

# The Impact of acne on the mental health of women and young adults, a case-control multicenter study of 300 patients in Lomé, Togo, West Africa

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## Abstract

**Background:** This study explores the relationship between acne and anxiety, both common health issues among young adults. Acne, a chronic inflammatory skin condition, can significantly impact an individual's self-esteem and quality of life. Anxiety, characterized by feelings of imminent danger and distress, often exacerbates this impact. While the association between acne and anxiety has been well-studied in developed countries, research in Africa, particularly in Togo, is limited.

**Materials and Methods:** A case-control study was conducted over eight months, from July 2017 to February 2018, in three public dermatology clinics in Lomé, Togo. The study included 300 acne patients, matched with 600 controls based on age ( $\pm 5$  years) and gender. Data were collected through structured interviews, clinical examinations, and validated questionnaires like the General Anxiety Disorder-7 (GAD-7) for anxiety assessment.

**Results:** Out of 4,126 dermatology patients, 300 (7.3%) consulted for acne, with young adults representing the majority. The study found a significant correlation between acne and anxiety, with a higher prevalence of anxiety among acne patients compared to the control group.

**Conclusion:** The findings highlight the psychological burden and mental health impact of acne in young adults in general and of women, emphasizing the need for a holistic approach to acne treatment that includes mental health support integrated in dermatologic treatment. Further research is recommended to explore this relationship in different African cultural contexts.

**Keywords:** acne; anxiety; mental health; sociodemographic; women, gender; young adults

## I-Introduction:

Acne and anxiety are two common health issues among young adults. Acne is a chronic inflammatory disease of the pilosebaceous follicle involving the sebaceous gland, follicular epithelium, Propionibacterium acnes, and innate immunity [1]. This condition can cause painful and unsightly skin lesions, as well as a deterioration in self-esteem and quality of life. On the other hand, anxiety is a feeling of imminent but undefined danger accompanied by discomfort, restlessness, distress, and even annihilation [2].

The pathophysiology of acne results from several factors, including excessive sebum production (hyperseborrhea), proliferation of epithelial cells in the follicular canal, a bacterium called Propionibacterium acnes, and an innate immune response of the skin. According to a study published in the "International Journal of Women's Dermatology" in 2018, testosterone may be involved in hyperseborrhea and the proliferation of epithelial cells in the follicular canal, which can lead to follicle obstruction and comedone formation. As for the epidemiology of acne, it is widespread worldwide. According to a study published in the "Dermatology" journal in 2002, acne affects approximately 80% of the global population. Moderate to severe acne represents about 20% of all acne cases. According to a study published in the "Journal of the American Academy of Dermatology" in 2004, prognostic factors for acne severity include hyperseborrhea, acne onset after the age of 17, acne extension on the back, stress in both sexes, and family prevalence of acne. Indeed, acne in adults (both men and women) is on the rise and affects approximately 40% of adults. However, according to a study conducted by the National Institute of Arthritis and Musculoskeletal and Skin Diseases in 2011, acne is the most common skin problem among adults, affecting about 54% of men and 40% of women aged 25 to 44. Other studies, such as those conducted by the Journal of the American Academy of Dermatology, have shown that adult acne is a growing problem, especially among women, with a prevalence estimated between 12% and 22%. Furthermore, acne is one of those conditions that can have a significant impact on the patient's quality of life, ranging from social withdrawal to depression and even suicide. Acne and anxiety are common issues among young adults, with acne being a chronic inflammatory disease involving the sebaceous gland, follicular epithelium, Propionibacterium acnes, and the skin's innate immunity. It can significantly affect self-esteem and quality of life due to painful, unsightly lesions. Anxiety, on the other hand, manifests as feelings of undefined danger, discomfort, and distress. Studies, such as those from the Journal of the American Academy of Dermatology, indicate that acne is associated with an increased risk of anxiety, social withdrawal, and even depression.

Anxiety, on the other hand, is a feeling of intense and persistent worry, often without apparent cause, which can interfere with daily activities and negatively affect quality of life [3]. Anxiety can also be associated with other psychological disorders such as depression and social phobia [4]. It can be very distressing and have a significant impact on the lifestyle of those who suffer from it. Indeed, individuals with acne may feel uncomfortable or even depressed, which can impact their mental health. This can also lead to significant anxiety [5].

Studies have shown that the risk of anxiety is higher in individuals with acne compared to the general population. A study conducted in 2002 revealed that 50% of patients with severe acne also suffered from anxiety [1]. Another study in 2009 demonstrated that acne patients were twice as likely to experience anxiety compared to the general population [2]. The impact of acne on mental health can be measured using various tools, such as the General Anxiety Disorder-7 (GAD-7), which is a questionnaire consisting of 7 items that screen for anxiety in patients. Other scales, such as the Hospital Anxiety and Depression Scale (HADS), measuring anxiety and depressive disorders, and the Liebowitz Social Anxiety Scale (LSAS), assessing social anxiety disorder, can also be utilized. The relationship between acne and anxiety is an extensively researched topic in developed countries [6]. However, limited work has been conducted on

this subject in Africa. The complex and multifactorial relationship between acne and anxiety can be influenced by several factors, such as the negative impact of acne on physical appearance and quality of life [7]. Indeed, in the The Journal of Clinical and Aesthetic Dermatology the skin and the nervous system have a close relationship due to their common origin from the ectoderm and sensitivity to the same neurotransmitters during embryological development. The skin, being visible and playing a crucial role in the expression of emotions, is essential for self-esteem and socialization. However, acne, often affecting the face, can have a negative impact on the individual's psychological state due to its visibility and difficulty to conceal. A study has demonstrated that individuals with acne exhibit higher levels of anxiety than the general population [2]. In Africa, acne is often considered commonplace or normal, and dermatologists may underestimate the prevalence of psychiatric comorbidities. Individuals with acne may struggle with body image and interpersonal relationships, leading to anxiety. However, no study has been conducted to determine the association between acne and anxiety in the specific country mentioned. Studies have been conducted in various countries, including Africa, Europe, Asia, and America, to explore the correlation between acne and anxiety [8-13]. In Togo, one study examined the impact of artificial depigmentation on acne [14]. Another study investigated the clinical aspects and quality of life of acne patients in Lomé [1]. However, no study has yet examined the correlation between acne and anxiety in this particular country. In this context, this article aims to examine the relationship between acne and anxiety in Lomé, Togo, using a case-control study design.

## II- objectives: 1 Specific Objectives:

- Determine the socio-demographic characteristics of acne patients: This objective aimed to understand the social and demographic factors that may influence the presence of acne in patients, such as gender, age, occupation, etc.
- Describe the clinical characteristics of acne patients: The objective was to understand the specific characteristics of acne, such as the location and severity of lesions, as well as the duration of the condition among patients.
- Determine the correlation between acne and anxiety: The ultimate goal of the study was to determine if there is a correlation between the presence of acne and levels of anxiety among patients. The objective was to understand if there is a relationship between physical appearance and the psychological state of patients.

## III- Materials and Methods

### 1. Study Type and Period:

We conducted a case-control study from July 2017 to February 2018, spanning a period of 8 months, in the three public dermatology services in the city of Lomé. Each case was matched with two controls based on age ( $\pm 5$  years) and gender. We included, with their consent, all patients diagnosed with acne by a dermatologist. Patients who decided to withdraw from the study were not included. The sample was open to all patients, and recruitment was consecutive and exhaustive.

#### a. Definition of Cases:

In International Journal of Epidemiology inclusion Criteria: Male or female patients of any age diagnosed with acne by a dermatologist in the three public dermatology services in Lomé and who gave their consent. Exclusion Criteria: Patients who refused to participate in the study.

#### b. Definition of Controls:

Principles of Epidemiology in Public Health Practice: Control Definitions in Clinical Studies,". Inclusion Criteria: Male or female subjects without acne lesions who gave their consent.

Exclusion Criteria for Controls: Subjects without acne lesions who refused to participate in the study.

**2. Data Collection:**

Data collection was done using a pre-established form (Annex: please provide the names of the different forms and questionnaires used in this study without specifying "Annex"). The interview collected sociodemographic parameters (age, gender). Adolescents were considered as patients aged 12 to 17 years, young adults as those aged 18 to 25 years, and adults as those above 25 years old.

The recruitment of cases was done during dermatology consultations. The physical examination conducted by the dermatologist specified the types of lesions present, their location, and clinical forms. The clinical evaluation of acne was done using the ECLA grid.

The recruitment of controls was done among companions, medical personnel, as well as outside of hospital settings (universities, markets, streets, public and private services, etc.).

**c.** For anxiety screening, a questionnaire was systematically distributed to both acne cases and controls: the General Anxiety Disorder-7 (GAD-7). This questionnaire was completed by cases at the end of the consultation and by controls. Both questionnaires are included in the appendix.

**d. Calculation and interpretation of scores:**

**e. ECLA score**

The total ECLA score, obtained by adding the scores of factors F1, F2, and F3, ranged from 0 to 36. An ECLA score of 12 or lower represented mild to moderate acne, while a score higher than 12 represented severe acne.

**b. GAD-7 score**

To assess anxiety, each item on the GAD-7 was rated from 0 to 3: 0=never; 1=several days; 2=more than half the time; and 3=nearly every day. The total score was obtained by adding the scores of each item, ranging from 0 to 21. A GAD-7 score of 10 or higher, with a sensitivity of 89% and specificity of 82%, indicated the presence of anxiety [17]. The results were interpreted as follows: a score below 10 indicated the absence of anxiety, while a score of 10 or higher confirmed the presence of anxiety.

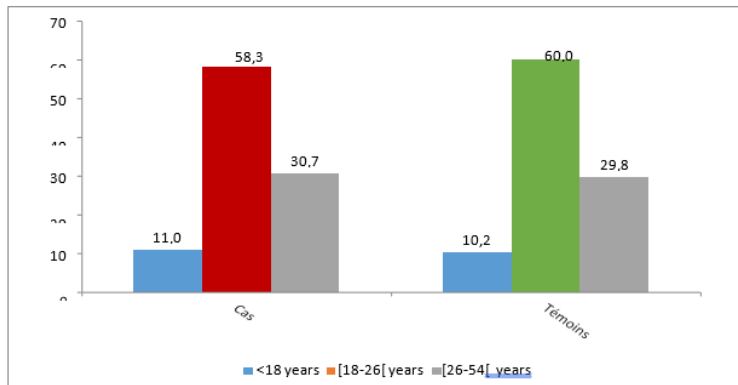
**4. Data analysis:**

After data collection, the forms were entered into a database designed using Epidata software version 3.1. Statistical analysis was performed using R Studio software version 3.4.3. It included descriptive analysis of the population and comparative analysis. In the descriptive analysis, the characteristics collected for cases (enrollment center, age groups, observed acne lesions, clinical forms of acne) were presented as frequencies and percentages for qualitative variables, or as mean and standard deviation for quantitative variables. In the comparative analysis, the statistical tests used were the paired Student's t-test (for comparing two quantitative variables) and the McNemar test (for comparing two qualitative variables).

**IV- Results:**

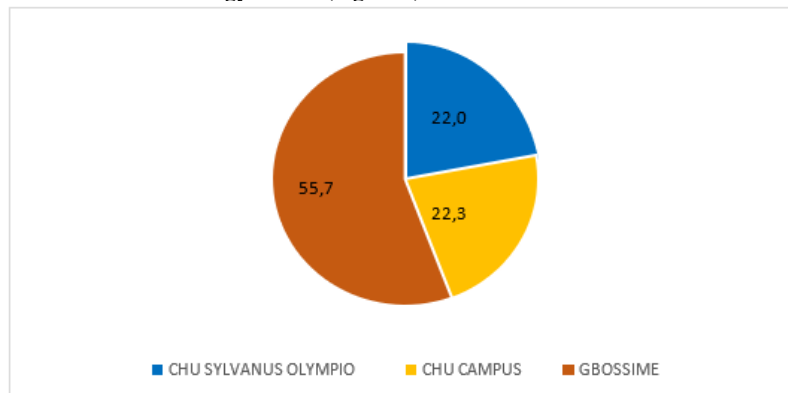
**1. General Results:**

A total of 900 subjects were recruited, including 300 cases (33 adolescents, 175 young adults, and 92 adults) with acne and 600 controls without acne. The controls were matched to the cases based on age ( $\pm 5$  years) (two controls for each case) and gender. Young adults represented two-thirds in both groups (Figure 1).



**Figure 1:** Distribution of cases and controls by age

During the study period, 300 out of 4,126 patients received in dermatology (7.3%, 95% CI [6.5-8.1%]) consulted for acne. Among the 300 acne patients, 167 were recorded at the Gbossimé Dermatology Center (Figure 2).



**Figure 2:** Source distribution of patients

**2. Age and Gender:**

Out of the 300 patients, 214 were female, resulting in a sex ratio (M/F) of 0.4. The mean age of the cases was 23.7±5.7 years (range: 12 to 52 years). The mean age of the controls was 23.6±6.2 years (range: 12 to 54 years), with no significant difference between the two groups (p=0.9362).

**3. Clinical Characteristics of Acne:**

**a. Types of observed lesions :**

The most commonly observed acne lesions were papules (97.3%), followed by seborrhea (92.3%), and comedones (90.7%) (Table 1).

Acne lesion	Number	%
Wheals	292	97,3
Hyper seborrhoea	277	92,3
Comedones	272	90,7
Hyper-pigmented macules	249	83,0
Pustules	217	72,3
Excoriation	177	59,0
Scabby points	120	40,0
Punctuform depressions	104	34,7
Nodules	95	31,7
Cysts	83	27,7
Atrophic scars	33	11,0
Hypertrophic scars	23	7,7

**Table 1:** Types of observed acne lesions

**b. Clinical forms of acne :**

Papulopustular acne was the most common clinical form (200/300; 66.7%), followed by retentional acne (Table 2).

Acné	Number	%
Papulo pustular	200	66,7
Retentional	58	19,3
Nodular	35	11,7
Pigmentary	7	2,7
Total	300	100

**Table 2 :** Clinical forms of acne

**4. Topography (location) of acne lesions:**

The face w affected in 100% of cases, either alone or in combination with other locations (Table 3).

Acne lesion	Number	%
Face	300	100,0
Back	190	63,3
Back, above scapula	123	41,0
Back, below scapula	67	22,3
Neck	140	46,6
Neck, upper cervical area	88	29,3
Neck, lower cervical area	52	17,3
Chest	136	45,3
Arms	60	20,0

**Table 3:** Locations of observed acne lesions

**5. Study of Acne and Anxiety :**

This questionnaire allowed us to identify 72 cases of anxiety among our 300 acne patients, representing a prevalence of 24.0% (95% CI 19.4-29.3). We identified 37 cases of anxiety among the 600 control subjects,

representing a prevalence of 6.2% (95% CI 4.44-8.48). The GAD-7 scores among the cases ranged from 0 to 21, with a mean score of 6.5±4.9. The mean GAD-7 score among the controls was 2.9±3.8 (range 0-21) with a significant difference between the two groups (p < 0.0001) (Table 4).

Anxiety	Cas (n=300)	Controls (n=600)	p-value
Yes	72 (24,0)	37 (6,2)	<0,0001
No	228 (76,0)	563 (93,8)	

**Table 4:** Comparison of Anxiety between Cases and Controls

**6. Study of Anxiety by Age Groups:**

The GAD-7 scores ranged from 0 to 21 among adolescents. We identified 5 cases of anxiety among our 33 adolescent acne patients (15.2%) and 2

cases of anxiety among the 62 adolescent control subjects (3.2%). The mean GAD-7 score among the cases was 5.7±4.4 (range 0-18) compared to 2.6±3.8 (range 0-21) among the controls, with a statistically significant difference in the GAD-7 score between the two groups (P value = 0.0472).

The GAD-7 scores ranged from 0 to 21 among young adults. We identified 49 cases of anxiety among our 175 young adult acne patients (28.0%) and 20 cases of anxiety among the 358 young adult control subjects (5.6%). The mean GAD-7 score among the cases was  $6.9 \pm 5.1$  (range 0-21) compared to  $3.0 \pm 3.7$  (range 0-21) among the controls, with a statistically significant difference in the GAD-7 score between the two groups ( $P$  value  $< 0.0001$ ).

The GAD-7 scores ranged from 0 to 19 among adults. We identified 18 cases of anxiety among our 92 adult acne patients (19.6%) and 15 cases of anxiety among the 180 adult control subjects (8.3%). The mean GAD-7 score among the cases was  $6.1 \pm 4.7$  (range 0-18) compared to  $2.8 \pm 3.9$  (range 0-19) among the controls, with a statistically significant difference in the GAD-7 score between the two groups ( $P$  value  $< 0.0001$ ).

Anxiety	(n=300)	Controls (n=600)	p-value
<b>Teenagers</b>			
Yes	5 (15,2)	2 (3,2)	0,0472
No	28 (84,8)	60 (96,8)	
<b>Young adults</b>			
Yes	49 (28,0)	20 (5,6)	<0,0001
No	126 (72,0)	338 (94,4)	
<b>Adults</b>			
Yes	18 (19,6)	15 (8,3)	<0,0001
No	74 (80,4)	165 (91,7)	

**Table 5 :** Comparison of Anxiety and Age Groups

### 7. Study of Anxiety by Gender :

In our series, regardless of gender, anxiety was more commonly found among cases (19.8% in males and 25.7% in females) compared to controls (1.6% in males and 7.5% in females), with a statistically significant difference ( $p$  value  $< 0.0001$ ).

Anxious	(n=300)	Controls (n=600)	p-value
<b>Male</b>			
Yes	17 (19,8)	3 (1,6)	<0.0001
No	69 (80,2)	186 (98,4)	
<b>Feminine</b>			
Yes	55 (25,7)	30 (7,5)	<0,0001
No	159 (74,3)	371 (92,5)	

**Table 6 :** Comparison of Anxiety and Gender

#### a. Study of Anxiety by Gender in Adolescents :

Among adolescents, regardless of gender, there was no statistically significant difference in anxiety between the inclusion status (cases and controls) ( $p$  value  $> 0.05$ ).

Anxious	(n=33)	Controls (n=62)	P-value
<b>Male</b>			
Yes	2 (12,5)	0(0,0)	0.1159
No	14(87,5)	30(100,0)	
<b>Feminine</b>			
Yes	3(17,7)	2 (6,3)	0.3257
No	14(82,3)	30 (93,7)	

**Table 7 :** Comparison of Anxiety and Gender in Adolescents

#### b. Study of Anxiety by Gender in Young Adults :

Among young adults, regardless of gender, anxiety was more commonly found among cases (26.8% in males and 28.6% in females) compared to controls (1.6% in males and 6.5% in females), with a statistically significant difference ( $p$  value  $< 0.0001$ ).

Anxious	Cas (n=175)	Témoins (n=354)	Valeur de p
<b>Masculin</b>			
Oui	15 (26,8)	2 (1,6)	<0,0001
Non	41 (73,2)	122 (98,4)	
<b>Féminin</b>			
Oui	34 (28,6)	15 (6,5)	<0,0001
Non	85 (71,4)	215 (93,5)	

**Table 8:** Comparison of Anxiety and Gender in Young Adults

#### c. Study of Anxiety by Gender in Adults :

Among adults, anxiety was more commonly found among female adult cases (23.1%) compared to controls (9.4%) with a statistically significant difference ( $p$  value = 0.0056).

Anxious	Cas (n=92)	Controls (n=174)	p-value
Male			
Yes	0 (0,0)	1 (2,9)	<b>0,9999</b>
No	14 (100,0)	34 (97,1)	
Féminine			
Yes	18 (23,1)	13 (9,4)	<b>0,0056</b>
No	60 (76,9)	126 (90,6)	

**Table 9:** Comparison of Anxiety and Gender in Adults

#### d. Study of Anxiety and ECLA Score:

The mean ECLA global severity score was  $12.3 \pm 5.0$  (range: 2 to 28). Acne was classified as mild to moderate in 162 patients (54.0%) and severe in 138 patients (46.0%). The mean ECLA score was  $11.7 \pm 5.1$  (range: 3 to 28) among anxious patients and  $12.5 \pm 5.0$  (range: 2 to 28) among non-anxious patients, with no statistically significant difference (p value = 0.2183) (Table X). Only 25 out of the 72 anxious patients (34.7%) had severe acne. The severity of acne was not correlated with anxiety scores (GAD-7:  $r = -0.02$ ;  $p = 0.6724$ ).

#### V-discussion:

##### The Association between Acne and Anxiety:

Our study revealed that 24.0% of acne cases (72 out of 300 patients) had symptoms of anxiety, compared to only 6.2% of controls (37 out of 600), indicating a significant association between acne and anxiety. These results are consistent with a meta-analysis of 42 previous studies that found a modest but significant positive correlation between acne and anxiety, with a correlation coefficient of  $r = 0.25$  [1].

##### Influence of Gender and Age on Anxiety in Acne Patients:

In our study, we found that anxiety was more prevalent in women with acne (25.7%) compared to men (19.8%). This trend is also observed in the general population, with a study from Harvard Medical School estimating that women are nearly twice as likely as men to suffer from anxiety disorders [5].

Regarding age, our study revealed that anxiety was most common among young adults with acne (28.0%), compared to adolescents (15.2%) and older adults (19.6%). This trend is also consistent with existing literature. For example, a study from the World Health Organization (WHO) found that the prevalence of anxiety disorders is generally higher in individuals aged 15 to 34 years [6].

##### Severe acne and anxiety:

In our sample, only 34.7% of anxious patients had severe acne. This finding challenges the common hypothesis that the severity of acne is directly proportional to the level of anxiety. Previous research has suggested a positive correlation between acne severity and anxiety [7], but other studies have noted that even mild to moderate acne can have significant psychological effects, emphasizing the importance of individual perceptions of acne [8].

#### VI. Conclusion :

In conclusion, our study, in line with numerous internationally conducted research, has highlighted a significant link between acne and an increased prevalence of anxiety, particularly among women and young adults. It is essential for healthcare professionals to be aware of this association in order to intervene early and appropriately, as these conditions can have a devastating impact on the mental health and quality of life of affected individuals.

As suggested by numerous studies, such as those by Dreno et al. (2018) and Tan et al. (2018), an integrated approach to the treatment of acne and anxiety could significantly improve the quality of life and self-esteem of patients. Furthermore, the role of mental health interventions, particularly cognitive-behavioral therapy, is increasingly recognized as an essential component of the overall management of patients with acne.

It is now more important than ever to advance our understanding of the relationship between acne and anxiety in order to propose integrated and effective treatment strategies. This way, every patient with acne can benefit from a tailored care plan that considers both the physical and psychological aspects of this complex condition.

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