Dermoquin 2% cream                           | Hydroquinone                      |
| Carotone                                     | Hydroquinone                      |
| Faiza Beauty Cream                           | Kojic acid, vitamin A, zinc oxide |
| Perfect White                                | Alpha hydroxy acid, kojic acid,   |
|                                              | titanium dioxide                  |
| Anea Gold Beauty Cream                       | None listed                       |
| Noor herbal Beauty Cream                     | Arbutin, kojic acid, licorice extract, vitamin A |
| Layla Beauty Cream                           | Kojic acid, titanium dioxide      |
| Fairness Cream – Paris collection            | Niacinamide, methoxyccinnamate    |
| Fair and Lovely                              | Titanium dioxide                  |
| Natural Face Beauty Cream                    | Ascorbic acid, vitamin A          |
| Chandni Whitening Cream                      | None listed                       |
| Brown Cream face                             | Unknown*                          |
| Golden                                       | Unknown*                          |

*Handwritten in the Other category by survey responders; therefore, the packaging was not available to determine ingredients.

### Discussion

To our knowledge, this is the first published report on the use of SL in Somaliland. Our results indicate that the use of SL products among female health science students is common and close to the high global and African prevalence as reported by Sagoe et al. (2019); 25.6% vs. 27.7% vs. 27.1%, respectively.

A variety of cutaneous and systemic adverse reactions were reported by participants. SL use in this population may be influenced by certain beliefs, including that a lighter skin color gives a woman more confidence, helps her have better job opportunities, and increases her chances of getting married. Although many participants who have used SL products use them to treat pigmentation disorders, more than one-third used them only to achieve a lighter skin color in the absence of a pigmentation disorder. The vast majority of participants, including those who have used SL products, realize that SL products may cause undesirable local and systemic adverse effects.

Specific education for consumers is needed on the proper use of SL products, how to avoid harmful products, and how to prevent complications. Additionally, health care professionals, including pharmacists who dispense SL products, need to be educated on local SL practices and the numerous potential complications associated with misuse of SL products (particularly those that contain corticosteroids and hydroquinone). This training will help health care professionals identify adverse effects, provide counseling, and recommend safe and effective alternative treatment options, including high-quality and affordable sunscreen.

Interestingly, 8% of participants have family members who own a business that sells SL products. Health care professionals with family members who sell SL products may be a special target for education.

Several years ago, a workshop was held in neighboring Nairobi, Kenya, where 80 delegates and experts deliberated on the issue of SL and produced important recommendations that bear repeating, given the results of our study (Table 5; Dlova and Ajose, 2014).

### Conclusion

The current study offers a novel look at SL in Somaliland and provides the impetus for a public education initiative and further studies targeting the general population.

### Table 5
Workshop recommendations.

- All Ministries of Health in Africa should embark on advocacy programs to educate their citizens on the dangers of using skin-bleaching cosmetics.
- All relevant African government agents should take appropriate steps to restrict access to bleaching products that contain hydroquinone, mercury, phenol, resorcinol, and all forms of corticosteroids.
- All governments should implement strict measures to remove all known skin-bleaching cosmetics from over-the-counter shelves.
- Education of the youth about the dangers of skin lighteners should target schools and other youth programs.
- Heavy penalties should be levied on companies that continue to manufacture the implicated products.
- Advertisements that promote fair skin as a symbol of beauty and use fair-skinned models to promote cosmetics that target the black market should be restricted or at least discouraged.
- The media should be used to create awareness about the dangers of skin bleaching (e.g., television, radio, newspapers, magazines) to all African women and men.

Source: Dlova and Ajose (2014).
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Conflict of Interest

None.

Funding

None.

Study Approval

The authors confirm that any aspect of the work covered in this manuscript that has involved human patients has been conducted with the ethical approval of all relevant bodies.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijwd.2019.08.006.

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