

Knowledge, Perception and Practice of Skin Bleaching among Adults in Northeastern Nigeria

Abstract

Background: Skin bleaching seems to have become common in different communities across Nigeria. The few studies that have been done in the past were limited to the southern part of Nigeria or to academic institutions only. It appears that the local communities in the northeastern region of Nigeria are seriously unaware of the possible risks related to the usage of bleaching products. The purpose of the study was to ascertain adults' knowledge, beliefs, and practices of skin bleaching in northeastern Nigeria. **Method:** It was a cross-sectional descriptive study that employed the multistage sampling method and the use of Statistical Package for Social Sciences (SPSS) to analyze the data. **Results:** It was found that skin bleaching was quite common in northeastern Nigeria. Nearly half of the respondents were not aware of the long-term hazards or negative consequences, as well as the ingredients in the skin bleaching agents. The respondents believed that the main reason why people bleach their skin was to appear more appealing to catch their partners' attention as well as to improve their social statuses. They also believed that bleaching the skin improved their chances of getting suitors and jobs. **Conclusion:** The practice of skin bleaching agents was noted to be common among the communities mainly due to a strong desire for aesthetic looks, attraction and high social status despite the dangers associated with it due to lack of knowledge and wrong beliefs. Government agencies, partners, other relevant parties along with the stakeholders among the local community members including religious and traditional leaders should take steps to protect the public from the menace of the skin bleaching agents through legislation, education and all other possible innovative means. Measures should be

Comment [OB1]: Multistage sampling procedure rather than method

Comment [OB2]: Statistical Product and Service Solutions (SPSS) is the new name

Comment [OB3]: Stakeholders rather than parties

taken against persons or organizations that disobey government restrictions regarding skin bleaching.

Subject Areas

Psychology

Keywords

Skin Bleaching, Knowledge, Practices, Side Effects, Complications

Comment [OB4]: This is not needed once educational interventions is put in place. Also, people are free agents and have choice of doing what they like. I suggest your recommendations should focus on companies producing the products

Comment [OB5]: Lower case please

Comment [OB6]: Complications is implies in the side effects

1. Introduction

Skin bleaching or skin whitening is the act of brightening the skin complexion by using substances that are applied to the skin or administered into the body by some means [1][2]. The use of skin bleaching agents has its drawback in terms of causing harmful effects. In quite a number of studies conducted across the many locations in the world, the majority of respondents were aware of skin bleaching, although many were not aware of its negative repercussions [1]. Skin bleaching is the process of using cosmetics or skin bleaching products to reduce the pigmentation of the skin [2]. Agents for bleaching or lightening the skin are known as skin-bleaching agents. The mechanism of action is to reduce the melanin levels produced by the skin cells. The pigment melanin, which skin cells generate, determines how light or dark the skin looks. Agents that bleach the skin can be found in a variety of cosmetic products, including creams, lotions, oils, serums, and chemicals that are ingested or injected into the body [1].

The practice of skin bleaching dates to 200 BCE. The Ancient Egyptians, Romans, and Greeks used honey with olive oil to lighten their skin. Ancient Greek men and women used white lead face masks. Bleaching is thought to have existed in China from 200 BCE, as it did in other ancient cultures [3].

Skin bleaching is a technique that is linked by some to racial superiority, self-image, and individual identity. Black skin is connected with poverty and slavery due to colonial rulers' influence on colored races, especially those they have colonized, who feel that white skin is the ideal hue that represents supremacy, power, and wealth. This perspective greatly influenced the colored races' fixation with the use of skin-lightening products and influenced the practice of skin whitening by Negroes and other people with dark skin tones in order to resemble the fair-skinned Caucasians in many facets of life, including skin tone. The media portrays persons with light skin as more successful compared to those with dark skin through advertisements and other productions [4].

Statement of the Problem: Melanin that gives the dark skin color is nature's way of protecting us from the negative effects of sunshine and does not connote poverty, inferiority or slavery, particularly in Africa where it is very sunny [5]. Melanin is needed to protect the body from the sunray. However, during the last four decades, skin bleaching has become more popular among people, especially

teens, all around the world. About 40 to 77 percent of the sub-Saharan African population is involved in one form of bleaching or the other. In 2018 World Health Organization (WHO) published that the prevalence of skin bleaching in Nigeria was as high as 77 percent, making Nigeria the leading country in Africa, followed by Togo (59 percent), South Africa (35 percent), and Senegal (27 percent) [6]. Many people are into the practice of skin bleaching by misguided knowledge and attitude due to reasons such as to gain recognition in terms of beauty, influence, superiority and class unmindful of the negative accompanying consequences. Skin bleaching has been linked to a number of negative side effects, including skin discoloration, acne, mercury poisoning, and kidney damage [4]. Previous research on skin bleaching in Nigeria especially in the northern region focused mainly on university students living out the general population. That may be an underestimation. The extent or prevalence of skin bleaching in the northern part of Nigeria is not certain. If nothing is done, the negative consequences of the practice of skin bleaching such as skin cancer, renal disease, and serious damage to the skin and other systems of the body may continue to undermine the quality of life of those involved and may lead to irreparable harm or death. This study sought to ascertain the frequency, knowledge, attitude and usage of skin bleaching agents among the adults in the study locale.

Justification: The need to ascertain the extent of knowledge attitude and use of bleaching agents among the population of the study locale cannot be emphasized in the pursuit of a better quality of life for all. Most of the studies carried out on skin bleaching in Nigeria were within tertiary institution, literate or more civilized settings. For instance, research conducted among female students at northeastern institutions did not include the male gender or the rest of the local population aside from the female students of tertiary educational institutions. The remaining population must be considered when addressing the menace posed by skin bleaching to provide more widely applicable solutions. This study provides the necessary information for planning by the relevant stakeholders. It will also serve as a step for further studies into the issues regarding skin bleaching for those in academia. Education of stakeholders and other members of the community on the consequences of the use of bleaching cream before they indulge in the habit is very crucial.

Significance of the Study: Understanding the factors responsible for the rise in the practice of skin bleaching in Nigeria is crucial. This study promotes social change and assists community leaders and health organizations in creating educational materials on the immediate and long-term dangers of skin bleaching. The information on skin-bleaching practices will be expanded by this study both locally and globally. Additionally, the findings will enhance understanding among pertinent parties, community members and the government as it formulates policies to stop the destructive practices of arbitrary and indiscriminate skin bleaching.

The general objective is to determine the knowledge, practice, and effects of skin bleaching among adults in northeastern Nigeria.

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Specific objectives are to evaluate the knowledge of skin bleaching agents among adults, assess the perception of the respondents, assess the prevalence of skin bleaching, and appraise the perception and level of practice of skin bleaching and the effects of skin bleaching as well as to identify the factors associated with it.

2. Literature Review

Skin bleaching is the practice of removing the melanin from the skin over time using dermatological, cosmetic, or home made products [1][7]. Melanin, the component that gives skin its color, also shields skin against too much exposure to UV radiation from the sun. Skin bleaching is also known as skin whitening, skin lightening or skin toning. Skin bleaching is generally defined as the deliberate alteration of one's skin color by the application or administration of chemicals or solutions to the skin or the body for the purpose of brightening it [8]. It was characterized as the cosmetic use of creams, gels, soaps, and household chemicals for lightening or depigmenting the skin, which might have short-term or life-threatening consequences. Skin bleaching was also described as a permanent or transient change to the epidermis, the outermost layer of the skin. It is the deliberate whitening of skin using different agents and techniques. Skin bleaching can be performed or prescribed professionally by a dermatologist or informally by non-doctors. The practice of skin bleaching dated back to 200 BCE and now supported by a big market involving multi-billion-dollar industry with customers distributed all over the world [3]. Products for skin bleaching are mostly used for aesthetic purposes, while they are occasionally used to treat pigmentary disorders such as melasma [6]. Skin lightening is linked to skin damage and detrimental effects on well-being [4]. The justifications made by some persons who use skin-lightening products while being aware of its harmful effects is associated with contemporary form of colorism [9]. The urge to have soft skin, attaining an even skin tone, getting rid of acne, rashes, and skin imperfections, as well as increased beauty and attractiveness, are directly linked to skin lightening practice. Agents used for skin bleaching include a variety of ingredients. The simple availability of the chemicals for skin bleaching as a result of ineffective legislative mechanism has been characterized as dangerous. Both men and women use skin whitening agents that contain dangerous chemicals and pose substantial health risks to them [8]. Mercury, hydroquinone, kojic acid, arbutin, lactic acid gel, topical retinoid, glutathione and corticosteroids such as clobetasol are some of the substances used in skin bleaching. Many of the skin lightening formulations contain between 8 per cent and 15 per cent of hydroquinone. There is proof that the chemicals in skin bleaching agents containing hydroquinone are carcinogenic [10]. Many people are using herbal extracts or natural skin bleaching agents as they are less costly and less harmful according to a recent assessment on the skin bleaching properties of plant extracts. These include carrot, milk thistle, honey, gram flour, milk from tender coconut, lico-

rice, mint, oranges and other citrus fruits, tomato, potato, almond, papaya, strawberry, blueberry, and others [1].

Common adverse effects of skin lightening agents: Hydroquinone which is a potent inhibitor of melanin synthesis is used to lighten the skin tone. Even in small doses, hydroquinone has health concerns that range from skin rashes, itching, and discolorations to malignancies. Due to the accumulation of homogentisic acid in the skin, preparations containing hydroquinone may also result in exogenous ochronosis and paradoxical blue-gray hyperpigmentation. Additionally, association with squamous cell carcinoma has been documented. Peripheral neuropathy, fish odor syndrome, and prenatal development retardation can all be brought about by systemic absorption [1][4]. Skin bleaching agents containing mercury has been linked to neurological problems, skin rashes, and kidney damage. Many of the women in their reproductive ages who use such agents transfer mercury to their fetuses when they are pregnant with threat of neurological and nephrological damage to the yet unborn child [11]. Skin bleaching agents containing corticosteroids are very common in the market. Example includes clobetasol that causes hormonal imbalance, hypertension, and skin color problems [1]. Corticosteroid based bleaching agents have certain cutaneous side effects such as immunosuppression leading to bacterial, viral, and fungal skin infections. A disturbed hypothalamic-pituitary-adrenal axis, on the other hand, might result in Cushing syndrome, adrenal insufficiency, diabetes, and hypertension, among other alarming side effects. Glaucoma and cataracts are two ophthalmologic side effects. Glutathione in bleaching creams causes cramps and bloating, Stevens-Johnson syndrome, renal, hepatic, and neurological damage, air embolism and thyroid dysfunction [4]. Topical or oral retinoid as a bleaching agent may lead to erythema and peeling of skin, retinoid dermatitis, photosensitivity, teratogenic and fetal complications, thyroid dysfunction and hepatic toxicity.

Knowledge of skin bleaching: According to a preliminary survey conducted in Malaysia, the majority of undergraduate respondents were aware of skin bleaching and the components that make up the skin-bleaching agents they use before purchasing them. This finding agrees with a South African research in which the majority of respondents were aware of the negative consequences linked to skin-bleaching products [12]. Many students were able to mention examples of the dangerous ingredients such as mercury, hydroquinone in skin-bleaching agents and the consequences of using skin-bleaching agents such as skin damage, discoloration and infections. A Community-based study done in Ghana among 319 youths revealed that 100.0 percent of the respondents had heard about skin bleaching through various sources such as family members (16.0 percent), friends (29.0 percent), media (19.4 percent), teachers and or literature (34.5 per cent) [13]. Making the skin smooth was the commonest definition of skin bleaching (84.3 per cent). About 54.1 per cent defined skin bleaching as altering the skin color. About 37.6 per cent of the respondents had knowledge of the ingredient used of the bleaching products

Comment [OB8]: I suggest the author look for a Nigeria based study to foreground this work because what operates in Malaysia is at variance with Nigeria considering different population and geography of study

citing examples of hydroquinone and arbutin being most common. The commonest adverse effect mentioned by the respondents was skin cancer (40.1 per cent) and wrinkled skin (17.6 per cent) [13]. An institution-based study on 357 students as respondents on Kampala International University-Western Campus found out that up to 305 (85 per cent) of the respondents knew that skin bleaching agents have side effects [14]. A cross-sectional study carried out among 450 market traders in Lagos metropolis revealed that 58.2 per cent of the users of skin bleaching products made the discovery themselves, 26.0 per cent aided by their peers, 4.2 per cent by chemist; others (5.2 per cent) were introduced to skin bleaching by health workers or family members while about 3.1 per cent got to know about bleaching agents through the social media. About 65.1 per cent of the respondents knew hydroquinone as an active ingredient of skin bleaching, 48.4 per cent knew Mercury as an active ingredient of skin bleaching. The commonest side effects heard by some of the respondents were skin discoloration (23.0 per cent), skin rashes (22.6 per cent) and stretch marks (20.6 per cent) (Adebajo, 2002) [15].

Similarly, a cross-sectional descriptive study conducted among female medical students in Wilberforce Island in Bayelsa State, Nigeria, revealed that, over 80 per cent of participants (110) knew skin bleaching products could cause side effects with skin irritation being the most identified followed by skin discoloration [6].

In North-central Nigeria, the awareness of skin bleaching was reported by 76.5 per cent of participants. The majority received information about skin bleaching through their friends (45.3 per cent), media (18.2 per cent) and family members (17.0 per cent). Only 12.2 per cent of participants knew the active ingredients in bleaching products. Carrot oil was the commonest ingredient identified by 4.5 per cent while hydroquinone was identified by 2.8 per cent. Other ingredients were papaya, cucumber, lemon, acids, turmeric, vitamin E and egg. The forms of bleaching products known by the participants were creams (76.9 per cent), soaps (7.7 per cent), injections (5.7 per cent) and tablets (1.6 per cent). It was also demonstrated that 63.5 per cent of female adolescents knew the side effects of skin bleaching products with skin damage being the commonest followed by easily inflamed skin [16].

3. The Practice of Skin Bleaching

A cross-sectional study was conducted among female University students in the Aljouf region of Saudi Arabia revealed that 56.2 per cent of female students reported usage of bleaching creams among 760 respondents [17]. In another cross-sectional survey of female patients in multispecialty hospitals in the Al-Jouf area of Saudi Arabia, 63.1 per cent of participants reported using skin bleaching products. Sixty-six per cent of people who use skin bleaching products do so for aesthetic purposes, and they feel that having lighter skin tone improves one's beauty, self-esteem, social status, ability to get married, and work chances [17].

In an online based study among women in Zimbabwe, prevalence of skin bleaching was found to be 31.2 per cent [18]. Most of the respondents claimed that their motivation for skin bleaching was to have smooth, healthy skin, attractiveness, and social favors, such as getting married and excellent employment. Work, appearance, and marital status were linked to skin bleaching. A community based study in Ghana showed that skin bleaching was common (26.3 per cent) [13]. Enhancing attractiveness and healthy skin (97.6 per cent), boosting self-esteem (78.6 per cent), and treating skin conditions (77.4 per cent) were among the justifications given for skin bleaching. A community-based study conducted among residents of Ikeja, Lagos using an electronic, self-administered questionnaire in the Google format, about 52.7 per cent of the respondents admitted to using different skin-lightening treatments, with the majority (71.8 per cent) saying that they did so primarily to treat skin diseases [19]. Similarly, a cross-sectional descriptive study conducted among female medical students in Wilberforce Island in Bayelsa State of Nigeria, 110 respondents involved in the study with about 56.4 per cent of them ranging between 20 and 24 years of age. The prevalence of skin bleaching products used by the participants was 40.9 per cent with facial cleansers being the commonest product used (51.1 per cent). Although about 80 per cent of the respondents did not think that light skin was superior to dark skin, removal of discoloration/dark spots (40 per cent) and cosmetic reasons (37.8 per cent) were the commonest reasons for use [6]. According to a NOI Polls research that was cited, 64 per cent of Nigerians think that skin bleaching is now quite popular in the country, especially among the women (97 per cent). This supports the World Health Organization's (WHO) claim that Nigeria, with skin bleaching prevalence of 77 per cent among women, has the highest rate worldwide [20]. The overall prevalence rate of bleaching cream use among market traders in Lagos metropolis was 77.3 per cent. That was 72.4 per cent among women and 27.6 per cent among men. The practice was strongly linked to poor socio-demographic status, low knowledge levels, and poor mental health. In another study in northeastern Nigeria, in which 384 female University students were interviewed revealed that about 48.1 per cent of the respondents were active users of skin whitening agents as the time of the study. The practice of skin-bleaching has been reported among adults in the past but the trend has changed now with involvement of large number of female adolescent group. This practice is on the rise due to socialization. It is true that skin-bleaching practice cuts across all ages, races, beliefs and ideologies [2].

A Cross-sectional study in Ghana among female high school students revealed that less than half of the respondents (40.9 per cent) had practiced skin bleaching within the last 12 months. However, about 51.3 per cent of those who were part of that practice do so to treat a skin disorder while the remaining do it to attain smooth and attractive skin complexion. This suggests that obtaining a smooth and perfect complexion is paramount among women [21]. Among the study participants in North-central Nigeria, 27 (10.7 per cent) students were using skin bleaching agents. About half of them (51.8 per cent) have been using

them for more than one year with the earliest age of onset being 11 years. The majority, 19 (70.4 per cent) applied bleaching more than once daily. Few of them (18.5 per cent) used a combination of creams for skin bleaching. Besides bleaching creams, 37.0 per cent of the students also used other forms of bleaching agent such as bleaching soaps (50 per cent), tablets (20 per cent) and herbs (10 per cent). About 75 per cent of the students applied the cream to the whole body while the rest limited application to the face and neck areas. Overall, 21 different brands of bleaching creams were used by these students. The common bleaching creams were Caro white, White secret, Perfect white, egg milk and skin clear. The choice of bleaching agent used was influenced by friends (40.8 per cent), family members (40.8 per cent) and media (11.1 per cent) among the participants [16]. Similarly, a study carried out among 395 female university students in Northeastern Nigeria, Bornostate revealed that below half of the participants (48.1 per cent) were active users of skin bleaching agent. In terms of frequency of application the majority (44.5 per cent) applied it once daily while the others applied it twice daily (39.0 per cent), once weekly 7.7 per cent and the rest (8.8%) used other patterns of application. Some (47.8 per cent) used a combination of skin bleaching products. Majority of the respondents, (57.1 per cent) chose the product by friend's recommendation, while others go by reading the brand name on labels (21.4 per cent) or through advertisements (10.4 per cent) [1].

It is evident that facial lightening is more frequently practiced than any other patterns. However, the reason for choosing which type or pattern of skin lightening depends largely on the individual and the purpose of doing it. At the initial stages of practice, a total body surface application is often used for maximum effect. That was then maintained with daily application of the products. Multiple products containing different agents may be used concurrently or sequentially [17].

Skin lightening was found to be practiced by prostitutes as a method of attracting the opposite sex. This happens to be very common among commercial sex workers and many of those who camouflage as fashion designers because of the stigma associated with prostitution. Some who are already fair in complexion by nature are found to use skin lightening agents to avoid tanning of the skin by sun [22].

Effects of Skin Bleaching: Bleaching agents may not have significant side effects with limited use but the risk of adverse reactions is increased when used for extended periods of time especially under occlusion [4]. Some women apply lotion to their bodies and wrap themselves in bandages under their clothes in the Caribbean, the Middle East, India, as well as in other places like Nigeria, Ghana, and South Africa. Preparations containing hydroquinone have been known to produce squamous cell cancer as well as exogenous ochronosis, a paradoxical blue-gray hyperpigmentation caused by homogentisic acid accumulation in the skin. Peripheral neuropathy, fish odor syndrome, and prenatal developmental retardation can all be results of systemic absorption. Neuropsychiatric toxicity, nephrotoxicity, pneumonitis, nail dyspigmentation, and mercurial baboon syn-

drome may all be systemic issues with preparations containing mercury. The possible negative consequences of glutathione have made it a serious health issue in many nations. India and the Philippines have both approved the use of glutathione infusions as supplementary therapies for cisplatin chemotherapy, but the FDA has not. Glutathione preparations for oral, topical, and intravenous use have proliferated internationally, but there is no established dosage or safe administration time. Significant side effects have been documented, including air emboli, Stevens Johnson Syndrome, hepatic, neurologic, and renal toxicity [4]. Many people who use skin lightening agents meet requirements for beauty and lessen the appearance of hyperpigmentation and other skin imperfections, but this has negative impacts on their health including the health of their children as a result of exposure to these agents during pregnancy or during infancy [23]. Some of the negative impacts include acrochordia, nephrotic syndrome, glomerulonephritis, dermatitis, and others. Our research provides a complete overview of these harmful effects and their causes, which may help healthcare providers correctly advise their vulnerable patients and persuade them not to use them while pregnant [23].

Sixty-five women with a mean age of 33 years attending dermatological clinics in Senegal in 2010 were subjected to a cross-sectional, quantitative, and descriptive survey to determine the expenditures associated with problems connected to the use of skin-lightening products. Most (80%) had a low income. Their total monthly income was about 5,675,000 CFA (US \$11,582). The total monthly cost of skin lightening for them was 19% of their total income. The aesthetic harm was categorized as moderate by 20% and high by 22% [24]. In a prospective descriptive study performed over 6 months among 86 females attending dermatology clinic in Le Dantec Hospital, Senegal, it revealed that hyperpigmentation of the joints was the most frequently found complication (85.4 percent), followed by striae atrophicae (72 per cent) and skin atrophy (59.8 per cent) (Dadzie & Antoinette, 2009) [25].

In a cross-sectional study of 348 market traders in Lagos, Nigeria, it was found that 23.9% of the participants had skin discoloration, 21.3% had skin rashes, 16.1% had stretch marks, 7.5% had easily bruised skin, and 5.5% had body odor [15].

Factors influencing Skin Bleaching: In the United States and Africa, some celebrities openly advocated skin-bleaching procedures as a route to success and beauty and emphasized that the majority of black celebrities had fairer complexions, which has a positive impact on the decision to use bleaching creams [11]. The use of skin bleaching agents corresponds to the level of education of the user. As the level of education increases the level of the use of skin bleaching agent also increases [21].

4. Methodology

Study locale: The study was in the first half of 2023 in Borno State, the largest state in the northeastern part of Nigeria and the second largest of the 36 states

in Nigeria. There are total of 27 local government areas in Borno State. The capital city of Borno (located at 11.5°N and longitude 13.5°E) is Maiduguri [1]. It has a harsh climate with a temperature range of 32°C to 42°C during hot season (February to June) and may as low as 15°C during the coldest months (December and January). Maiduguri has a rich and diverse cultural heritage and is pluralist in ethnic composition with Kanuri being the dominant ethnic group. Most of the inhabitants are Muslims and Christians with few traditionalists. Borno has been bedeviled with crisis of the Boko Haram insurgency since 2009 and it is still not over several areas of the state insecure and inaccessible [26]. Women in Borno traditionally have their traditional beauty procedures including halawa and dilke, a body scrub made with potatoes, cloves, turmeric, and oils, as well as durkhaan, a smoke bath made from sandalwood to tighten skin [27].

Study design: Cross-sectional descriptive study.

Study population: The study population included adults living in Borno state.

Sample Size Estimation: The formula was used in calculating the sample size for the descriptive study which is as follows using the Taro Yamane formula as below [28],

$$n = \frac{Z^2 pq}{d^2}$$

where:

n = minimum sample size for estimation of a meaningful event;

Z = standard normal deviate;

p = proportion of the factor;

$q = (1 - p)$;

d = desired level of precision.

Hence, Z = standard normal deviate (which is usually 1.96) and corresponds to a 95 percent confidence interval.

p = proportion of practice of skin bleaching is 48.1 which is 0.481 [1].

$q = (1 - p) = 1 - 0.481 = 0.519$

d = Desired level of precision = 5 percent (5/100) = 0.05

$$n = \frac{(1.96)^2 * 0.481 * 0.519}{(0.05)^2} = \frac{3.8416 * 0.481 * 0.519}{0.0025} = 383.6 \approx 384$$

Thus, the sample size calculated using the formula above is 384. To allow for an estimated attrition rate of 10 per cent, the minimum sample size was adjusted to 422.

Method of Sampling: The multi-stage sampling method was used in the study.

Stage 1 (Selection of LGAs): Maiduguri and Jere local government areas (LGAs) were selected by convenience sampling method. Almost all the ethnic groups in the state are well represented in Maiduguri and Jere local government areas which are located adjacent to each other. These two LGAs have 15 and 12 wards each respectively.

Comment [OB9]: The 2 local governments selected should not be convenience methods rather purposive sample technique since they have are the two largest local governments

Stage 2 (Selection of wards): Purposively, a quarter of the number wards in each of LGAs (4 in Maiduguri and 3 in Jere) were selected for the study by convenience method.

Stage 3 (selection of settlements): Twenty-five per cent of the total number of settlements in each of the wards was identified by convenience to be included in the study.

Stage 4: Selection of respondents' households. A major landmark (such as the local head's residence or the main mosque) in each of the communities was chosen as a reference point, and the home closest to it was visited to conduct the first responder interview.

Stage 5: (Selection of Respondents): An individual who was at least 15 years old was chosen as the responder in each household using the convenience sampling method. Only one responder was chosen at random from each home in the designated settlements by going door to door until the number allotted respondents for that settlement was attained. Number of respondents in each of the settlement was determined by proportionate allocation.

Data collection tool and sources of data: A semi-structured questionnaire which comprised closed and open-ended questions was used as the data collection tool. The primary source of data was the survey in which responses elicited were recorded in the questionnaire. It was designed in English language and administered by the interviewer. The questionnaire comprised sections asking questions about socio-demographic data and other pieces of information on knowledge and practice of skin bleaching as well as cutaneous effect of skin bleaching. The interviewers engaged were capable of asking the questions in the local language understood by the respondents. The data was collected during the interviews middle of March to middle of April 2023 (4 weeks).

5. Data Analysis and Presentation

The information obtained from the respondents was analyzed using statistical package science (SPSS) version 25. The data were presented in tables with percentages and frequencies. The p value was set at 0.05 to determine the associations. Association of knowledge and practice with the socio-demographic variables was tested using Chi square at 95 per cent confidence interval.

Ethical Consideration: Approval was obtained from the Research and Ethical Committee of University of Maiduguri Teaching Hospital, Borno State, Nigeria. Express consent was obtained from each respondent before the interviews. All the data were kept as confidential.

6. Results

Table 1 shows, that majority of the respondents were within the age group between 15 and 24 years, females, Muslims with O level school certificate as highest level of qualification but unemployed.

The calculated mean age of the respondents was 25 ± 7.4 .

Table 1. Socio-demographic characteristics of respondents.

Demographic variable	Frequency (n=422)	Percentage (percent)
Age (Years)		
15-24	253	60.0
25-34	122	28.9
35-44	39	9.2
45-54	8	1.9
Total	422	100
Gender		
Male	137	32.5
Female	285	67.5
Total	422	100
Marital status		
Single	291	69.0
Married	112	26.5
Divorced	11	2.6
Widowed	8	1.9
Total	422	100
Religion		
Muslim	317	75.1
Christian	105	24.9
Total	422	100
Educational level		
No formal education	15	3.6
Quranic/Sangaya	32	7.6
Primary School certificate	64	15.2
O-Level certificate	177	42.0
Tertiary	133	31.6
Total	422	100
Occupation		
Civil servant	54	12.8
Petty trader	74	17.5
Business person	126	29.9
Unemployed	142	33.6
Others	26	6.2
Total	422	100

About 90.3 percent of the respondents were aware of skin bleaching as shown in **Table 2**. Less than half of the respondents knew about the reasons why skin bleaching is done and the active ingredients it contains. Main source of knowledge were friends and the leaflet.

Table 3 demonstrates that the majority (62.5%) were knowledgeable about the negative effects of skin bleaching, but that knowledge was not as compelling as their claim of awareness.

Table 4 depicts that single women were perceived to use bleaching agent the most compared to the men or the married women especially to be more beautiful. Most respondents felt light skin is more beautiful and to look more prosperous.

Table 5 shows the proportion of current users of bleaching agent (prevalence rate) as 32.0 per cent.

Table 6 demonstrates that 42.2 per cent used skin bleaching as cosmetics than treatment of dark spots discoloration (18.5 per cent) or acne (3.7 per cent). The remaining (31.9 per cent) specifically used bleaching agent to lighten the skin.

Table 7 demonstrate that majority (86.7 per cent) of the users of skin bleaching were satisfied with the result of skin bleaching. The level of satisfaction varies with 68.4 per cent just satisfied while 28.1 per cent were more than satisfied.

Table 8 shows that original skin color ($p < 0.01$) and educational level ($p < 0.00$) were associated with the level of knowledge of respondents on skin bleaching.

Table 9 depicts that association exist between the practice of skin bleaching each one among gender ($p < 0.00$), original skin color ($p < 0.017$) or educational level ($p < 0.000$) of respondents.

Table 2. Knowledge on skin bleaching.

Variable	Frequency	Percentage(%)
Awareness of skin-bleaching agents		
Yes	381	90.3
No	41	9.7
Total	422	100
*Source of information about skin bleaching (n=381)		
Friends	240	39.0
Family Members	109	17.1
Media	115	18.7
Chemist	57	9.3
Vendor	94	15.3
Total	615	100
Knowledge on purpose of skin bleaching		
Changing skin color	139	36.5

Continued

Makingtheskinmorebeautiful	139	36.5
Makingtheskinsmoother	67	17.6
Fortreatmentofskinconditions	36	9.4
Total	381	100
Knowledgeofactiveingredientsinskin-bleachingagents		
Yes	107	28.1
No	274	71.9
Total	381	100
*Typeofactiveingredients(n=107)		
MercurySalt	28	16.8
Hydroquinone	69	41.3
Arbutin	15	9.0
kojicacid	37	22.1
Glutathione	12	7.2
Steroid	6	3.6
Total	167	100
*Sourceofinformationofactiveingredients		
Labelsorleaflets	84	78.5
Friends	7	6.5
Family	11	10.3
Media	5	4.7
Total	107	100

*Multipleresponsesallowed.

Table3.Knowledgeof sideeffectandlong termcomplicationsofskin bleaching.

Variables	Frequency	Percentage (%)
Awarenessofthesideeffectsofskinbleaching		
Yes	238	62.5
No	143	37.5
Total	381	100
*Whatsideeffectsareyouawareof(n=238)		
Skinirritation	118	13.6
Skindiscoloration	196	22.6

Continued

Skininfections	45	5.2
Sunburn	130	15.0
Skinpeeling	49	5.6
Stretchmarks	121	13.9
Acne	117	13.4
Fragileskin	93	10.7
Total	869	100
Long-term complications of the use of skin-bleaching products		
Yes	131	55.0
No	107	45.0
Total	238	100
*Long-term complications of bleaching agents do you know of (n = 131)		
Kidneyfailure	39	23.6
Skin cancer	113	68.5
Vertigo	2	1.2
Fetaltoxicity	11	6.7
Total	165	100

*Multiple responses allowed.

Table 4. Perception of skin bleaching among respondents.

Variables	Frequency	Percentage (%)
*Who use skin-bleaching agents more		
Single-Men	18	5.4
Single-women	253	76.5
Married-Men	8	2.4
Married-women	52	15.7
Total	331	100
*Why do you think most people bleach their skin (n = 381)		
For beauty	308	32.8
To be of higher social status	101	10.7
To have more chances of being employed	45	4.8
To attract the opposite gender	270	28.7

Continued

To impress their Partners	170	18.1
To avoid discrimination	46	4.9
Total	940	100
Which skin color do you think is more beautiful		
Very light skin	18	4.3
Light skin	212	50.2
Dark skin	186	44.1
Very Dark Skin	6	1.4
Total	422	100
Light skin is superior or advantageous over dark skin		
Yes	103	24.4
No	319	75.6
Total	422	100
Why is light skin advantageous over dark skin		
Dark skin connotes poverty	4	3.9
Dark skin is less attractive	90	87.4
Others	9	8.7
Total	103	100

*Multiple responses allowed.

Table 5. Practice of the use of skin bleaching.

Variables	Frequency	Percentage (%)
Current users of skin bleaching product		
Yes	135	32.0
No	287	68.0
Total	422	100
Previous users of skin bleaching		
Yes	52	18.1
No	235	81.9
Total	287	100
Duration of use of skin bleaching		
Less than 6 months	36	26.7
1 year	46	34.1
2 years	38	28.1

Continued

>2years	15	11.1
Total	135	100
Preferred skin-bleaching product		
Local product	52	38.5
International	64	47.4
Traditional	19	14.1
Total	135	100
Number of bleaching product used in the last 12 months		
1	59	43.7
2	54	40.0
More than 2	22	16.3
Total	135	100
Number of friends or relatives who use or have used skin-bleaching products		
1	24	8.6
2	112	40.3
>2	142	51.1
Total	278	100
Duration of their usage		
Less than 6 months	28	10.1
1 year	26	9.4
2 years	116	41.7
>2 years	108	38.8
Total	278	100

Table 6. Practice of skin bleaching.

Variable	Frequency	Percentage(percent)
Reasons for skin-bleaching		
Cosmetic	57	42.2
Discoloration of dark spots	25	18.5
Acne	5	3.7
skin lightening	43	31.9
others	5	3.7
Total	135	100

Continued

*Method you practice (n=135)		
Creams	112	51.9
Injectable	9	4.2
Tablets	4	1.9
Locally made/traditional concoction	18	8.3
Organic products	5	2.3
Soap	68	31.4
Total	216	100
Frequency of use of skin-bleaching agents		
Rarely	3	2.2
Occasionally	20	14.8
Sometimes	32	23.7
Always	80	59.3
Total	135	100
Source of bleaching agents		
Supermarkets	23	17
Cosmetics shops	86	63.7
Online	4	3.0
Drugstores	6	4.4
Self-formulation	16	11.9
Total	135	100
Influencer your choice of agents		
No one	30	22.2
Friends	78	57.8
Advertisement	23	17.0
Sample	4	3.0
Total	135	100

Table 7. Level of satisfaction among users of skin bleaching agents.

Variable	Frequency (n=135)	Percentage (percent)
Satisfied with the results of skin bleaching		
Yes	117	86.7
No	18	13.7
Total	135	100

Continued

Level of satisfaction			
Undecided	1	0.9	
Partly satisfied	3	2.6	
Just Satisfied	80	68.4	
More than satisfied	33	28.1	
Total	117	100	
If dissatisfied what have you done about it			
Stopped using it	4	22.2	
Bought more bleaching agent	10	55.6	
Others	4	22.2	
Total	18	100	

Table 8. Assessment of relationship between socio-demographic characteristics and knowledge.

Variable	Goodknowledge	Poorknowledge	Total	P-Value(X ² ,95% CI)
Originalskincomplexion				
Lightskin	39	104	143	<0.01
Darkskin	112	164	276	
Others	0	3	3	
Educational Level				
Noformaleducation	0	15	15	<0.00
Quranic/Sangaya	4	28	32	
PrimarySchoolcertificate	11	53	64	
SSCE	59	118	177	
Tertiary	77	56	133	

Table 9. Relationship between socio-demographic characteristics and practice.

Variable	Good Practice	Poor Practice	Total	P-Value
Gender				
Male	16	118	134	<0.00
Female	109	173	282	
Original skin complexion				
Light skin	31	110	141	<0.017
Dark skin	92	180	272	
Others	2	1	3	

Continued

Educational Level				
No formal education	0	15	15	
Quranic/Sangaya	1	31	32	
Primary School certificate	9	54	63	<0.00
SSCE	57	119	176	
Tertiary	58	72	130	

7. Discussion

Table 1 shows the age range of the majority (60.0 per cent) of the respondents was 15 - 24 years, followed by those within the age range 25 to 34 years (28.9 per cent). The mean age of the respondents was 25 ± 7.4 years. (Standard deviation = 7.4). The proportion of the females was about 67.5 per cent of the respondents due to the fact that they remain indoors most of the times. This is similar to the findings in a similar community based studies in Ghana where the female respondents (50.2 per cent) out proportioned the males (49.8 per cent) [13]. The same finding is in a similar study in Lagos [19]. About two thirds of all the respondents were unmarried as found in the above two studies in Ghana and Lagos which similar community based studies. Majority of the respondents (75.1 per cent) were Muslims. About 42.0 per cent of the respondents had secondary school education as their highest qualification. About one third of the respondents were unemployed. The rest were civil servants, petty traders or business persons. Few of the respondents belong to other categories of employments.

Table 2 shows that a greater proportion of the respondents (90.3 per cent) were aware of skin bleaching agents and most got their information from friends (56.9 per cent). This is in keeping with similar studies done in Keffi, North Central Nigeria (76.5 per cent) and in Borno, Northeastern Nigeria (95.7 per cent) where a majority were aware of skin bleaching and mostly got the information from friends and media (45.3 per cent and 51.6 per cent) respectively [1][16]. The finding was however different from the findings in a community based cross sectional among the residents of Ikeja in Lagos, Nigeria where the main sources of information were persons (63.1 per cent) and internet (36.9 per cent) [19]. University campus based study among female students at Kampala International University-Western campus showed the major sources of information were friends (50 per cent) [14]. The source of information about bleaching agents varies among different places but friends seem to be the commonest source. On the knowledge of purpose of skin bleaching about one-third (36.5 per cent) of the respondents stated that skin bleaching was to change the skin color while about 17.6 per cent mentioned that the purpose was to make the skin look more beautiful. A community-based cross-sectional study in Ghana, the respondents admitted

that skin bleaching was about making the skin smooth (84.3 per cent)

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and changing the skin color 43.2 per cent by using chemicals 54.1 per cent [13]. Contrary to the use of bleaching agents according to respondents in the present study to treat skin conditions (9.4 per cent), the respondents in similar community based study in Ikeja, Lagos said skin bleaching agents are also used to treat skin blemishes (62.2 per cent) and acne (71.8 per cent). Respondents in similar study in Ghana admitted that skin bleaching agents are also used in treating skin diseases (77.4 per cent). The study in Ghana also revealed that skin bleaching agents are used for other reasons include enhancing beauty (97.6 per cent), boost self-esteem (78.6 per cent), increasing the chances of getting better jobs (9.5 per cent) and attaining social class (9.5 per cent). Many of the expressions by the respondents in the various studies seem to be inter related and linked to physical elegance or more pleasing to the eyes. Despite the utterances of the respondents about the reasons for skin bleaching only about 25 per cent of them knew about the ingredients of the agents used mainly (78.5 per cent) from the labels or the leaflets accompanying the in the present study. In contrast to the present study, more respondents in the Ghanaian study (37.6 per cent) and among the female students at Kampala International University-Western campus (42 per cent) know about the ingredients of the skin bleaching agents. Hydroquinone was the commonest ingredient identified by most of the respondents (41.3 per cent) while steroid was identified by least (3.6 per cent) of the respondents in the present study.

Table 3 shows the respondents' knowledge of the side effect and long term complications of skin bleaching. More than half (62.5 per cent) of the respondents were aware of the side effects associated with the use of skin bleaching agents, with the commonest identified side effect being skin discoloration (22.6 per cent), followed by sunburn (15.0 per cent), stretch marks (13.9 per cent), skin irritation (13.6 per cent), acne (13.4 per cent), fragile skin (10.7 per cent), skin peeling (5.6 per cent) and skin infection (5.2 per cent). Proportion of the respondents that was aware of the side effects of bleaching agents was lower than the findings of similar to a study carried out in the northeastern Nigeria, among female University students where about 89.1 per cent knew about the side effect of skin bleaching [1]. About 55.0 per cent of the respondents were aware of the long term complications of skin bleaching such as cancer (58.4 per cent), kidney failure (16.2 per cent), fetal toxicity (4.6 per cent) and vertigo (0.8 per cent).

About 76.5 per cent of the respondents believed that single women uses skin bleaching agents more as in **Table 4**. This perhaps may be due the fact that this group of women are looking for suitors as most men prefer light skin women as found in the study conducted on University students in Kampala where 83.0 per cent of the respondents believed that Single women use skin bleaching agents more [14].

According to a study conducted among Ghanaians, the respondents believed that skin bleaching agents add to the beauty of the skin (73.0 per cent) as well as enhance attraction towards the opposite sex (64.0 per cent) [13]. About half

(50.2 percent) believed that light skin to be more beautiful than the darker one as in **Table 4**. Adewoyin (2020) [8] noted in his study that light skin tone has been mistaken for symbol of beauty, purity, sweetness, sex appeal, superiority and higher social status some. **Table 4** shows that about 24.4 per cent of the respondents believed that light skin is superior and advantageous over dark skin just as noted by Adewoyin. About 87.4 per cent of the respondent in the present study believed that dark skin is less attractive. This may be as a result of influence of colonization of Africa by the white people that left them with mentality that light skin matches superiority, higher social status, sex appeal, and riches while dark skin is associated with poverty and slavery [8]. The trend that white skin has evolved to be seen as a sign of attractiveness in South Asian countries such as Pakistan, India, Bangladesh, etc. still remains for the sake of being loved by others, most of whom are female; most people with dark skin tones try to achieve lighter skin throughout their lives [29].

Table 5 shows the proportion of current users of bleaching agent (prevalence rate) as 32.0 percent within the study locale at the time of data collection while about 18.1 percent had used skin bleaching agents in the past. The proportion of active users of bleaching agents is less than that of the campus based study conducted within the region in 2018 [1]. This is less than what was found in a similar study conducted in Dakar, Senegal among 368 women out of which 52.7 percent were active users of skin bleaching agents [30]. The prevalence rate was also less than the rate found in a similar study in Lagos, Nigeria with 450 traders in participation in which 77.3 per cent were actively using skin bleaching product at the time of the study. This variation could be as a result of age coverage, social exposure, financial status of the participants and the stigma surrounding the use of skin bleaching within the communities [15]. In the present study, about 34.1 per cent and 28.1 per cent had been using the skin bleaching agent for the past one year and two years before the study respectively. That was low in comparison to the study done in North Central Nigeria among 189 adolescents where half (51.8 percent) of them had been using the skin bleaching agents for more than a year. The prevalence rate found in the present study is less than the value (37.7 percent). A University based cross sectional study in Karachi, Pakistan with 499 students of both gender in participation revealed that 30.9 percent of them had used skin lightening products during their life out of which 15.1 percent of the total participants using the skin bleaching agent at the time of the study.

About 47.4 per cent of the respondents attested to preferring the use of foreign products as against the local (38.5 percent) and traditional (14.1 percent) products. This can be due to the perception that foreign products were rated more effective than locally-made or traditional products. In the last 12 months prior to the study about 43.7 per cent of the respondents said to have used one skin bleaching agent while the remaining used two (40.0 percent) or more than two (16.3 per cent) bleaching agents.

About 65.9 percent of the respondents admitted to having either friends or

relatives who use or have used skin bleaching agents in the past.

Table 6 shows that out of the 32.0 percent of those who use bleaching agents, about half use the one that are topically applied such as creams or while about one third use soaps. About 59.3 percent of the users of skin bleaching agents use it on daily basis while the others use them sometimes, occasionally or rarely. Majority of the users of skin bleaching agents obtain the products from the cosmetics shops (63.7 per cent) or super markets (17.0 per cent). Others got the products from drug stores, online or locally manufacture them by themselves. Most of those who practice skin bleaching do so because of the influence of friends (57.8 per cent). Most (86.7 per cent) of those who practice the habit of skin bleaching were satisfied with their actions as in **Table 7**.

Table 8 shows that the level of knowledge of respondents on skin bleaching was associated with user's original skin color ($p < 0.01$) and educational level ($p < 0.00$). **Table 9** above shows that there was a statistically significant ($p < 0.05$) relationship between practice of skin bleaching and each one of the following: gender (< 0.00), original skin complexion (< 0.017) and educational level (< 0.00). The prevalence (48.1 per cent) of practice of skin bleaching in among the University students was higher than that of the present study (32.0 percent) in which only about 31 per cent that had reached tertiary level of education [1].

8. Conclusions

Northeastern Nigeria was observed to have a high prevalence of skin bleaching practices. The majority of respondents were unaware of the ingredients of the skin bleaching agents, and almost half were unaware of the long-term risks or adverse effects. In their opinion, the primary motivation behind skin bleaching was to enhance one's physical attractiveness in order to capture the attention of the opposite sex. Additionally, they thought that bleaching one's skin would raise one's social standing and bring luck in the form of potential mates or job opportunities. The majority said that while a darker complexion could be less beautiful than lighter skin, but not necessarily inferior.

Recommendation

Government agencies, partners, and other interested parties, such as religious and traditional leaders, have a duty to inform the public about the dangers of skin bleaching through public campaigns, radio and television commercials, social media posts, and billboards.

To limit access to bleaching agents, the government should enact laws prohibiting the importation of harmful skin bleaching substances and the local manufacture of them.

The promulgated policies would be enforced by government organizations such as NAFDAC, NDLEA, and other security agencies.

If individuals or organizations disregard government regulations pertaining to skin bleaching, appropriate action should be taken against them.

It is time for Nigeria's government to outlaw the sale of skin-whitening products that pose a risk to individuals' or public health.

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