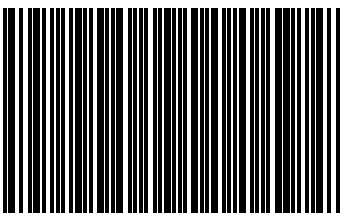




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Nigerian Journal of Dermatologists, NJD, is a forum for communication of research results and policy issues in the health sciences especially as related to dermatology and allied sciences, Plastic Surgery, Venereology, Pathology, Anatomy, Physiology and Biochemistry.

The journal is dedicated to serving primarily scientists in Africa and other developing countries outside the continent who seek a medium for publishing their research findings. Since science is global, articles would be welcome from every geographical location across the world.

There are pressing and specific problems related to Africa and to people of coloured skin. Ainhum, acne keloidalis are examples of two of a long list of cutaneous diseases peculiar to the sub region and waiting for research by the basic sciences; gratifying modalities of treatment are equally awaited.

The editorial board will therefore give priority to the development and promotion of such cutaneous health issues.

Frequency of publication: Quarterly.

Content format: Each issue will contain essentially the following sections, with variants where necessary:

- i. A short editorial statement on policy issues not more than two thousand words, placed not necessarily on the first page.
- ii. A short review (not more than five thousand words) titled "Perspective" on a current topical issue in Dermatology.
- iii. One or two review articles by invitation or on application.
- iv. Peer reviewed articles by invitation or on application.
- v. Letters to the editor.
- vi. News about, and on, African health and related matters.

Research papers should be composed of the following in that order, clearly typed in double space:

- i. Title, which should be short and specific.
- ii. Full names of all the authors, qualifications and affiliations of each, and full address of each author. (Qualifications of authors are only required for purposes of Editor's use and not for publication).
- iii. Name and address of the corresponding author and his/her phone/fax numbers (home & office).
- iv. Sources of financial support, if any.
- v. Summary of not more than 200 words as well as three to four key words.
- vi. Introduction.
- vii. Materials and methods.
- viii. Results.
- ix. Discussion
- x. Conclusion
- xi. Acknowledgments — placed immediately after the next, and before the references
- xii. Citations and references will be arranged according to the Vancouver Style:

A. Citation of Periodicals

Kofi-Tsekpo WM and Karekezi CW. Detectability and measurability of amoscantate in plasma by TLC and HPLC. *Drugs under Experimental and Clinical Research*. 1988; 14: 31-37.

Watkins WM, Howells RE, Brandling-Bennet AD and Koech DK. In vitro susceptibility of Plasmodium falciparum isolates from Jilore, Kenya to antimalarial drugs. *American Journal of Tropical Medicine and Hygiene*. 1987; 37: 445-451.

B. Citation of Books

Ole Fijerskov, Firoze Manji and Vibeke Baellum, eds. Dental fluorosis Handbook for health workers. Copenhagen: Munksgaard, 1988 p.

C. Citation of Chapters in books

Same as (B) above.

D. References

in the body of text should be in chronological order and identified by roman numerals in brackets: e.g. Specific point mutations in naturally resistant laboratory isolates of P. Falciparum [4, 5]

E. Figures, Charts & Pictures

Figure legends and tables should be professionally done. Tables/ charts should be in black and white - 100 mm (minimum) and 175 mm (maximum). Coloured pictures may be submitted. Such pictures should be very clear and in size 5 x 7 inches. Where digital pictures are submitted, they should be in jpeg or bitmap format and not less than 300dpi resolution. Unclear and blurred pictures will be rejected. The publisher also reserves the right to convert coloured plates to grayscale where necessary.

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- i. A letter of submission electronically.
- ii. Manuscript created using a word-processing program in PC format is encouraged. This is submitted electronically. Two hard copies of the peer reviewed , corrected manuscript will be sent over by the corresponding author to the editorial assistant, Regina Faleye MS, at the editorial office in the Department of Medicine, University College Hospital, Ibadan, Oyo State, Nigeria
- iii. Written permission from authors whose copyright material has been used in the manuscript.
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Adekunle George FMCP.

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The current edition of the Nigerian Journal of Dermatology (NJD) has presented a wide range of topics, from common everyday challenges like acne vulgaris to relatively rare entities like Hidradenitis suppurativa (HS).

Acneiform eruptions will remain a global problem and a recurring malady. The incidence and pattern may vary from one geographical location to another. Information from an area may thus help dermatologists and Family physicians who are likely to see such cases to be better informed about the peculiarities in presentation. In this edition "Prevalence and Risk Factors of Acne Vulgaris among Secondary School Students in Eboyin State" is presented. Eboyin State is one of the 36 States in Nigeria.

Karl Marx, the founder of communism, suffered from hidradenitis suppurativa. This skin disorder left him with a feeling of "self-loathing" and alienation, according to an article in the British Journal of Dermatology (1) The prevalence of HS in Lagos was 2.2% in a study validating a Screening Questionnaire (2). In this edition, there is a further look at the disease, with a focus on "Clinical Profile of Hidradenitis Suppurativa in Nigerians."

The paediatric age group has not been omitted or forgotten. The number of Paediatric dermatologists has increased from none fifteen years ago to over twenty-five presently (3). "Vitiligo in Paediatric Patients with dark skin types" is one of the articles in the current edition. The world has moved from dependence on hard copies to soft copies and shifted almost wholly to the internet,... to Social media!!!

TikTok is a popular platform (4,5) for skincare and cosmetic companies to promote their products, sometimes with the involvement of dermatologists

or influencers. Many influencers, including those without medical expertise, create skincare content, potentially blurring the lines between education and promotion. In this edition, a paper is being published that shines light on this aspect of dermatology titled *"From TikTok to clinic; Understanding and responding to TikTok beauty trends in Dermatology"*.

In this edition, one is exposed to a menu of rare and common, clinical and laboratory-skewed publications, and from the traditional/standard format of sharing information to the World of Social media.

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From Tiktok to Clinic: Understanding and Responding to Tiktok Beauty Trends in Dermatology

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Abstract

Introduction: TikTok is a video-sharing social media application with over a billion users. It ranks as the fifth most popular social media platform globally and has evolved from being solely entertaining to an educational hub, especially in beauty and skincare. Although TikTok can serve as a source of beauty information, it has its challenges – including the spread of false information and the promotion of harmful beauty trends. Influencers and dermatologists have leveraged TikTok to educate and engage people. Dermatologists need to play an essential role in understanding and responding to beauty trends, and this requires a preemptive approach.

Objective: This review analyses the intersection of TikTok beauty trends and dermatology, and the implications of these trends for clinical practice.

Methodology: Studies were identified through PubMed, Google Scholar, and grey literature from 2018 to 2025, analyzing TikTok's influence on dermatology, with a focus on viral beauty trends. Only articles published in English were included in this write-up.

Result: These trends included Korean beauty, skin cycling, skincare routine, skin slugging and organic skincare. The dermatologist's responses to these trends include observing beauty trends that have gone viral on TikTok, subscribing to blogs, online resources, and publications focused on beauty and skincare, and engaging with patients on these trends. Dermatologists can provide accurate information and address potential risks associated with current beauty trends.

Conclusion: Dermatologists must adapt to evolving beauty trends by proactively engaging, ensuring dermatological care aligns with the principles of evidence-based medicine, and promoting safe skincare practices.

Keywords: TikTok, dermatology, beauty, beauty trends

De Tiktok à la clinique : Comprendre et répondre aux tendances beauté sur Tiktok en dermatologie

Résumé

Contexte : TikTok est une application de partage de vidéos sur les réseaux sociaux comptant plus d'un milliard d'utilisateurs. Cinquième plateforme la plus populaire au monde, elle est passée d'un simple outil de divertissement à une plateforme éducative, notamment en matière de beauté et de soins de la peau. Si TikTok peut être une source d'information beauté, elle présente aussi des défis, comme la diffusion de fausses informations et la promotion de tendances beautés néfastes. Influenceurs et dermatologues utilisent TikTok pour informer et interagir avec le public. Les dermatologues ont un rôle essentiel à jouer pour comprendre et répondre à ces tendances, ce qui nécessite une approche proactive.

Objectif : Cette revue analyse l'intersection entre les tendances beauté sur Tiktok et la dermatologie, ainsi que leurs implications pour la pratique clinique.

Méthodologie : Les études analysant l'influence de Tiktok sur la dermatologie, et plus particulièrement les tendances beautés virales, ont été identifiées via PubMed, Google Scholar et la littérature grise entre 2018 et

2025. Seuls les articles publiés en anglais ont été inclus dans cette analyse.

Résultats : Ces tendances de beauté incluent la beauté coréenne, le cycle de soins de la peau, les routines de soins, le « skin slugging » et les soins bio. Les dermatologues réagissent à ces tendances en observant les tendances beauté devenues virales sur TikTok, en s'abonnant à des blogs, des ressources en ligne et des publications spécialisées en beauté et soins de la peau, et en échangeant avec leurs patients sur ces tendances. Les dermatologues peuvent fournir des informations précises et aborder les risques potentiels associés aux tendances beautés actuelles.

Conclusion : Les dermatologues doivent s'adapter à l'évolution des tendances beauté en s'engageant activement, en veillant à ce que les soins dermatologiques soient conformes aux principes de la médecine factuelle et en promouvant des pratiques de soins de la peau sûres.

Mots-clés : TikTok, dermatologie, beauté, tendances beauté

Introduction

TikTok is a social media platform that allows users to create and share short videos. It is owned by the Chinese company ByteDance and has over 1.5 billion users.^{1,2} TikTok is the 5th biggest social media platform and is fast-growing.³

In early 2024, Nigeria had 23.84 million active TikTok users, making it the country with the highest number of active users in West Africa and ranking 19th globally in terms of TikTok usage.⁴ TikTok is used primarily for entertainment but has evolved into an information hub.⁵ In recent times, TikTok has played a prominent role in the beauty and skincare industry. Although this is not peculiar to TikTok, as beauty and skincare content are prominent on all other social media platforms. Healthcare professionals, including dermatologists, use TikTok for patient education, and this has contributed to the platform's scientific impact. Top dermatology-related TikTok videos include patient experiences or testimonials, educational content, clinical demonstrations, product reviews, beauty trends, and skincare tips.⁶ However, with the ease of access to information and short duration of videos, averaging 30 to 60 seconds via TikTok, there is a potential for propagation of false, misleading or harmful information.⁷ Another downside of TikTok is that users can be influenced into embarking on an 'odyssey' in pursuit of beauty and skincare trends.

As TikTok becomes more popular, its impact is significant in developing countries such as Nigeria and other African nations. In these regions, access to accurate dermatological information may be limited, making TikTok a primary source of skincare-related information.

A beauty trend is a popular product, style, or behavioural pattern that has gained prominence in the beauty and cosmetic field over a given period. Social media platforms such as TikTok, Instagram, Facebook, and Snapchat have played a pivotal role in shaping and sustaining these trends.⁸ This is achieved through social media advertising and influencer promotion. Dermatologists and other healthcare professionals should not only be abreast of TikTok beauty trends but also be at the forefront of navigating them and understanding their implications for clinical practice.

Objective

This review aims to analyse the intersection of TikTok beauty trends and dermatology and to provide insights to navigate their influence effectively in dermatology clinical practice.

Methodology

The study design was a narrative review that synthesised current evidence and insights on TikTok beauty trends and their implications for dermatology practice. A literature search was conducted using PubMed, Google Scholar, and grey literature sources (including professional blogs, industry reports, and TikTok analytics pages). The search covered publications from January 2018 to April 2025, capturing the period when TikTok gained significant global traction.

Various combinations of the following keywords and Boolean operators were used: "TikTok" OR "social media" AND "dermatology" OR "skincare trends" OR "beauty trends" OR "skin care routine" OR "organic skincare" OR "K-beauty" OR "Korean beauty" OR "skin slugging" OR "skin cycling."

Inclusion criteria were articles addressing TikTok beauty trends and their importance to dermatology or skincare; studies, reviews, or reports in English; and peer-reviewed publications and grey literature sources relevant to clinical practice. Exclusion criteria included articles unrelated to dermatology or TikTok, studies focused solely on other platforms (e.g., Instagram, Facebook) without mention of TikTok, and non-English publications.

Results

The literature search yielded approximately 29 relevant sources after applying inclusion and exclusion criteria. These comprised:

- 17 peer-reviewed journal articles, including original studies and narrative reviews on social media trends, dermatology, and TikTok-related health content.
- 12 grey literature sources, such as industry reports, professional blogs, and TikTok analytics pages, which included trending hashtags and popularity metrics for specific beauty trends.

This literature review highlighted five major beauty trends that have recently dominated TikTok. These include:

1. Skincare routines

Skincare routines comprise a series of steps and practices that involve the regular use of products to improve the appearance of the skin. The desire for people to adopt a skincare routine is on the rise, and this trend will persist over the next two decades.⁵ During the COVID pandemic lockdown, people were stuck indoors and had more free time.⁵ This led to an increased consumption of social media, particularly TikTok. With this extra time, many people shifted from applying a full face of makeup to dedicating more time to their skincare and adopting new skin routines.^{9,10} The surge in video call-based meetings during the lockdown further heightened interest in facial skincare products. Interestingly, there is also a growing pandemic of the use of skincare products among preadolescents, which is driven by social media platforms such as TikTok, Facebook and Instagram.¹¹

Zhang et al. found that routine skin care with

effective, high-quality products improved self-esteem and positively affected self-image.¹² This explains the growing trend of skincare routines, which has become popular among social media users.

The drawbacks of blindly following TikTok-promoted skincare routines include overuse of active ingredients, unsubstantiated product claims and promotion of unrealistic expectations. A 'one-size-fits-all' skincare routine will not cater to the different skin types.

Within our clinics, it is essential to emphasise the importance of a consistent skincare routine with appropriate products and the need to adjust it based on each individual's dermatological needs. Educating on the timing of application (day or night) and on layering cosmeceuticals to achieve maximal effect and minimise side effects or contact dermatitis is key.

Having a tailored skincare routine can help manage existing skin conditions, such as acne and hyperpigmentation and can complement specific dermatological treatments and procedures.

2. Korean beauty

This is also known as K-beauty and has increased in popularity on TikTok. Similar to K-drama and K-pop, K-beauty has made a bold entrance into the global marketplace. The expanding influence of Korean beauty is attributed to its integration of cosmetic technology and product innovation, which uses 'unconventional' natural ingredients.^{13,14} Emerging as one of the top 10 beauty markets in the world, South Korea had an estimated market size of \$3.9 billion, reflecting its significant influence and consumer demand for K-beauty products.¹⁵ Korean beauty emphasizes products that provide hydration and have anti-ageing and lightening effects. This beauty trend intersects with dermatology as our patients increasingly use skin-lightening agents and anti-ageing products.

The ingredients used in these products include the following:

Animal-based additives

- a) Snail secretions, also known as snail mucin

These are the secretions of the mollusc, *Cryptomphalus aspersa* – the brown garden snail.

The secretions contain growth factors, glycosaminoglycans, and hyaluronic acid, and thus have hydrating, antioxidant, anti-ageing, and antimicrobial properties. Several studies have demonstrated its use in photoaging, burns, atopic dermatitis, skin cancer and skin rejuvenation.^{13,16,17}

- b) Bee glue – Propolis¹⁸
- c) Horse oil¹⁹
- d) Donkey milk²⁰

Marine-based additives include salmon egg extract, seaweed, starfish powder, and pearl powder.^{13,21–24}

Plant-based additives

These include aloe vera, birch, bamboo, bearberry, chamomile, cherry blossom, ginseng, green tea, turmeric, licorice and pomegranate.^{13,25,26}

Fungi-based additives

Common ones are Galactomyces ferment filtrate, Tremella fuciformis and Truffle.^{13,27,28}

The incorporation of these exotic ingredients showcases the innovative nature of K-beauty products. The goal of K-beauty is for users to achieve 'glass skin,' which means dewy, flawless, poreless skin resembling glass. A 10-step Korean skincare routine helps accomplish this.²⁹

Although these unconventional cosmeceutical ingredients are undergoing validation, medical literature is scarce on their safety and efficacy.¹³ Some of these ingredients, such as snail mucin, have shown therapeutic potential in dermatological conditions such as atopic dermatitis, acne, psoriasis, radiation dermatitis and burns.³⁰ It is essential for dermatologists to be aware of these ingredients.

In sub-Saharan Africa, the hot and humid climate increases the risk of occlusion and breakouts when heavy, layered products are used. There is a risk of irritation from the ingredients in K-beauty products.

3. Skin cycling

It is an old concept that involves rotating skin care products on a 4- or 5-day cycle.^{31,32} It is based mainly on the expert opinion of a US dermatologist, Dr Whitney Bowe.³³

It entails using active ingredients on certain days, followed by rest days. For instance, using an exfoliant

on Monday, followed by retinol on Tuesday. For the remaining 3 days, a topical bland emollient is applied. This alternating regimen reduces irritation caused by increased retinol penetration, with the use of an emollient on rest days. The cycle is repeated.

This trend intersects with current dermatology practice, which involves retinol rest days or free days. Skin cycling will likely be ineffective for those with certain skin conditions such as severe acne, rosacea and psoriasis. However, there is currently no clinical study on skin cycling.

4. Skin slugging

Skin slugging is a viral TikTok beauty trend that involves slathering a petrolatum-based ointment on the skin as the last step in evening routines.³⁴ It has gained significant traction. The rationale is that petrolatum jelly helps repair the skin barrier and enhance moisture retention.³⁵ Petrolatum jelly, although believed to be non-comedogenic, is an occlusive agent that reduces transepidermal water loss, thereby increasing hydration.³⁴ Additionally, it improves the penetration of topical medication.

In our clinics, we have loosely used the skin slugging technique in patients with atopic dermatitis, ichthyosis and diaper rash. While it can be effective in some instances, it is crucial to be aware of the risks - pomade acne as well as allergic reaction to the mineral oil in petrolatum jelly.³⁵ It can also be messy and feel too heavy for some individuals, making it undesirable. Dermatologists should be aware of this trend to identify 'sluggers' and educate them appropriately. There is a paucity of scientific evidence supporting the use of skin slugging.

5. Organic skin care

Organic skin care products are formulated with natural and organic ingredients. There has been a significant increase in sales of these products, likely driven by rising health awareness of 'chemical-free' products and a preference for eco-friendly options.³⁶ In sub-Saharan African countries, especially Nigeria, there is a growing demand for organic skin products because they are perceived as safer. Some of these products are touted to deliver quick and immediate results, fueling their popularity. However, this demand has led to the proliferation of fraudulent

organic skincare businesses.³⁷ The majority of these products are not developed by properly trained cosmetic formulators or cosmetic chemists and contain high quantities of steroids, hydroquinone and other chemicals which are damaging to the skin.³⁸ Compounding this issue is the lack of regulation in the industry. This intersection is for dermatologists to identify patients who use these products through proper history-taking. Dermatologists respond by educating patients about the harmful effects of unregulated organic skincare products and treating patients with adverse effects from their use. Engaging in public health campaigns to raise awareness of the risks of using unregulated organic skincare products and advocating for stronger regulation of their sales and products can be helpful.

Factors affecting the success of TikTok Beauty Trends

The success of these TikTok beauty trends can largely be attributed to the influence of beauty influencers, also known as 'Skinfluencers'. Influencers are people who can sway the opinions of large numbers of people.³⁹ They are marked by significant followings and high engagement rates. Consumers often perceive them as relatable and trustworthy sources of information. Interestingly, influencers have played a key role in social media marketing, creating a ripple effect by inspiring imitation behaviour, recommending products, and stimulating interest. Furthermore, TikTok's online advertisements have influenced consumer purchasing decisions.⁴⁰ These advertisements are meticulously crafted to be relevant to consumer needs and stimulate appeal to consumers.⁴⁰

Dermatologists can collaborate with these influencers by co-creating educational content, hosting live question-and-answer sessions, and providing dermatologist-approved product recommendations.

Impact of TikTok beauty trends on patients' behaviour

TikTok influences users' decision-making ability. Because users are exposed to a myriad of beauty content, this exposure gradually shapes their perceptions of dermatological outcomes and the efficacy of specific products or procedures.^{40,41} As a

consequence, dermatologists may encounter patients who come to the clinics, armed with information obtained from TikTok, desiring to replicate popular trends or achieve a specific aesthetic goal seen on the platform. This promotes unrealistic expectations.⁴²

Risks of TikTok trends

TikTok has been described as a "double-edged sword", acknowledging both the risks and benefits.³⁹ While there are benefits, which include the provision of information and social support, there are significant risks associated with it. The abundance of information by non-experts makes it daunting for some users to find reliable information. A study by Bressler et al. revealed that dermatologists expressed greater concern about the risks associated with TikTok beauty trends than about the potential benefits.⁴³ These concerns include the substitution of professional dermatological care with unqualified providers, as well as the promotion of non-evidence-based products. Other risks include using multiple skincare products, which may interact and cause adverse skin reactions. Moreover, there is a risk of misinformation.

Additional risks include the platform's potential to encourage harmful behaviours, boost the popularity of products lacking scientific backing, and foster dissatisfaction with one's appearance and self-dysmorphia due to the prevalence of filtered images.³⁹

Responding to TikTok beauty trends in our clinical practice.

Responding to TikTok beauty trends requires a proactive approach. Dermatologists must stay abreast of trends in beauty, skincare products, skincare routines and do-it-yourself (DIY) treatments. This can be achieved by actively observing beauty trends, hashtags and challenges, following influential TikTok accounts run by dermatologists and other relevant accounts, regularly monitoring blogs, online resources and publications focused on beauty, skincare and dermatology, and engaging with our patients by openly discussing their skincare routines, products and concerns. By being aware of these trends, dermatologists can have informed discussions with their patients, addressing misconceptions or potential risks associated with the trends. Integration of these TikTok beauty trends - proper skincare

routines, modified skin slugging, modified skin cycling, use of certain Korean beauty products- into clinical practice allows dermatologists to apply these trends while ensuring the well-being of their patients.

Role of Dermatological Societies and Healthcare Institutions

Apart from individual dermatologists addressing these trends, dermatology societies and healthcare institutions play a pivotal role in this effort. Their influence carries significant weight. These organizations can remain current with emerging beauty trends and address them through their official social media platforms. Launching educational campaigns on TikTok and other social media platforms to share accurate information is another effective strategy. Furthermore, researching popular beauty trends can help provide scientific validation or debunk myths. Collaborating with influencers to promote safe beauty practices and advocating for stronger regulation against misleading or harmful skincare content are also critical measures.

Conclusion

TikTok has come to stay. It has a significant influence on its users engaging with content related to beauty, skincare routines and product reviews. Although TikTok has become a platform for health education, it also presents challenges such as misinformation and the promotion of harmful practices.

As dermatologists, embracing a proactive approach to TikTok beauty trends requires us to stay informed about emerging trends, engage on the platform, and work with patients to address their skincare concerns and provide accurate information. Beyond individual efforts, collaboration is vital. Dermatologists should partner with social media influencers to educate people. Dermatology societies and regulatory bodies can further amplify the dissemination of accurate information related to these trends. Establishing guidelines for safe skincare content on social platforms can help curb misinformation and protect public health.

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Speciation of Fungal Dermatoses in HIV-Positive Patients: A Comparative Study of HAART-Experienced and HAART-Naive Individuals in Southern Nigeria.

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Abstract

Background: Fungal dermatoses remain a significant challenge among HIV-positive individuals, particularly in resource-limited settings. Highly active antiretroviral therapy (HAART) has transformed HIV care by reducing opportunistic infections through improved immune response. However, the relationship between HAART use and the prevalence, severity, and spectrum of fungal dermatoses remains inadequately characterized, especially in sub-Saharan Africa. This study aims to compare the patterns and severity of fungal species causing dermatoses among HAART-experienced and HAART-naive HIV-positive individuals in Benin City, Nigeria.

Methods: This comparative cross-sectional study was conducted at the University of Benin Teaching Hospital (UBTH) in Edo State, Nigeria, from July to October 2019. We recruited a total of 300 HIV-positive participants, comprising 150 HAART-experienced individuals and 150 HAART-naive individuals. The systematic random sampling technique was employed. Data collection included demographic and clinical information; clinical examination of skin lesions, and laboratory investigation findings. We confirmed the diagnoses using potassium hydroxide microscopy (10% for skin scrapings and 20% for hair and nail clippings) and fungal cultures. Statistical analysis was conducted using SPSS version 25, with p-values < 0.05 considered statistically significant.

Results: The prevalence of fungal dermatoses was significantly lower in HAART-experienced individuals (14%, 21/150) compared to HAART-naive individuals (24.6%, 37/150) ($\chi^2 = 5.47$, $p = 0.02$). *Candida albicans* was the most prevalent fungal species in both groups, and was more frequently isolated from HAART-naive individuals. Severe fungal dermatoses were significantly more common among HAART-naive individuals (54.1%, 20/37) compared to HAART-experienced individuals (23.8%, 5/21); ($\chi^2 = 4.99$, $p = 0.02$). HAART-experienced individuals demonstrated a broader spectrum of less severe fungal dermatoses.

Conclusions: HAART-experienced individuals showed significantly reduced prevalence and severity of fungal dermatoses, although fungal species, such as *Candida albicans*, persisted in both groups. These findings show the importance of improving HAART coverage and adherence to reduce the burden of fungal infections among HIV-positive individuals.

Keywords: Fungal dermatoses, HIV-positive, HAART-experienced, HAART-naive, *Candida albicans*.

Identification des espèces fongiques responsables de dermatoses chez les patients séropositifs : étude comparative entre patients sous traitement antirétroviral hautement actif (HAART) et patients naïfs au sud du Nigéria.

Résumé

Contexte : Les dermatoses fongiques constituent un problème majeur chez les personnes séropositives, notamment dans les contextes de ressources limitées. Le traitement antirétroviral hautement actif (HAART) a transformé la prise en charge du VIH en réduisant les infections opportunistes grâce à une meilleure réponse immunitaire. Cependant, la relation entre l'utilisation du HAART, la prévalence, la gravité et le spectre des

dermatoses fongiques reste mal caractérisée, en particulier en Afrique subsaharienne. Cette étude vise à comparer les profils et la gravité des espèces fongiques responsables de dermatoses chez les patients séropositifs sous HAART et ceux naïfs de HAART à Benin City, au Nigéria.

Méthodes : Cette étude transversale comparative a été menée au Centre Hospitalier Universitaire de Benin (UBTH), dans l'État d'Edo, au Nigéria, de juillet à octobre 2019. Nous avons recruté 300 participants séropositifs, dont 150 personnes ayant déjà reçu un traitement antirétroviral (TAR) et 150 personnes naïves de TAR. Un échantillonnage aléatoire systématique a été utilisé. La collecte des données comprenait des informations démographiques et cliniques, l'examen clinique des lésions cutanées et les résultats des analyses de laboratoire. Les diagnostics ont été confirmés par microscopie à l'hydroxyde de potassium (10 % pour les prélèvements cutanés et 20 % pour les prélèvements de cheveux et d'ongles) et par culture fongique. L'analyse statistique a été réalisée à l'aide du logiciel SPSS version 25, avec un seuil de signification statistique fixé à $p < 0,05$.

Résultats : La prévalence des dermatoses fongiques était significativement plus faible chez les personnes ayant déjà reçu un traitement antirétroviral (14 %, 21/150) que chez celles n'en ayant jamais reçu (24,6 %, 37/150) ($\chi^2 = 5,47$, $p = 0,02$). *Candida albicans* était l'espèce fongique prévalente dans les deux groupes et était plus fréquemment isolée chez les personnes n'ayant jamais reçu de traitement antirétroviral. Les dermatoses fongiques sévères étaient significativement plus fréquentes chez ces dernières (54,1 %, 20/37) que chez celles ayant déjà reçu un traitement antirétroviral (23,8 %, 5/21). ($\chi^2 = 4,99$, $p = 0,02$). Les personnes ayant déjà reçu un traitement antirétroviral hautement actif (HAART) présentaient un spectre plus large de dermatoses fongiques moins sévères.

Conclusions : Les personnes ayant déjà reçu un HAART présentaient une prévalence et une gravité significativement réduites des dermatoses fongiques, bien que certaines espèces fongiques, comme *Candida albicans*, persistent dans les deux groupes. Ces résultats soulignent l'importance d'améliorer la couverture et l'observance du HAART afin de réduire la charge des infections fongiques chez les personnes séropositives.

Mots-clés : Dermatoses fongiques, Personne séropositive, HAART, personnes naïves, *Candida albicans*

Introduction

The advent of highly active antiretroviral therapy (HAART) has revolutionized HIV management.¹ Despite these advancements, fungal dermatoses persist as a significant burden among HIV-positive individuals, particularly in resource-limited settings.² These infections range from superficial conditions, such as tinea infections and candidiasis, to more severe invasive forms, reflecting the degree of immunosuppression.³ Globally, fungal dermatoses are among the most common opportunistic infections in HIV patients, with sub-Saharan Africa bearing the highest prevalence.⁴ Factors such as delayed diagnosis, limited access to antifungal therapies, and inconsistent HAART uptake exacerbate this burden.⁵ In Nigeria, the dual burden of HIV and constrained healthcare resources creates a challenging environment for the effective management of fungal dermatoses.⁶ With over 1.9 million people living with HIV, the country has one of the highest HIV burdens globally, contributing to widespread immunosuppression and a higher susceptibility to

opportunistic infections, including fungal dermatoses.⁷ These conditions often present as the first clinical manifestations of advanced HIV disease, serving as both diagnostic markers and contributors to morbidity.⁸

Compounding the issue is the limited access to healthcare infrastructure and resources.⁹ Diagnostic capabilities for fungal infections, such as culture facilities and molecular speciation tools, are sparse, especially in rural and underserved areas.⁹ This limitation often results in delayed or inaccurate diagnoses, leading to suboptimal treatment outcomes.¹⁰ Furthermore, access to antifungal medications is hindered by financial constraints and inconsistent supply chains, leaving many patients untreated or inadequately treated.¹¹ Gaps in HAART coverage and adherence further complicate the situation. While HAART has significantly reduce the incidence of opportunistic infections through immune reconstitution, coverage in Nigeria remains suboptimal, with statistics showing ART (antiretroviral therapy) coverage being less than 90%

among eligible individuals receiving treatment; falling short of the UNAIDS target of 95-95-95 by the year 2025.¹² Even among those on HAART, challenges such as drug resistance, inconsistent adherence, and treatment interruptions can diminish its protective effects, leaving patients vulnerable to recurrent fungal infections. However, there is limited research exploring the specific fungal species affecting HIV-positive individuals and how HAART modifies these patterns.

Understanding the relationship between HAART and fungal dermatoses is pivotal for optimizing care in HIV-positive populations. HAART-induced immune reconstitution is known to reduce the incidence of many opportunistic infections, yet its impact on fungal dermatoses remains inadequately characterized, particularly in sub-Saharan Africa.

Speciation studies are crucial as they enable targeted antifungal interventions, reduce treatment resistance, and improve patient outcomes. Benin City, Nigeria, presents a unique setting for such research due to the fact that it is a major centre for HIV care in Nigeria and plays host to diverse persons living with HIV from various ethnicities (in South-South, Nigeria).

Comparing the patterns of fungal dermatoses in HAART-experienced and HAART-naïve patients provides an opportunity to assess HAART's protective effects while identifying persistent gaps in fungal infection management. This study evaluated the patterns and spectrum of fungal dermatoses in HIV-positive patients.

Methods

Study Area: We conducted the study at the President's Emergency Plan for AIDS Relief (PEPFAR) clinics within the University of Benin Teaching Hospital (UBTH), Benin City, Edo State, Nigeria. UBTH, located in Egor Local Government Area, is one of five public tertiary healthcare institutions in Edo State and serves as a multi-speciality healthcare provider in West Africa. For over 40 years, it has been recognized as a centre of excellence, receiving referrals from across Nigeria, including neighbouring states such as Delta, Bayelsa, Kogi, Ondo, Anambra, Ekiti, and the Federal Capital Territory. The hospital has a capacity of 1,200 beds and provides both inpatient and outpatient services.

The Dermatology/Venereology Unit of the Department of Internal Medicine oversees the adult PEPFAR clinic, which manages HIV care. The PEPFAR clinic runs four days a week, attending to an average of 80 patients per week who are referred from the General outpatients' clinics, Consultants' outpatient clinics, the Accident and Emergency unit, and neighbouring states.

The diagnosis of fungal dermatoses was made by the Dermato-venereologist who works with the medical officers posted to the unit. The Adherence and Counselling units are operational sub-units within the PEPFAR clinic that are responsible for ensuring patient adherence to HAART medications and clinic visits, as well as providing support and motivation to patients.

Study Design: This study used a comparative cross-sectional design to evaluate differences in fungal dermatoses between HAART-experienced and HAART-naïve patients.

Selection Criteria for the Treatment-Experienced Patients: Inclusion Criteria: Patients living with HIV aged ≥ 18 years who had been on HAART for ≥ 6 months, regardless of clinical stage, and who provided written informed consent. Exclusion Criteria include Patients with other immunosuppressive conditions (e.g., diabetes mellitus, malignancies, or use of immunosuppressive drugs); pregnant patients; and those experiencing treatment, virologic, or immunologic failures.

Treatment-Naïve Patients: Inclusion Criteria: Patients living with HIV aged ≥ 18 years who had never been on HAART, and Patients who gave written informed consent. Exclusion Criteria include pregnant patients and those with other immunosuppressive conditions as outlined above.

Sample Size Determination: The sample size for this study was determined using the formula for calculating the two independent proportions.¹³ Minimum sample size for each of the study population was 125; 10% of calculated sample size was added as non-response = 12.5; Minimum sample size was therefore = 137.5 \approx 138. For this study. A sample size of 150 for each population group was used.

Study Population: Each group comprised 150 participants.

- Group A: HAART-experienced patients (on therapy for ≥ 6 months irrespective of clinical stage).
- Group B: HAART-naive patients (recently diagnosed and not yet commenced on therapy).

Ethical Considerations: Ethical approval (ADM/E 22/A/VOL. VII/14563) was obtained from the UBTH Ethical Committee. Informed consent was secured from all participants after explaining the study's purpose, procedures, risks, and benefits. We maintained confidentiality and respected each participant's intellectual property rights.

Sampling Technique: A systematic random sampling technique was used:

HAART-Experienced Patients (Group A): Sampling interval: 26:1, based on an average of 1,280 eligible patients over three months. Participants were selected by ballot, with successive patients chosen at intervals of 26.

HAART-Naive Patients (Group B): Sampling interval: 6:1, based on an average of 320 newly diagnosed patients over three months. Participants were similarly selected at intervals of six using the same balloting method.

Assessment of Severity: A customized severity scoring system was developed using the Wallace Rule of Nines to estimate the body surface area (BSA) involved: mild: 1–9% BSA; moderate: 10–30% BSA, and severe: $>30\%$ BSA.¹⁵

Clinical Examination and Diagnostic Procedures: Clinical examination and relevant laboratory investigations are used to confirm the diagnosis and identify fungal species. Participants were examined in a well-lit, private setting, with chaperones present as needed. We assessed the skin lesions for type, shape, size, and site.

Laboratory investigations were done to confirm the diagnosis. Skin scrapings and nail clippings: Examined with potassium hydroxide (KOH), 10% for skin and 20% for nail and hair samples under light microscopy for fungal elements.

Fungal culture: Inoculated on Sabouraud Dextrose Agar and Dermatophyte Test Medium, incubated at 25–30°C for up to four weeks. Culture plates were inoculated at room temperature (27°C). Cultures were inspected three times weekly for fungal growth. Specimens that failed to yield any growth after three weeks of incubation were discarded, and the results were recorded. For cultures that yielded growth, the macroscopic appearance of the colonies was noted. A cellulose tape mount for microscopic examination was briefly applied to a microscope slide with a drop of lactophenol cotton blue. The slide was mounted on the microscope and observed at 40x magnification to identify characteristic features of dermatophytes from different genera.

Data Management

Data were collected using a standardized, interviewer-administered questionnaire that captured demographic details, clinical information (e.g., HAART therapy and adherence [4-day recall self-reporting and pill count]), and skin disorders. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Percentages and proportions were used to describe categorical variables, while means and standard deviations were used to summarize continuous variables. The types of fungal dermatoses were represented using charts. The mean ages of the two population groups were compared using independent-samples t-tests. The statistical significance of categorical variables was estimated using the chi-square test. P values less than 0.05 were taken as significant.

Ethical approval (ADM/E 22/A/VOL. VII/14563) was obtained from the UBTH Ethical Committee. Informed consent was secured from all participants after explaining the study's purpose, procedures, risks, and benefits. Confidentiality was maintained, and intellectual property rights respected.

Results

A total of 300 participants were recruited for this study, divided equally into two groups: 150 HAART-experienced and 150 HAART-naive. Table 1. The mean age of the HAART-experienced group was 45.02 ± 11.23 years, with an age range of 20 to 72 years. In comparison, the HAART-naive group had a

mean age of 42.62 ± 12.22 years, with a range of 18 to 69 years. In terms of gender distribution, the HAART-naive group comprised 100 females (66.7%) and 50 males (33.3%), with a male-to-female ratio of 1:2. The HAART-experienced group included 114 females (76.0%) and 36 males (24.0%), resulting in a male-to-female ratio of 1:3.2. While females predominated in both groups, the proportion of females was higher in the HAART-experienced group. However, this difference was not statistically significant ($p=0.074$).

Marital status data showed that the majority of participants in both groups (153, 51.0%) were married. Specifically, 52% ($n = 78$) of the HAART-experienced group were married, compared to 50% ($n = 75$) in the HAART-naive group. The remaining participants in the HAART-experienced group were single (22.7%, $n = 34$) or widowed (18.6%, $n = 28$). Similarly, in the HAART-naive group, 32% ($n = 48$) were single, 14.7% ($n = 22$) were widowed, and 0.7% ($n = 1$) were divorced. Educational attainment showed a similar pattern across the two groups, with the majority of participants attaining secondary education: 49 (32.7%) in the HAART-experienced group and 52 (34.7%) in the HAART-naive group. Most participants had completed secondary education, accounting for 37.6% of the HAART-experienced group and 36.0% of the HAART-naive group. The least represented category in both groups was individuals with no formal education (See Table 1).

Relationship between Presence and Severity of Fungal Dermatoses in the HAART-experienced and HAART-naive groups. There was a statistically significant difference in the prevalence of fungal dermatoses between the HAART-experienced and HAART-naive groups ($\chi^2 = 5.47$, $p = 0.02$); Table 2. Specifically, 21 (14%) of the HAART-experienced participants had fungal dermatoses, compared to 37 (24.6%) in the HAART-naive group. Regarding the severity of fungal dermatoses, a statistically significant difference was observed between the two groups. In the HAART-experienced group, 5 (23.8%) participants had severe fungal dermatosis (based to body surface area affected), compared to 20 (54.1%) in the HAART-

naive group. Among HAART-experienced participants, 10 (47.6%) had mild fungal dermatoses, while 9 (21.6%) in the HAART-naive group had mild disease ($\chi^2 = 1.42$, $p = 0.23$). (See Table 2).

Clinical Types of Fungal Dermatoses in HAART-Experienced and HAART-Naive Groups.

We identified nine clinical types of fungal dermatoses in the study groups. Eight (8) of these occurred in both groups, and they include Tinea corporis (27.6%), Tinea cruris (6.9%), Tinea manuum (3.5%), Tinea faciei (3.5%), Tinea pedis (17.2%), Flexural Candidiasis (24.1%), Onychomycosis (10.3%) and Pityriasis versicolor (5.2%).

Tinea corporis was the most common fungal dermatosis in the HAART-experienced population, representing 28.6%, and in the HAART-naive population, 29.7%, of which 24.3% had only Tinea corporis, 2.7% had Tinea corporis coexisting with onychomycosis, and 2.7% had Tinea corporis with T. capitis. Notably, Tinea capitis was conspicuously absent in the HAART-experienced group; it affected only the HAART-naive group, occurring either singly in 2.7% of those in this group or in combination with other fungal dermatoses (Tinea corporis), affecting 2.7% of the population.

The prevalence of Pityriasis versicolor was only slightly higher in the HAART-naive group (5.4%) than in the HAART-experienced group (4.8%).

Onychomycosis was observed in 4.8% of the HAART-experienced group. In contrast, in the HAART-naive group, it occurred alone in 5.4% of participants and coexisted with T. corporis, T. cruris, and T. faciei, affecting 2.7% of participants.

Tinea manuum was seen in 2.7% of the HAART-naive group and 4.8% of the HAART-experienced group; candidiasis was seen in 24.3% of the HAART-naive group and 23.7% of the HAART-experienced group. Tinea pedis was observed in 16.2% of the HAART-naive group and 19% of the experienced groups. There was no significant difference in fungal dermatoses among HAART-experienced and naive populations (p -value = 0.803). (See Table 3).

Table 1: Demographic Characteristics of Study Participants

Demographic Variables	(Frequency n, %)		p-value
	HAART Naïve (%)	HAART Experience	
Age			
<20 Years	1(0.7)	0(0.0)	0.256
20-29 Years	25(16.6)	12(8.0)	
30-39 Years	41(27.3)	40(26.7)	
40-49 Years	40(26.7)	43(28.5)	
50-59 Years	28(18.7)	32(21.3)	
60-69 Years	15(10.0)	21(14.0)	
≥70 Years	0(0.0)	2(1.4)	
Gender			
Female	100(66.7)	114(76.0)	0.074
Male	50(33.3)	36(24.0)	
Marital Status			
Divorce	4(2.7)	10(6.7)	0.150
Married	75(50.0)	78(52.0)	
Separated	1(0.7)	0(0.0)	
Single	48(32.0)	34(22.7)	
Widow/Widower	22(14.6)	28(18.6)	
Educational Status			
Primary	32(21.3)	45(30.0)	0.072
Secondary	49(32.7)	52(34.7)	
Tertiary	61(40.7)	41(27.3)	
None	8(5.3)	12(8.0)	
Occupation			
Civil Servants	17(11.3)	22(14.7)	0.177
Drivers	4(2.7)	10(6.7)	
Fashion Designer	9(6.0)	11(7.3)	
Hair Dresser	13(8.7)	14(9.8)	
Health Care Workers	3(2.0)	1(0.7)	
Retired	4(2.7)	2(1.3)	
Students	1(0.7)	6(4.0)	
Traders	77(51.3)	62(41.3)	
Unemployed	11(7.3)	6(4.0)	

Table 2: Relationship between Presence and Severity of Fungal Dermatoses and Study Group

Variables	Frequency n, (100%)		Statistic test/p-value
	HAART Experienced	HAART Naïve	
Fungal Dermatoses			
Present	21 (14.0%)	37 (24.6%)	$\chi^2=5.47, p=0.02$
Absent	129 (86.0%)	113 (76.4%)	
Severity of Fungal Dermatoses			
Mild	10 (47.6%)	9 (21.6%)	$\chi^2= 1.42, p\text{-value} = 0.23$
Moderate	6 (28.6%)	8 (24.3%)	$\chi^2= 0.35, p\text{-value} = 0.55$
Severe	5 (23.8%)	20 (54.1%)	$\chi^2= 4.99, p\text{-value} = 0.02$

*Odds ratio = $\frac{113 \times 21}{129 \times 37} = 0.5$

Table 3: Clinical Patterns / Types of Fungal Dermatoses in HAART Experienced and Naive

Clinical Types of Fungal Dermatoses	HAART		
	Experience (%)	Naïve (%)	
Onychomycosis	1 (4.8)	2 (5.4)	
Pityriasis versicolor	1 (4.8)	2 (5.4)	
Tinea corporis	6 (28.6)	9 (24.3)	
Tinea corporis & onychomycosis	0 (0.0)	2 (5.4)	
Tinea capitis	0 (0.0)	1 (2.7)	
Tinea capitis and corporis	0 (0.0)	1 (2.7)	
Tinea cruris	2 (9.5)	2 (5.4)	
Tinea cruris and onychomycosis	0 (0.0)	1 (2.7)	
Tinea faciei	1 (4.8)	1 (2.7)	
Tinea faciei and onychomycosis	0 (0.0)	1 (2.7)	
Tinea manum	1 (4.8)	1 (2.7)	
Candidiasis	5 (23.7)	8 (21.6)	
Tinea pedis	4 (19.0)	6 (16.3)	
Total	21 (100.0%)	37 (100.0)	p-value = 0.803

Clinical and Mycologic Correlations for HAART-experienced and HAART naïve

There was mycologic evidence (microscopy and culture) of fungal dermatoses in 28 (48.3%) participants out of 58 scrapings. Microscopic evidence of fungal elements (hyphae and/or spores) could be demonstrated in scrapings from 17(60.7%) out of the 28 cases. Meanwhile, demonstration of fungal organisms by culture alone (culture positivity) was observed in 11 (39.3%) of the 28 cases. However, among the 28 participants, 5 (17.7%) had both microscopic and culture evidence.

Of the 17 participants diagnosed with microscopic evidence of fungal dermatoses, 2 (7.1%) were HAART-experienced, while 15 (53.6%) were HAART-naïve. Three (10.7%) of the 11 patients diagnosed with culture positivity were HAART-

experienced, while 8 (28.6%) were HAART-naïve.

Among the 2 HAART-experienced participants with microscopic evidence of fungal dermatoses, 1 (3.4%) also had a culture-positive result, for a total of 4 (14.1%) HAART-experienced participants with culture positivity. In the HAART-naïve group, of the 15 participants with microscopic evidence, 4 (14.3%) also had culture positivity, for a total of 12 (42.9%) participants with culture positivity.

Only dermatophytes were cultured in this study. *Trichophyton rubrum* was the predominant dermatophyte species, isolated from 9 (56.3%) participants, while *Trichophyton tonsurans* was isolated from 6 (37.5%) participants, and *Microsporum canis* was isolated from 1 (6.2%) participant.

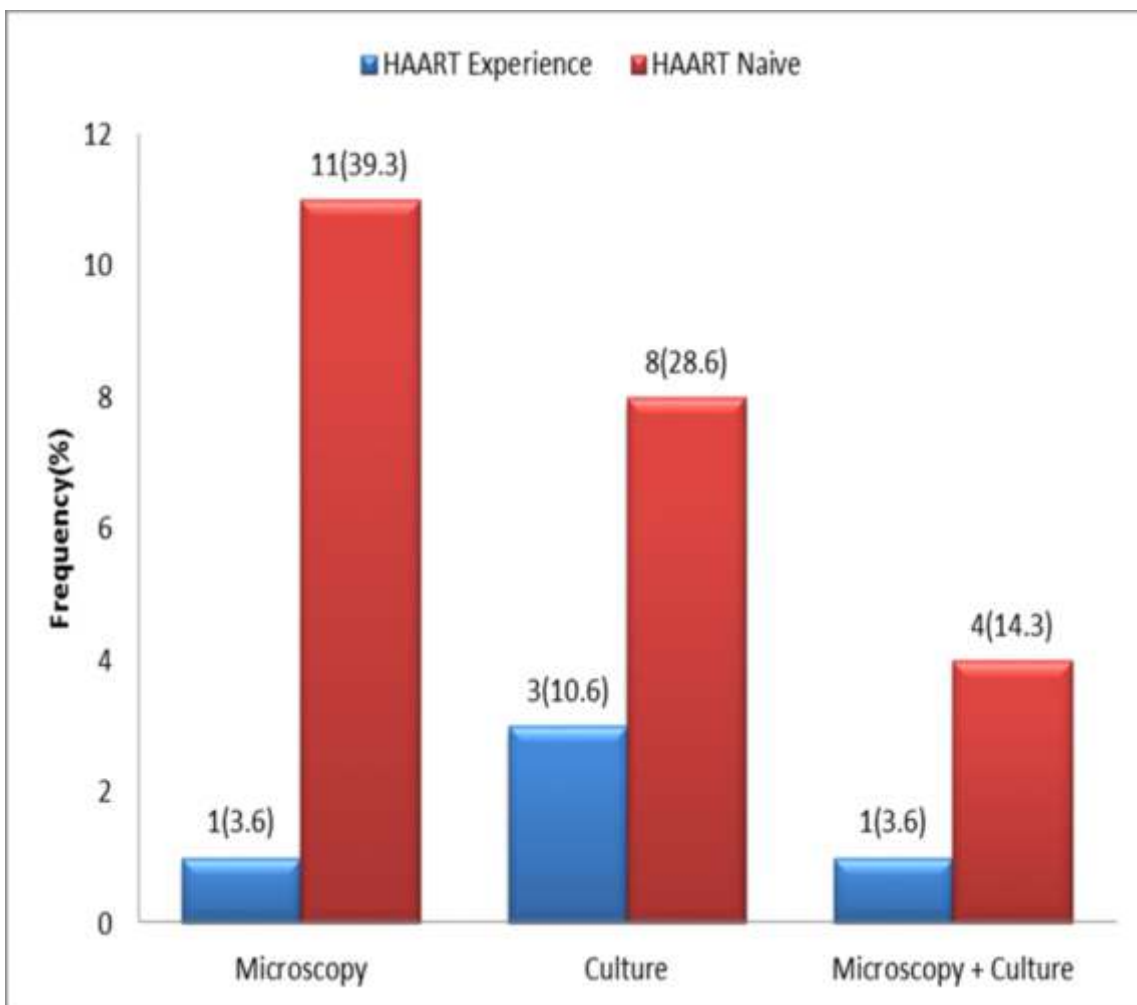


Figure 1: Clinical- Mycologic Correlations for HAART-experienced and HAART naïve

Discussion

The findings of this study highlight significant differences in the prevalence, severity, and microbiological characteristics of fungal dermatoses between HAART-experienced and HAART-naive individuals. These results show the impact of HAART on the immunological milieu (the complex local environment of immune cells and molecules that interact to facilitate immune responses) and its role in modifying susceptibility to fungal infections. The study found a lower prevalence of fungal dermatoses among HAART-experienced participants than among HAART-naive participants. This difference is consistent with HAART's protective role in reducing opportunistic infections through immune restoration. HAART therapy increases CD4+ T-cell counts and reduces viral load, thereby mitigating the immunosuppression that predisposes individuals to fungal infections.¹⁶ The higher prevalence in HAART-naive individuals aligns with previous research indicating that fungal dermatoses are common markers of advanced HIV disease and immunosuppression.^{17,18}

In terms of severity, fungal dermatoses were significantly more severe in HAART-naive individuals. This finding further supports the immunological benefits of HAART, as immune reconstitution reduces the severity and extent of infections.¹⁹ Additionally, the higher proportion of mild cases in the HAART-experienced group suggests that even when fungal dermatoses occur in this population, they are more likely to be less severe, likely due to partial immune recovery.

This study identified nine clinical types of fungal dermatoses, with eight occurring in both groups and Tinea capitis occurring exclusively in HAART-naive individuals. The most common fungal dermatosis in both groups was Tinea corporis, accounting for over a quarter (25.9%) of the dermatosis. This suggests that Tinea corporis may be prevalent across various levels of immunosuppression but more severe in individuals with lower immune function, as observed in HAART-naive participants. The exclusive occurrence of Tinea capitis in the HAART-naive group reflects a higher susceptibility to specific dermatophyte infections in the absence of HAART-mediated immune restoration.

Onychomycosis and candidiasis were also prevalent in both groups, with slightly higher rates in the HAART-naive group. However, the differences were not statistically significant. Pityriasis versicolor and Tinea pedis showed a similar distribution across groups, further suggesting that, while HAART improves immune function, certain fungal infections persist due to other predisposing factors, such as environmental conditions or personal hygiene practices.²⁰

Mycological investigations revealed notable differences in the rates of positive microscopy and culture findings between the groups. Microscopic evidence of fungal elements was higher in HAART-naive individuals compared to HAART-experienced individuals. Similarly, culture positivity was more frequent in the HAART-naive group than in the HAART-experienced group. These findings emphasize the increased fungal burden in HAART-naive individuals and reflect the higher prevalence and severity of fungal dermatoses in this population. However, there is a paucity of studies specifically designed to determine the outcomes of laboratory fungal testing in this study population.

The predominance of dermatophytes, specifically *Trichophyton rubrum* as the most commonly isolated species, aligns with existing literature on fungal infections in immunosuppressed populations.^{21, 22} Other species, such as *Trichophyton tonsurans* and *Microsporum canis*, were also identified, indicating a diverse spectrum of dermatophyte infections. The higher isolation rates of *T. rubrum* may be linked to its ability to persist on keratinized tissues, making it a significant pathogen in both immunocompromised and immunocompetent individuals.^{22,23}

These findings have several implications for public health and clinical practice in Nigeria. The higher prevalence and severity of fungal dermatoses in HAART-naive individuals highlight the need to prioritize early initiation of HAART to prevent opportunistic infections. Integrating dermatologic assessments into routine HIV care could enable early identification and management of fungal infections, improving the quality of life for people living with HIV. The predominance of dermatophyte infections, particularly *T. rubrum*, suggests that antifungal

treatments targeting these pathogens should be a focus of therapeutic strategies.

Limitations

This study has been able to highlight the differences in the patterns of superficial mycoses and fungal disease burden among HAART-experienced and HAART-naive individuals, emphasizing the role of HAART in the care of HIV positive individuals. This study, however, being a cross-sectional study, precludes the establishment of causal relationships between HAART use and reduced fungal dermatoses. Longitudinal studies are needed to monitor changes in fungal infection patterns, prevalence and severity over time in individuals initiating HAART. Furthermore, environmental and socioeconomic factors influencing fungal dermatoses were not assessed and warrant further exploration. Future research should investigate the role of specific immunological markers, such as CD4+ T-cell counts and viral load, in predicting susceptibility to fungal dermatoses. Additionally, evaluating the efficacy of antifungal therapies in HAART- and non-HAART-treated populations could inform targeted interventions.

Conclusion

This study provides information on the patterns, speciation, and severity of fungal dermatoses comparing HAART-experienced and HAART-naive populations. The findings demonstrate that fungal dermatoses remain a significant clinical challenge, with a higher prevalence and severity observed in HAART-naive individuals. This shows the protective role of HAART in mitigating opportunistic infections through immune reconstitution while demonstrating the importance of early initiation and adherence to HAART therapy. The identification of specific fungal species prevalent in this population emphasizes the need for routine fungal speciation in clinical practice to guide targeted antifungal treatment and mitigate the risk of drug resistance.

Future research should explore longitudinal trends in fungal dermatoses in relation to HAART adherence, resistance patterns, and the potential emergence of antifungal-resistant strains. Additionally, strengthening public health initiatives aimed at improving access to HAART and enhancing

adherence will be pivotal in reducing the burden of fungal dermatoses among HIV-positive populations.

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Conflicts of Interest: Nil

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Vitiligo in Pediatric Patients with Dark Skin Types: Epidemiological, Clinical Characteristics, Therapeutic Management, and Progression in Ouagadougou, Burkina Faso

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Abstract

Background: Vitiligo is an acquired, multifactorial leukoderma marked by progressive loss of melanocytes from the epidermis, hair follicles, and mucous membranes. It affects individuals of all ages, including children, and pediatric cases present particular sociodemographic, clinical, therapeutic, and developmental features.

Aims: This study aimed to describe the epidemiological, clinical, therapeutic, and evolutionary characteristics of pediatric vitiligo seen at the Dermatology and Venereology Department of Yalgado Ouédraogo University Hospital in Ouagadougou, Burkina Faso.

Methods: We conducted a descriptive, cross-sectional study using retrospective data collected over ten years.

Results: Sixty-eight pediatric vitiligo cases were recorded, representing a prevalence of 0.28%, with a female predominance (male-to-female ratio 0.44:1). The mean age was 6.4 ± 4 years (range: 1–15 years). A family history was noted in 6.45% of cases. Disease progression was slow in 72.58% and stable in 27.42%, with an average duration of 12.2 months. Segmental vitiligo accounted for 21% of cases, while among non-segmental forms, vulvar involvement was most common (51%). 19.3% of patients had anaemia. Topical corticosteroids were the most frequently used treatment, either alone (51.61%) or combined with vitamin C (24.19%). Complete remission occurred in 6.45% of patients, partial remission in 56.45%, and no improvement in 11.3%.

Conclusion: Pediatric vitiligo is rare in our hospital-based research area. In this setting, vulvoperineal involvement is frequent and a significant source of parental concern. Local treatments offer limited efficacy.

Keywords: Vitiligo, Pediatric, Epidemiology, Clinical profile, Phototype 6

Vitiligo Chez les Enfants à Peau Foncée : Caractéristiques Épidémiologiques, Cliniques, Thérapeutiques et Évolutifs à Ouagadougou, Burkina Faso

Résumé

Contexte : Le vitiligo est une leucodermie acquise et multifactorielle caractérisée par une perte progressive de mélanocytes au niveau de l'épiderme, des follicules pileux et des muqueuses. Il touche les personnes de tout âge, y compris les enfants, et les cas pédiatriques présentent des particularités socio-démographiques, cliniques, thérapeutiques et évolutives.

Objectifs : Cette étude visait à décrire les caractéristiques épidémiologiques, cliniques, thérapeutiques et évolutives du vitiligo pédiatrique observé au service de dermatologie vénéréologie du CHU Yalgado

Ouédraogo de Ouagadougou, au Burkina Faso.

Méthodes : Nous avons mené une étude descriptive transversale à partir de données rétrospectives recueillies sur une période de dix ans.

Résultats : Soixante-huit cas de vitiligo pédiatrique ont été recensés, soit une prévalence de 0,28 %, avec une prédominance féminine (ratio hommes/femmes : 0,44/1). L'âge moyen était de $6,4 \pm 4$ ans (de 1 à 15 ans). Des antécédents familiaux ont été notés dans 6,45 % des cas. L'évolution de la maladie était lente dans 72,58 % des cas et stable dans 27,42 %, avec une durée moyenne de 12,2 mois. Le vitiligo segmentaire représentait 21 % des cas, tandis que parmi les formes non segmentaires, l'atteinte vulvaire était la plus fréquente (51 %). Une anémie était présente chez 19,3 % des patients. Les corticostéroïdes topiques constituaient le traitement le plus fréquemment utilisé, seuls (51,61 %) ou en association avec la vitamine C (24,19 %). Une rémission complète a été observée chez 6,45 % des patients, une rémission partielle chez 56,45 % et aucune amélioration chez 11,3 %.

Conclusion : Le vitiligo pédiatrique est rare dans notre zone de recherche hospitalière. Dans ce contexte, l'atteinte vulvo-périnéale est fréquente et constitue une source importante d'inquiétude pour les parents. Les traitements locaux ont une efficacité limitée.

Mots-clés : Vitiligo, Pédiatrie, Épidémiologie, Profil clinique, Phototype 6

Introduction

Vitiligo is an acquired, polygenic, multifactorial disorder characterized by autoimmune-mediated destruction of melanocytes. It clinically manifests as achromic macules with well-defined borders, typically asymptomatic, affecting the skin, mucous membranes, and hair. While vitiligo is not life-threatening, its visible nature can profoundly impact a patient's quality of life, especially as children grow older.^{1,2} The emotional and social effects are particularly pronounced, with children often facing teasing and social exclusion at school due to the visibility of lesions. These effects can lead to long-term psychiatric consequences, including anxiety, introversion, social withdrawal, pediatric depression, and body dysmorphic disorder.^{3,4}

The global prevalence of vitiligo is estimated to range from 0.1% to 2%, with significant variability across ethnic groups and countries, irrespective of race or gender. It is reported that one-third to one-half of adult cases of vitiligo have an onset in childhood.^{5,6} The prevalence of vitiligo in Africa is difficult to ascertain due to underreporting. In Benin, Degboè B et al.⁷ reported a hospital prevalence of 0.9% across all ages in 2017. In Burkina Faso, Traoré A et al.⁸ found a hospital prevalence of 0.84% across all ages in 2007 at the dermatology department of Yalgado Ouédraogo University Hospital in Ouagadougou. While vitiligo affects individuals of all ages, its precise prevalence in the pediatric population remains unknown. A study by Faye O et al.⁹ in rural Mali in 2005 reported a

childhood vitiligo prevalence of 0.23%. Ahogo CK et al. in Côte d'Ivoire observed a hospital prevalence of 1.78%.¹⁰ Vitiligo was found to be the 5th most common skin disorder in children five years and below in a study carried out in Nigeria.¹¹

The limited data on this psychologically traumatic condition, especially in children within sub-Saharan Africa, prompted us to undertake this study to better understand the epidemiological, clinical, therapeutic, and evolutionary characteristics of vitiligo in the pediatric population of Burkina Faso.

Methods

This was a descriptive, retrospective cross-sectional study that reviewed the records of patients aged 0 to 15 years who presented to the Dermatology and Venereology Department of CHU-YO for vitiligo over 10 years, from January 1, 2012, to December 31, 2021. All patients aged 0 to 15 years, regardless of sex, with a diagnosis of vitiligo and a complete clinical file were included in the study. Incomplete records were excluded, particularly those where the diagnosis of vitiligo was made but no clinical, therapeutic, or follow-up data were available.

The variables assessed included epidemiological (hospital frequency), sociodemographic (age, sex, education, occupation, place of residence), clinical (personal and family history, type of vitiligo, clinical forms,¹² topography, disease progression), paraclinical (biological tests: blood count, fasting blood glucose, thyroid-stimulating hormone,

Triiodothyronine, Thyroxine, histopathology), therapeutic (drugs prescribed, dosage, administration method, treatment duration, side effects), and evolutionary (complete remission, partial remission, no response to treatment, lost to follow-up) aspects. Treatment consisted of 8-methoxypsoralen (meladinin) lotion, applied to the affected area, followed by gradual exposure to sunlight for up to 12 hours.

The chi-square test was used to assess the association between complete remission and the treatment regimens used (CI=95%, $p \leq 0.005$). We have obtained the agreement of the national ethics committee to disclose these results (N° 2025-009/MS/MESRI/CERS, Ouagadougou).

Results

Epidemiological aspects

We identified 68 cases of pediatric vitiligo among 24,107 patients who consulted the Dermatology and Venereology Department of CHU-YO between January 1, 2012, and December 31, 2021. However, six patient records did not meet the inclusion criteria. The hospital frequency of childhood vitiligo was 0.28%. The mean age of the patients was 6.4 ± 4 years, with a range from 1 to 15 years. There were 43 female patients (69.3%) and 19 male patients (30.7%), yielding a male-to-female ratio of 0.44. Thirty-four patients were in school (54.8%), and 53 patients (85.48%) were residing in urban areas. Thirty-three cases (53.2%) were in the 0-5 age group (Figure 1).

Clinical aspects

The mean duration of the lesions before consultation was 12.2 ± 19.9 months, with a range of 1 month to 96 months (8 years), median was 5 months, the interquartile range: 3 to 12 months. Disease progression was slow in the majority of cases (72.58%). A family history of vitiligo was reported in 4 patients (6.45%), with first-degree relatives affected in 2 cases (3.22%) and second-degree relatives in 2 cases (3.22%). Personal atopy (allergic conjunctivitis and rhinitis) was noted in 5 patients (8.06%) and family atopy in 7 patients (11.29%), with two patients (2.9%) also having comorbid HIV infection. There were no reported personal or family histories of diabetes and thyroiditis. Six patients (9.68%)

exhibited triggering factors, such as skin microtrauma, consistent with the Koebner phenomenon. Seventeen patients (27.42%) reported pruritus in their lesions. Segmental vitiligo (Figure 2) accounted for 21% of cases (13 patients), while non-segmental vitiligo (Figure 3) was observed in 49 patients (79%). Table 1 summarises the clinical forms of non-segmental vitiligo, and Table 2 the topography of vitiligo. Mucosal vitiligo was classified under focal vitiligo in 27 of 33 cases. Vulvoperineal vitiligo was found in 25 patients with no other location elsewhere on the skin. Lesions were achromic in 43 patients (69.35%), bichromatic in 4 patients (6.45%), and hypopigmented (vitiligo minor) in 31 patients (50%), with various combinations observed.

Paraclinical aspects

Biological tests were routinely requested in cases of non-segmental vitiligo, but were not performed in all instances. Fasting blood glucose levels were normal in 25 patients. Complete blood counts in 32 patients showed mild to moderate anaemia in 12 (19.3%). Thyroid hormone levels were normal in 3 patients (4.84%). No skin biopsies were performed to confirm the diagnosis of vitiligo.

Therapeutic aspects

As shown in Table 3, two patients (3.22%) received no treatment. The most commonly prescribed treatment was class II corticosteroids (strong potency). The average treatment duration was 2.47 months, ranging from 1 to 15 months. Nine patients (15%) experienced side effects. Pruritus was reported in three patients on corticosteroids, two patients on 8-methoxypsoralen (with or without corticosteroids), erythema was observed in three patients receiving 8-methoxypsoralen, and ulceration occurred in one patient on a combination of corticosteroids and 8-methoxypsoralen. The combination of corticosteroids and 8-methoxypsoralen appeared to be the most likely to cause side effects.

Evolutionary aspects

Complete remission was achieved in 4 patients (6.67%) out of 60; there was no statistically significant relationship between treatment regimens and complete remission ($p=0.827$; 0.802 ; 0.4028). Partial remission was observed in 35 patients

(58.33%). Sixteen patients (26.67%) did not attend follow-up after the first consultation, and seven patients (11.66%) did not improve with treatment. Of the four patients who achieved complete remission, 2 (3.33%) received corticosteroids combined with vitamin therapy, 1 (1.67%) received corticosteroids alone, and 1 (1.67%) received topical PUVA therapy. The majority of patients with partial remission were treated with corticosteroids alone or in combination with vitamin therapy.

Discussion

Epidemiological aspects

The hospital incidence of childhood vitiligo in the Dermatology and Venereology Department of CHU-YO was 0.28%. Our findings are consistent with those reported in sub-Saharan Africa, where Faye O et al.⁹ in Mali and Ahogo KC et al.¹⁰ in Côte d'Ivoire reported childhood vitiligo frequencies of 0.23% and 1.78%, respectively. The variation in prevalence rates may be attributed to differences in research methodologies. Additionally, studies conducted in Taiwan and Egypt reported low prevalence rates of vitiligo of 0.09% and 0.18%, respectively, in the pediatric population.^{13,14} In the United States, Patel R et al. reported prevalences of 1.52% in children (mean age, 7.7 years) and 2.16% in adolescents (mean age, 14.4 years).¹⁵

The mean age of our patients was 6.4 years, which is comparable to the 6.18 years reported by El-Husseiny R et al.¹⁶ in Egypt. In contrast, Ahogo KC et al.¹⁰ in Côte d'Ivoire reported a higher average age of 10 years. The literature indicates that the average age of children diagnosed with vitiligo in various pediatric studies ranges from 4 to 8 years.^{5,17} Our findings align with existing literature and reinforce the observation that vitiligo commonly manifests in school-age children.

This condition predominantly affects females. This female predominance has been corroborated by other researchers, including Ahogo KC et al.¹⁰ in Côte d'Ivoire, Lahloue A et al.¹⁸ in Morocco, and Agarwal S et al.¹⁹ in India, who reported male-to-female (M/F) sex ratios of 0.9, 0.42, and 0.76, respectively. Nearly all studies examining vitiligo in the pediatric population have reported a higher prevalence in females.^{5,16}

Clinical aspects

The average duration of lesion progression before specialist consultation was 12.2 months. This extended period may be attributed to factors such as illiteracy, lack of awareness, and a tendency to pursue readily accessible treatments, particularly phytotherapy initially. El Husseiny et al.¹⁶ also reported a prolonged average consultation time of 24.12 months. A family history of vitiligo was identified in 4 patients (6.45%). Similar findings were reported by Ahogo KC et al.¹⁰, Agarwal S et al.¹⁹, and Martins CPDS et al.,²⁰ who documented a family history of vitiligo in 16.9%, 17.5%, and 24.3% of children with vitiligo, respectively.

Six patients (9.68%) identified triggering factors, including skin microtrauma consistent with the Koebner phenomenon. Ahogo KC et al.¹⁰ in Côte d'Ivoire and Martins CPDS et al.²⁰ in Brazil reported the occurrence of the Koebner phenomenon in 12.5% and 38.2% of children with vitiligo, respectively.

Pruritus was noted in 27.4% of our patients, which aligns with findings by Degboé B et al., who reported pruritus in 13.4% of cases.⁷ While vitiligo is typically asymptomatic, it may present with pruritus during episodes of active flare-ups. In our setting, phytotherapy, which patients often use before seeking medical consultation, may also contribute to the onset of pruritus.

The predominance of non-segmental vitiligo is well-documented in the literature.^{2,5} In our study, the most common site of lesions was the vulva, affecting 25 patients (40.3%), followed by the face (30.64%), the lower limbs (25.80%), the upper limbs (21%), and the trunk (9.8%).

Our findings contrast with those of Ahogo KC et al.¹⁰ in Côte d'Ivoire, El-Husseiny R et al.¹⁶ in Egypt, and Anaba EL et al.,²¹ who indicated that the face was the most common site of vitiligo in children. Vulvoperineal involvement is less common according to other authors.^{10,21} Vitiligo can manifest on any area of the skin; however, it is particularly prevalent on the backs of the hands, feet, elbows, knees, and genitals, which are regions subject to friction.³ The vulvar and anal regions are also areas prone to rubbing. Vitiligo in the vulvar and anal regions raises the question of

whether the cleaning methods used in these areas may contribute to the condition. However, this aspect has not been investigated. The use of synthetic or mixed-fibre underwear is a recognised risk factor for dyschromic genital lesions in women.²²

Therapeutic and Evolutionary Aspects

Topical corticosteroid therapy, recognized as the standard treatment for vitiligo,⁵ was the most frequently employed therapeutic approach, utilized in 51.61% of cases. In Ethiopia, Tsadik et al.²³ reported that 75.5% of cases were treated with topical corticosteroids. Treatment outcomes were favorable in 62.9% of cases, with patients experiencing either complete or partial repigmentation. However, seven patients (11.3%) did not show any improvement with the prescribed treatment. The relatively low rate of complete repigmentation may be attributed to the prolonged duration of disease progression before consultation, as earlier intervention is associated with a greater likelihood of achieving satisfactory repigmentation.²⁴ Additionally, the presence of an undiagnosed autoimmune condition may also play a role.

Among the reported side effects, pruritus was not associated with topical corticosteroid use; instead, atrophy and telangiectasia were noted.³ Conversely, erythema and pruritus are recognized side effects of methoxypsoralen, which is no longer recommended in current treatment guidelines for vitiligo.²

In our study, 16 patients (25.80%) were lost to follow-up after their initial consultation. The high rate of loss to follow-up can be attributed to the fact that vitiligo has no organic consequences and does not affect patients' autonomy. In our context, skin problems are often neglected, especially if they are asymptomatic and localised, particularly as there are few dermatologists. Additionally, despite therapeutic education, treatment adherence is challenging due to various biases and religious or spiritual beliefs, leading many patients to prefer phytotherapy. According to beliefs, a disease of mystical origin does not need to be treated in a modern way.

Conclusion

This study indicates that vitiligo is a relatively rare condition in the pediatric population. In our setting, it

predominantly affects school-aged girls. The most prevalent form of vitiligo observed was non-segmental vitiligo, particularly involving the vulvar region. Managing vitiligo presents challenges due to the suboptimal response to treatment, low adherence to therapy among parents, as evidenced by the significant number of patients lost to follow-up, and the extensive duration of follow-up required.

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TABLES

Table 1: Distribution of patients with non-segmental vitiligo according to clinical form

Type de Vitiligo	Number (n=62)	Fréquence (%)
Focal Vitiligo	33	53.22
Mucosal Vitiligo	27	43.55
Vulgaris Vitiligo	08	12.9
Acrofacial Vitiligo	06	9.68
Universalis Vitiligo	02	3.22

Table 2: Distribution of patients with vitiligo according to lesion topography

Topography of lesions	Number (n=62)	Frequency (%)
Mucous membranes	27	43.55
{ Vulva anal region	25	20.97
{ Lower lip of the mouth (inner side)	2	3.22
Face	19	30.64
Lower limbs	16	25.80
Upper limbs	13	21
Front of trunk (thorax & abdomen)	6	9.7
Back	5	8.1
Neck	3	4.84
Palms	2	3.22
Soles	2	3.22
Other (hair, ears, scalp)	4	6.45

Table 3: Distribution of patients with vitiligo according to treatment regimen

Treatment modalities	Number (n=62)	Frequency (%)
Dermocorticoid	32	51.61
Dermocorticoid + vitamin therapy	15	24.19
Dermocorticoid + topical antioxidant	5	8.06
Topical calcineurin Inhibitor + vitamin therapy	3	4.83
Dermocorticoid + 8 methoxypsoralen 0.1% solution	2	3.22
8 Methoxy psoralen 0.1% solution	2	3.22
Dermocorticoid + 8 methoxy psoralen 0.1% solution + vitamin therapy	1	1.61

FIGURES

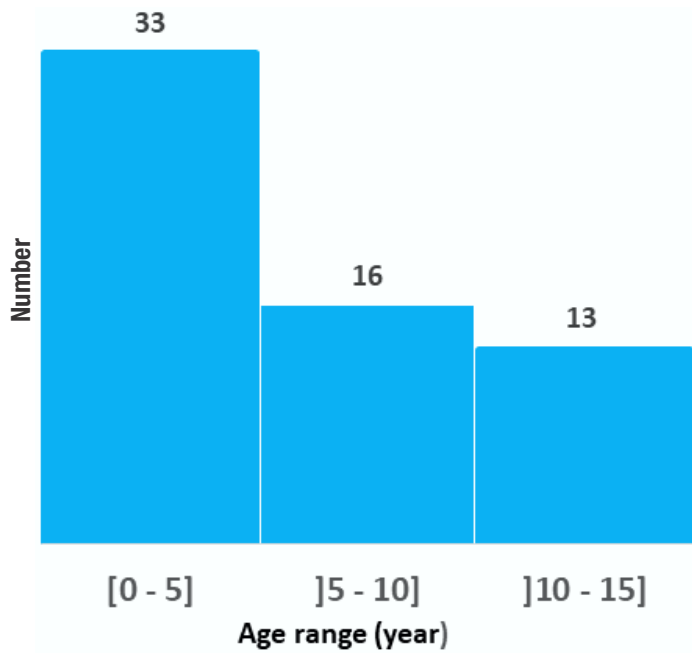


Figure 1: Age distribution of patients with vitiligo



Figure 2: Vulvar vitiligo in a 4-year-old girl



Figure 3: Segmental vitiligo on the front of the neck in a 10-year-old boy

Hidradenitis Suppurativa in Skin of Colour: A Multicentre Review of Clinical and Demographic Trends in Nigeria

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Abstract

Background: Hidradenitis suppurativa (HS) is underreported in African populations, leading to gaps in clinical and epidemiological data. This study aimed to describe the clinical characteristics and associated comorbidities among Nigerian patients.

Methods: This retrospective chart review included 64 adult patients diagnosed with HS between January 2017 and December 2022 across seven dermatology clinics in Nigeria. Data extracted included demographic characteristics, disease severity (Hurley staging), body mass index (BMI), and medical history (smoking, alcohol use, diabetes, acne). BMI was categorized according to WHO cutoffs, and statistical analysis was performed using SPSS version 26; $p < 0.05$ was considered significant.

Results: Among the 64 patients, 70.3% ($n=45$) were female. The median age was 30 years [IQR: 24,36], and HS onset occurred before age 29 in 66.9%. The axilla was the most commonly affected site, with inflammatory nodules (64%), papules (45.3%), and pustules (34.4%) as predominant lesion types. Over half (56.2%) had moderate to severe disease (Hurley Stage II/III). Obesity (BMI > 25 Kg/m²) was present in 51.5%, while acne (29.7%) and diabetes (4.7%) were the most frequent comorbidities. Antibiotics were the primary treatment modality.

Conclusion: Although HS appears uncommon among Nigerians, severe disease is the most common presentation. The axilla is the predominant site of involvement, nodules and papules are the most common lesion types. Treatment is mostly with antibiotics. This study underscores the need for increased awareness, earlier diagnosis, and expanded therapeutic options, including biologics, in African populations.

Keywords: Hidradenitis suppurativa, clinical, Hurley's stage, Africa

Key message: Hidradenitis suppurativa, although uncommon among Nigerians, is associated with prolonged duration and severe disease.

Hidradénite Suppurée sur Peau Noire : Revue Multicentrique des Tendances Cliniques et Démographiques au Nigéria

Résumé

Contexte : L'hidradénite suppurée (HS) est sous-diagnostiquée dans les populations africaines, ce qui entraîne des lacunes dans les données cliniques et épidémiologiques. Cette étude visait à décrire les caractéristiques cliniques et les comorbidités associées chez les patients nigériens.

Méthodes : Cette étude rétrospective a porté sur les dossiers de 64 patients adultes chez lesquels une HS a été diagnostiquée entre janvier 2017 et décembre 2022 dans sept cliniques de dermatologie au Nigéria. Les

données extraites comprenaient les caractéristiques démographiques, les signes de gravité de la maladie (classification de Hurley), l'indice de masse corporelle (IMC) et les antécédents médicaux (tabagisme, consommation d'alcool, diabète, acné). L'IMC a été catégorisé selon les seuils de l'OMS et l'analyse statistique a été réalisée à l'aide du logiciel SPSS version 26 ; un seuil de signification De P < 0,05 a été retenu.

Résultats : Parmi les 64 patients, 70,3 % étaient des femmes. L'âge médian était de 30 ans [IQR : 24-36], et l'hidradénite suppurée (HS) s'est déclarée avant l'âge de 29 ans chez 66,9 % des patients. L'aisselle était la zone la plus fréquemment atteinte, les nodules inflammatoires (64 %), les papules (45,3 %) et les pustules (34,4 %) étant les types de lésions prédominants. Plus de la moitié des patients (56,2 %) présentaient une forme modérée à sévère de la maladie (stade ii/iii de Hurley). L'obésité (IMC > 25 Kg/M²) était présente chez 51,5 % des patients, tandis que l'acné (29,7 %) et le diabète (4,7 %) étaient les comorbidités les plus fréquentes. Le traitement de première intention était l'antibiothérapie.

Conclusion : Bien que L'HS semble rare chez les Nigériens, la forme sévère est la plus fréquente. L'aisselle est la zone prédominante touchée, et les nodules et les papules sont les types de lésions les plus courants. Le traitement repose principalement sur l'antibiothérapie. Cette étude souligne la nécessité d'une meilleure sensibilisation, d'un diagnostic plus précoce et d'un élargissement des options thérapeutiques, notamment par le biais des biothérapies, au sein des populations africaines.

Mots-Clés : Hidradénite Suppurée, Clinique, Stade De Hurley, Afrique

Introduction

Hidradenitis suppurativa (HS), also referred to as acne inversa, is a chronic, inflammatory, and relapsing disorder of the pilosebaceous unit that primarily affects apocrine gland-rich regions of the body, such as the axillae, groin, perianal, perineal, and inframammary areas.¹⁻³ Clinically, HS is characterized by painful, deep-seated nodules, abscesses, draining sinus tracts, and ultimately, disfiguring scars in longstanding disease.^{1,2} Beyond its physical manifestations, HS exerts a profound psychological and social burden due to malodorous discharge, pain, impaired mobility, and reduced quality of life.⁴⁻⁸

Hidradenitis suppurativa typically begins after puberty, with peak onset in the second to fourth decades of life.^{2,9-12} Its pathogenesis is multifactorial, involving follicular occlusion, immune dysregulation, and mechanical stress, compounded by genetic and environmental influences.¹³ Recognized risk factors for the development and progression of HS include obesity, tobacco use, family history, and hormonal changes.^{2,9,13,14} Although individuals with skin of colour (SOC), including those of African descent, have been increasingly reported to have higher prevalence and more severe phenotypes of HS, there remains a paucity of epidemiological and clinical studies from sub-Saharan Africa.^{12,14-18} In particular, data from Nigeria are virtually non-existent despite the large and diverse

population, limiting understanding of HS in this setting. The current study aims to fill this gap by describing the clinical profile and comorbidities of HS among Nigerian patients. Specifically, the study evaluated the anatomic distribution of lesions, lesion morphology, disease severity based on Hurley staging, and treatment modalities, as well as the associations with BMI, acne, diabetes mellitus and smoking.

Materials and Methods

This retrospective multicenter chart review of 64 adult patients diagnosed with HS was conducted at seven locations: the outpatient skin clinics of the Lagos State University Teaching Hospital, the Federal Medical Centre Keffi, the University of Abuja Teaching Hospital, Abuja, the University of Calabar Teaching Hospital, the Kaduna State University Teaching Hospital, the University of Port Harcourt Teaching Hospital and the Gastroderm clinic, Lekki phase 1, Lagos, Nigeria. The study was preceded by ethical approval (LREC/06/10/1953) by the Lagos State University Teaching Hospital ethical review board. The study covered six years from January 2017 to December 2022 and was conducted over three months from November 2022 to January 2023.

Case notes of all patients diagnosed with HS at the clinics during the study period were reviewed, and data were extracted using a proforma designed by the researchers. Confidentiality was ensured by assigning

numbers to each case note. Variables collected included age, sex, BMI, lesion location and morphology, Hurley stage, comorbidities (acne vulgaris, diabetes mellitus), smoking history, and treatment modality.

Data were analyzed using SPSS version 26. Normality was assessed using the Kolmogorov–Smirnov test. Categorical variables were presented as frequencies and percentages; continuous variables were summarized using medians and interquartile ranges (IQR). Comparisons were made using the Mann-Whitney U test, the Chi-squared test, and Fisher's exact test, as appropriate. Statistical significance was set at $p < 0.05$.

Results

Of the 13,602 medical records reviewed, 64 patients (0.47%) were diagnosed with hidradenitis suppurativa (HS) between 2017 and 2022. The majority (70.3%) were female, with an age range of 12–59 years and a median (IQR) age of 30 (24–36) years. Most patients (78%) were aged 20–39 years. The age at HS onset ranged from 10 to 59 years, with a median (IQR) of 26 (20–32) years. Onset occurred before age 20 in 23.4%, between 20–29 in 40.6%, between 30–39 in 28.1%, between 40–49 in 4.7%, and after 50 in 3.1%. The median (IQR) disease duration was 36 (12–60) months (range: 1–420 months).

A family history of HS was reported in 10.9% (7/64) of cases. Smoking was documented in 4.7%, with two patients actively smoking at diagnosis. Alcohol intake was reported in 15.6%. Shaving of the genital area was undocumented in 70.3% (45/64), while 20.3% (13/64) reported shaving, and 9.4% (6/64) did not. Diabetes mellitus was present in 4.7%, and acne history was noted in 29.7% of patients. Table 1.

Table 2 shows the clinical profile of the patients. The median BMI of the group was 27.6 (23.6, 30.3) Kg/m^2 , and 51.5% were overweight/ obese. The axilla was the most frequently involved site, followed by the groin. The most common clinical lesion was nodules (41/64), followed by papules (29/64) and pustules (22/64), as shown in Figures 1–4. The median fasting blood sugar of the patients was 88.0 mg/dl (IQR 82.3, 97.8 mg/dl). Diabetes mellitus was recorded in 3

patients, and acne in 29.7% (19/64). One patient had no active lesions at the time of evaluation, and HS was severe in 56.1% of patients. Antibiotics were the primary modality of treatment. Treatment was not documented in two patients as there was no flare at the time of evaluation. The severity of HS was significantly associated with HS duration and female gender. Table 3

Discussion/Conclusion

Studies on hidradenitis suppurativa (HS) in African populations are limited, likely due to the rarity of the condition, potential underdiagnosis, and under-reporting.^{12,14–16} This study contributes to the growing body of evidence by demonstrating that HS in this population predominantly involves the axillae, presents with nodular lesions, is more common in females and is often diagnosed at a moderate to severe stage

In this study, over half of the patients with HS were female, consistent with previous reports.^{6,11,12} Hidradenitis suppurativa is generally more prevalent among females; however, geographic variations in gender distribution have been observed. For instance, a study from Tunisia reported a male predominance, while a study from Singapore found no significant gender bias.^{18,19}

The majority of patients in this study experienced disease onset before age 29, consistent with previous reports indicating that HS typically begins around puberty or in the early twenties.^{10,11} This age distribution is consistent with other epidemiological studies.^{10,11} The duration of HS was long in most individuals, reflecting the diagnostic challenges associated with HS. The prolonged disease duration observed in our cohort reflects a common diagnostic delay, as HS is frequently misdiagnosed as folliculitis or furunculosis in early stages. Without specialized dermatological evaluation, patients often seek care only after disease chronicity and progression, a trend also noted in other studies.^{8,20}

The prevalence of a positive family history of HS in this cohort was lower than in other studies.²¹ This may reflect the overall low prevalence of HS in the study population. Additionally, a familial predisposition to HS has been associated with earlier disease onset, greater disease severity, and delays in seeking

treatment, often due to the perception of HS as a normal familial condition.²²

Comorbidities, including features of metabolic syndrome, were infrequent in this study population. Smoking was not a prominent factor, reported in only three patients (4.7%). This is consistent with social patterns in Nigeria, where smoking is not a widespread practice.²³ A similar finding was reported in a Ghanaian study, which also found no association between HS and smoking, suggesting that smoking may not be a significant risk factor for HS in African populations.¹² However, in other populations, smoking has been identified as a key risk factor for HS and is known to exacerbate disease severity, impair ulcer healing, and promote bacterial colonization.^{2,24,25}

A history of acne vulgaris was reported in approximately one-third of the patients. Acne vulgaris is more common in individuals with HS than in the general population and is associated with increased disease severity.²⁵ However, in this study, acne vulgaris was not significantly associated with HS severity. Both HS and acne vulgaris involve the pilosebaceous unit and share overlapping pathogenetic mechanisms, including follicular occlusion and inflammation.²⁵ Diabetes mellitus was documented in only three patients, and the mean fasting blood glucose of the cohort remained within normal limits. Although diabetes mellitus is a recognized comorbidity in HS,²⁵ it was relatively infrequent in this population. The hyperglycemic environment and associated insulin resistance in diabetes mellitus are thought to exacerbate HS by promoting microbial proliferation, enhancing pro-inflammatory cytokine activity, and impairing wound healing.²⁵

Approximately half of the patients were either overweight or obese; however, body mass index (BMI) was not significantly associated with HS severity in this study. Although obesity is a risk factor for HS, its association with severity is not clearly documented.^{11,13,25} Obesity has been shown to aggravate HS by increasing disease flares, extending anatomical involvement, and worsening overall severity.^{26,27} Increased skin friction and maceration within intertriginous folds in obese individuals create a conducive environment for inflammation and

secondary bacterial colonization.²⁷ Furthermore, adipose tissue functions as an endocrine organ that secretes pro-inflammatory cytokines, thereby perpetuating a chronic inflammatory state.²⁷

The axilla was the most frequently affected anatomical site, followed by the groin. This distribution aligns with HS's predilection for apocrine gland-rich intertriginous areas.^{2,3} These findings are consistent with previous reports, where the axilla and groin are the most commonly involved regions.^{7,19} The predominant lesion types observed in this study included inflammatory nodules, papules, and pustules, while ulcerations, sinus tracts, and keloidal scars were also noted in some cases. These morphologies are characteristic of HS, which is clinically defined by recurrent painful nodules, abscesses, sinus tracts, and scarring.^{1,2,19}

Hurley staging in this study mirrored previous reports, with all three stages of HS represented among patients. However, a greater proportion of individuals presented with stage II and III disease, indicating that moderate-to-severe HS was the predominant clinical presentation. Although most studies report a spectrum of Hurley stages, hospital-based studies tend to document more advanced disease.^{7,8,19,28} This trend may be attributable to the fact that patients with early-stage (Hurley I) HS are more likely to self-manage their symptoms and delay specialist consultation. Similarly, a study in African American patients noted a relatively low incidence of HS but a higher severity of disease at presentation.¹⁷

Consistent with findings from other studies, antibiotics, particularly a combination of rifampicin and clindamycin, were the most frequently utilized treatment modalities, followed by retinoids.¹⁹ A combination regimen of rifampicin and clindamycin is recommended in current treatment guidelines for HS.^{29,30} Surgical and laser treatments were also employed. Surgery was primarily performed to manage sinus tracts³¹ and scarring, while laser therapy, particularly for hair removal, served as an adjunctive treatment with symptomatic benefits.³²

Intralesional triamcinolone acetonide and biologics were used in a limited number of patients. Both are recognized treatment options for HS.^{30,33}

Triamcinolone acetonide inhibits leukotrienes and interleukin-1, reducing inflammation, while biologics target tumour necrosis factor and cytokine pathways.^{30,33} However, the high cost of biologics limits their accessibility in Nigeria.

Triamcinolone acetonide inhibits leukotriene pathways and suppresses interleukin-1 and other pro-inflammatory cytokines, whereas biologics target tumour necrosis factor-alpha and other cytokines involved in the chronic inflammatory cascade of HS.^{30,33} However, due to high costs and limited accessibility, the use of biologics remains infrequent in our setting.

Hidradenitis suppurativa severity in this cohort was significantly associated with female gender and disease duration. Prolonged disease course without adequate intervention often results in the development of scarring and progressive severity.²⁰ These findings are consistent with previous studies that have identified duration of disease and female gender as significant predictors of HS severity.^{17,22}

A key limitation of this study was the relatively small sample size, reflecting the rarity of HS in the Nigerian population and potentially limiting the generalizability of our findings. Nonetheless, the strengths of the study include its multicenter design, the extended 6-year data collection period, and the confirmation of diagnoses by dermatology specialists, which ensure diagnostic accuracy and consistency.

In conclusion, this study represents the first documented analysis of the clinical profile of HS in a Nigerian cohort. Although HS remains an uncommon diagnosis in Nigerians, it often presents with moderate to severe disease and is characterized by a prolonged disease course. The axilla was the most frequently affected anatomical site, and lesion morphology was consistent with that reported in other populations. Antibiotics were the most commonly employed treatment modality. Further research is warranted in this population to explore additional aspects of HS, including its impact on quality of life, the therapeutic efficacy and accessibility of biologic agents, and patient perceptions and health-seeking behaviours. In addition, validated instruments for HS

diagnosis should be routinely used in the evaluation of patients with recurrent folliculitis and boils.

Statement of Ethics

Ethical approval (LREC/06/10/1953) for this study was granted by the Ethics review committee of the Lagos State University Teaching Hospital following a review of the study protocol. Consent was not obtained from the patients, as this is a retrospective study. The hospital authorities also granted permission to access the patient's case records.

Conflict of Interest Statement

The authors have no conflict of interest

Funding Sources

The authors funded the study

Author Contributions

ELA: Conceptualization, literature review, conduct of study, first draft, final review

BO: Conceptualization, conduct of study, first draft, final review

EH: Conceptualization, conduct of study, first draft, final review

SH: Conceptualization, conduct of study, first draft, final review

PI: Conceptualization, conduct of study, first draft, final review

EO: Conceptualization, conduct of study, first draft, final review

Data Availability Statement: Data is available upon request.

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Figure Legends

1. Fig. 1A. Hidradenitis suppurativs (axilla). Nodule. Hurley's stage I
2. Fig. 1B. Hidradenitis suppurativs (axilla). Nodules, pustule. Hurley's stage I
3. Fig. 2. Hidradenitis suppurativs (axilla). Nodules, pustules, ulcers, scars. Hurley's stage II
4. Fig. 3. Hidradenitis suppurativs (axilla). Nodules, sinus tracts, atrophic scars. Hurley's stage III
5. Fig. 4A. Hidradenitis suppurativa (axilla). Keloids.
6. Fig. 4b. Hidradenitis suppurativa (gluteal). Atrophic scars, post-inflammatory hyperpigmentation.

Table 1. Sociodemographic Variables and Clinical History of the Patients

Variable	Frequency (n = 64)	%
Age group (years)		
< 20	4	6.3
20 - 29	26	40.6
30 - 39	24	37.5
30 - 49	6	9.4
> 50	4	6.3
Age at diagnosis (years)		
< 20	5	7.8
20 - 29	28	43.8
30 - 39	21	32.8
40 - 49	7	10.9
> 50	3	4.7
Duration of HS (months)		
< 12	33	51.6
12 - 23	10	15.6
24 - 59	21	32.8
Family history		
Yes	7	10.9
No	54	87.5
I don't know	1	1.6
History of acne vulgaris		
Yes	19	29.7
No	45	70.3
History of diabetes		
Yes	3	4.7
No	61	95.3
Smoking		
Yes	3	4.7
No	61	95.3
Alcohol intake		
Yes	10	15.6
No	54	84.4
Regularly shaved axilla		
Yes	16	25.0
No	3	4.7
Not documented	45	70.3

Table 2. Clinical Characteristics of Patients

Variable	Frequency (n = 64)	%
BMI grade		
Underweight	2	3.1
Normal	18	28.1
Overweight	18	28.1
Obese	15	23.4
Not done	11	17.2
Site of lesion		
Axilla	55	85.9
Groin	22	34.4
Genital	13	20.3
Breast	6	9.4
Buttocks	12	18.8
Atypical sites	10	15.6
Type of lesion		
Nodules	41	64.1
Papules	29	45.3
Pustules	22	34.4
Atrophic scars	17	26.6
Keloid	11	17.2
Sinus tract	11	17.2
Abscesses	7	10.9
Ulcers	7	10.9
Hyperpigmented patches	2	3.1
Cyst	1	1.6
Fistula	1	1.6
HS staging		
No lesion	1	1.6
Hurley I	27	42.2
Hurley II	23	35.9
Hurley III	13	20.3
Treatment given**		
	n = 54	
Antibiotics	46	85.2
Retinoids	15	27.8
NSAID	7	13.0
IL TAC	4	7.4
Laser	3	5.6
Benzyol peroxide	2	3.7
Surgery	2	3.7
Biologics	1	1.9
None	2	3

** Undocumented in some patients

Table 3. Factors Associated with the Severity of HS

Variables	Mild HS n = 28 (%)	Severe HS n = 36 (%)	p
Median Age (IQR)	30.5 (24.0, 36.0)	30.0 (23.3, 38.5)	0.771
Age at onset (IQR)	26.0 (22.0, 33.8)	22.5 (18.3, 32.0)	0.319
Age at diagnosis (IQR)	28.0 (24.0, 36.0)	29.0 (23.0, 38.5)	0.865
Duration of HS months (IQR)	18.0 (6.0, 45.0)	48.0 (24.0, 81.0)	0.005
Blood sugar (IQR)	88.0 (79.8, 95.8)	87.5 (83.3, 99.5)	0.648
BMI (IQR)	26.0 (22.9, 28.7)	28.1 (23.8, 31.5)	0.221
Smoking			
Yes	2 (66.7)	1 (33.3)	0.577 [#]
No	26 (42.6)	35 (57.4)	
Gender			
Male	12 (63.2)	7 (36.8)	0.042
Female	16 (35.6)	29 (64.4)	
History of acne			
Yes	6 (31.6)	13 (68.4)	0.202
No	22 (48.9)	23 (51.1)	
History of diabetes			
Yes	1 (33.3)	2 (66.7)	1.000 [#]
No	27 (44.3)	34 (55.7)	

NB: # = Fischer exact p-value

FIGURES



Fig. 1A. Hidradenitis Suppurativa (Axilla). Inflamed Discrete Nodule. Hurley's Stage I



Fig. 1B. Hidradenitis Suppurativa (Axilla). Nodules, Pustule. Hurley's Stage I



Fig. 2. Hidradenitis Suppurativa (Axilla). Nodules, Pustules, Ulcers, Scars. Hurley's Stage II





Fig 3. Hidradenitis Suppurativa (Axilla). Nodules, Sinus Tracts, Atrophic Scars. Hurley's Stage III



Fig. 4A. Hidradenitis Suppurativa (Axilla). Keloids



Fig. 4B. Hidradenitis Suppurativa (Gluteal). Atrophic Scars, Post-Inflammatory Hyperpigmentation

Prevalence and Risk Factors of Acne Vulgaris Among Secondary School Students in Ebonyi State, Nigeria

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ABSTRACT

Background: Acne vulgaris is a chronic inflammatory disorder of the pilosebaceous gland with a high prevalence in adolescents, associated with complications including psychosocial impact. There is a paucity of studies on acne prevalence in urban versus rural areas in Southeastern Nigeria, and even fewer studies on how acne triggers vary between these contrasting environments. This knowledge gap underscores the importance of conducting the present study.

Objectives: To determine the prevalence of acne vulgaris in urban versus rural secondary school students in Ebonyi and identify its risk factors.

Methods: This cross-sectional study was conducted in four secondary schools (two urban and two rural) and five hundred (500) participants across Ebonyi State. Pre-tested, structured interviewer-administered Questionnaires were used to collect data, and acne severity was measured clinically using the Global Acne Grading System. (GAGS). Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 22.

Results: The overall prevalence of acne vulgaris was 67.9%, with a female-to-male ratio of 1.4:1. It was higher in rural participants (79.4%) than in urban participants (59.4%). It had a significantly earlier age of onset (13.24 ± 1.52 years) in urban than in rural participants (13.88 ± 1.70 years), $p < 0.05$. Males had higher odds of developing severe acne (urban OR = 0.14, $p = 0.015$; rural OR = 0.76, $p = 0.73$) than females. Other factors positively associated with acne severity in the participants included age (urban OR=0.75, $P=1.07$ vs rural OR=0.17, $P=1.49$), milk intake (urban $p=0.69$, rural=1.00), family history, and body weight; however, these did not reach statistical significance.

Conclusion: Acne vulgaris is more prevalent among rural than urban secondary school students in Ebonyi State. Several potential risk factors were identified, though most were not statistically significant. Targeted preventive measures are recommended for both urban and rural adolescents.

Keywords: acne vulgaris, prevalence, adolescents, risk factors, Nigeria

Prévalence et Facteurs de Risque de l'Acné Vulgaire Chez les élèves du Secondaire de l'État d'Ebonyi, au Nigéria

Résumé

Contexte : L'acné vulgaire est une affection inflammatoire chronique des glandes pilo-sébacées, très fréquente chez les adolescents et associée à des complications, notamment des répercussions psychosociales. Les études sur la prévalence de l'acné en milieu urbain et rural dans le sud-est du Nigéria sont rares, et celles portant sur les facteurs déclenchants de l'acné varient dans ces deux environnements. Ce manque de données souligne l'importance de la présente étude.

Objectifs : Déterminer la prévalence de l'acné vulgaire chez les élèves du secondaire en milieu urbain et rural dans l'État d'Ebonyi et identifier ses facteurs de risque.

Méthodes : Cette étude transversale a été menée dans quatre établissements d'enseignement secondaire

(deux urbains et deux ruraux) auprès de 500 participants répartis dans l'État d'Ebonyi. Des questionnaires structurés, préalablement testés et administrés par un enquêteur, ont permis de recueillir les données. La gravité de l'acné a été évaluée cliniquement à l'aide du système mondial de classification de l'acné (GAGS). Les données ont été analysées à l'aide du logiciel SPSS (Statistical Package for the Social Sciences), version 22.

Résultats : La prévalence globale de l'acné vulgaire était de 67,9 %, avec un ratio femmes/hommes de 1,4/1. Elle était plus élevée chez les participants vivant en milieu rural (79,4 %) que chez ceux vivant en milieu urbain (59,4 %). L'âge d'apparition était significativement plus précoce en milieu urbain ($13,24 \pm 1,52$ ans) qu'en milieu rural ($13,88 \pm 1,70$ ans), $p < 0,05$. Les hommes présentaient un risque plus élevé de développer une acné sévère (OR en milieu urbain = 0,14, $p = 0,015$; OR en milieu rural = 0,76, $p = 0,73$) que les femmes. D'autres facteurs étaient positivement associés à la gravité de l'acné chez les participants, notamment l'âge (OR en milieu urbain = 0,75, $p = 1,07$ vs OR en milieu rural = 0,17, $p = 1,49$), la consommation de lait ($p = 0,69$ en milieu urbain, $p = 1,00$ en milieu rural), les antécédents familiaux et le poids corporel ; cependant, ces associations n'étaient pas statistiquement significatives.

Conclusion : L'acné vulgaire est plus fréquente chez les élèves du secondaire en milieu rural qu'en milieu urbain dans l'État d'Ebonyi. Plusieurs facteurs de risque potentiels ont été identifiés, mais la plupart n'étaient pas statistiquement significatifs. Des mesures préventives ciblées sont recommandées pour les adolescents, tant en milieu urbain que rural.

Mots-clés : Acné Vulgaire, Prévalence, Adolescents, Facteurs de risque, Nigéria

Introduction

Acne vulgaris is the 8th most prevalent disease internationally, affecting an estimated 9.4% of the global population.(1) Its prevalence is exceptionally high in developed countries, with about 31% to 95% of the adolescent population affected.(2) However, recent evidence suggests that the disorder is becoming increasingly common in developing countries, a trend that was not previously observed.(3) Although the pathogenesis of acne vulgaris is attributed mainly to increased sebaceous gland secretion, follicular hyperkeratinization, follicular microbial colonization, and chronic inflammation,(4,5) several external factors, such as industrialization, dietary changes, the use of cosmetics, and environmental influences may explain the higher prevalence of acne vulgaris observed in urban areas compared to rural areas. Consequently, it is plausible that, despite similar genetic backgrounds, individuals residing in urban areas are more likely to develop acne vulgaris than those in rural areas.

Hagenström et al. found an acne prevalence rate of 6.49% in a nationwide survey in Germany.(4) While in China, a higher prevalence of 8.1% was reported, with nineteen-year-old adolescents being the most affected.(5) Pre-pubertal and adolescent-based research further revealed higher prevalence rates of

10.6% in Mexico,(6) 93.2% in Iran(7) and 62.7% in Cameroon.(8)

An acne prevalence rate of 90.7% was noted by Husain(9) among school children in Kaduna, Nigeria. Benson et al.(10) reported an acne prevalence rate of 37.3% in Benin City in 2016, while in the same year, at Ibadan, Okoro et al. reported a rate of 64.4%.(11) These different rates lend credence to the assertion that the incidence of acne vulgaris varies with geographical locations. In Cross River State, Eshan et al. reported an acne prevalence of 35%,⁽¹²⁾ but in South-East Nigeria, Onyekonwu et al.⁽¹³⁾ reported a prevalence rate of 7% in a hospital-based study. The environment appears to influence acne prevalence, with higher rates observed among migrants from rural to urban areas.(14) A plausible explanation other than genetics could be the intake of foods with high glycemic index, smoking, drugs, comedogenic cosmetics, and corticosteroids, some of which could be more available in urban areas.(3,15) Acne prevalence rates of 0.1% to 38% in rural and 65% to 97% in urban communities have also been recorded,(9,16) but the respondents' duration of residence in those areas was not clearly stated and may have contributed to the observed difference in the prevalence rates in the study.

There appears to be a paucity of studies on the

prevalence of acne vulgaris in Ebonyi State, South-East Nigeria. In this study, we aimed to elucidate the prevalence and predictors of acne vulgaris among urban and rural secondary school students in Ebonyi State.

Subjects, Materials, and Methods

This study was a community-based comparative cross-sectional study conducted among 10–19-year-old students in two randomly selected public and two private co-educational secondary schools, each in the Ezza (rural) and Abakaliki (urban) areas of Ebonyi State, Nigeria, from September 2020 to October 2020. A total of 736 students were screened, of which 500 had active acne lesions.

Ethical approval was obtained from the Research and Ethics Committee of the University of Nigeria Teaching Hospital, Enugu, and permission from the Ebonyi State Ministry of Education and the Principals of the participating schools. Written consent was obtained from parents/guardians of participants under 18 years and from participants over 18 years.

The participants were examined by the principal researcher and two trained resident doctors under natural daylight. Acne diagnosis was based on visible comedones, papules, and pustules, assessed using the Global Acne Grading System (GAGS). Those with acne vulgaris were then consecutively recruited for further data collection.

A pre-tested, structured, interviewer-administered proforma was used to collect data on socio-demographic characteristics, acne onset, body parts affected, family history of acne, influence of exam stress, diet type, sleep duration, and menstrual cycle on acne flares. Clinical examination was performed to determine body weight, height, and acne grade using a Hana™ bathroom weighing scale, a meter-calibrated wall, and GAGS, respectively.

The data obtained were analyzed using the Statistical Package for the Social Sciences (SPSS) version 22. Categorical variables were summarised as percentages and graphically represented using graphs, tables, and charts. Continuous variables (age, weight, height, sebum levels, global acne grading system scores) were summarised as means and standard deviations, and the level of statistical

significance was set at $P < 0.05$.

Results

Five hundred of the 736 students who took part in the study had acne vulgaris, including 250 from urban and 250 from rural secondary schools. There were significantly more females than males in the urban study group ($p < 0.05$), as shown in Table 1. Conversely, there were nearly an equal number of males and females in the rural study group. Most participants in both study groups (30.8% urban, 38.2% rural) were aged 15-19 years, with a higher proportion in the rural area. [Table 1]

The mean age of onset of acne vulgaris was significantly higher among participants from urban areas than among those from rural areas. [Table 1] The study revealed a total prevalence of 67.9% for acne vulgaris; in the urban area, 59.4% of 421 screened students had acne vulgaris, while 79.4% of 315 screened students in the rural area had acne vulgaris. (Figure 1)

In both the urban and rural study populations, similar proportions of participants had mild, moderate, and severe acne (48.2%, 1.6%, and 0% in urban, and 48.6%, 1.4%, and 0.2% in rural, respectively). Acne severity was reclassified using GAGS scores into mild (1-30) and severe (≥ 31) categories. Severe nodulocystic acne (GAGS > 39) was observed exclusively in the rural population.

Comedones were the most common lesion observed on the forehead, right cheek, left cheek, nose, chin, and chest of participants in both the urban (66.4%, 67.5%, 60%, 90.8%, 71.2%, and 12%, respectively) and rural (40.2%, 44.6%, 44%, 86.9%, 47.2%, and 6%, respectively) study groups (Figure 2), with the T-zone (forehead, nose, and chin) having more lesions than the U-zone (right and left cheeks), and the nose being particularly affected.

In the urban area, milk consumption and a family history of acne were found to increase the risk of developing acne vulgaris by about 20% (odds ratios of 1.4 and 1.2, respectively). In the same vein, age and body weight showed an almost equal and direct proportional relationship with the risk of acne. [Table 2]

Also, among urban participants, males had significantly higher odds ($p=0.015$) of developing severe acne than females, with males approximately 7 times more likely to have severe acne. [Table 2] Conversely, logistic regression analysis of the rural study group showed that males had about 1.31 times higher odds ($1/0.762 = 1.31$) of severe acne than females, although this difference was not statistically significant. ($p=0.73$) [Table 3]

Similarly, the analysis of the rural study group

showed that milk intake or a family history of acne was associated with a lower chance of developing acne. However, this observation (negative association) was not statistically significant ($p>0.05$) [Table 3]

The severity of acne was cross-tabulated with milk intake among both urban and rural participants. This study found no statistically significant association between milk intake and acne severity in either population. [Table 4]

Table 1: Socio-demographic characteristics of the study population

Socio-demographic features	Urban n (%)	Rural n (%)	X ²	P value*
Gender(n=500)			15.16	<0.001
Male	84 (16.8)	127(25.4)		
Female	166(33.2)	123 (24.6)		
Age in years(n=500)			12.80	<0.001
10-14years	96 (19.2)	59 (11.8)		
15-19years	154(30.8)	191(38.2)		
Age at onset of acne	n=244 13.24±1.52	n=230 13.88±1.70		<0.05
School category			492.06	<0.001
Private	125(25)	125(25)		
Public	125(25)	125(25)		
Weight in Kg	n=250 52.46±8.29	n=250 48.65±7.11	23399	<0.05
Height(m)	n=250 1.64± 0.08	n=250 1.61±0.08	25030	<0.05
BMI (Kg/m²)	n=250 19.45±2.76	n=250 18.67±2.22	26151	<0.05

n = number of responses % = percentage X² = Chi square.

*P is significant if <0.05

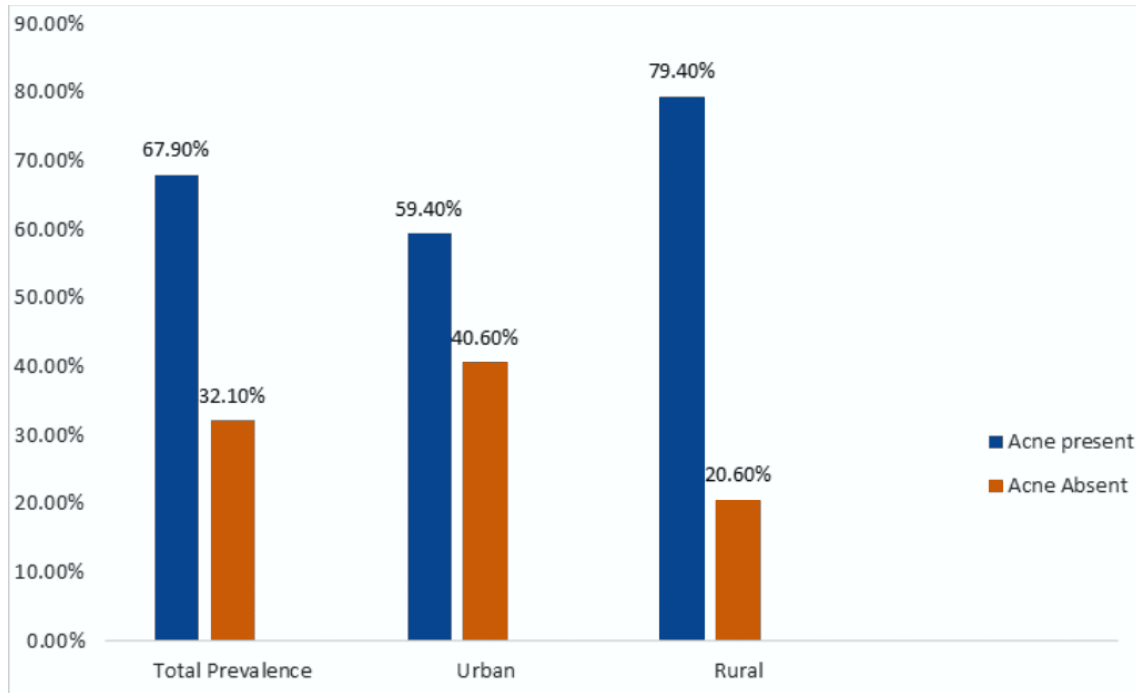


Figure 1: Prevalence of Acne vulgaris in the study population

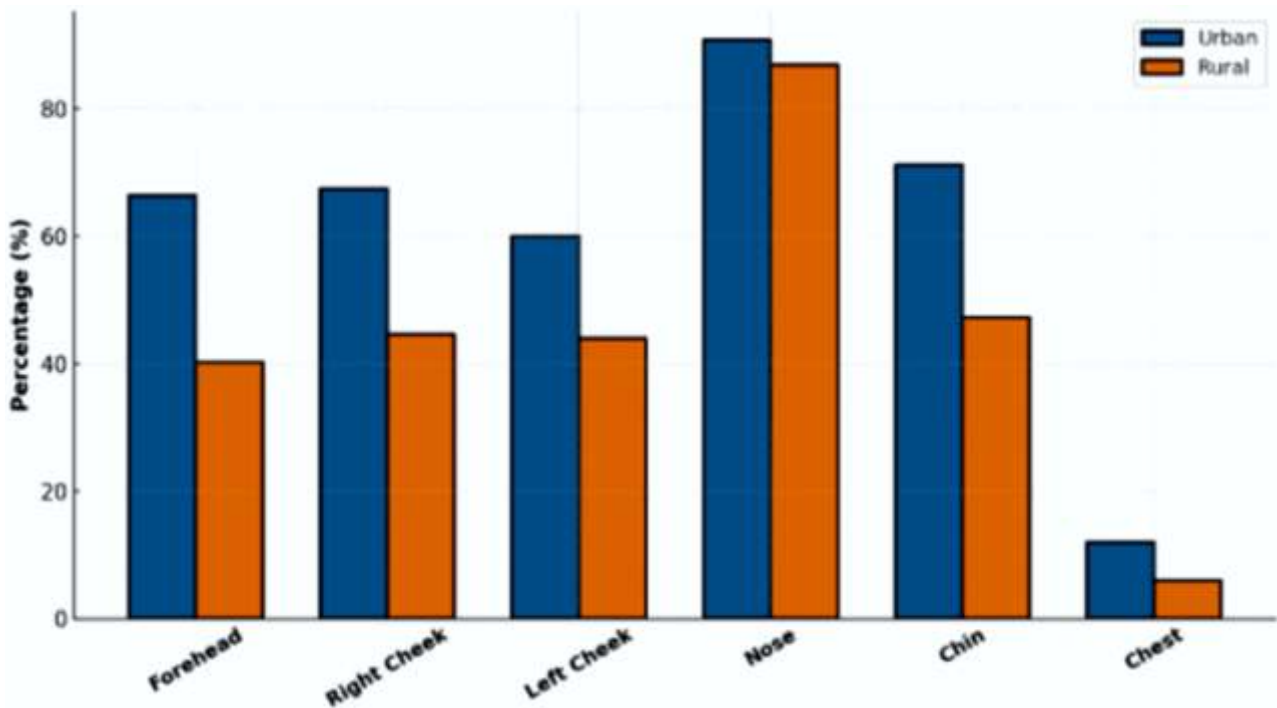


Figure 2: Distribution of comedones on different body parts among Urban versus Rural school students

Table 2: Logistic regression of predictors of acne vulgaris among urban secondary school students in Ebonyi State

Variable	P-value**	Odds Ratio	95% C.I.
Age	0.75	1.07	0.70-1.64
Gender	0.015	0.14	0.03-0.71
Milk intake*	0.69	1.40	0.27-7.28
Sleep duration	0.28	2.21	0.52-9.35
family history	0.77	1.24	0.30-5.13
Weight	0.18	1.04	0.98-1.11

C.I.: Confidence Interval *See table 4 for Fisher's exact test
 **P is significant if <0.05

Table 3: Logistic regression of predictors of acne vulgaris among rural secondary school students in Ebonyi State

Variable	**P-value	Odds Ratio	95% C.I
Age	0.17	1.49	0.84-2.62
Gender	0.73	0.76	0.17 -3.48
Milk intake*	1.00	0.00	0.00
Sleep duration	0.39	2.56	0.30-21.66
Family history	0.47	0.57	0.12-2.63
Weight	0.50	1.04	0.93-1.16

* See Table 4 for Fisher's exact test. **P is significant if <0.05

Table 4: Cross-tabulation of Milk Intake and Acne Severity in Rural and Urban Populations

	Milk intake	Mild Acne	Severe Acne	Total	χ^2(p-value)	Fisher's exact (*p-value)
Rural(n=250)	No milk	225	7	232	$\chi^2=0.59$, p=0.44	P=1.00 (2-sided)
	Milk	18	0	18		
	Total	243	7	250		
Urban(n=250)	No milk	194	7	201	$\chi^2=0.05$, p=0.82	P=0.69 (2-sided)
	Milk	47	2	49		
	Total	241	9	250		

*P is significant if <0.05

Discussion

This study examined the prevalence, pattern, and predictors of acne vulgaris in secondary schools in urban and rural areas of Ebonyi State, Nigeria.

Acne vulgaris was common in Ebonyi State, affecting 67.9% of the population studied. This value was higher than observed in Jos (55%)⁽¹⁷⁾ and Ibadan (64.4%),⁽¹¹⁾ but lower than the prevalence in Kaduna (90.7%).⁽⁹⁾

The variations in prevalence compared to previous studies by Yahaya⁽⁹⁾ and Ayanlowo⁽¹⁸⁾ may be due to geographical differences, including humidity, sunlight intensity, and differences in participant age demographics.

Contrary to previous research, our study found a slightly lower prevalence of acne in urban areas than in rural areas. This unexpected outcome may be attributed to enhanced dermatological care access in urban areas,⁽⁷⁾ differential skincare product utilization patterns,⁽¹⁴⁾ population-specific dietary variations, and increased use of comedogenic preparations, such as corticosteroids, petroleum jelly, and shea butter, in rural populations. However, specific topical product use patterns were not evaluated in this study, a limitation that warrants further investigation.

Although access to dermatological services was not formally assessed, only two consultant dermatologists and one dermatology registrar in the urban tertiary hospital were serving the entire state

during this research. This limited specialist availability may contribute to the observed urban-rural differences in acne prevalence.

Acne vulgaris was more common in urban females (32.8%) than males (16.8%), similar to Skroza's finding of 53% and 47%, respectively.⁽¹⁹⁾ Could gender differences in enrollment of students in urban versus rural schools also account for this difference in our study? Further research may help shed more light on this.

The urban area had an earlier onset of acne (mean age 13.24±1.52) than the rural area (mean age 13.88±1.70), likely due to the significantly higher mean body weight and height in urban participants. (Table 1) It is known that body mass index is inversely proportional to the age of puberty commencement, which is usually signalled by acne.⁽²⁰⁾

The Global Acne Grading System showed a predominance of mild non-inflammatory acne in both study populations, with both having similar proportions of mild, moderate, and severe cases of acne vulgaris; a finding consistent with other studies in Nigeria⁽¹¹⁾ and Egypt.⁽²¹⁾ An acne grading tool, such as GAGS, is easy to use in the community setting. It helps identify mild disease, aid early diagnosis, and enable the timely commencement of therapy to prevent complications.⁽²²⁾

In this study, acne lesions occurred on the facial regions of the study population in both the rural and

urban groups. Plausible factors accounting for this observation include heightened exposure to ultraviolet radiation, the use of comedogenic facial skincare products, or increased frequency of hand-to-face contact. These results are similar to those of Anaba et al., who observed a high prevalence (53.2%) of facial acne in the students they studied, with similar counts of closed and open comedones.(23)

Our study demonstrates that milk consumption showed a non-significant trend toward increased acne prevalence in the urban group, mirroring previous research linking milk intake to acne vulgaris.^{1—(2427)} It is proposed that potent molecules present in milk fat can increase insulin secretion and insulin-like growth factor-1 synthesis, which, in turn, can lead to the proliferation of sebum and keratinocytes.(28,29)

In the urban area, milk intake was associated with an increased risk of acne, whereas no such association was observed among rural secondary school students. The quantity and type of milk taken, however, were not considered and may have influenced the results.

We did not find any rural-urban comparative study of acne vulgaris in Nigeria; instead, there were isolated studies conducted across different geographical groups.

The study, to the best of our knowledge, is the first in Southeastern Nigeria and has brought to the fore variations in the prevalence and determinants of acne vulgaris severity among adolescents living in urban versus rural areas.

It is recommended that proper skin care practices be included in the health education curriculum of secondary schools in Ebonyi State to educate young people about acne and help them avoid practices that could worsen disease outcomes.

The provision of increased psychological and educational support to adolescents who have acne through the setting up of health support groups will greatly enhance self-image among this group of young people.

Conclusion

Acne vulgaris remains a significant skin disorder in adolescents, not only globally but also in Ebonyi State. Although some variations were observed in the prevalence and predictors of the disorder between urban and rural areas of Ebonyi State, further studies are needed to validate these findings. Health education and policies targeted at adolescents would help mitigate the disorder's impact.

List of Abbreviations

- BMI: body mass index;
- CADI: Cardiff Acne Disability Index;
- cm: centimeters;
- GAGS: Global Acne Grading System;
- HADS: Hospital Anxiety and Depression Scale;
- Kg: kilogram;
- m²: square meter;
- ml: milliliters;
- Vs: versus

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