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Health Knowledge, Cosmetic Interests, Attitude, and the Need for Health Education Regarding the Use of Topical Bleaching Agents Among Women in West Saudi Arabia: A Cross-Sectional Study

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Synopsis

We aimed at investigating the cosmetic interests, public confidence in cosmetic industry, health knowledge, practice, and need for health education regarding using topical bleaching agents (TPAs) among a relatively big sample size in Al-Madinah (west Saudi Arabia, a conservative eastern society that acquires its social customs from Islam). Islamic values increased women respect and esteem in this society. This is reflected on cosmetic practices and attitude, e.g. women use face cover outdoors. This issue is vital for both women health and beauty, and is rarely discussed. TPAs use is affected by culture, social customs, and health awareness regarding TPAs chemical constituents, e.g. hydroquinone, mercury, steroids that may harm skin and general health. Ethical committee approval was done for our study that included 531 women (attending the outpatient clinics in March–April 2016) of targeted 571 (response rate was 89.8%). 43.3% (230 women) are current TPAs users. Three hundred and eight-nine women (73.3%) regularly used TPAs to heal pigmented areas like freckles (75.8%) and just to lighten skin color (58.7%). Side effects of discontinuation were restoration of normal skin color (44.3%) or even darker skin (27%), skin dryness (20%) and rash (9.6%). Mercury is recognized as harmful to human health by 30.2%, whereas cortisone was chosen by others (53.2%). Unexpectedly, minority of investigated women (10%) considered using TPAs safe and recognized harms of some ingredients as mercury whereas the majority (70.2%) does not encourage others for TPAs use although they themselves kept

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using TPAs for different reasons. Cosmetic interest is high among women using TPAs, highest among the middle age (26–40 years), and lowest among women more than 40 years (50% versus 17.9%) ($p < 0.001$). Using skin TPAs in west Saudi Arabia is comparable with international standards, higher among educated women, house wives and employed women. This denotes care of married employed women to use TPAs to express beauty to husbands. This is not reduced by work duties and is controlled by conservative Islamic modesty. Health education is mandatory regarding TPAs components and use during pregnancy and lactation. Cosmetic science and industry needs more research to improve TPAs use through providing better safe alternatives for many TPAs components, e.g. mercury and hydroquinone.

INTRODUCTION

Dermatologists define skin bleaching as "the practice of using chemical substances or any other products with a depigmenting potential in an attempt to lighten the skin tone or improve skin complexion by lessening the concentration of melanin to obtain a reduction of the physiological skin pigmentation" (1).

The Saudi society is a conservative Islamic society in general and in Al-Madinah Al-Munawwarah (west Saudi Arabia) in particular where the society acquires its customs from the Islamic manners and values. There, women are well-respected receiving a lot of care by family and society during all her life as a daughter, sister, wife, mother, and grand-mothers. Use of skin topical bleaching agents (TPAs) is an important issue among female patients attending the outpatient dermatology clinics in Al-Madinah. As for expressing the beauty of women (e.g. using TPAs and other cosmetics), this is limited to first-degree relatives, e.g. the husband, father, sons, and brothers but not to other men. Women in Al-Madinah are keen to use a face cover outdoors. That really maintains respect and moral protection from the Islamic point of view. However, there is no study from west Saudi Arabia to shed light on the health issue of using TPAs.

We aimed to investigate the cosmetic interests, public confidence in cosmetic industry, health knowledge, practice, and need for health education regarding using TPAs for cosmetic purposes among a relatively big sample size in Al-Madinah (west Saudi Arabia, a conservative eastern society). This issue is vital for both women health and beauty and is rarely discussed where studies from Saudi Arabia are scanty, especially west Saudi Arabia. Whiteness of the skin is considered an important element in constructing female beauty worldwide, particularly in cultures with black-colored skin (2). Skin bleaching preparations are universally used by women with skin prototypes IV to VI on a cosmetic basis, primarily to lighten normally dark skin (3). Skin bleaching is a growing phenomenon around the world and is becoming a bigger business. The prevalence rates of using skin bleaching products are variable in different parts of the world. They ranged from 24% among Japanese women (4) and 30% among women from Ghana (5) to alarming rates in India (65%) (4) and also in Lagos, Nigeria (75%) (6).

Both production and marketing of skin bleaching products are vital issues directly impacting female health. Both issues have become a worldwide multibillion dollar industry (4) making it one of the most common forms of potentially harmful body modification practices worldwide (7). That is because the active ingredients used in skin bleaching creams include hydroquinone, (8, 9) highly potent corticosteroids, and mercury salts (10). That can be potentially dangerous and harmful and may carry out several complications ranging from dermatologic consequences, e.g. epidermal atrophy, ochronosis, eczema, dermatitis, acne, in addition to more serious health risks, e.g. diabetes, skin cancer, fetal toxicity, renal, and liver impairment and failure (8–13).

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The harms caused by using skin beaching products result from acute or chronic long-term exposure to some hazardous chemical agents that may be present in these products (14). With this globally growing phenomenon studies from Saudi Arabia are still very few (15, 16) to assess the magnitude of the problem and to explore the knowledge, attitudes, and patients' practices toward using TPAs among Saudi women. There may be a high use of skin-lightening products (containing mercury) in Saudi Arabia (15). Alghamdi confirmed the importance of evaluating skin bleaching practice in Riyadh (central Saudi Arabia) to protect women's health (16).

Our study is the first report from west Saudi Arabia to investigate the patients' need toward education and counseling regarding the use of TPAs. The main objectives of this study were to estimate the prevalence of the use of TPAs, potential health effects, and to explore the knowledge of women attending governmental hospitals clinics at Al-Madinah Al-Munawwarah city (west Saudi Arabia).

PATIENTS AND METHODS

This is a cross-sectional study aiming at investigating the patients' attitudes and needs toward health education and counseling regarding the use of TPAs. The study was carried out at Al-Madinah Al-Munawwarah city. It is located at the northwestern region of the Kingdom of Saudi Arabia (KSA) and is considered to be the second holiest Islamic city after Makkah. Al-Madinah is the city of peace and tranquility and is a place of numerous historical and archaeological sites. In Al-Madinah Al-Munawwarah city, there are three general hospitals belonging to the Ministry of Health; King Fahad, Ohud, and Al-Ansar hospitals where the study was carried out.

POPULATION AND SAMPLING

The study was conducted in three hospitals; King Fahad tertiary care hospital, 680 beds; Ohud Secondary care, 250 beds; and Al-Ansar secondary care with 100 beds. All women aged between 16 and 60 years, attending outpatient clinics at the three general hospitals, were involved in this study throughout the period of study conduction (March–April 2016) and constituted the study population.

The minimum sample size for this study has been decided according to Swinscow (17) as follows:

$$n = Z2 \times P \times Q\mathrm{D}2 \tag{1}$$

where:

n: Calculated sample size
Z: The z-value for the selected level of confidence (1-–) = 1.96.
P: The estimated prevalence of using TPAs in the population = 38.9%, i.e., 0.389 (16).
Q: $(1 - P)$ = 61.1%, i.e., 0.611
D: The maximum acceptable error = 0.04.

So, the calculated minimum sample size was:

$$n = (1.96)2 \times 0.389 \times 0.611 = 571.\ (0.04) \tag{2}$$

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After a non-probability convenient sampling technique, approximately 600 women attending outpatient clinics of the three general hospitals were recruited by the authors proportionally to beds (250 from King Fahad hospital, 200 from Ohud hospital, and 150 from Al-Ansar hospital).

DATA COLLECTION

Self-administered valid Arabic questionnaire has been used to collect data from the participants as previously reported (16). Used questionnaire included 27 questions; personal information (age, marital status, educational level, occupation, and monthly average household income), detailed information regarding the use of TPAs, such as the age at which the participants started using them, the duration and frequency of usage, source of obtaining these agents, reason(s) for usage during pregnancy and lactation, money spent monthly on TPAs, parts of bodies they applied these products to, and the amounts (grams) applied. To help the participants to identify the amount used per month, four empty jars/tubes of different capacities were shown to them. The women were also asked about the safety of the bleaching agents, whether or not they believed that bleaching creams obtained at herbal stores were safe, whether they thought bleaching creams might harm their skin or general health, and whether they were willing to use bleaching creams even if the components of the cream were unknown. From the given components such as corticosteroids, hydroquinone, and mercury, they were asked to choose the most dangerous component to human health.

The study passed by many phases. The authors visited King Fahad, Ohud, and Al-Ansar hospitals' outpatient clinics where women of different age groups, marital status, level of education, and economic status.

The authors gave a self-administered questionnaire to women attending different hospital clinics in Al-Madinah city during the waiting time (before meeting relevant physicians in outpatient clinics). The authors explained to them that the research interest beyond the questionnaire focuses on TPAs, not regular cosmetics. The authors collected the questionnaire after being filled in.

ETHICAL CONSIDERATION

The following approvals were obtained before and during study conduction:

-Approval from the local training committee.
-Approval from local ethical committee.
-Permission from the health authorities responsible for King Fahad hospital.
-Permission from the health authorities responsible for Ohud hospital.
-Permission from the health authorities responsible for Al-Ansar hospital.
-Participants' permission.

In addition, confidentiality of data was assured.

A pilot study was done on 50 women to test the wording and clarity of the questions as well as the average time required to complete the questionnaire. As a feedback, the questionnaire was clear and an average of 9 minutes was required to complete it. The collected data within the pilot study were not included into the main study.

The authors fulfilled all the required official approvals. All participants were reassured by the authors about the objectives of this study. They were assured that participation in this study is optional.

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STATISTICAL ANALYSES

Statistical Package for Social Sciences (SPSS) software version 22.0 was used for data entry and analysis. Descriptive statistics (number and percentage) and analytic statistics using chi-squared tests (χ^2) to test for the association and/or the difference between the two categorical variables were applied. *P* value ≤0.05 was considered statistically significant.

RESULTS

The present study included 531 women out of targeted 571 (with a response rate of 89.8%). Their ages ranged between 16 and 60 years (39.9 ± 9.0 years) (Table I). More than half of them (54.3%) aged between 26 and 40 years. Slightly more than half of them (50.3%) were married whereas 39.6% were single. Higher educated women (university and above) represent 59.4% of the participants whereas illiterates represent only 4.9% of them. Slightly more than one-third of them (34.8%) were employed and 31.7% were house wives. Monthly average household income ranged between 2,000 and 5,000 Saudi Riyals (SR) (500 USD and 1,250 USD) among 28.8% of the participants whereas it exceeded 20,000 SR (5,000 USD) among 6% of them.

PREVALENCE OF USING TPAs

As demonstrated in Figure 1, 43.3% of the participants (230 out of 531) were current users of TPAs. Out of noncurrent users, 52.8% (159 out of 301) had previously used TPAs as shown in Figure 2. Overall, 389 women out of 531 (73.3%) regularly used TPAs.

Table I
Sociodemographic Characteristics of the Participants (*n* = 531)

Variables	Categories	Frequency	Percentage
Age (years)	16–25	176	33.1
	26–40	288	54.3
	>40	67	12.6
Marital status	Single	210	39.6
	Married	267	50.3
	Divorced/separated	39	7.3
	Widowed	15	2.8
Educational level (*n* = 515)	Illiterate	25	4.9
	High school or lower	184	35.7
	University or higher	306	59.4
Occupation	House wife	168	31.7
	Student	65	12.2
	Employed	185	34.8
	Unemployed	113	21.3
Monthly average household income in SR and USD	<2,000 SR (<500 USD)	88	16.6
	2,000–5,000 SR (500–1,250 USD)	153	28.8
	5,001-10,000 SR (1,250–2,500 USD)	151	28.4
	10,001–20,000 SR (2,500–5,000 USD)	107	20.2
	>20,000 SR (>5,000 USD)	32	6.0

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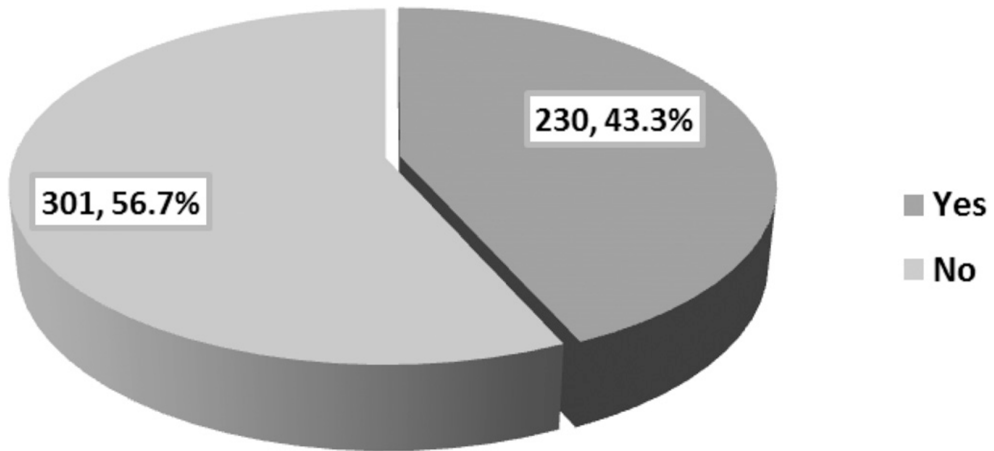

Figure 1. Prevalence of using skin TPAs among women attending government hospitals and clinics at Al-Madinah Al-Munawwarah city, west Saudi Arabia ($n = 531$).

DETAILS OF PRACTICE

Women in Al-Madinah are keen to use face cover outdoors. Table I also shows that the ages of the women when they first started using TPAs varied from 16 to 55 years (mean 24.4 ± 7.9 years). Details of using topical TPAs among regular users are described in Table I. Majority of women using bleaching agents (54.3%) are middle-aged (26–40 years), and the use decreases with advancing age. Married women (50.3%) are using TPAs more than nonmarried women possibly to express beauty to husband according to Islamic values. There is a direct relation between the use of TPAs and educational level, where highly educated women (university level and higher) (59.4%) use TPAs more than others. House wives (31.7%) and employed women (34.8%) are a majority. That gives the impression that married women are keen to use TPAs to express their beauty to husbands. This is not reduced by work duties. Women from all economic levels are keen to use

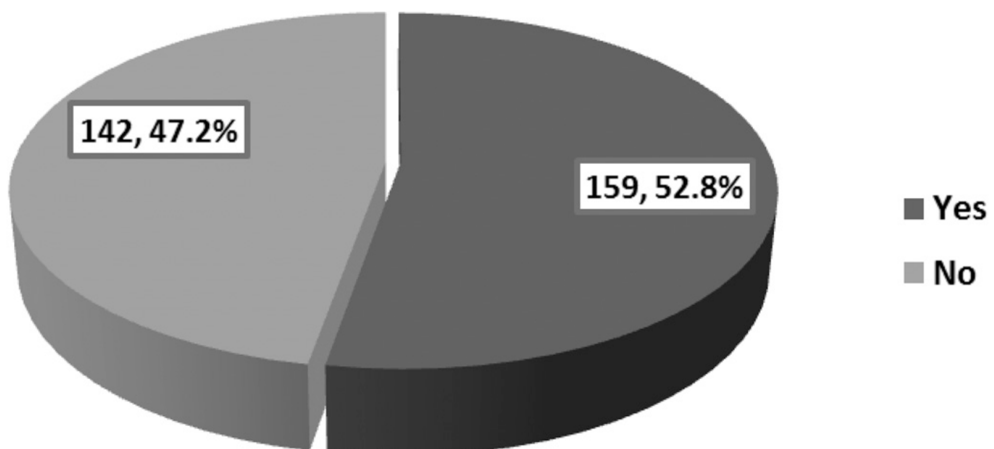

Figure 2. History of previous use of TPAs among women who are not currently using these products ($n = 301$).

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beauty care agents and spend generously for it. Majority of women (77.4%) having an average income (from 500 to 5,000 USD) are keen to use TPAs.

Bleaching products were used by 74.1% of the participants at least once daily. The monthly cost of the TPAs ranged between 5 and 2,500 SR (1.25–625 USD) (mean 136.4 ± 217.3 SR = 34.1 ± 54.1 USD). Thirty-seven women (13%) reported that they spent more than 200 SR (50 USD) per month on bleaching preparations. The amount of the bleaching creams consumed per month ranged between 1 and 800 g (mean 61.6 ± 98.5 g). More than one-third of the participants (35.3%) consumed more than 50 g of bleaching cream per month. In addition, 11.6% of women continued applying the TPAs throughout pregnancy whereas 20% did so during lactation.

In Table II, more than one-third of women (39.6%) obtained these preparations from the pharmacy without prescription whereas 33.9% of them obtained these agents through prescription and 20.8% from beauty and cosmetic shops. The nature of the used agent was most frequently a mixture composed of a readymade drug at the pharmacy (37.8%)

Table II

Details of Using Topical Bleaching Agents Among Women Who Ever Used Them (n = 389)

Questions	Responses	Frequency	Percentage
How did you obtain the cream?[a]	Prescription	132	33.9
	From the pharmacy without prescription	154	39.6
	From herbal shops and open markets	62	15.9
	Beauty and cosmetic shops	81	20.8
What is the nature of the cream you used?[a]	Is composed of a readymade drug at the pharmacy	178	45.8
	Mixture composed at the pharmacy	66	17.0
	Mixture composed at herbal shops	44	11.3
	Beauty product, non-medical	120	30.8
What is the reason behind the use?	To heal pigmented areas like freckles	147	37.8
	Just to lighten the color of the skin	80	20.6
	Both of the above reasons	148	38.0
	Others	14	3.6
Frequency of applying bleaching cream	Once daily	160	41.1
	Twice daily	108	27.9
	Thrice times daily	20	5.1
	Not daily	74	19.0
	Others	27	6.9
Do you use bleaching creams during pregnancy? (n = 241)	Yes	28	11.6
	No	213	88.4
Do you use bleaching creams during lactation? (n = 235)	Yes	47	20.0
	No	188	80.0
Monthly cost of bleaching agents in SR (n = 285)	<100 (25 USD)	185	64.9
	100–200 (25–50 USD) > 200	63	22.1
	(>50 USD)	37	13.0
Amount of cream you use monthly (g) (n = 119)	≤10	33	27.7
	11–50	44	37.0
	>50	22	35.3
Age (years) at starting using bleaching cream (n = 354)	≤15	37	10.5
	16–25	179	50.5
	>25	138	39.0

[a]More than one answer was allowed.

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or a nonmedical beauty product (30.8%). The commonest reported reasons for using these preparations were healing pigmented areas like freckles (75.8%) and just to lighten the color of the skin (20.6%).

Figure 3 shows that these agents were applied to the whole body in 13.4% of regular users whereas almost two-thirds of them (67.7%) used the products on their faces, 49.1% used them on their necks, and 25.2% used them on their hands. Among current users (n = 230), 8.7% had used bleaching creams continuously for more than 1 year whereas 26.1% of them has used them continuously between 7 and 12 mo. Overall the duration of continuing use ranged between 1 and 72 mo (8.1 ± 10.2) (Table III).

Figure 4 illustrates the outcome of discontinuing using TPAs. Less than half of the respondents (44.3%) reported that the color of their skin returned to normal once they discontinued the use of bleaching creams whereas 27% of them reported that their skin became even darker than before use. Skin dryness and rash were reported by 20% and 9.6% of users, respectively.

WOMEN'S KNOWLEDGE REGARDING USING TPAs

Regarding the health knowledge–related to risks attributed to TPAs, only 30.2% of the participants could recognize that mercury is the most harmful chemical to human health, which could be one of the components of bleaching creams whereas cortisone was chosen by more than half of them (53.2%) as shown in Figure 5.

Figure 6 demonstrates that 40.4% of the participants believed that misusing bleaching creams could harm their skin. Figure 7 shows that only 15.7% of the women agreed that using TPAs could harm their general health.

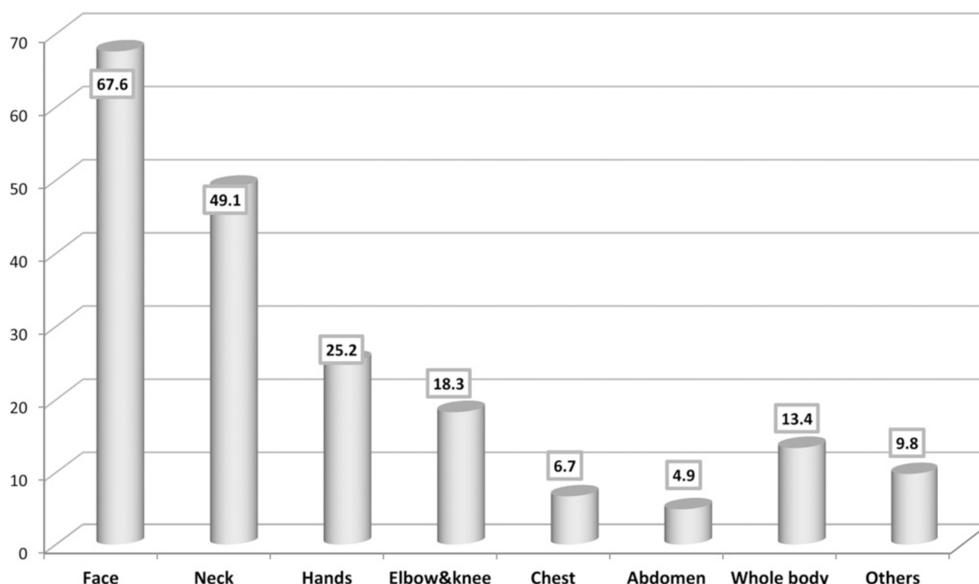

Figure 3. Skin areas for application of skin bleaching agents among the participants (n = 389).

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Table III
Duration of continuous usage ofng Bleaching Creams Among Current Users (n = 230)

Duration	Frequency	Percentage
1 mo	27	11.7
2–6 mo	110	47.8
7–12 mo	60	26.1
>12 mo	20	8.7
Unknown	13	5.7

WOMEN'S ATTITUDE TOWARD USING TPAs

As shown in Table IV, minority of the participants (10%) considered the use of bleaching creams sold at herbal stores safe whereas 61% of them disagreed with that. Also, 9.3% of them would recommend the use of bleaching creams sold at herbal shops to others, whereas 70.2% reported that they would not do so. More than half of the respondents (55.3%) wanted the color of their skin to be lighter than its normal color whereas 26.7% did not want that.

From Table V, it is shown that 45.5% of the participants believed that lighter skin color made them more beautiful, whereas 38.7% believed that lighter skin color made them more self-confident. More than one-third of them (36.2%) used skin TPAs to renew their look. Only 13.5% of singles believed that lighter skin color increases chances of finding a spouse and 9.6% of married participants believed that it stabilizes marriage. Sixty-three women (16.2%) reported that they would use bleaching creams that gave fast results, even if the components were unknown (Figure 8).

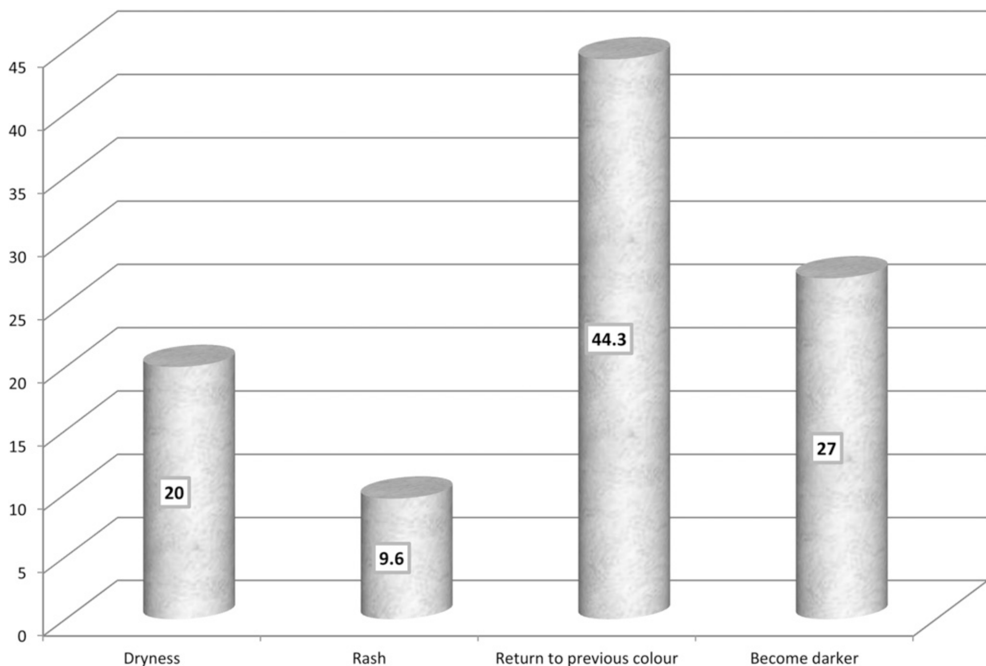

Figure 4. Outcomes of discontinuation of skin TPAs use among women in Al-Madinah Al-Munawwarah, Saudi Arabia.

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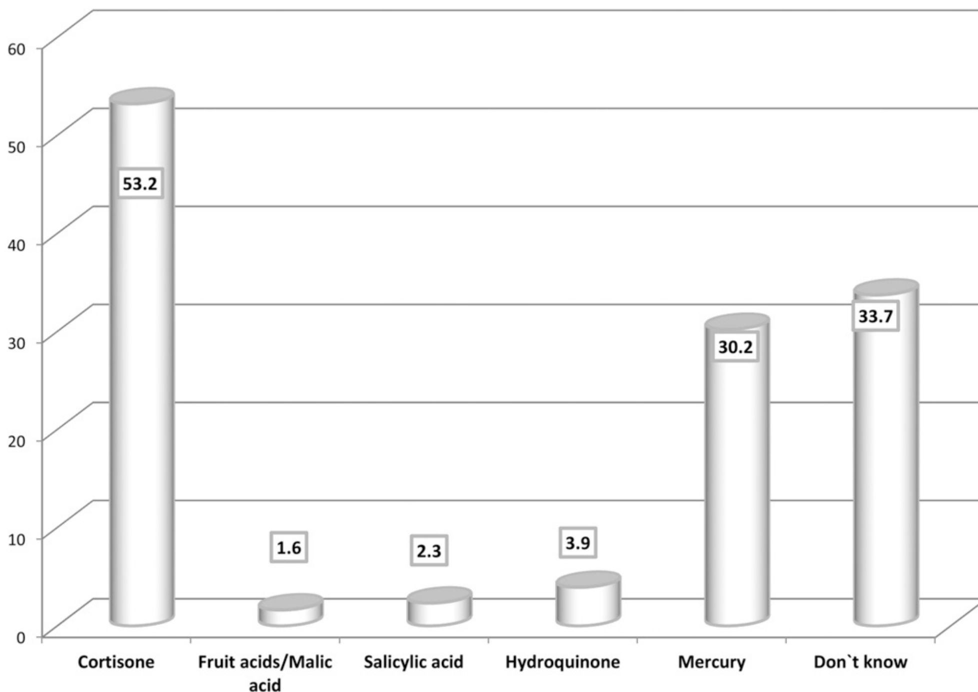

Figure 5. Participants' knowledge regarding harmful chemicals to human health, which could be one of the components of bleaching creams.

FACTORS ASSOCIATED WITH CURRENT USAGE OF TPAs

Table VI presents the sociodemographic factors associated with the current usage of bleaching agents among women. Usage was the highest among those of the middle age (26–40 years) and lowest among those aged over 40 years (50% vs. 17.9%). The difference was statistically significant ($p < 0.001$).

Current usage of TPAs was significantly associated with women's educational level ($p = 0.007$); being the highest among females that are university graduated or higher (48%)

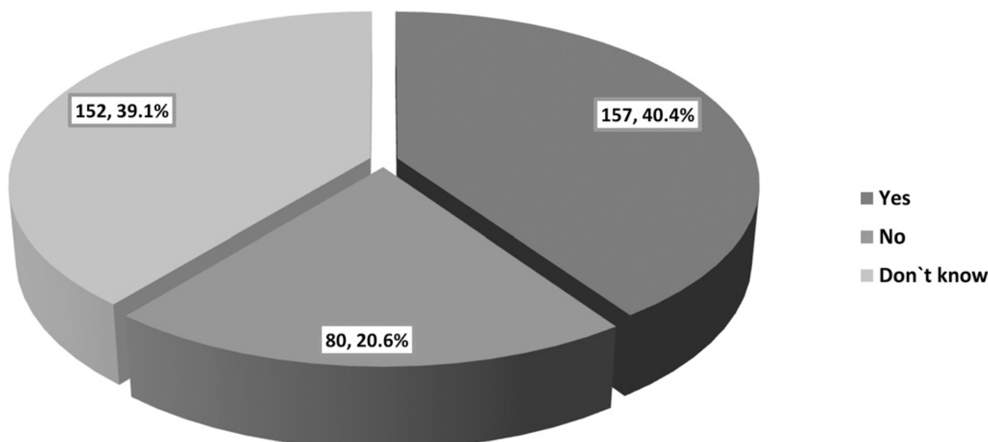

Figure 6. Health knowledge that overuse or misuse of topical bleaching creams could harm the skin.

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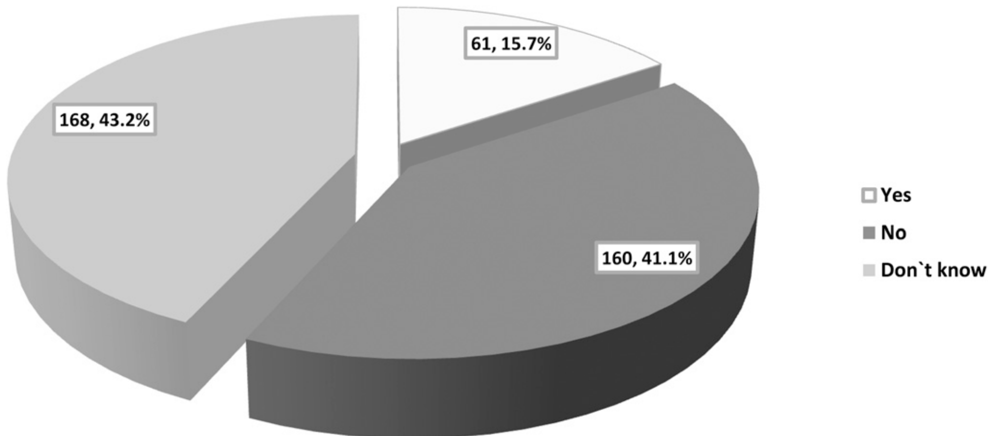

Figure 7. Health knowledge that overuse or misuse of topical bleaching creams could harm their body and health.

and lowest among illiterate women (20%). Current usage of TPAs was the highest among women with higher family income (>20,000 SR/mo; >5,000 USD) and the lowest among those with lower family income (<2,000 SR/mo; <500 USD; 50% vs. 29.5%). However, the difference did not reach a statistically significant level ($p = 0.073$). Other sociodemographic factors (marital status and occupation) were not significantly associated with the current usage of TPAs.

DISCUSSION

TPAs use is a worldwide phenomenon with variable incidence among world countries that may have potential health hazards necessitating patient awareness, education, and counseling. Strength points in this study include discussing an important public health problem that is rarely discussed in Saudi Arabia in addition to inclusion of a relatively big sample size. In a Sudanese study, more than half of the studied subjects (55.4%) misused TPAs whereas 51.6% of them used cosmetics to lighten their skin for a relatively long duration (1–3 years) (18). In Jordan, the prevalence of using skin lightening products was

Table IV
Health Attitude of the Participants Toward Bleaching Agents ($n = 389$)

	Agree Strongly *N* (%)	Agree *N* (%)	Do not know *N* (%)	Disagree *N* (%)	Disagree Strongly *N* (%)
Do you consider the use of bleaching creams sold at herbal stores safe?	5 (1.3)	34 (8.7)	113 (29.0)	87 (22.4)	150 (38.6)
Do you encourage others to use bleaching creams sold at herbal shops?	5 (1.3)	32 (8.2)	79 (20.3)	109 (28.0)	164 (42.2)
Do you want the color of your skin to be lighter than its normal color?	59 (15.2)	156 (40.1)	70 (18.0)	62 (15.9)	42 (10.8)

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Table V
Reasons for Regular Use of Skin Bleaching Agents Among the Participants (n = 389)

Reasons	Frequency	Percentage
To increase beauty	177	45.5
To increase self-esteem	147	37.8
To improve appearance among friends	17	4.4
To increase chances of finding a spouse (for single) (n = 155)	21	13.5
To secure and stabilize marriage (for married) (n = 198)	19	9.6
To imply descend from high class	8	2.1
To increase chances of finding a job (for unemployed) (n = 79)	5	6.3
To stabilize your situation at your current job (for employed) (n = 145)	3	2.1
To follow fashion	11	2.8
To renew their look	141	36.2

60.7% to treat hyperpigmentary disorders where more than one-third of the women were not aware of the potential side effects of these products (19). In Malaysia, prevalence of skin lightening products usage was 60.6% (20). Askari et al. (2012) studied the prevalence and determinants of using bleaching products in Pakistan. The prevalence was 59% (21). Dlova et al. (2015) evaluated the skin lightening practices of women in South Africa. The prevalence of using skin lightening products was 32.7%. The main reported reasons were treatment of skin problems (66.7%) and skin lightening (33.3%) (22).

In accordance with other studies (17), the prevalence of current usage of TPAs in the present study was 43.3% and that of regular usage was 73.3%, which is slightly greater than rates reported in a previous Saudi study by Alghamdi with a rate of current usage of 38.9 (16). In Jordan, a prevalence rate of 60.7% has been reported (19) whereas it was 67.2% in Senegal (23) and 72.4% in Lagos, Nigeria (24).

In the present study, 13.4% of the participated women applied TPAs to their whole body (Figure 3). This figure is higher than that reported by Alghamdi (7.3%) in a previous Saudi study conducted among women visiting outpatient clinics in the Saudi capital, Riyadh (16). This increase in rate may be attributed to the women's desire to achieve a lighter face and body color influenced by the concept of beauty linked to fair skin

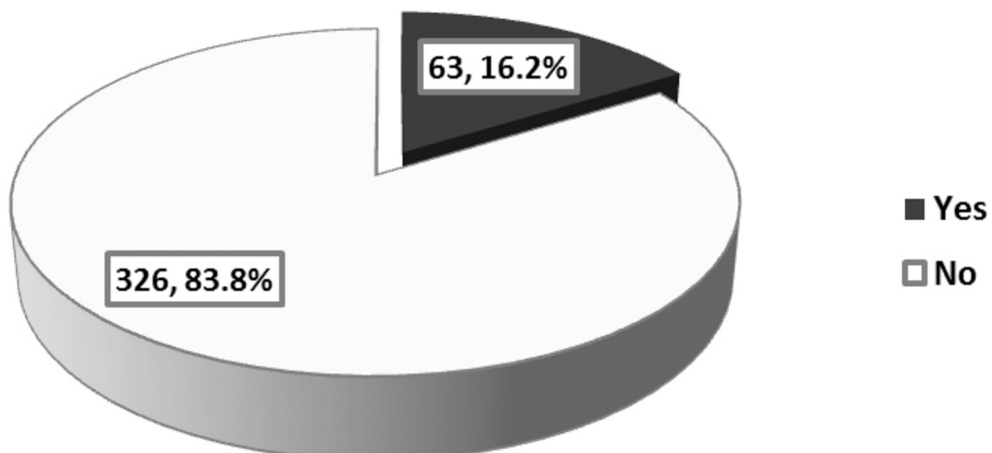

Figure 8. Desire to use bleaching creams that give fast results even if its components are unknown (n = 389).

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Table VI
Sociodemographic Factors Associated with Current Usage of Bleaching Agents

	Current use of bleaching agents			
Age	Yes *N* = 230	No *N* = 301	χ^2	*p* value
Age (years)				
16–25 (*n* = 176)	74 (42.0)	102 (58.0)		
26–40 (*n* = 288)	144 (50.0)	144 (50.0)		
>40 (*n* = 67)	12 (17.9)	55 (82.1)	22.97	<0.001
Marital status				
Single (*n* = 210)	83 (39.5)	127 (60.5)		
Married (*n* = 267)	121 (45.3)	146 (54.7)		
Divorced/separated (*n* = 39)	21 (53.8)	18 (46.2)		
Widowed (*n* = 15)	5 (33.3)	10 (66.7)	4.04	0.258
Educational level (*n* = 515)				
Illiterate (*n* = 25)	5 (20.0)	20 (80.0)		
High school or lower (*n* = 184)	71 (38.6)	113 (61.4)		
University or higher (*n* = 306	147 (48.0)	159 (52.0)	9.99	0.007
Occupation				
House wife (*n* = 168)	68 (40.5)	100 (59.5)		
Student (*n* = 65)	29 (44.6)	36 (55.4)		
Employed (*n* = 185)	85 (45.9)	100 (54.1)		
Unemployed (*n* = 113)	48 (42.5)	65 (57.5)	1.15	0.765
Monthly average household income in SR				
<2,000 (<500 USD) (*n* = 88)				
2,000–5,000 (500–1,250 USD) (*n* = 153)	26 (29.5)	62 (70.5)		
5,001–10,000 (1,250–2,500 USD) (*n* = 151)	71 (46.4)	82 (53.6)		
10,001–20,000 (2,500–5,000 USD) (*n* = 107)	70 (46.4	81 (53.6)		
>20,000 (>5,000 USD) (*n* = 32)	47 (43.9)	60 (56.1)		
	16 (50.0)	16 (50.0)	8.56	0.073

(Table V). However, it is much lower than figures reported from Nigeria (81.3%) (8, 24) and Senegal (92%) (9).

As expected, the current study revealed that women with higher household incomes were using more bleaching creams than those with lower income (Tables I–II), although not reaching a significant cut-off level. The participants in this study spent on the an average of 136.4 ± 217.3 SR (34.1 ± 54.1 USD) monthly on TPAs (Table II), which was considered relatively high keeping in mind that the household income of 45.4% of the participants was below 5,000 SR (1,250 USD) (Table I).

Unexpectedly, in the present study, higher educated women (who should be more knowledgeable of TPAs' side effects) used these products more significantly. Similarly, the highest rate of usage unexpectedly was reported in the age group 26–40 years as it was expected to be higher in younger ages (Table I). This may be attributed to the idea that fair skin is not only a symbol of beauty but is also associated with better employment and marital prospects. A previous study carried out in Southern Nigeria reported that TPAs-related side effects were particularly frequent in unmarried women, literate women, and female students (24).

Importantly, skin TPAs are harmful to health at a level that is comparable with or even exceeds the level of other risk behaviors (14). Despite that, the lack of knowledge of the danger of bleaching products is evident in this study, e.g. mercury is the most dangerous constituent of bleaching products as it is highly toxic. This is known by only 30.2% of

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the participants as the most toxic product of TPAs whereas more than half of them (53.2%) selected corticosteroids (Figure 5). Comparable results have been reported by Alghamdi in his study (16).

Regarding the duration of applying TPAs in the present study, 8.7% had used bleaching creams continuously for more than 1 year with an overall duration ranging between 1 and 72 mo (Table III). This is quite smaller than the report in a previous Saudi study (16) where the duration of the bleaching practice ranged between 1 and 150 mo (12.5 years). In Senegal, the duration ranged between 1 and 420 mo (35 years) (9). That may be related to the degree of skin darkness.

Concerning the amount of TPAs used each month, it ranged between 1 and 800 g (mean 61.6 ± 98.5 g/mo) (Table II). Actually, this extremely necessitates health education. Toxicity of some components, e.g. mercury is related to the dose and duration of exposure. In another Saudi study, it ranged between 2 and 600 g (mean 90.09 g/mo). In African countries, such as Nigeria, the amount ranged between 60 and 150 g/mo (25) whereas in Senegal the amount ranged between 15 and 350 g/mo (9). The maximum amount used in the present study (800 g) is considered too big if we recognize that 45 g of bleaching cream is quite enough to cover the whole body (16). The difference between our figures and those reported in African countries is attributed to the fact that skin color in African countries is of the dark black (type VI) whereas in Saudi Arabia it is lighter (skin type IV–V) (16).

In the present study, 11.6% of the investigated women continued applying TPAs during pregnancy whereas 20% did that during lactation (Table II). Quite close results were observed in a previous Saudi study regarding the main city Riyadh where 10.3% of women continued applying bleaching products during pregnancy and 20.8% during lactation (16). These figures are very far from those reported in Senegal where rates of application of TPAs throughout pregnancy or lactation were 81% and 87%, respectively (9). This difference may be attributed to the lower level of awareness about the dangers of using nonprescribed medications or products during pregnancy in Senegal compared with Saudi Arabia.

Hamed et al. (19) reported that women who use skin lightening agents are more likely to believe that lighter skin color has a positive role to play in self-esteem, perception of beauty and youth, marriage, and employment opportunities compared with nonusers. In the current study, self-reported complications of discontinuing the use of bleaching practice were returning of the normal skin color or a darker one, skin dryness and skin rash (Figure 4). These side effects prevent the consumers from discontinuing this practice. Therefore, there is a need to make a more public awareness to ask for medical advice instead of continuing using these products. Our study had some limitations. It included a nonprobability convenient sample of women attending outpatient clinics in general hospitals in Al-Madinah city, which affect the generalizability of results. Its cross-sectional nature creates difficulties in ascertaining causality.

CONCLUSIONS

By the end of this study, we can draw many conclusions. The use of skin TPAs is a common practice among Saudi women aged 16–60 years attending outpatient clinics of general hospitals in Al-Madinah city, Saudi Arabia. It is significantly higher among women aged

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between 26 and 40 years and those of higher educational level (university and above) than others. Most women used TPAs against their own recommendation to others. The motivation beyond using TPAs is strong. A considerable proportion of the investigated women did not know that overuse or misuse of these products can harm their skin and general body health. Most topical skin bleaching agents were obtained from pharmacies (without a medical prescription), herbal shops, open markets, beauty markets, and cosmetic shops. These products caused skin problems, e.g. skin dryness, itching, and return to original skin color or even darker. Finally, those products were used mostly to increase beauty, self-esteem as well as to renew their look. There is public awareness about possible side effects, although a considerable proportion of the investigated women need more patient education and counseling to guard against malpractice. Cosmetic science and industry needs more research to provide better safe alternatives for many TPAs components, e.g. mercury and hydroquinone.

STUDY RECOMMENDATIONS AND FUTURE PERSPECTIVES

1. Using TPAs is a repeated daily phenomenon that denotes women care about beauty and smartness. It is a general worldwide common female criterion.
2. Up to many hundred grams (800 g in our study) of TPAs can be consumed. This necessitates the awareness of the contents and components of the used cosmetics in addition to the follow-up of the prolonged use.
3. Nonprescribed cosmetics from pharmacies and herbal shops are out of health control with complete lack of dermatologists' supervision. Contents of such cosmetics are unknown and possible health harm strongly exists. Women's health education is mandatory.
4. Cosmetics are better to be labeled with a pamphlet that describes clearly the cosmetics content, components, side effects, safety issue for prolonged use, and precautions.
5. Regarding pricing, many cosmetic preparations are very expensive. Cosmetics industry and trade are quite relevant to women health status. That issue should be brought into control under umbrella of regular health authorities.
6. Cosmetics containing hydroquinone and mercury may carry side effects to the level of toxicity with prolonged overuse and malpractice. Such cosmetics should not be sold outside pharmacies and should never be given without a written doctor's prescription.
7. Cosmetics containing hydroquinone and mercury should not be used by lactating and pregnant women for fear of teratogenic effects.
8. Public health education, media education, medical magazines, and health announcements should be activated. Paid commercial advertisements in the media that attract women to use unknown bleaching agents should be discouraged.
9. Systemic absorption of TPAs containing mercury and hydroquinone is possible. Regular follow-up of such women is mandatory. Complications of using TPAs, e.g. epidermal atrophy, eczema, dermatitis, and others should be treated by specialized dermatologists. Future usage of TPAs should be modified by shifting to different types that are tolerable.
10. Cosmetic science and industry needs more research to provide better safe alternatives for many TPAs components, e.g. mercury and hydroquinone.

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APPENDIX 1: Questionnaire

1. Do you currently use bleaching creams? 1. Yes 2. No
2. If no, have you ever used bleaching creams before? 1. Yes 2. No
   If yes in questions 1 and/or 2, please answer the following questions (3–27)
   If no in questions 1 and 2, please answer questions 23–27
3. How did you obtain the cream?
   1. Prescription
   2. From the pharmacy without prescription
   3. From herbal shops and open markets (nonmedical shops)
   4. Beauty and cosmetic shops.
4. The cream you used:
   1. Is it composed of a readymade drug at the pharmacy?
   2. Mixture composed at the pharmacy
   3. Mixture composed at herbal shops
   4. Beauty product, nonmedical
5. The reason behind the use is:
   1. To heal pigmented areas like freckles
   2. Just to lighten the color of the skin
   3. Both of the above reasons (1 & 2)
   4. Others
6. Do you use bleaching creams during pregnancy? 1. Yes 2. No
7. Do you use bleaching creams during lactation? 1. Yes 2. No
8. How much do you pay monthly for the bleaching cream you use?...........SR
9. What areas do you apply the cream on? Please indicate by either Yes or No.
   A. Face 1. Yes 2. No
   B. Hands 1. Yes 2. No
   C. Arms 1. Yes 2. No
   D. Legs 1. Yes 2. No
   E. Stomach 1. Yes 2. No
   F. Chest 1. Yes 2. No
   G. Armpits 1. Yes 2. No
   H. Neck 1. Yes 2. No
   I. Forearm 1. Yes 2. No
   J. Feet 1. Yes 2. No
   K. Thighs 1. Yes 2. No
   L. Genitals 1. Yes 2. No
   M. Back 1. Yes 2. No
   N. Whole Body 1. Yes 2. No
   O. Elbows and knees 1. Yes 2. No
10. On average how many times do you use bleaching creams?
    1. Once daily
    2. Twice daily
    3. Thrice daily
    4. Not daily
    5. Other, please specify ....
11. What is the amount of cream you use monthly? ....g

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12. How old were you when you started using bleaching creams for the first time? ……………………………..years
13. Do you consider the use of bleaching creams sold at herbal stores safe?
    1. Agree strongly
    2. Agree
    3. Do not know
    4. Disagree
    5. Disagree strongly
14. Do you encourage others to use bleaching creams sold at herbal shops?
    1. Agree strongly
    2. Agree
    3. Do not know
    4. Disagree
    5. Disagree strongly
15. Why do you use bleaching creams? You can choose more than one answer, please indicate by either Yes or No.
    A. To increase you beauty 1. Yes 2. No
    B. To increase your self-esteem 1. Yes 2. No
    C. To improve you appearance among your friends 1. Yes 2. No
    D. To increase your chances of finding a spouse (for single) 1. Yes 2. No
    E. To secure and stabilize your marriage (for married) 1. Yes 2. No
    F. To imply you descend from high class 1. Yes 2. No
    G. To increase your chances of finding a job (for unemployed) 1. Yes 2. No
    H. To stabilize your situation at your current job (for employed) 1. Yes 2. No
    I. To follow fashion 1. Yes 2. No
    J. To renew your look 1. Yes 2. No
16. Are you willing to use bleaching creams that give fast results even if its components are unknown? 1. Yes 2. No
17. How long have you been using bleaching creams continuously (nonstop)? .... months
18. What happens to your skin if you stop using the bleaching cream for a period longer than two weeks?
    A. It dries 1. Yes 2. No
    B. Develops a rash 1. Yes 2. No
    C. Returns to previous color 1. Yes 2. No
    D. Becomes darker than before you used the cream 1. Yes 2. No
19. Do you want the color of your skin to be lighter than its normal color?
    1. Strongly agree
    2. Agree
    3. Do not know
    4. Disagree
    5. Strongly disagree
20. Do you think that over or misusing bleaching creams could harm your skin?
    1. Yes
    2. No
    3. Do not know

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21. Do you think that overusing bleaching creams could harm your body and health, e.g. diabetes, high blood pressure, osteoporosis, or decreased kidney function?
    1. Yes
    2. No
    3. Do not know
22. In your opinion, which of the following is the most harmful chemical to human health, which could be one of the components of bleaching creams?
    1. Cortisone
    2. Fruit acids or Malic acid
    3. Salicylic Acid
    4. Hydroquinone
    5. Mercury
    6. Do not know

Personal Information

23. Age ....
24. Marital status
    1. Single
    2. Married
    3. Divorced
    4. Widow
    5. Separated
25. Educational Level
    1. Illiterate
    2. High school or lower
    3. University or higher
26. Occupation
    1. Student
    2. Unemployed
    3. Home maker
    4. Employed
    5. Other, please specify..
27. Monthly average household income
    1. Less than 2,000 Riyals
    2. 2,000 Riyals to 5,000 Riyals
    3. 5,001 Riyals to 10,000 Riyals
    4. 10,001 Riyals to 20,000 Riyals
    5. More than 20,000 Riyals

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