



Original Research

Skin-lightening patterns among female students: A cross-sectional study in Saudi Arabia

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ABSTRACT

Background: Skin-lightening products (SLPs) are commonly used worldwide, and their improper use and overuse is becoming a burden on health care workers, including dermatologists.

Objective: This study aimed to determine the characteristics, determinants, preferences, and side effects of the use of SLPs among Saudi female students and their association with mental health.

Methods: A cross-sectional analytic study, using a self-administered prevalidated questionnaire, was conducted among female students in the Aljoud region of Saudi Arabia. We used the consecutive nonprobability sampling technique to recruit participants. The questionnaire contained demographic data, two questions about knowledge of SLPs, eight questions regarding perceptions of fair skin, and three proxy scales for mental health (depression, posttraumatic stress disorder, and Internet addiction).

Results: The mean age of the participants (\pm standard deviation) was 29 ± 9.6 years. Of the 760 responders, 427 (56.2%) used SLPs; all were women with relatively light skin (types III–V). There was a unanimous positive perception of lighter skin tone among women. The participants used skin-lighteners for cosmetic and medical conditions (67.2% and 17.5%, respectively). The practice was significantly associated with poor mental health status, poor level of knowledge, and lower sociodemographic status ($p < .05$).

Conclusions: The use of SLPs is highly prevalent among Saudi female students. Users believe that fairer skin is associated with beauty and social advantage. Female students with a lower economic status and poor mental health are more prone to overuse SLPs. A need exists for targeted public health campaigns to raise public awareness about uncontrolled skin lightener usage.

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Introduction

Lightening of the skin complexion through the use of chemical compounds has been practiced since ancient times. Although it is a common practice particularly among dark-skinned women of African ethnicity, skin lightening is increasingly common among fair-skinned women who look to tone their skin complexion (de Souza, 2008).

There is a misconception across many cultures that fairer skin is associated with beauty and a higher social status, and product overuse and misuse may stem from this preconception (Hamed et al., 2010). Furthermore, several reports associate skin-lightening product (SLP) overuse with poor mental health status, depressive symptoms, and trauma symptoms (Peltzer and Pengpid, 2017).

Although many of the active ingredients used in SLPs are of unknown origin, the most common pharmacologic compounds are

hydroquinone, mercury, and steroids (Dlova et al., 2012; Nnoruka and Okoye, 2006). Although the use of mercury is prohibited in many countries, numerous studies worldwide confirm the presence of mercury in SLPs. Indeed, many SLPs sold in affluent countries reportedly contain toxic amounts of heavy metals and mercury, exceeding the U.S. Food and Drug Administration's acceptable limit of one part per million (ppm). In reality, the use and marketing of SLPs in affluent countries is relatively unregulated, and consumers are frequently unaware of the potential side effects of SLP misuse or abuse (Al-Saleh et al., 2003, 2005). Previous reports demonstrate a plethora of complications, ranging from eczema to nephrological, neurological, and developmental complications that are either induced or aggravated by SLP misuse (Mahé et al., 2003, 2005).

There is a paucity of studies on the social and psychological dimensions of SLPs consumption and on the determinants and extent of use. In the current study, we investigate skin-lightening

Table 1
Sociodemographic characteristics of study participants

Characteristic	n (N = 760)
Age (y)	
<20	117
20–25	391
>25	252
Marital status	
Married	151
Single	609
Skin tone	
Light	236
Light brown	372
Dark brown	152
Skin type	
Dry	324
Oily	141
Combination	295
Monthly income	
<2000 SR*	57
2000–5000 SR*	479
>10000 SR*	195
>20000 SR*	29

* 3.74 Saudi Riyals = 1 U.S. Dollar.

practices among female students and provide insights that can inform targeted interventions. Ultimately, the aim is to educate consumers of the risks inherent to SLPs use and, in the process, to curb the prevalence of potential long-term effects.

Methods and participants

We conducted a cross-sectional analytic study at the educational institutes of Northern Saudi Arabia (Jouf University and Northern Border University) from October 2017 to April 2018 to determine the knowledge, practices, and perceptions surrounding SLP use among Saudi female students. The medical ethics committee of the College of Medicine at Jouf University approved the study proposal.

The calculated sample size was 801, assuming usage of SLPs among 20% of female students at a 2.5% margin of error and 95% confidence level. We included all female students between the ages of 18 and 30 years who were enrolled in any university course and willing to participate. Using nonprobability consecutive sampling, we distributed 825 self-administered questionnaires with a cover letter among the target population. The cover letter explained the objectives, measures for confidentiality of personal data, and voluntary nature of the study. Of the 825 questionnaires

distributed, 760 students filled out the questionnaire completely (response rate: 92.3%).

Questionnaire

The self-administered questionnaire had three sections. In the first section, we collected demographic data on the respondents. The second section was related to knowledge and practices of SLP use and perception about fair skin. The third section was designed to measure the mental health of the participants. We assessed the knowledge of the respondents with two questions about harmfulness and active ingredients of SLPs. We also assessed the skin-lightening practices of the respondents with the following two questions: "Have you ever used SLPs?" and "How often have you used SLPs in the past year?"

We measured perceptions of lighter skin tone with a validated eight-question tool developed by Hamed et al. (2010). The questionnaire measured the domains of beauty, self-esteem, youthfulness, social class, employment, marriage, attractiveness, and media influence on a five-point Likert scale. The perceptions of the respondents depicted the relative effect of lighter skin tone.

We measured the mental health of the respondents with three proxy scales (depression, posttraumatic stress disorder [PTSD], and Internet addiction) using already validated tools. For the assessment of depressive symptoms, we used the 10-item Centre for Epidemiologic Studies Depression Scale (Andresen et al., 1994). Moderate and severe depressive symptoms were classified with a score of ≥ 10 . Participants were also probed for PTSD using Breslau's seven-item screener. Participants were identified as having a positive screen for PTSD if they scored ≥ 4 during the last 4 weeks (Kimerling et al., 2006). For pathological Internet use/Internet addiction, we used the validated eight-item Young Diagnostic Questionnaire for Internet Addiction (Young, 1998). Participants were considered pathologic users if they scored ≥ 5 using the eight-item yes-or-no questions.

Data analysis

Data were analyzed using the Statistical Package for Social Sciences, version 22.0 (SPSS Inc, 2012, Chicago, IL). Mean and standard distribution were calculated for continuous variables, such as age. For categorical variables, frequency and percentages were used. The χ^2 test was used to analyze the differences between frequencies in the different groups, and multivariate logistic regression tests were fitted. A *p*-value of $< .05$ was considered significant.

Table 2
Knowledge and perception of skin lightening among users versus nonusers

Variable	Totaln (%)	SLP usersn (%)	Nonusersn (%)
Knowledge			
1. The use of SLPs can harm the skin	276 (36.3)	211 (49.4)*	65 (19.5)
2. Knows the active ingredients in SLPs	176 (23.2)	104 (24.4)	72 (21.6)
Perception			
1. A lighter skin tone is more beautiful	525 (69.1)	332 (77.7)†	193 (57.9)
2. Lighter skin tone provides higher self-esteem	294 (38.7)	168 (39.4)†	126 (37.8)
3. Lighter skin tone gives a younger look	451 (59.3)	279 (65.3)†	172 (51.6)
4. Lighter skin tone implies that one belongs to a high social class	536 (60.5)	308 (52.1)†	228 (68.5)
5. Lighter skin tone helps people to get a better job opportunity	328 (33.1)	215 (50.4)†	113 (33.9)
6. Lighter skin tone increases one's chances of getting married	311 (40.9)	167 (39.1)‡	144 (43.2)
7. People consider lighter skin tone more beautiful	448 (59)	268 (62.8)*	180 (54)
8. The way SLPs are advertised on TV or Internet has an influence on one's preference of lighter skin tone	345 (45.4)	247 (57.9)†	98 (29.3)

Abbreviations: SLP = skin-lightening product

* *p* < .05† *p* < .001‡ *p* < .01

Table 3
Practice of skin lightening

Variable	n (%)
Skin lightening prevalence	427 (56.2)
Skin lightening use (in past 12 mo)	
1–10 times	207 (48.4)
> 10 times	197 (46.1)
Never	23 (5.3)
Reasons of skin-lightening practice	
Lighter skin tone	287 (67.2)
Hyperpigmentary disorder	75 (17.5)
Both	65 (15.2)
Method of skin lightening*	
Injection	1 (0.2)
Pills	9 (2.1)
Serum	169 (39.5)
Cream	194 (45.4)
Soap	109 (25.5)
Active ingredient within skin-lightening product*	
Gluthianone	6 (1.4)
Anti-oxidant (Vitamin C)	70 (16.4)
Kojic acid	21 (4.9)
Hydroquinone	193 (45.2)
Steroids	26 (6.1)
Mercury	49 (11.5)
Kligman formulation (hydroquinone, tretinoin, and hydrocortisone)	79 (18.5)
Faced a problem*	
Redness/itch	125 (29.3)
Discoloration	50 (11.7)
Color returns to normal	129 (30.2)
Eczema	26 (6.1)
Satisfied with current skin-tone	87 (20.37)

* Not mutually exclusive.

Results

In the present study, 56.2% of female students reported SLP usage among 760 respondents (mean age \pm standard deviation [SD]: 23.6 \pm 3.4 years; range: 18–30 years). A total of 372 respondents (62%) had a light brown skin tone, and 152 respondents (39.3%) had a light skin tone. The sociodemographic characteristics of the study participants are presented in Table 1. Only 36.3% of participants believed that SLPs could pose a harm to the skin. One fourth of SLP users and nonusers were unaware of the active ingredients in the product (Table 2).

Many respondents believed lighter skin is associated with beauty, youthfulness, and social advantage (69.1%, 59.3%, and 60.5%, respectively). Respondents reported media influence with regard to perception of a lighter skin tone (Table 2). With regard to skin-lightening practices in our study population, we found that SLPs are used specifically to attain a lighter skin tone. Many users were dissatisfied with their current skin tone as the color of the skin had returned to normal because of ineffective regimens (Table 3). (See Table 4.)

After adjusting for several confounders in the multivariate regression analysis, we found poor mental health status (episodes of depression, presence of PTSD syndrome, and pathologic Internet use) to be associated with skin-lightening use. Furthermore, knowledge of harmfulness and active ingredients in skin lighteners affected skin-lightening practices significantly (adjusted odds ratio: 0.35 and 0.16, respectively; 95% confidence interval, 0.24–0.50 and 0.09–0.28, respectively).

Discussion

The results of the present study demonstrate a high prevalence of skin-lightening practices. Approximately 56.2% of female

Table 4
Associations between skin-lightening product use and sociodemographic, health risk knowledge, and mental health status

Variable (%)	Skin-lightening product users n (%)	Unadjusted odds ratio (95% confidence interval)	Adjusted odds ratio (95% confidence interval)
Age (y)			
<20 (15.4)	56 (13.1)	1 (reference)	1 (reference)
20–25 (51.4)	222 (52)	0.64 (0.40–0.98) [‡]	0.74 (0.42–1.28)
>25 (33.2)	149 (34.9)	0.90 (0.65–1.25)	0.92 (0.62–1.36)
Marital status			
Single (80.1)	335 (78.5)	1 (reference)	1 (reference)
Married (19.9)	92 (21.5)	0.78 (0.54–1.12)	1.14 (0.73–1.78)
Household income			
<2000 SR* (7.5)	33 (7.7)	1 (reference)	1 (reference)
2000–5000 SR* (63)	267 (62.5)	0.10 (0.02–0.47) [‡]	0.12 (0.02–0.63) [‡]
>10000 SR* (25.7)	100 (23.4)	0.93 (0.02–0.39) [‡]	0.09 (0.02–0.42) [‡]
>20000 SR* (3.8)	27 (6.3)	0.07 (0.01–0.33) [‡]	0.09 (0.02–0.43) [‡]
Skin type			
Dry (42.6)	150 (35.1)	1 (reference)	1 (reference)
Oily (18.6)	89 (20.8)	0.49 (0.35–0.67)*	0.69 (0.47–1.01) [‡]
Combination (38.8)	188 (44)	0.97 (0.64–1.47)	0.93 (0.57–1.51)
Skin tone			
Light (31.1)	139 (32.6)	1 (reference)	1 (reference)
Light brown (48.9)	213 (49.9)	1.47 (0.97–2.21)	1.11 (0.69–1.78)
Dark brown-black (20)	75 (17.6)	1.37 (0.94–2.00)	1.16 (0.75–1.80)
Skin-lightening variables			
Awareness of harmful effects (36.3)	125 (29.3)	0.73 (0.54–0.98)*	0.35 (0.24–0.50)*
Awareness of active ingredients (63.7)	211 (49.4)	0.14 (0.08–0.24)*	0.16 (0.09–0.28)*
Mental health and addictive behavior			
Depression (moderate/severe) (53.3)	234 (54.8)	0.47 (0.35–0.63)*	0.53 (0.38–0.74)*
PTSD syndrome (8.3)	48 (11.2)	0.37 (0.20–0.67) [‡]	0.46 (0.24–0.89) [‡]
Pathologic Internet use (30.7)	161 (37.7)	0.45 (0.32–0.63)*	0.57 (0.39–0.82) [‡]

Abbreviations: PTSD = posttraumatic stress disorder.

* $p < .001$ † $p < .01$ ‡ $p < .05$

3.74 Saudi Riyals = 1 U.S. Dollar.

students were using SLPs. This finding is valuable and higher than the previously reported prevalence of SLP usage among dark-skinned women in Africa (Dlova et al., 2015). In a previous study, the reported prevalence of SLP usage was 32.7% among South African participants (Dlova et al., 2015). The difference may be due to the difference in socioeconomic status of both populations. The marketing of SLPs is better and more targeted in affluent countries.

Skin-lightening practices are prevalent in the Middle East as reported in published studies. Alanzi et al. (2018) reported that the prevalence of SLP use (bleaching products only) was approximately 43.3% among Saudi women. Our findings align with the findings by Alanzi et al., because we included many other types of SLPs. Our findings also imply that overuse of SLPs in Saudi Arabia is independent of the sampled population and geographical distribution. Another study from Saudi Arabia, focusing mainly on consumers of topical bleachers, found that 38.9% of the population engages in skin-lightening practices (AlGhamdi, 2010).

Additionally, reports from other Middle Eastern countries show rates of SLP use that are slightly higher than those in the current study. For instance, Hamed et al. (2010) found that 60.3% of Jordanian women actively use SLPs. Our study may have captured comparatively higher rates of use in Africa due to our use of terms such as “fairness products” and “rejuvenation skin brighteners” when referencing SLPs. These terms are not as connotatively cumbersome because they do not allude to skin whiteness. Many studies conclude that SLP use is definitively influenced by the media's use of these terms (Hamed et al., 2010; Peltzer and Pengpid, 2017).

Determinants of skin-lightening practices include sociodemographic factors, economic status, media exposure, and psychological status of the individual (Peltzer and Pengpid, 2017). In the current study, we found that women with a poorer economic background are more likely to use SLPs. The belief that lighter skin is associated with wealth and high social status may inspire the use of SLPs (Hamed et al., 2010). A previous study reported the same association (AlGhamdi, 2010). In the current study, we found that poor mental health is also associated with SLP use. Similarly, previous reports have indicated an association between a pattern of poor mental health status and SLP use (Dlova et al., 2015; Gwaravanda, 2011; Peltzer and Pengpid, 2017). The philosophy speculated behind the psychologic determinants suggests that symptoms of poor mental health are interlinked with deficits in body image or self-esteem (Gwaravanda, 2011).

In the current study, more than one half of respondents believed that SLPs pose no threat to their health, and two thirds were unaware of the active ingredients in SLPs. This poor knowledge of SLPs is different from that in previous studies (Dlova et al., 2015; Peltzer and Pengpid, 2017). These differences can be attributed to sampling techniques and population characteristics. Twenty percent of SLP users were not satisfied with the results of SLPs, but they remained active users. This finding aligns with those reported in the literature (Hamed et al., 2010). Frequently reported adverse symptoms were redness, discoloration, and skin-color reversion. Participants persisted in using SLPs even with the unwanted effects because of the perceived advantages of a lighter skin tone.

Hydroquinone, mercury, and steroids are the most common active ingredients in SLPs worldwide (Dlova et al., 2012; Nnoruka and Okoye, 2006). Although many countries have banned the use of mercury in skin-lightening formulations due to its well-established toxicity and reported side effects, many studies worldwide have revealed high concentrations in SLPs, even in countries with strict regulations. For example, Hamann et al. (2014) found that 6% of 549 sampled SLPs in the United States contain mercury concentrations > 1000 ppm. In addition, Al-Saleh et al. (2005) found that 45% of the most commonly used SLPs in Saudi Arabia contain high levels of mercury, in excess of the U.S. Food and Drug Administration's acceptable limit of 1 ppm. The current study found that

around 11.5% of SLP users have used products that contain mercury. Our study participants also used glutathione and kojic acid, but these products do not have a well-established efficacy.

The findings of the current study highlight several public health implications. First, there is a dire need for targeted interventions through media channels to educate the public on the risks of misuse of SLPs. Second, the noticeable high prevalence of SLP use may indicate that the current legislative measures are not effective. For instance, many SLPs are easily available either via online markets or local beauty stores and are easily obtained with no need for a prescription. Furthermore, many of the reported products in our study contained either active ingredients of unconfirmed efficacy or materials of proven toxicity, yet they were marketed as natural skin lighteners.

The limitations of the present study include the sampling technique, cross-sectional study design, and self-reported practices only. The nonprobability consecutive sampling may not have produced a representative sample. In addition, uneducated youth and men were not represented in this study. Lastly, the associations are measured using a cross-sectional design, which may not provide well-established casualty.

Conclusions

The use of SLPs is highly prevalent among Saudi female students. SLP users believe that fairer skin is associated with beauty and social advantage. Female students with a lower socioeconomic status and poor mental health are more prone to overuse SLPs. A need exists for targeted public health campaigns to raise public awareness about the uncontrolled use of skin lighteners. We hereby suggest an audit of available natural SLPs to uncover their harmful contents.

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