



## Original Research

# Epidemiology and Clinical Presentation of Skin Disorders among Cameroonian Adolescents

## *Épidémiologie et présentation clinique des dermatoses chez les adolescents camerounais*

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### ABSTRACT

**Background.** Skin disorders are a major health problem affecting children as well as adults and causing distress and disability. Despite its high prevalence, it has been given little attention and has not been regarded as a significant problem that could benefit from public health solutions. Skin disorders are common in the adolescents; their impact on the quality of life can be enormous, particularly when considering the visibility of skin diseases and the psychologically vulnerable period of adolescence. The objective of the study was to describe the epidemiological and clinical profiles of skin disorders among adolescents living in Yaoundé, Cameroon. **Methods:** We carried-out a cross-sectional observational study among adolescents registered in two boarding schools in Yaoundé. A self-administered questionnaire was used to collect information on the sociodemographic background and relevant past-history. Thereafter, a whole-body examination was conducted by a dermatologist to determine the presence and types of skin disorders, if any. **Results.** A total of 265 adolescents were included in the study among whom 191 (72.1%) females. The mean age was  $15.02 \pm 2.017$  years. The prevalence of skin disorders was 75.5% and higher in females (81.2%) than in males (60.8%). Acne was the most common but was more common among older adolescents (62.7%). Skin bleaching was common and associated with skin disorders ( $p=0.001$ ). **Conclusion.** Skin disorders affect three quarter of the adolescent population in this study, with acne being the most common disorder. Skin bleaching seems to be a common practise among these adolescents, and may significantly increase the burden in this young population.

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**Mots clés :** adolescents, dermatoses, dépigmentation volontaire, Yaoundé, Cameroun.

### RÉSUMÉ

**Introduction :** Les pathologies dermatologiques sont un problème de santé majeur chez les enfants comme les adultes. Leur impact sur la qualité de vie peut être important surtout de par leur caractère affichant et la période de vulnérabilité psychologique qu'est l'adolescence. L'objectif de notre étude était de décrire les profils épidémiologiques et cliniques des dermatoses chez des adolescents. **Matériels et méthodes :** Nous avons réalisé une étude transversale prospective dans deux internats de Yaoundé au Cameroun. Un questionnaire auto-administré a été utilisé pour recueillir des informations sociodémographiques et l'examen physique a été réalisé à la recherche des lésions cutanées. Les données ont été analysées à l'aide du logiciel SPSS version 23. Une valeur  $P < 0,05$  a été considérée comme statistiquement significative. **Résultats :** 265 adolescents ont été inclus, 191 (72,1%) étaient de sexe féminin. L'âge moyen était de  $15,02 \pm 2,017$  ans. La prévalence des dermatoses était de 75,5 % ; elle était plus élevée chez les filles (81,2 %) que chez les garçons (60,8 %). L'acné était la pathologie la plus fréquente surtout chez les adolescents les plus âgés (62,7%). La dépigmentation volontaire était fréquente et associée significativement aux dermatoses ( $p=0,001$ ). **Conclusion :** Les dermatoses affectent trois quarts de la population adolescente dans cette étude, l'acné étant la plus fréquente. La dépigmentation volontaire qui semble être une pratique courante chez ces adolescents augmente de manière significative la morbidité dans cette jeune population.

### HIGHLIGHTS OF THE STUDY

#### What is already known on this topic

Skin disorders are among the most frequent disorders of school-aged children. In Cameroon, few community based studies have assessed this issue.

#### What question this study addressed

Epidemiology and clinical presentation of skin disorders among Cameroonian adolescents

#### What this study adds to our knowledge

The prevalence of skin disorders is as high as 75.5%. The most common skin disorder is acne and it is more common among older adolescents. Skin bleaching is a common practice and is associated with the occurrence of skin disorders and complications.

#### How this is relevant to practice, policy or further research.

In schools, education on acne and awareness campaigns on depigmentation and its harmful consequences on health should be done to enlighten adolescents but also their parents to improve their health.

## INTRODUCTION

Skin disorders are a major health problem affecting children and adults, and causing a lot of distress and disability. They are a growing health problem in developing countries. Indeed, according to the Global Burden of Disease (GBD) 2017, skin disorders were the fourth leading cause of non-fatal disease burden worldwide[1]. The incidence of skin disorders varies from one country to the other and even within the same country from one region or area to the other [2]. The pattern of skin disorders in any community is influenced by factors such as genetic constitution, climate, socioeconomic status, occupation, education, hygiene standards, customs and quality of medical care[3,4]. Despite that infectious diseases remain dominant in developing countries, the burden of atopic dermatitis and other non-infectious diseases is fast increasing[5].

The pattern of skin disorders also varies across ages both in the specific types and in clinical presentation. Skin disorders are also among the most frequent disorders of school-aged children, over a third of whom are affected at any given time[6]. The school environment makes students vulnerable to cross-transmission of communicable skin diseases, because they engage in activities that involve interpersonal contact, especially at game or play[6]. Children and adolescents are more prone to developing skin disorders than adults because they are more often exposed to climatic and social conditions that make them more likely to develop skin infections and suffer minor skin injuries[6].

In Cameroon, few studies have assessed the prevalence of skin disorders like scabies and acne among adolescents; but these are just two out of the numerous skin disorders that affect adolescents. Hospital based studies usually don't give a true reflection of the exact situation in a community because they can be affected by factors such as health-seeking behaviour, accessibility to healthcare and socio-economic factors[5]. Therefore, we designed a community-based study to have a better picture of the

spectrum of skin diseases among adolescents in our country.

## METHODS

### Study design and population

We conducted a school-based cross-sectional study from 1 February to 17 March 2020 in two secondary boarding schools, namely the Christian Comprehensive Secondary School (CCSS) and the Pi and Ju Anglo-Saxon International College (PIJASIC). These schools are located in Yaoundé, the capital city of Cameroon.

Participants were adolescents aged between 10 and 19 years (younger adolescent: 10-14 years and older adolescents: 15-19 years), regularly registered in these study sites, and from whom a parent/guardian consent had previously been obtained. No exclusions were applied. We conducted a convenient and exhaustive sampling during the study period, for all those present at study sites during interviewers' visits.

### Data collection

After obtaining ethical clearance, administrative approvals, permission from school authorities and consent forms signed by parents, the study was explained to students. Self-administered questionnaires were distributed to them, then students were examined by a dermatologist in a well-lit room, previously arranged for the occasion. Their whole body was examined except the genitalia.

The skin disorders were: skin appendages, disorders of pigmentation, infections, dermatitis, hypertrophic and atrophic disorders, keratinization disorders, benign tumours and miscellaneous. Diagnosis was made for each participant and specific medications were subsequently prescribed to those found with skin disorders. Incomplete data were returned.

### Analysis

Data was analysed using the software statistical package for social sciences (SPSS) version 23 for windows. Frequencies and percentages were computed for categorical variables, and mean (or median) and standard deviation (or interquartile range) for continuous variables depending on whether the variable followed a Gaussian shape or not. Chi's square and odds ratios (with their 95% confidence intervals (CI) were used to analyse associations between skin disorders and different variables. P value <0.05 was considered statistically significant.

## RESULTS

A total of 350 questionnaires were distributed in the two schools. Two hundred and seventy (77.1%) questionnaires were returned among which 265 (75.7%) were included in the study because of incomplete data.



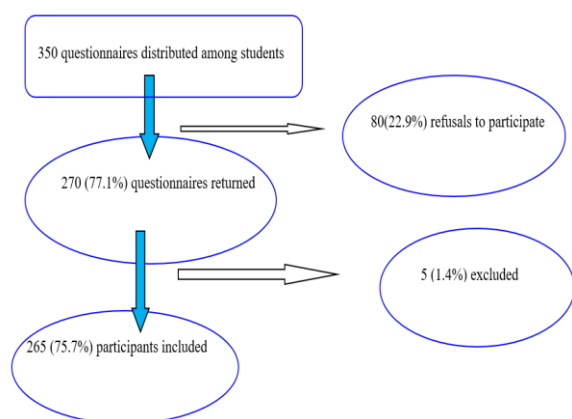


Figure 1: Participant flowchart

**Sociodemographic characteristics**

Age of participants ranged from 10 to 19 years with a mean of 15.0 ±2.0 years. Males accounted for 27.9% (n=?) of the population. The male/female sex ratio was 1:2.6. Young adolescents represented 46.4% of the study population (Table I).

**Table I: Age and sex of population (N=265)**

|                             | Frequency (n) | (%)  |
|-----------------------------|---------------|------|
| <b>Age range (years)</b>    |               |      |
| Younger adolescents (10-14) | 123           | 46.4 |
| Older adolescents (15-19)   | 142           | 53.6 |
| <b>Sex</b>                  |               |      |
| Male                        | 74            | 27.9 |
| Female                      | 191           | 72.1 |

**Prevalence of skin disorders**

The prevalence of skin disorders was 75.5%. A total of 32 skin disorders were recorded and they were grouped into eight categories according to ICD-11 and Rook’s textbook of dermatology [7, 8]: Infections of the skin, dermatitis/eczema, disorders of pigmentation, disorders of skin appendages, disorders of keratinization, benign skin tumours, hypertrophic/atrophic skin disorders and miscellaneous. Disorders of skin appendages were the most common skin disorders (45.7%) with acne representing 97.5% of this category. Tables II show a summary of all skin disorders encountered in our study.

**Table II: Distribution of skin disorders disease class**

| Skin disorder (n)                               | % in class | % in whole study |
|-------------------------------------------------|------------|------------------|
| <b>Disorders skin appendages (N=121; 45.7%)</b> |            |                  |
| Acne (118)                                      | 97.5       | 44.5             |
| In-growing toenail (2)                          | 1.7        | 0.8              |
| Hyperhidrosis (1)                               | 0.8        | 0.4              |
| <b>Disorders pigmentation (N=22; 8.3%)</b>      |            |                  |
| Dyschromia of the face (18)                     | 81.8       | 6.8              |
| Post-inflammatory hyper-pigmentation (2)        | 9.1        | 0.8              |
| Dermatosis Papulosa Nigra (1)                   | 4.5        | 0.4              |
| Acanthosis Nigricans (1)                        | 4.5        | 0.4              |
| <b>Infections of the skin (N=21; 7.9%)</b>      |            |                  |
| Pityriasis versicolor (12)                      | 57.1       | 4.5              |
| Dermatophytosis (2)                             | 9.5        | 0.8              |
| Onychia (2)                                     | 9.5        | 0.8              |
| Viral wart (1)                                  | 4.8        | 0.4              |
| Herpes labialis (1)                             | 4.8        | 0.4              |

**Table II: Distribution of skin disorders disease class**

| Skin disorder (n)                                       | % in class | % in whole study |
|---------------------------------------------------------|------------|------------------|
| Scabies (1)                                             | 4.8        | 0.4              |
| Folliculitis (1)                                        | 4.8        | 0.4              |
| Varicella (1)                                           | 4.8        | 0.4              |
| <b>Dermatitis/Eczema (N=17; 6.4%)</b>                   |            |                  |
| Contact dermatitis (9)                                  | 52.9       | 3.4              |
| Atopic dermatitis (5)                                   | 29.4       | 1.9              |
| Chronic dermatitis (2)                                  | 11.8       | 0.8              |
| Hand dermatitis (1)                                     | 5.9        | 0.4              |
| <b>Hypertrophic/Atrophic skin disorders (N=7; 2.6%)</b> |            |                  |
| Keloid/Hypertrophic scar (4)                            | 57.1       | 1.5              |
| Striae (3)                                              | 42.9       | 1.1              |
| <b>Disorders of keratinization (N=6; 2.3%)</b>          |            |                  |
| Keratosis pilaris (3)                                   | 50.0       | 1.1              |
| Keratoderma (3)                                         | 50.0       | 1.1              |
| <b>Benign skin tumours (N=2; 0.8%)</b>                  |            |                  |
| Haemangioma (1)                                         | 50.0       | 0.4              |
| Syringoma (1)                                           | 50.0       | 0.4              |
| <b>Miscellaneous (N=60; 22.6%)</b>                      |            |                  |
| Papular urticaria (22)                                  | 36.7       | 8.3              |
| Xerosis (21)                                            | 35.0       | 7.9              |
| Hyperseborrhoea (11)                                    | 18.3       | 4.2              |
| Intertrigo (2)                                          | 3.3        | 0.8              |
| Sebaceous hyperplasia (2)                               | 3.3        | 0.8              |
| <b>Pityriasis rosea (1)</b>                             | 1.7        | 0.4              |
| <b>Cyst (1)</b>                                         | 1.7        | 0.4              |

The most common skin disorder was acne with a prevalence of 44.5% (n=118), with a female preponderance (p-value<0.01). The second most common skin disorder was papular urticaria, representing 8.3% (n=22) of cases. Xerosis represented 7.9% (n=21) of the study population. Facial dyschromia was the most common pigmentation disorder and represented 6.8% (n=18) of skin disorders; this was more common in females (p-value<0.001).

**Variation of skin disorders among different age groups**

Acne remained the most common skin disorder in the two age groups (Table III) but was more common among older adolescents than younger adolescents (p=0.000). While papular urticaria was the second most common disorder, it was slightly more common among early adolescents. Contact dermatitis was more common among early adolescents (p=0.05).

**Table III: Most common disorders in both age groups.**

| Skin disorders           | Younger adolescents N (%) | Older adolescents N (%) | p-value      |
|--------------------------|---------------------------|-------------------------|--------------|
| Acne                     | 29 (23.6)                 | 89 (62.7)               | <b>0.000</b> |
| Papular urticaria        | 14 (11.4)                 | 8 (5.6)                 | 0.09         |
| Xerosis                  | 10 (8.1)                  | 11 (7.7)                | 0.90         |
| Dyschromia               | 7 (5.7)                   | 11 (7.7)                | 0.50         |
| Pityriasis versicolor    | 6 (4.9)                   | 6 (4.2)                 | 0.79         |
| hyperseborrhea           | 3 (2.4)                   | 8 (5.6)                 | 0.19         |
| Contact dermatitis       | 7 (5.7)                   | 2 (1.4)                 | <b>0.05</b>  |
| Atopic dermatitis        | 3 (2.4)                   | 2 (1.4)                 | 0.53         |
| Keloid/Hypertrophic scar | 2 (1.6)                   | 2 (1.4)                 | 0.88         |
| Keratosis pilaris        | 0 (0)                     | 3 (2.1)                 | 0.10         |

The most common skin disorder among early adolescents (10-14 years) was acne with a prevalence of 23.6% (n=29). The second most common in this group was papular urticaria with a prevalence of 11.4% (n=14). The five most common skin disorders among early adolescents is given in the figure below.

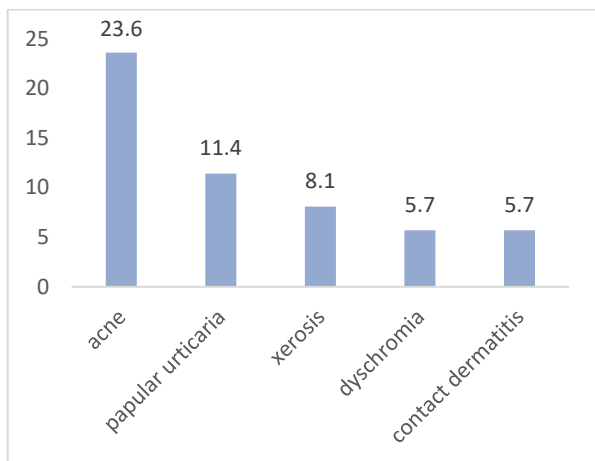


Figure 1: Most common disorders among younger adolescents.

Acne being the most common disorder in this age group accounted for 62.7% (n=89) of the skin disorders in late adolescents (15-19 years). It was followed by dyschromia of the face with a prevalence of 7.7% (n=11). The most common skin disorders in this age group is seen in the figure below.

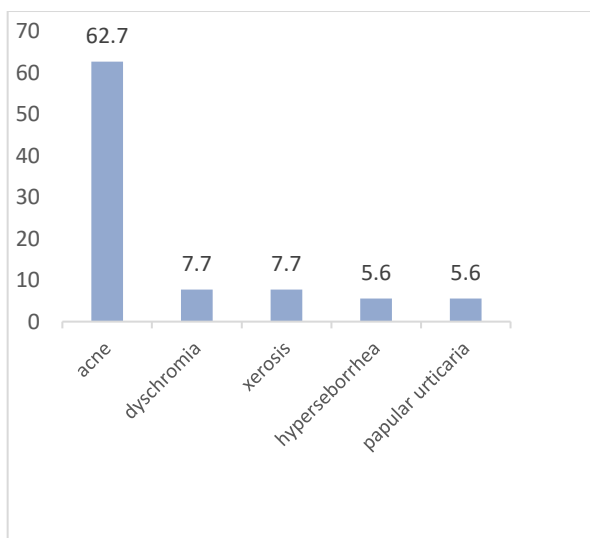


Figure 2: Most common disorders among older adolescents.

**Factors associated with skin disorders**

The prevalence of skin bleaching was 11.7% (n=31). Bleaching was more common among females (p=0.001). It was also more common among older adolescents than younger adolescents, but this was of no statistical significance (p=0.194). Adolescents who practiced bleaching had a 1.4-increased odds of presenting a skin disorder (OR 1.39; p value =0.001). The most common

skin disorder associated with bleaching was facial dyschromia.

Table IV: Skin bleaching and disorders

| Variable         | Skin disorders |     | Odds Ratio | P Value |
|------------------|----------------|-----|------------|---------|
|                  | No             | Yes |            |         |
| <b>Bleaching</b> |                |     |            |         |
| Yes              | 12             | 56  | 1.39       | 0.001   |
| No               | 53             | 144 |            |         |

Concerning Atopy, family history and skin disorders (table V), there was a non-significant odds ratio between history of atopy and skin disorders (OR 0.93 - 1.39; p-value 0.59 – 0.83), No significant odd ratio between family history and skin disorders (OR 0.96-0.98; P value 0.91-0.96). This implies that history of atopy, family history of atopy or skin disorders cannot be considered as risk factors for skin disorders in our study.

Table V: Family history and skin disorders

| Variable                      | Skin disorders |     | OR   | 95% CI    | P    |
|-------------------------------|----------------|-----|------|-----------|------|
|                               | No             | Yes |      |           |      |
| <b>Skin disease in family</b> |                |     |      |           |      |
| Yes                           | 8              | 25  | 0.98 | 0.42-2.3  | 0.96 |
| No                            | 57             | 175 |      |           |      |
| <b>Atopy in the family</b>    |                |     |      |           |      |
| Yes                           | 11             | 35  | 0.96 | 0.45-2.02 | 0.91 |
| No                            | 54             | 165 |      |           |      |

**DISCUSSION**

Our study was carried out in the acute context of covid 19 crisis, the barrier measures were beginning to be applied and unfortunately we were not able to go to all the schools planned, hence the small size of the population and results that cannot be generalised. Nevertheless, it is the first study of this kind in Cameroon and it permit to discover that skin diseases are frequent among adolescents and, even more surprisingly, skin bleaching is a practice that is found in this younger population.

The age range of our population was between 10 and 19 years with a mean of 15.02 years ± 2.017. Females represented 72.1% of our study population. This could be explained by the fact that females were more anxious to know about their skin than males.

The point prevalence of skin disorders in our study was 75.5%. This was closed to the 70.8%, 71.4% and 79.9% seen by Ogunbiyi et al in Southwest Nigeria, Yamamah et al in Egypt and Uludag et al in Turkey [9, 10, 11]. This high prevalence shows that skin disorders are common among this population and more attention should be given to them. Some studies however found lower prevalence like Henshaw et al, Komba and Mgonda et al who found prevalence of 64.1% and 57% respectively [6,12]. This great difference could be due to the fact that skin disorders greatly vary among countries and even within the same country [2]. This variation could be due to factors like socio-economic status of the population, hygiene practise and lifestyle.

Acne was the most common skin disorder in our study with a prevalence of 44.5%. Acne is considered a disease of adolescence. It is the most common dermatological disorder encountered among adolescents. The result

obtained in our study was comparable to results obtained by Freyre et al and Onayemi et al [13, 14]. Prevalence as high as 80-90% have been observed in white populations [15, 16]. This difference between the prevalence of acne in western countries and non-western countries was not attributable to genetics alone, but diet was also a main risk factor. Consumption of spicy, oily and sugary foods was associated with high prevalence of acne [17]. Acne was more common among late adolescents than early adolescents. Prevalence of acne increases with age group being more common in late adolescents and young adults compared to early adolescents as seen by Hanisah et al in Malaysia [18]. The second most common disorder in our study was papular urticaria with a prevalence of 8.3%. This is caused by hypersensitivity reaction to bites from mosquitoes which are quite common in the tropical climate. The tall trees and stagnant water around the school environment are breeding grounds for insects and mosquitoes. This could be responsible for the high prevalence of papular urticaria in our study. Our result was higher than that seen by Henshaw et al in Nigeria [19]. Their study was carried out in the cleanest town in Nigeria, which is devoid of dirty drains and untended shrubbery.

Xerosis accounted for 7.9% of skin disorders in our study. This condition of dry skin could result from practises like use of hot water to bath, use of corrosive soaps and use of hard sponges to scrub the body which is common in our practise. It is believed that scrubbing of the body with these sponges makes the body cleaner. The prevalence of xerosis in our study was higher than that reported by Ayanlowo et al [5]. They carried out a hospital based study where those who consult are those who are sick or those who are disturbed by the condition [5]. Pityriasis versicolor (PV) accounted for 4.5% of skin disorders in our study. PV is a disorder with onset and/or peak in adolescence. Some studies carried out in primary school children found very low prevalence of PV while higher prevalence was recorded in involving secondary school students [20]. It is a common tropical dermatosis caused by the yeast of the genus *Malassezia*, which is part of the normal skin flora but can be pathogenic, especially in a hot and humid climate. Contact dermatitis accounted for 3.4% of the skin disorders in our study. The most common type of contact dermatitis was irritant contact dermatitis due to contact with certain species of the rove beetle, such as the Nairobi fly. The insect does not bite or stings but releases a fluid which contains paderine, a strong blistering chemical. Atopic dermatitis accounted for 1.9% of skin disorders in our study. Uludag et al found a higher prevalence (3.4%) in their study [11]. This could be explained by the fact that they included both primary and secondary school children in their study. Atopic dermatitis being more common in childhood was the reason for the higher prevalence in their study. Among the adolescent population in the same study, they had a prevalence of 1.8% which was similar to that observed in our study.

The prevalence of bleaching in our study was 11.7% and was more common in females than males. Adolescence is a period where people begin to be conscious of their

appearance. They want to be more beautiful, want the perfect skin colour and therefore engage in practices like skin bleaching. The prevalence of bleaching in our study was closed to that obtained by Bissek et al [21] in Yaounde. Our result was however lower than those obtained by Wone et al in Dakar, Senegal[22] and Atadokpede et al in Benin[23] who had prevalence of 67.2% and 36.6% respectively. Possible reasons for this difference are that, the diagnosis of bleaching in Benin was based on the body lotion or bathing soap used by the students. All those who used products with bleaching effects were considered to be bleaching while in our study, the diagnosis of bleaching was clinical. Secondly, in Senegal, the study was carried out in the general population and not limited to adolescents as was the case in our study. There was a significant association between bleaching and skin disorders.

## CONCLUSION

The prevalence of skin disorders in our study was high as 75.5% of adolescents in our study had a skin lesion. The most common skin disorder was acne (44.5%) and was more common among late adolescents. Skin bleaching is a common practise among adolescents and is associated with the occurrence of skin disorders as complications in our population. In schools, education on acne and awareness campaigns on depigmentation and its harmful consequences on health should be done to enlighten adolescents but also their parents to improve their health.

## CONFLICT OF INTEREST

The authors declare no conflict of interest

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