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Knowledge, Attitude and Practice of the Nephrotoxic Effects of Skin Bleaching Among Women in Akure Metropolis

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Abstract: Background: Skin bleaching (SB) is a practice that keeps rising among Nigerian women. The prevalence is as high as 77.3%, making Nigeria the leading country in Africa. It is associated with various adverse effects on the kidney health especially when agents containing ingredients such as mercury and steroids are used. It is therefore important to eliminate the practice of skin bleaching to reduce the associated nephrotoxic effects.

Objective: The aim of this study is to evaluate the knowledge, attitude and practice of skin bleaching and its nephrotoxic effect among women in Akure metropolis, Ondo State, Nigeria.

Method: This was a cross-sectional descriptive study among 269 women in Akure. They were interviewed using a self-administered questionnaire. The questionnaire sought information on the knowledge, attitude and practice of skin bleaching. Data was analyzed using IBM SPSS.

Result: A total of 269 women with a mean age of 29.16 ± 9.60 years completed the survey Most (65.7%) of the respondents had a good knowledge of skin bleaching. A majority (93.2%) had heard about skin bleaching, while

55.3% knew that skin bleaching can affect kidney health. Among the study participants, 140 (53.0%) were using skin bleaching products. Level of education, marital status and occupation were significantly associated with skin bleaching ($p<0.05$)

Conclusion: The level of knowledge and attitudes towards the effects of skin bleaching on kidney health were found to be good. However, the practice was found to be high in more than half of the respondents. Therefore, regulation and control skin bleaching products' sales and use should be implemented.

Keywords: Skin Bleaching, Kidney, Women

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 whose action is to reduce amount of melanin produced by the skin. Products used to achieve this purpose are known as depigmenting, skin-lightening, skin-bleaching, and skin-brightening or skin brightening agents.[5, 25]

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, due to a system of inequality that grants special advantages to lighter skinned individuals known as colorism.[11, 12, 13]

Skin bleaching is a global cosmetic practice commonly common among Africans and Asians. Among Africans it varies (32.7%-52.2%) with higher prevalence in Nigeria.[26] The practice of SB is high among young people with up to 55.9% of those less than 30 years engaging in the practice of SB[8]. Among young female adults (students of tertiary institutions) the use of bleaching cream is as high as 48.1% while among adolescents (high school students) it is about 36.6% in proportion. [24, 26]

Mercury is a known cause of nephrotic syndrome and can also cause hyperpigmentation due to the deposit of mercury granules in the skin in chronic bleachers.[13] Topical steroids damage the skin causing large multiple stretch marks, skin atrophy, skin infections, folliculitis and systemic disorders such as Cushing's syndrome and diabetes mellitus.[19] Despite the risk of these complications, the practice of skin bleaching is still rampant in most African societies. Skin bleaching is a growing global public health issue that poses significant risks to consumers resulting from the main ingredient which are associated with hypertension, diabetes and even kidney disease.[3]

The practice of skin bleaching is associated with various problems. These result from the main ingredients in most bleaching agents such as hydroquinone, mercury and steroids. Hydroquinone is associated with dermatitis, exogenous ochronosis, fish-odour syndrome, nail discolouration and patchy skin pigmentation.[20] In addition, topical corticosteroids predispose to skin infections, such as dermatophytosis, folliculitis, erysipelas, scabies and viral warts. Systemic adverse effects

due to chronic corticosteroid use include Cushing's syndrome, diabetes mellitus, immunosuppression, hypertension, and suppression of the hypothalamic-pituitary-adrenal axis with adrenal suppression, the latter being the most alarming complication, as it can lead to death.[7] Inorganic mercury salts contained in creams and other cosmetics are easily absorbed through the skin, sweat glands and sebaceous glands, they penetrate the epidermis, accumulating in the hair and the body's organs, with the highest concentration found in the kidney, near the proximal tubule.[1, 3]

Acute or chronic exposure can result in dermal, gastrointestinal, neurological and renal toxicity. Organic and metallic mercury, which is more lipophilic, is more typically associated with neurological damage which includes; muscle weakness, peripheral neuropathy, depression, psychosis, anxiety, vision loss while inorganic mercury more often causes kidney damage such as tubular injury and glomerular injury upon acute and chronic exposures respectively. A common clinical sign in exposed infants and children is hypertension. Since mercury crosses the placenta, the use of skin lighteners containing mercury during pregnancy may lead to pre- and post-natal intoxication, leading to serious harmful effects on babies.[18]

The kidney

The kidney is a bean shaped organ about the size of a fist. It is located in the retroperitoneal space at the sides of the vertebral column, extending from T12-L3. The nephron is the minute or microscopic structural and functional unit of the kidney which is about 1 to 1.5 million nephrons in each kidney.[27]

The kidneys function in a wide variety of ways necessary for health. They regulate fluid and electrolyte balance, promote bone integrity. [6] It ensures long term acid-base balance and also produces erythropoietin which stimulates the production of red blood cell. It also produces renin for blood pressure regulation and carries out the conversion of vitamin D to its active form. [16] Of these includes excretion of toxic metabolite. Due to these ability (to reabsorb and accumulate divalent metals) the kidney is the first target organ of heavy metal toxicity present in skin bleaching products.[17]

Nephrotoxic effects of skin bleaching products

Mercury

The kidneys are the main organ for excreting mercury, causing it to accumulate in the proximal tubules after absorption from the skin.[1] Tubular necrosis and altered proximal tubular cell permeability and proteinuria is seen in acute exposure to high quantities of mercury. Chronic exposure directly damages the podocytes, causing glomerular diseases such as minimal change disease (MCD), membranous glomerulonephritis (MGN), and focal segmental glomerular sclerosis (FSGS), all which leads to nephrotic syndrome.[17]

Corticosteroids

Corticosteroids in skin bleaching products cause corticosteroids induced electrolyte imbalance characterized by hypernatremia, hypokalemia and fluid retention, hypertension which can indirectly stress the kidneys, a predisposing factor to other disease like diabetes potentially leading to kidney damage.

Lead

Chronic lead exposure worsens kidney injury by increasing urate secretion, promoting vasoconstriction, and ultimately leading to glomerulosclerosis, hypertension, and interstitial fluid loss. Acute exposure to lead primarily affects the proximal tubules, where intranuclear inclusion bodies containing lead-protein complexes form. This proximal tubular damage impairs reabsorption processes and frequently results in Fanconi syndrome, which is characterized by the loss of electrolytes in the urine.[23]

Statement of the problem

The misconception that the light skinned has more opportunities in the society has led to the alarming prevalence of this practice. In 2018 World Health Organization (WHO) published that the prevalence of skin bleaching in Nigeria was as high as 77%, making Nigeria the leading country in Africa, followed by Togo (59%), South Africa (35%), and Senegal (27%), which may involve the use of multiple bleaching agent to achieve desired tone. [9]

The resultant effect of bleaching agents includes kidney disease, skin irritation, depletion of melanin etc. Melanin which is the pigment responsible for different skin tones plays a vital role as it protective roles against UV light and infection which poses consumers to risk.

Justification

Due to these misconception, many has been misled into the practice of skin bleaching. It is however necessary to curb these practice, as this will subsequently reduce morbidity and mortality rate.

Aim: This study is to evaluate the knowledge, attitude and practice of skin bleaching and its nephrotoxic effect among women

Objective: To determine the prevalence of skin bleaching, evaluate the knowledge, access the respondents' perception on skin bleaching their knowledge of nephrotoxic effect of these agents

MATERIALS AND METHODOLOGY

Study location

This study was carried out among women in Akure metropolis. Akure is a city in south-western Nigeria. It is the capital and largest city of Ondo State. The city had a population of 403,000 as of the 2006 population census. Its current population is 774,000.

Study design

The design for this study is descriptive cross-sectional study

Sample size

The sample size for this study was determined using the formula

$n= Z^2pq/d^2$

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% confidence interval.

p = proportion of practice of skin bleaching is 77.3% which is 0.773.

Desired level of precision = 5 per cent (5/100) = 0.05

$n= (1.96^2\times (0.773 \times 0.227)/ (0.05)^2 = 269$

Thus, the sample size using this formula is 269. [9]

Data Collection Tool and Techniques

The participants were interviewed using a structured questionnaire adapted from a review of several studies. The questionnaire has four (4) sections; socio-demographic characteristics of the

respondents, knowledge, attitude, skin bleaching practices respectively. A scoring system was made to measure the level of knowledge about the nephrotoxic effects of skin bleaching. Three questions were used to assess knowledge. One mark was awarded for the correct answer and zero for the incorrect answer. The total score was converted to a percentage. The scores were graded as good or poor. Scores of 50% and less defined poor knowledge, while scores above 50% defined good knowledge. The same system was applied for the scoring of attitude and practice.

Data analysis and management

The data were cleaned, collated and analyzed using the IBM SPSS. Descriptive statistics generated frequency tables, means and standard deviations. Inferential statistics were carried out, and the Chi-Squared test was used to test for the association between categorical variables. The level of statistical significance was set at $p < 0.05$.

RESULT

A total of 265 participated in the survey. The mean age of the participants was 29.16 ± 9.60 years. Most (198; 66.9%) of the respondents were aged 21–30. One hundred and fifty two (57.7%) were single, while (5; 1.9%) were widowed. Most (166; 63.9%) of the respondents had tertiary education, while (36; 13.8%) had only primary education, and 105 (40.2%) were civil servants (Table I).

Knowledge of Skin Bleaching

Most (65.7%) of the respondents had a good knowledge of skin bleaching. A majority (93.2%) had heard about skin bleaching, while 55.3% knew that skin bleaching can affect kidney health. About 35.1% claimed their sources of information was social media, while 15.8% got their sources of information from family/friends. Less than a third (21.1%) identified kidney failure as a potential risk of skin bleaching on kidney health. (Table II). Most of the participants in the age group 21-30 (62.9%) knew that skin bleaching affects kidney health, while only 34.3% of those aged 40 years and above knew about this. Most of the single women (60.1%) knew that skin bleaching can affect kidney health, while only 20.0% of the divorced women had that knowledge. Most of the respondents who has tertiary level as their highest level of education (66.3%) knew that skin bleaching can affect kidney health.

Attitude towards skin bleaching

About two-thirds (67.0%) had a positive attitude towards skin bleaching. Less than a third (54; 20.8%) agreed that skin bleaching is necessary, also 54 (20.6%) agreed to consider using skin bleaching products despite the potential risks to kidney health. However, 137 (51.9%) disagreed that the benefits of skin bleaching outweighs the potential kidney risks. (Table III). Thirteen respondents among the 40+ category (37.1%) said they will still consider skin bleaching despite potential kidney risks, while 39.7% and 38.9% agreed with the same among respondents with secondary and primary education respectively. Also, about 27.7% of those with primary education thought the benefits of skin bleaching outweigh the potential kidney risks.

Practice of skin bleaching

Among the study participants, 140 (53.0%) were using skin bleaching products. Most (90; 64.8%) of them were using the products daily. A majority, 124 (88.2%) used a combination of skin beaching products. All the widowed respondents were using skin bleaching products, also most of the divorced (80.0%) (Table IV). The 40+ age group (71.4%), and primary education level (75.0%) were using skin bleaching products (Table V)

There was a significant association between like marital status and use of skin bleaching products ($p<0.05$). Also, with level of education, occupation and practice of skin bleaching. The frequency of use of skin bleaching products decreased with level of education with primary education (75.0%) having the majority of users (Table V).

Table I: Sociodemographic characteristics of the participants

Sociodemographic characteristics	*Frequency*	*Percentage %*
Age group (years)	n= 266	
<21	34	12.7
21-30	132	49.4
31-40	65	24.3
>40	35	13.1
Highest Level of Education	**n = 260**	
Primary	36	13.8
Secondary	58	22.3
Tertiary	166	63.9
Marital Status	**n = 265**	
Single	153	57.7
Married	102	38.5
Divorced	5	1.9
Widowed	5	1.9
Occupation	**n = 261**	
Civil Servant	105	40.2
Self-Employed	86	33.0
Student	70	26.8

Table II: Knowledge of skin bleaching among women in Akure metropolis

Knowledge	*Frequency*	*Percentage %*
Ever heard of Skin Bleaching?	**n = 265**	
Yes	247	93.2
No	18	6.8
Do you know SB can affect kidney health?	**n = 262**	
Yes	145	55.3
No	117	44.7
Potential risks of SB on kidney health?	**n = 223**	
Kidney damage	129	57.8
Kidney failure	47	21.1
Kidney stones	47	21.1
Sources of information about effects of SB on kidney health	**n = 265**	
Social media	93	35.1
Healthcare provider	80	30.1
Family/ Friends	42	15.8
Television/Radio	50	18.8

Table III: Attitude of participants towards skin bleaching

Attitude	*Agree Frequency (%)*	*Undecided Frequency (%)*	*Disagree Frequency (%)*
Is SB necessary?	54 (20.8)	39 (15)	167 (64.2)
Would you consider using SB products	54 (20.6)	42 (16)	166 (63.4)

despite potential kidney risks?			
Do you think the benefits of SB outweighs the potential kidney risks?	47 (17.8)	80 (30.3)	137 (51.9)

Table IV: **Practice of skin bleaching among women in Akure metropolis**

Practice	Frequency	Percentage (%)
Ever used SB products?	**n = 264**	
Yes	140	52.7
No	124	47.3
How frequently do you use SB products?	**n = 140**	
Once in a month	22	15.1
Once in a week	28	20.1
Daily	90	64.8
Combination of SB products	n= 140	
Yes	124	88.5
No	32	11.5

Table V: Association between skin bleaching and socio-demographic characteristics of the respondents

Sociodemographic Characteristics	Use of SB products					
	No Freq (%)	Yes Freq (%)	Total Freq (%)	X^2	df	p-value
Age group (years)						
<21	13 (38.2)	21 (61.8)	34 (100.0)			
21-30	67 (51.1)	64 (48.9)	131 (100.0)	9.320	6	0.156
31-40	35 (53.0)	29 (47.0)	66 (100.0)			
>40	10 (28.6)	25 (71.4)	35 (100.0)			
Highest Level of Education						
Primary	9 (25.0)	27 (75.0)	36 (100.0)			
Secondary	17 (29.3)	41 (70.7)	58 (100.0)	71.934	6	0.001
Tertiary	97 (57.8)	69 (42.2)	166 (100.0)			
Marital Status						
Single	79 (51.6)	74 (48.4)	153 (100.0)			
Married	45 (44.1)	57 (55.9)	102 (100.0)	185.392	8	0.001
Divorced	1 (20.0)	4 (80.0)	5 (100.0)			
Widowed	0 (0.0)	5 (100.0)	5 (100.0)			
Occupation						
Civil Servant	58 (55.2)	47 (44.8)	105	64.699	6	0.001

Self-Employed Student	33 (38.4) 31 (44.3)	53 (61.6) 39 (55.7)	(100.0) 86 (100.0) 70 (100.0)			

DISCUSSION

This study was aimed to evaluate the knowledge, attitude and practice of the nephrotoxic effects of skin bleaching among women resident in Akure metropolis. Most of the respondents were aged 21-30 years (49.4%), Single (57.7%), Tertiary level of education (63.9%) and Civil Servants (40.2%). This study revealed that 93% of the respondents have heard about skin bleaching, while only 55.3% were aware of the effects of skin bleaching on kidney health. However, about 65.7% of the respondents had a good knowledge of skin bleaching. This is similar to other studies that had reported good knowledge and awareness of skin bleaching where just about two-thirds were aware of the complications associated with skin bleaching. [2] A similar survey in Jordan revealed that about two-thirds of users of skin-lightening products knew its adverse effects.[10]

Regarding the source of information, the majority of participants have heard about the adverse effects of skin bleaching on kidney health from the social media (35.1%), followed by healthcare providers (30.1%) as a source of knowledge. This did not corroborate with a study done in Northeastern Nigeria where the majority of the participants heard about skin whitening agents mainly from their friends (51.6%). [3] This contrast might be due to the level of acceptance and practice of social media between the northern and southern parts of Nigeria.

Regarding the attitude (64.2%) of respondents agreed that skin bleaching is not necessary, while (51.9%) think the benefits of skin bleaching do not outweigh its potential risks to kidney health. About 67.0% have favorable attitude toward skin bleaching products, this agrees with the study by Amodu et al on university students where majority (51.8%) agrees that skin bleaching should be used for medical purposes only.

At the time of this study, it was revealed that about 52.7% of the respondents were practicing skin bleaching. This agrees with study to a survey conducted in Jordan, where 60.7% of the respondents had used skin bleaching products[10]. Also, majority (64.8%) using it daily, and a major proportion (88.5%) combining skin bleaching products. This partially agrees with the findings in a Senegalese survey, where 92.0% did the same. [15] The lower rate in the present study might be attributed to the increasing cost of procuring these skin bleaching products, hence, the lower frequency rate for the use of skin bleaching products.

Socio-demographic characteristics such as educational level, marital status and occupation were significantly associated with the use of skin bleaching products. The frequency of use decreased with level of education. Respondents with primary education used skin bleaching products more than those with higher educational qualifications. This might be due to the poor knowledge of the adverse effects of the products because of low education. This agrees with a study by Lewis et al in 2011.

CONCLUSION

The level of knowledge and attitudes towards the effects of skin bleaching on kidney health of Women in Akure were found to be good. Unfortunately, the practice was found to be high in more than half of the respondents. Despite knowledge and being aware of the danger of skin bleaching products on kidney health, it does not stop them from it. This means that a good knowledge and awareness alone does not guaranty a proper practice. Level of education, marital status and occupation were significant to the use and practice of skin bleaching products. Therefore, it should be emphasized that interventions and education about nephrotoxic effects of skin bleaching need urgent implementation. Also, regulation and control skin bleaching

products' sales and use should be implemented.

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