

# Keloids from Ear Piercing in People with Pigmented Skin in Sub-Saharan Africa: Modalities and Complications

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**Received :** April 25, 2024

**Published :** May 07, 2024

## ABSTRACT

**Introduction:** Ear piercing, a practice for aesthetic or ritual purposes, exposes practitioners to infectious and allergic risks. On pigmented skin, the risk of the appearance of a keloid scar should be noted. Our objective is to study piercing modalities and complications, factors favoring keloids, and clinical aspects on dark skin. **Methodology:** Cross-sectional study carried out over a year, in the dermatology department of the Treichville University Hospital (Abidjan), including adult patients of dark phototypes, presenting a post-piercing keloid of the ear. **Results:** Seventy-two patients were recruited, giving a hospital prevalence of 0.96% of post-ear-piercing keloids. And a proportion of 39% among keloids of all locations. Women represented 92% (sex ratio of 0.4). The average age was  $25.61 \pm 5.77$  years {18 – 52}. Thirty-six percent (36%) had a family history of keloids. The average time to onset after piercing was 14.9 months. It was mainly done at home (56%) and with jewelry (82%). The ear lobule was the main site (61%) with a single keloid in 90% of patients. Post-piercing skin infections were present in 53%. Surgical ablation followed by corticosteroid infiltration was the main treatment performed (77%). Carrying out the piercing at home ( $p < 0.001$ ), the use of jewelry for piercing ( $p = 0.002$ ), the large size of keloids ( $p = 0.002$ ), poor aseptic conditions ( $p < 0.001$ ) were statistically linked to the occurrence of keloids. **Conclusion:** Ear piercing at home, the use of jewelry, the large size of keloids, and poor aseptic conditions could promote the appearance of ear keloids on pigmented skin in sub-Saharan Africa.

**Keywords:** Piercing; Ear Keloid; Pigmented Skin; Africa

## INTRODUCTION

Keloid scars are benign fibrous skin tumors that originate from

the reticular dermis [1]. They can occur spontaneously or as a result of infection or skin trauma, particularly following piercing, and are more common in patients with a personal and/or family history of keloids [2-6]. Piercings are body modifications that involve perforating the ear or another part of the body to insert an ornament for aesthetic or ritual purposes, depending on the culture [7]. The practice of piercing carries risks of infection and allergic reactions due to the conditions and metals used. Additionally, there is a risk of keloid scarring at the site of the piercing, which is more common in individuals with darker skin pigmentation [8]. The study aimed to describe piercing modalities and complications, factors favoring keloids, and clinical aspects on dark skin in tropical Africa.

## MATERIAL AND METHODS

**Type and scope of the study:** This was a descriptive and analytical cross-sectional study conducted at the Dermatology and Venereology Department of Treichville University Hospital.

**Study Period:** January to December 2021, a period of twelve months.

**Study population:** The study population consisted of individuals of any sex aged 18 or over who exhibited keloid scarring of the ear.

**Inclusion criteria:** Patients aged 18 and above with keloid scars of the ear, regardless of sex, who have provided their informed consent to participate in the study. The diagnosis of keloid was based on the following criteria:

- Scar of hard consistency
- Evolving for more than 12 to 18 months beyond the limits of the lesion, with no tendency to regress
- Pruritic and irregular, with or without pain
- Presence of crab-leg expansion

**Non-inclusion criteria:** Patients with hypertrophic scars were not included.

**Data Collection:** The data were collected via a survey form following questioning and a clinical examination of patients seen in consultation at Treichville University Hospital.

**Data processing:** The data were processed and analyzed anonymously using SPSS 21 software. Tables, graphs, and figures were produced using Excel 2016 and Word 2016. Quantitative variables were expressed as mean  $\pm$  standard deviation or median and were compared using Student or Wilcoxon tests. Categorical variables were expressed as headcount (percentages) and were compared using chi-square or Fisher tests. The significance level was set at 5%.

**Ethical Considerations:** The study was submitted for approval to the Medical and Scientific Director of the Treichville Hospital and University Center, which acts as the local ethics committee. The data collected did not identify the patients included in the study. The patients provided their verbal and signed consent for the use of the data collected in a scientific publication.

## RESULTS

### Socio-professional Characteristics of Patients

During the study period, 7508 patients consulted the clinic, including 185 cases of keloid scars in various locations, resulting in a prevalence of 2.46%. Out of these cases, 72 were ear keloids, accounting for 38.92% of all keloids and a hospital prevalence of 0.96%. The study population was predominantly female (92%), with a sex ratio (M/F) of 1:11. The mean age of patients was  $25.61 \pm 5.77$  years [18-52], with a predominance of patients aged between 18 and 25 years. All patients had phototype VI. Out of the total number of patients, 55 (76%) had a higher level of education, with the majority being pupils and students (55%). Table 1 summarizes the socio-demographic characteristics of the patients.

**Table 1:** Main socio-demographic characteristics of patients with keloids.

Characteristics	Effectives	Percentage
Age range [18 - 25 years [	33	46
Gender		
Female	66	92
Male	06	08
Occupation		
Students	40	55
Education level		
University	55	76
Monthly income		
< 60000 FCFA	39	54
[300000 - 450000 FCFA[	05	07

FCFA: French African Colonies Francs

**Clinical Features of Keloid Scars**

The mean age of patients at the time of piercing was 21.90 ± 5.03 years (extremes 13 and 41 years). There was a personal (39%) and family (36%) history of keloid scarring. The average

time to keloid formation after piercing was 14.87 ± 5.10 months (07 and 24 months). Pruritus was the most frequent functional symptom, present in 70 patients (97%). Keloid scars were located preferentially in the ear lobules (61%) (Figure 1) and averaged between 2 and 6 cm in size (Table 2).



**Figure 1:** Post-piercing keloid scar of the left ear in a 35-year-old adult woman.

**Table 2:** Distribution of patients according to keloid characteristics.

Characteristics of keloids	Effectives (n=72)	Percentage
<b>Siege</b>		
Helix	34	47
Anthelix	03	04
Lobula	44	61
<b>Count</b>		
1	65	90
2	05	07
3	02	03
<b>Size</b>		
Small	13	18
Medium	35	49
Large	24	33
<b>Skin condition</b>		
Normal	03	04
Hyperpigmented	66	92
Hypopigmented	03	04

The conditions under which ear piercings were performed and the post-piercing procedures are summarized in Tables 3 and 4.

**Table 3:** Distribution of patients by piercing method (n= 72).

Piercing procedures	Effectives	Percentage
<b>Reason for design</b>		
<b>Mode</b>	<b>55</b>	<b>77</b>
Aesthetics	11	15
Culture	06	08
<b>Place of realization</b>		
<b>Home</b>	<b>40</b>	<b>56</b>
Market	18	25
Professional Institute	14	19
<b>Material for piercing</b>		
Pistol	04	06
Disposable piercing needle	02	03
Sewing needle	04	06
Piercing catheter	03	04
<b>Jewelry</b>	<b>59</b>	<b>82</b>
<b>Aseptic conditions</b>	<b>28</b>	<b>39</b>
Alcohol	24	33
Others	04	06

**Table 4:** Distribution of patients according to post-piercing modalities (n=72).

Post-piercing procedures	Effectives	Percentage
<b>Number of piercings performed</b>		
1	05	07
<b>2</b>	<b>59</b>	<b>82</b>
3 or more	08	11
<b>Type of jewelry worn</b>		
With pressure	25	35
<b>With loop</b>	<b>42</b>	<b>58</b>
Broom	03	04
Wire	02	03
<b>Complications</b>	<b>45</b>	<b>62</b>
Infection	29	40
Ulceration	38	53

**Treatment of Keloids**

Of the total number of patients, 35 (49%) received keloid scar treatment. Surgery was the most common treatment, with 27 patients (77%) undergoing this procedure. Intracheloidal infiltration was the second most common treatment, with 7 patients (20%) receiving it, followed by pressure therapy, which was used on only 1 patient (3%).

**Analytical study**

No statistically significant association was found between age, reason for piercing, place of piercing, number and complications of piercing, and number of ear keloids (refer to Table 5).

**Table 5:** Characteristics by age of piercing.

<b>Variables</b>	<b>≤ 25 years n = 56 ; (%)</b>	<b>&gt; 25 years n = 16 ; (%)</b>	<b>p-value</b>
<b>Reason for design</b>			
<b>Mode</b>	45 (80)	10 (63)	0,329
Aesthetics	07 (13)	04 (25)	
Culture	04 (07)	02 (12)	
<b>Place of realization</b>			
<b>Home</b>	32 (57)	08 (50)	0,385
Market	15 (27)	03 (19)	
Professional Institute	09 (16)	05 (31)	
<b>Number of ear piercings</b>			
1	02 (04)	03 (19)	0,096
2	47 (84)	12 (75)	
3 or more	07 (12)	01 (06)	
<b>Complications</b>			
Yes	36 (64)	09 (56)	0,558
No	20 (36)	07 (44)	
<b>Number of ear keloids</b>			
1	51 (91)	14 (88)	0,472
2	03 (05)	02 (12)	
3	02 (04)	00 (00)	

However, a statistically significant association was observed between the place of piercing ( $p < 0.001$ ), use of inappropriate jewelry ( $p = 0.002$ ), large keloid size ( $> 6\text{cm}$ ) ( $p = 0.002$ ), and occurrence of post-piercing complications (refer to Table 6).

**Table 6:** Characteristics according to the occurrence of complications.

Variables	Onset of complications		p-value
	Yes n = 45 ; (%)	No n = 27 ; (%)	
<b>Aseptic conditions</b>			0,006
Yes	12 (27)	16 (59)	
No	33 (73)	11 (41)	
<b>Place of realization</b>			< 0,001
Home	30 (67)	10 (37)	
Market	13 (29)	05 (19)	
Professional Institute	02 (04)	12 (44)	
<b>Type of jewelry worn after piercing</b>			0,002
With pressure	09 (20)	16 (59)	
With loop	31 (69)	11 (41)	
Other	05 (11)	00 (00)	
<b>Number of ear keloids</b>			0,180
1 keloid	39 (87)	26 (96)	
At least 2 keloids	06 (13)	01 (04)	
<b>Size of keloids on the ear</b>			0,002
Small	04 (09)	09 (33)	
Medium	20 (44)	15 (56)	
Large	21 (47)	03 (11)	

**DISCUSSION**

This study aimed to describe keloid scars of the ear after piercing in phototype VI patients.

Our study found a higher frequency of keloids (38.92%) compared to Kassi et al. (4.9%, 2016) in our same department, Allah et al. (25.5%, 2013) in Abidjan, and Traoré et al. (8.8%, 2019) in Ouagadougou [9-11]. However, it was lower than the findings of Carmassi et al. in France, who reported 38 cases of keloids, including 44.4% of ear keloids [12]. This increase may be associated with the growing prevalence of piercings

among the Ivorian population.

The observed average age ( $25.61 \pm 5.77$  years) was slightly higher than that reported by Kluger et al. in France (20.6 years for men and 18.9 years for women) [13]. The prevalence of piercing decreased with age, with the phenomenon mainly affecting the 16-24 age group in the Kibadi study in Congo [14]. These data were compared with hospital statistics, which showed a predominance of keloids in young subjects in the immediate post-pubertal period (between 16 and 30 years of age). This period is characterized by significant hormonal



changes [14]. Additionally, some authors have suggested that the high incidence of keloids in young subjects was due to increased skin tension, while older subjects experienced skin slackening [15].

Niang et al. (2015) in Senegal and Kassi et al. (2012) in Côte d'Ivoire have also highlighted the predominance of female piercings [16, 9]. Although piercings are mainly for aesthetic purposes, they are more common among women in our regions [14]. However, our series also included five men who were interested in piercings. In their 2012 study in Antananarivo, Ahn et al. (2012) also found piercings among men [17].

Kibadi et al. (2017) conducted a study in the Democratic Republic of Congo (DRC) and reported a high prevalence of keloids among students (65.7%), which is higher than the prevalence found in our study (55%) [14]. The study suggested that the importance of physical appearance and the desire to follow fashion trends through mimicry may lead young people to use ornamental objects such as ear jewelry.

A study conducted in Burkina Faso in 2019 found that 22.4% of patients had a family history of keloids, a figure slightly lower than our findings of 36% [2]. In contrast, only 2.3% of patients in the DRC had a family history of pathological scarring [14].

The earlobe was the most common site for ear piercings, while Kibadi et al. found the helix to be the preferred site in their study in the DRC (98.3%) [14]. Guiard-Schmid reported that jewelers still perform the majority of piercings, particularly of the ear lobes [18].

The average duration of keloid evolution was  $14.87 \pm 5.10$  months, which is comparable to the results of the study by Kibadi et al. In their study, 132 patients (76.7%) had lesions that were at least one year old, and 40 patients (23.3%) had lesions that were less than one year old [14]. In Burkina Faso, Traoré et al. found an average lesion evolution time of 3.69 years [1 month - 17 years] in their study of keloids and hypertrophic scars in schools [2]. The time between injury and keloid formation varies. Keloids typically develop during the healing process and can appear within the first 12 months, although in some cases they may not appear for several years [1].

Pruritus was observed in 97% of the patients, which is comparable to the findings of Traoré et al.'s study in Burkina Faso, where pruritus was noted in 46 pupils [2]. Keloid scars can

cause itching, pain (burning sensation), contact paresthesia, and a pulling sensation due to the continuous production of cells and the consequent increase in local pressure [1]. These symptoms usually are indicative of scar progression [16].

Reasons for getting piercings are primarily driven by fashion (75%) and aesthetics (15%). This is consistent with previous studies, such as Kibadi et al., who found that participants' motivations for getting a piercing were primarily aesthetic [14]. Kluger et al. also reported that the main motivations for getting piercings were to beautify the body (53.1%) and to distinguish oneself from others (31.1%) [13]. The young population in our country is often influenced by the fashion choices of their idols, who are frequently sports or music stars. It is important to note that this statement is subjective and should be marked as such.

Jewelry was the most commonly used piercing material for 79% of the patients. In the Democratic Republic of Congo, Kibadi et al. reported that the ear was pierced with the stem of the jewelry [14]. Khanna et al. in England stated that the most commonly used techniques were needle or gun piercing [20]. The inaccessibility of these sophisticated techniques to young adults in Africa could explain why they do their piercing at home, more simply with jewelry.

The high incidence of skin complications can be attributed to piercings being performed outside of specialized institutes and aseptic measures not being respected. This observation was also made by Kibadi et al. in their study, where patients had their piercings done in markets by sellers of costume jewelry. Local skin infections were the most frequent complication in our patients. The study conducted by Kluger et al. in France found that complications included infections (44%), healing problems (37.9%), skin irritation (29.7%), and itching (15%) [13]. Pathological scarring occurred after an allergic reaction or local inflammation in the Kibadi study [14]. Literature reports have documented ear complications after piercing [6, 21]. According to studies, ear piercing can result in complications ranging from minor infections to allergic reactions, keloid formation, or ear lobule tearing. Our study found that complications related to the piercing were linked to poor technique, poor jewelry quality, and failure to observe aseptic conditions. These factors were statistically associated with the occurrence of these complications.

Surgery was also used as a main method to treat keloids in



the patients received. Keloids were treated using various therapeutic procedures in the Kibadi study conducted in the DRC, including intralesional corticosteroid infiltration, surgery (intra-cicatricial excision), pressotherapy, and silicone gel application [14]. In a previous study in Abidjan, Kassi et al. found that the triple combination of keloid excision, delayed corticosteroid infiltration, and pressotherapy was more effective in 95% of patients [9].

## CONCLUSION

Post-piercing keloids of the ear are increasingly common in Abidjan hospitals, particularly among young women who follow fashion trends. These keloids are localized to the lobule and are often complicated by infections. Factors associated with the occurrence of keloids in the ear after a piercing include poor piercing technique, low-quality jewelry, and failure to observe aseptic conditions, all of which increase the risk of infection. To decrease the occurrence of these complications, it appears necessary to increase awareness and modify the behavior of young individuals who engage in this practice.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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