

Factors Associated with Voluntary Cosmetic Depigmentation in Schools in the Collines Department (Benin)

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Abstract

Skin depigmentation is a worrying practice that is gaining popularity, particularly among young girls. However, this practice poses health risks. It also reflects a negative view of black skin color. This was a cross-sectional study carried out between April and May 2023 which involved 1039 female students from schools and universities in the Collines department selected by stratified sampling. Data was collected during a face-to-face interview using a questionnaire providing information on the demographic, socio-cultural, and economic characteristics of the girls. The depigmentation products used were identified as well as the complications caused by the use of these products. Statistical analysis made it possible to calculate the frequencies and logistic regression made it possible to identify the factors associated with depigmentation. The prevalence of depigmentation among the girls surveyed was 78.2%. The main products used were soaps based on mercurial derivative and hydroquinone (21.6%) and lotions based on hydroquinone and corticosteroids (75.7%). The factors associated with the practice of depigmentation were the ethnicity of the respondents (OR = 2.52; 95% CI = [0.47 - 13.33], p = 0.001); the average monthly income of the parents (OR = 3.26; 95% CI = [1.71 - 6.09], p = 0.003); the opinion of the respondents on depigmentation (OR = 2.48; 95% CI = [0.84 - 7.3], p < 0.001) and the value given to light skin versus black skin (OR = 3.41; 95% CI = [2.32 - 5.01], p < 0.001). In conclusion, the prevalence of depigmentation among the girls surveyed is high. Consequently, reinforced awareness measures and stricter control of bleaching products

are imperative to address this high prevalence of the phenomenon.

Keywords

Voluntary Depigmentation, Cosmetic Depigmentation, Factors Associated, Students, Collines Department, Benin

1. Introduction

Skin color varies from continent to continent. Black skin is the primary characteristic of Africans. This characteristic has been stigmatized since colonization. This negatiation of the color of black skin has over time led to behaviors which, for the most part, have the objective of changing the black color of the skin. This “fashion” phenomenon reveals a certain socio-anthropological aspect, which equates the black color of the skin with a negative and inferior vision of the human being [1]. This practice, despite the health risks, is increasingly being adopted by young girls and women and even certain men in sub-Saharan Africa. It also seems to be a widespread social phenomenon all over the world. Thus, several studies report the practice in the Indian Ocean (Mayotte) with a prevalence of 33% in a sample of 163 women [2]; in the Middle East (Saudi Arabia) [3], in Asia (India, Philippines, Hong Kong (China), Vietnam, Malaysia); in Central America and South America. It seems rare or even exceptional in the French West Indies [4].

The practice of voluntary cosmetic depigmentation has become a real public health problem due to serious dermatological and systemic complications. Although this practice is adopted by everyone regardless of gender, according to several studies it is the prerogative of women [5]. Increasingly, it has also become the adoption of pupils and students (36.6%) [6]. The main motivations are, among others, following fashion, the desire to be beautiful, imitating people around you, self-medication, the need to seduce, the desire to please, the desire to standardize the complexion, social events such as marriages, social ascension, and success, the influence of magazines and cinema, aggressive advertisements which promote a stereotype of beauty [7] [8].

Advertisements made for bleaching products on television channels and micromy are often a source of encouragement for depigmentation. Unfortunately, there are no mechanisms in place to control these advertisements [1] and national regulations to combat the manufacturing and sale of depigmentation products are poorly operational. Nigeria and Ivory Coast are the countries in West Africa where the cosmetics industry is developed and their bleaching products are flooding the Beninese market. The geographical location of the Collines department in Nigeria exposes it to the importation of bleaching products without control, which could facilitate the adoption of the practice among young girls.

In Benin, the prevalence of voluntary cosmetic depigmentation was 50.3% according to a study carried out in the three large markets of Parakou [1] while it

was 79.22% in Comé [9]. Likewise, similar average ages are reported with most of them having a minimum of 15 years in several studies [9] [10]. In our education system, girls aged around fifteen are in high schools and colleges. Certainly, a few rare teenagers around fifteen are found in schools but these cases are more in rural areas. The present study aims to understand the extent of the phenomenon of voluntary cosmetic depigmentation in schools and to identify the explanatory elements.

2. Materials and Methods

Study framework

This study took place in the Collines department located in central Benin. This was a descriptive cross-sectional study that took place from April to May 2023. The study population consisted of students from public and private colleges and universities in the Collines department. We included all girls enrolled in a public and private college and university located in the Collines department who agreed to participate in the study. We excluded girls who withdrew their consent during the survey.

Type and period of study

This was a descriptive cross-sectional study with analytical purposes which took place from April to May 2023.

Study methods

The sampling was probabilistic for the choice of students and non-probabilistic for the choice of students from the two universities located in the department. For the choice of students, the sampling was stratified at two levels. The first level was a simple random survey of three municipalities of the six in the Collines department. At the second level, we carried out a simple random survey of four districts per selected municipality, *i.e.* 12 districts selected. Within the districts, two strata were created: the private stratum and the public stratum. One establishment was selected in each stratum by simple random sampling. In each school, the list of girls aged 13 and over in 2nd, 1st, and Tle classes was established and then the targets were drawn at random.

The non-probability convenience sampling technique was used for the selection of female students in the two Universities.

Inclusion criteria

Be regularly enrolled in one of the establishments selected for the study; be enrolled in second to final-year classes or enrolled at university; be present on the days of data collection; have given consent to the study (for adult participants) and have obtained parental authorization (for minors).

Sampling size

The minimum sample size for our study was calculated using the Schwartz formula. The estimated prevalence of depigmentation that was considered is 0.37 [6] with a precision of 5%.

Formula: $n = [\varepsilon\alpha^2 pq / \rho^2]$

p = estimated prevalence of depigmentation ($p = 0.37$);

$q = 1 - p = 0.63$;

accepted risk of error ($\epsilon\alpha^2 = 1.96^2$);

i = desired precision for our results, $i = 0.03$;

Thus the minimum size of our sample for the study is $n = 994.97 \approx 995$ students. By increasing the minimum sample size calculated to cover cases of non-response by 5%, the sample size will be $N = n + (5\% \times n) = 1044$ rounded to 1045. After processing the data we excluded 6 forms for lack of completeness, *i.e.* a size of 1039 girls surveyed.

2.1. Study Variables

The dependent variable in our study was depigmentation. It had two modalities: the “Yes” modality for depigmented individuals; the “No” modality for non-depigmented individuals.

Explanatory variables

Sociodemographic variables: age, ethnicity, religion, student class, nationality, etc. Variables linked to the practice of voluntary cosmetic depigmentation: types of cosmetic products used; methods of practice; the motivations; dermatological consequences and systemic consequences.

2.2. Collection Materials and Tools

A structured interview guided by a questionnaire made it possible to collect information relating to the practice of depigmentation. This tool was developed by the corresponding author of this article and has been read and approved by all other authors. The reliability of the questionnaire was measured by the Cronbach’s alpha index.

2.3. Data Collection and Analysis

Data collection was carried out with the digitized questionnaire and then deployed on the kobotoolbox platform. The data were analyzed with IBM SPSS version 25 software. Quantitative variables were expressed as average with their standard deviation and qualitative variables as proportion. The characteristics of users of bleaching products were compared to those of non-users using the chi-square test. Variables associated with depigmentation were determined using univariate analysis and those found to be significant (with $p < 0.05$) were entered into the multivariate model using a retrospective selection. For the final analysis, the 95% confidence limit was used with a $p < 0.05$.

2.4. Ethical Considerations

The investigation protocol was validated by the public health unit of the Faculty of Health Sciences of Cotonou. Collection authorizations were obtained from the said unit, the departmental education directorates, and the directors of the establishments. The anonymity and confidentiality of the data collected were by

the ethical principles applicable to medical research on human subjects contained in the Declaration of the World Medical Association of Helsinki.

3. Results

3.1. Socio-Demographic Characteristics

In total, 1039 pupils and students were selected to participate in the study. This sample included 882 male and 157 female students. The average age of the respondents was $19.2 \text{ years} \pm 2.9 \text{ years}$ with extremes of 13 and 31 years. The most represented age group was that of girls aged between 19 and 23 (47.9%). Overall, 80.8% of the population surveyed practiced one of the Christian religions. A proportion of 96.6% was unmarried respectively. A small proportion (36.8%) had an income-generating activity and 58.5% lived in an urban area (Table 1).

3.2. Main Dermatological Products Commonly Used by Young Girls Who Are Losing Their Pigmentation

Among the respondents, 21.6% used soap containing a bleaching product, and 75.6% used lotion containing a bleaching agent (Figure 1).

Among the 224 who used bleaching soaps, respectively 36 (16.1%) and 188 (83.9%) used soaps based on mercury derivative and based on hydroquinone (Figure 2).

Of the 786 girls who used a body lotion containing bleaching chemicals, respectively 668 or 85% and 118, or 15% used body lotions containing hydroquinone and corticosteroids (Figure 3).

3.3. Varied Plain Analysis

The univariate analysis showed a significant association between the dependent variable “use of bleaching products” and several other independent variables. From this varied analysis presented in Table 2, we note that young girls aged

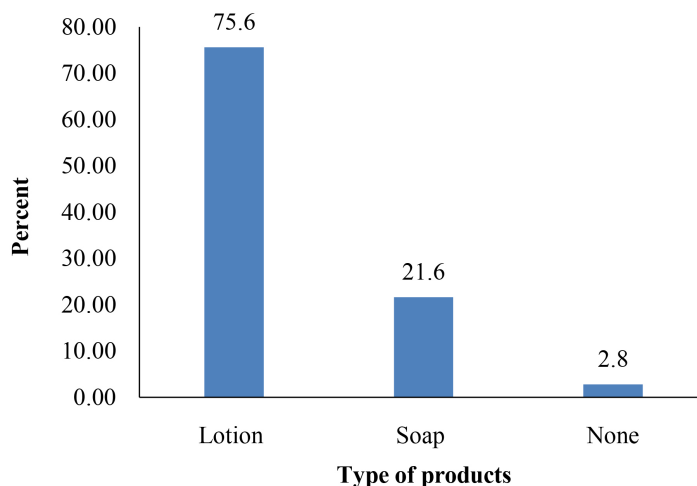


Figure 1. Distribution of products used by respondents in the Collines department according to their nature, April to May 2023.

Table 1. Socio-demographic characteristics of young girls in school in the Collines department surveyed from April to May 2023.

Terms	Workforce (n = 1039)	Percentage
Age		
[13 - 18]	457	44.0
[19 - 23]	498	47.9
24 and over	84	8.1
Ethnic group		
Idacha	263	25.3
Fon	262	25.2
Yoruba and related	228	21.9
Mahi	177	17.0
Adja	74	7.1
Others*	35	3.4
Nationality		
Beninese	1028	98.9
Others**	11	1.1
Religion		
Christian	840	80.8
Muslim	118	11.4
Endogenous	81	7.8
Marital status		
Not married	1000	96.6
Bride	39	3.4
Level of study		
Secondary	882	84.9
University	157	15.1
Income-generating activity		
No	657	63.2
Yes	382	36.8
Residence area		
Urban	608	58.5
Peri-urban	280	26.9
Rural	151	14.5

Autres*: Gitamari, Yome, Ani, Minan/Autres** = Togolaise, Nigériane.

Table 2. (a): Varied analysis of factors associated with the use of voluntary de-pigmentation products among young school girls in the Col-Lines department, April to May 2023. (b): Varied analysis of factors associated with the use of voluntary depigmentation products among young school girls in the Collines department, April to May 2023.

(a)					
Variables	Depigmented students		ORb	IC 95%	p-value
	Yes (%)	No (%)			
Age					0.026
[13 - 18]	360 (44.3)	97 (42.9)	1		
[19 - 23]	397 (48.8)	101 (44.7)	1.05	[0.77 - 1.44]	
24 and over	56 (6.9)	28 (12.4)	0.53	[0.32 - 0.89]	
Nationality					0.306
Others	10 (1.2)	1 (0.4)	1		
Beninese	803 (98.8)	225 (99.6)	2.8	[0.35 - 22.0]	
Ethnic group					<0.001
Adja	67 (8.2)	7 (3.1)	1		
Others	33 (4.1)	2 (0.9)	1.72	[0.33 - 8.76]	
Fon	166 (20.4)	96 (42.5)	0.18	[0.08 - 0.4]	
Idacha	202 (24.8)	61 (27.0)	0.34	[0.15 - 0.79]	
Mahi	149 (18.3)	28 (12.4)	0.55	[0.23 - 1.33]	
Yoruba and related	196 (24.1)	32 (14.2)	0.64	[0.27 - 1.51]	
Marital status					0.557
Not married	781 (96.1)	219 (96.9)	1		
Bride	32 (3.9)	7 (3.1)	0.78	[0.34 - 1.79]	
Level of study					<0.001
Secondary	717 (88.2)	165 (73.0)	1		
University	96 (11.8)	61 (27.0)	2.76	[1.92 - 3.96]	
Average monthly income of parents (FCA)					0.011
Under 52 000	633 (77.9)	196 (86.7)	1		
52,000 - 100,000	65 (8.0)	13 (5.8)	1.54	[0.83 - 2.8]	
100,000 and more	115 (14.1)	17 (7.5)	2.09	[1.22 - 3.57]	

ORb: brute odds, 1\$ = 599,00FCFA.

(b)					
Variables	Depigmented students		ORb	IC 95%	p-value
	Yes (n %)	No (n %)			
Importance of the external appearance of the body					0.038
No	2 (0.2)	3 (1.3)	0.18	[0.17 - 1.49]	
Yes	811 (99.8)	223 (21.6)	1		
Perceived superior value of light-skinned women					<0.001
No	423 (52.0)	169 (74.8)	0.36	[0.26 - 0.5]	
Yes	390 (48.0)	57 (25.2)	1		

Continued

Religion					<0.001
Christian	635 (78.1)	205 (90.7)	0.38	[0.19 - 0.78]	
Muslim	106 (13.0)	12 (5.3)	1.10	[0.44 - 2.75]	
Endogenous	72 (8.9)	9 (4.0)	1		
Income Generating Activity					0.116
No	504 (62.0)	153 (67.7)	0.77	[0.56 - 1.06]	
Yes	309 (38.0)	73 (32.3)	1		
Opinion on depigmentation					<0.001
The fashion	86 (10.6)	18 (8.0)	0.54	[0.18 - 1.56]	
Good practice	284 (34.9)	13 (5.8)	2.48	[0.84 - 7.3]	
Bad for health	399 (49.1)	190 (84.1)	0.23	[0.09 - 0.61]	
Find/keep husband	44 (5.4)	5 (2.2)	1		
Third party encouragement					0.375
None	23 (2.8)	9 (4.0)	0.70	[0.32 - 1.53]	
Entourage (friend/mother/sister/ neighbors/media)	790 (97.2)	217 (96.0)	1		

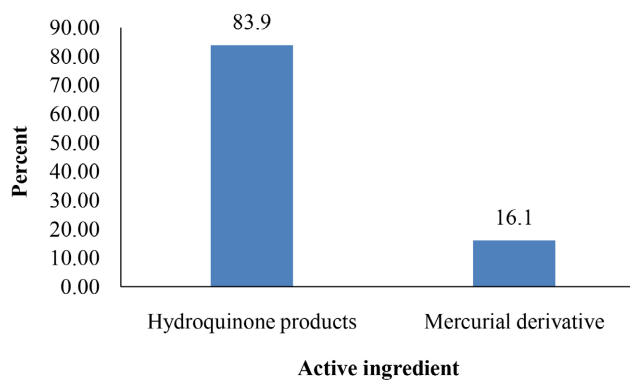


Figure 2. Soaps used for depigmentation by young girls attending school in the Collines department according to their active ingredient, April to May 2023.

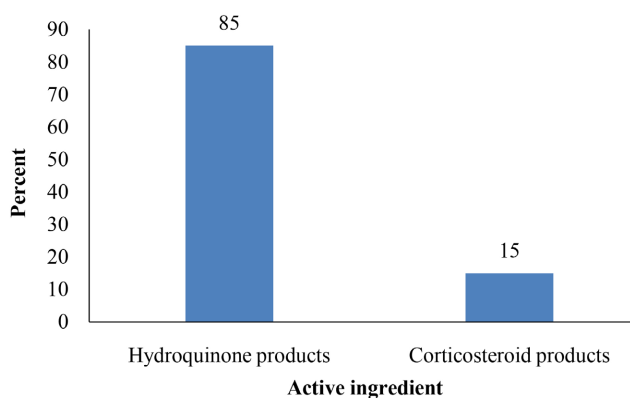


Figure 3. Body lotion used for depigmentation by young girls attending school in the Collines department according to their active ingredient, April to May 2023.

between 19 and 23 were more likely to be depigmented students (OR = 1.05; CI 95% = [0.07 - 1.44], $p = 0.026$) only girls aged between 13 and 18. Girls belonging to the ethnic group other than Fon, Idacha, Mahi, Yoruba, and related are more likely to be depigmented students than Adja girls (OR = 1.72; CI 95% = [0.33 - 8.76], $p < 0.001$). Student girls used bleaching products more than secondary school girls (OR = 2.76; CI 95% = [1.92 - 3.96], $p < 0.001$). Girls whose parents have an average monthly income greater than 52,000 F CFA make more use of bleaching products than girls whose parents had an average monthly income less than 52,000 F CFA (OR = 2.09; CI 95% = [1.22 - 3.57], $p = 0.011$). Girls who thought that the external appearance of the body is not important are less likely to be depigmented students than their counterparts who attach importance to the external appearance of the body (OR = 0.18; 95% CI = [0.17 - 1.49], $p = 0.038$). Similarly, girls who believe that a light-skinned girl has no special value versus a black/dark-skinned girl are less likely to be depigmented students than their counterpart who places special value on a girl. Fair skin (OR = 0.36; CI 95% = [0.26 - 0.5], $p < 0.001$). Muslim girls in this study were more likely to be depigmented students than Christian girls (OR = 1.10; CI 95% = [0.44 - 2.75], $p < 0.001$). The risk of depigmentation was twice as high among girls who thought that it was a practice as opposed to those who thought that this practice allowed them to find/keep a husband (OR = 2.48; CI 95% = [0.84 - 7.3], $p < 0.001$).

There was no statistically significant association between the use of bleaching products and nationality, marital status of the respondents, possession of an activity, and encouragement from a third party (**Table 2(a)** and **Table 2(b)**).

3.4. Prevalence of Voluntary Depigmentation

More than three-quarters (78.2%) of the respondents used bleaching products in the form of soap and/or body lotion (**Figure 4**).

3.5. Multivariate Analysis

From the multi-varied analysis, it appears that the ethnicity, the average monthly income level of the parents of the girls surveyed, the value given to light skin

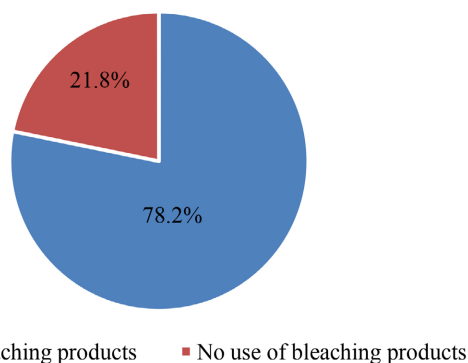


Figure 4. Prevalence of voluntary depigmentation.

versus black skin, and the opinion (position) of the girls on depigmentation were the factors that best explained the adoption of the practice of voluntary depigmentation among young school girls in the Collines department.

Indeed, the risk of adopting the practice of voluntary depigmentation was more than twice as high among girls belonging to the ethnic group other than the Fon, Idacha, and Mahi compared to Adja girls (OR = 2.52; CI 95% = [0.47 - 13.33], $p = 0.001$). Fon ethnic group appears to be a protective factor. The risk of practicing depigmentation increases among girls when the average monthly income level of their parents increases. This risk was respectively 1.65 and 3.26 among girls whose parents had an average monthly income of 52,000 - 100,000 F CFA and 100,000 F CFA and more compared to girls whose parents had an average monthly income of less than 52,000 F CFA. In addition, for those whose light-skinned girls were more valuable than black-skinned girls, the risk of practicing depigmentation was higher (OR = 3.41; CI 95% = [2.32 - 5.01], $p < 0.001$). Understanding that the practice of depigmentation is bad for health constitutes a protective factor (Table 3).

Table 3. Multivariate analysis of factors associated with the use of voluntary depigmentation products among young school girls in the Collines department, April to May 2023.

Variables	depigmented students		ORa	IC 95%	p-value
	Yes (n %)	No (n %)			
Ethnic group					0.001
Adja	67 (8.2)	7 (3.1)	1		
Fon	166 (20.4)	96 (42.5)	0.23	[0.09 - 0.55]	
Idacha	202 (24.8)	61 (27.0)	0.68	[0.28 - 1.65]	
Mahi	149 (18.3)	28 (12.4)	0.93	[0.37 - 2.35]	
Yoruba and related	196 (24.1)	32 (14.2)	1.13	[0.45 - 2.81]	
Others	33 (4.1)	2 (0.9)	2.52	[0.47 - 13.33]	
Average monthly income of parents (FCFA)					0.003
Less than 52,000	633 (77.9)	196 (86.7)	1		
52,000 - 100,000	65 (8.0)	13 (5.8)	1.65	[0.82 - 3.32]	
100,000 and more	115 (14.1)	17 (7.5)	3.26	[1.71 - 6.09]	
Value of light-skinned women versus dark-skinned women					<0.001
No	423 (52.0)	169 (74.8)	1		
Yes	390 (48.0)	57 (25.2)	3.41	[2.32 - 5.01]	
Opinion on depigmentation					<0.001
The fashion	86 (10.6)	18 (8.0)	0.54	[0.18 - 1.56]	
Good practice	284 (34.9)	13 (5.8)	2.48	[0.84 - 7.31]	
Bad for health	399 (49.1)	190 (84.1)	0.23	[0.09 - 0.61]	
Find/keep husband	44 (5.4)	5 (2.2)	1		

1\$ = 599,00FCFA, ORa = adjusted odds.

4. Discussion

4.1. Prevalence of Voluntary Cosmetic Depigmentation among Young Girls at School

In this study, 78.2% of respondents practiced voluntary depigmentation. Our results are similar to those reported by Glèlè-Ahanhanzo and al who found a prevalence of 79.22%, CI 95% = [75.72 - 82.78] in a population-based study in the south-east of Benin [9]. A prevalence lower than this was found in a study carried out by Djegbo among women in the three large markets of Parakou in 2013 which was 50.3% [11]. This difference could be explained by the difference in the study targets. These two studies were carried out among different socio-professional groups and in addition, the present one was among relatively younger groups. This high prevalence could be explained by the fact that the Hills department is close to the Federal Republic of Nigeria with a lot of trade. These exchanges also include the marketing of depigmenting products that are not subject to control before their deployment on the market. This ease of access combined with other factors would explain this high prevalence. Our results also differ from those reported by Hamed *et al.* on the practice of skin lightening among women living in Jordan [12]. In this study, a prevalence of 60.7% was found. This study was carried out in the Asian continent unlike ours which was carried out in West Africa. Indeed, several studies have already reported differences in the prevalence of voluntary depigmentation between continents [1] [3] [13] [14]. The population of the Asian continent being light in color, would adopt this practice less, which is certainly what justifies this difference between the results found.

4.2. Factors Associated with Voluntary Cosmetic Depigmentation among Young Girls at School

Regarding the factors associated with depigmented students, the results indicate that girls belonging to ethnic groups other than Fon, Idacha, and Mahi have a higher risk of adopting voluntary depigmentation. This observation suggests that cultural and social differences between ethnic groups may influence individuals' attitudes and behaviors toward depigmentation. Already the cultural habits of certain ethnic groups in northern Benin confirm these attitudes. They are accustomed to the use of plants for cosmetic purposes such as henna to color the palms of the hands, the soles of the feet, and body tattoos on the occasion of certain sociological events.

Unlike our study, it is another sociological factor that was found to be associated with the use of depigmenting products by a study carried out in Comè in the south-east of Benin [9]. The population source and target of the two studies being different could justify this difference.

Egbi *et al.* in a study among female medical students in Nigeria found a significant association between the use of SLP and skin color (OR = 3.8; IC 95% = [1.572 - 9.318], $p = 0.003$) [15]. These factors differ from those found in the

present study. In our study, it was rather the value given to women with fair complexions towards women with dark complexions that were associated with depigmented students. This preference for light skin may be influenced by cultural beauty standards and social perceptions prevalent in our societies. Likewise, the sociological representations inherited by Africa since slavery as well as the myth of the superiority of white color over black skin justify these results.

In this study, the average monthly income level of girls' parents also had a significant impact on the propensity to practice voluntary cosmetic depigmentation. Contrary to this result, the results of Asumah and al did not show an association between income level and the use of depigmenting products [5]. The difference in sociocultural contexts could justify this difference. This result also differs from those of Yayehrad *et al.* who found a significant association between the practice of depigmentation and the level of education (ORa = 7.66, CI 95% = [1.23, 47.59]; p = 0.029) [16]. As for the study by Motlohi *et al.* on the knowledge, perceptions, practices, promotional factors, and awareness of the health risks of African Basotho women about skin-lightening products, it is the profession that was associated use of SLA (ORa = 2.91, 95% CI 1.15 - 7.40; p = 0.02) [17]. Indeed, the variations between the results of these authors and ours could be explained by the difference in the targets and population of the study. These different studies were conducted in the general population, unlike ours.

Girls who consider depigmentation to be a good practice have a higher risk of practicing it compared to those for whom depigmentation is associated with finding or keeping a partner. This highlights the importance of individual beliefs and personal perceptions in young girls' decision-making process.

Nyoni-Kachambwa *et al.* identified occupation, skin tone, and marital status as being associated with skin bleaching. The risk of skin bleaching for participants who worked was (OR = 1.45; CI 95% = [0.32 - 1.91], p = 0.02); participants with dark skin (OR = 2.56; CI 95% = [0.76 - 2.87], p = 0.01); and unmarried participants (OR = 2.87; CI 95% = [0.29 - 3.58], p = 0.03). This difference could be explained by the difference in the methodology between the two studies. Additionally, the questionnaire in their study was self-administered and data was collected from networks, unlike our study where the questionnaire was administered face to face [18].

5. Limits of Study

As limits of this study, we can count information biases. It was not possible to verify (confirmed or unconfirmed) the exactitude of information given by respondents. To minimize that bias, during data collection, efforts were made to assure coherence and concordance in the responses given. Also as a limitation, this study did not include male students and out-of-school youth. This could have a more complex vision of depigmentation practices.

6. Conclusion

This study made it possible to measure the extent of the practice of depigmenta-

tion in schools in the Collines department of Benin. It showed a very high prevalence. This prevalence was among the highest reported to date in West Africa. The associated factors identified in the present study (ethnic group, average monthly income of parents, value of light-skinned women versus dark-skinned women, and opinions on depigmentation) must now be taken into account in the implementation of actions to combat depigmentation in the school environment.

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Conflicts of Interest

The authors declare no potential conflict of interest concerning the research, authorship, and/or publication of this article.

Authors' Contributions

All authors have contributed to the correction of the document.

Ethical Considerations

The survey protocol was validated by the public health unit of the Cotonou Faculty of Health Sciences. Authorizations for data collection were obtained from the aforementioned unit, the departmental teaching directorates and the directors of the establishments. The anonymity and confidentiality of the data collected complied with the ethical principles applicable to medical research on human subjects, as set out in the Declaration of the World Medical Association of Helsinki.

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