



MISUSE OF TOPICAL CORTICOSTEROIDS IN THE TREATMENT OF ACNE AND HYPERPIGMENTATION: AN OBSERVATIONAL STUDY IN TWO PHARMACIES IN LAGOS, NIGERIA.

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ABSTRACT

Nigeria witnesses a prevalent inclination towards the use of easily accessible over-prescribed drugs and topical corticosteroids are no different. This study explores the misuse of topical corticosteroids, particularly focusing on the widespread use of triple action creams (TACs) (which combine antibiotics, antifungals, and topical corticosteroids) in addressing hyperpigmentation and acne. This study was conducted to examine the misuse of TACs and adverse effects experienced by the study population and highlight the association between motivations of use, demographics and respondents profile. A cross-sectional descriptive study was carried out in 2 pharmacies from March 2023 to January 2024 amongst 326 individuals using triple-action creams for skin conditions. Data collection included administering questionnaires and conducting physical skin analyses. Chi-squared and Fisher tests were used for data interpretation. Among 326 subjects, the female population (81.9%) was found to abuse TACs the most, and (84.4%) of the study population was aged between 21-30 years. Betamethasone dipropionate (56.8%) was the most commonly employed steroid used for treating acne (41.7%) and hyperpigmentation (17.5%). Side effects from prolonged use included sensitivity (63.2%), macular hyperpigmentation (37.1%), erythema (29.8%), and steroid-induced acne (21.5%). In conclusion, This study provides recent insights into the population segments most affected by the misuse of triple-action creams along with current treatment practices and preferences for the treatment of acne and hyperpigmentation within the study population. These findings concerning the adverse effects experienced by the study population underscore the need for regulatory measures regarding the marketing and prescription of topical corticosteroids.

Keywords: *Acne, Corticosteroid abuse, Hyperpigmentation, Lagos, Nigeria, Triple action creams.*

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INTRODUCTION

The historical admiration for flawless skin is a universal phenomenon transcending global cultures, and Nigeria is no exception. Flawless skin is typified by a smooth, blemish-free, and lighter complexion, a coveted attribute. Acne is a common skin condition that occurs when hair follicles become clogged with oil and dead skin cells, presenting as pimples, blackheads, or whiteheads (Ayer and Burrows, 2006). Hyperpigmentation, another common skin condition, is the localized darkening of the skin caused by a host of factors, one of which is acne (Ayer and Burrows, 2006). Nigeria, predominantly characterised by an indigenous population falling within the Fitzpatrick skin scale range of 5-6 experiences a predisposition to hyperpigmentation causing an inclination towards lighter skin, even at the expense of skin health (Sachdeva, 2009). Acne also presents darker on the skin when inflamed further intensifying demand for treatments for post-acne hyperpigmentation which has led to demand for a singular treatment that addresses both issues.

Hormonal and genetic factors are the primary causes of acne, but there is a prevalent misconception associating it with inadequate hygiene (Ayer and Burrows, 2006). As a result, individuals have turned to non-mainstream treatments, including antiseptic liquids, harsh cleansers, and triple-action creams. Triple-action creams (TACs) are products that contain antibiotics, antifungals, and topical corticosteroids in an emulsion base. These creams have gained popularity in the Nigerian markets as a treatment for acne and post-acne scars over the last few decades (Nnoruka and Okoye, 2006). These creams are easily accessible without a prescription at pharmacies, supermarkets, and roadside stalls.

The British National Formulary categorises topical corticosteroids into four classes, Class-I-IV with Class-I steroids being the most potent and prone to triggering side effects and Class-IV being the least potent and least likely to trigger side effects (Vaziri et al., 2015). Triple action creams which contain Class-I and Class-II in the form of Clobetasol and Betamethasone are the most readily available form of topical corticosteroids in Nigerian pharmacies, where they account for approximately 73% of sales (Ibekwe *et al.*, 2018). This aligns with the widespread availability of these products and their protracted misuse which causes great concern in our region (Joda *et al.*, 2017). Given the inclusion of antifungals and antibiotics in these formulations, compromised skin barrier function is also a consistent occurrence with prolonged usage.

This study aims to investigate the current prevalence of triple action cream usage for treating acne vulgaris and hyperpigmentation in Lagos, by exploring user motivations behind the use of these creams, which are often marketed as cosmetic products despite being classified as drugs, and by shedding light on these incidences, the study aims to contribute to data which may be used in the targeting of demographics majorly affected by this issue to facilitate effective reach for educational campaigns. Nigeria is underrepresented in this area of research and there is a lack of recent data on the topic despite the misuse of topical corticosteroids being a widespread issue in this region.

MATERIALS AND METHODS

From March 2023 to January 2024, a cross-sectional descriptive study targeted customers at two community pharmacies in Lagos, Nigeria-Yaba and Victoria Island. The study included adult participants of both genders who reside in Lagos and didn't have any chronic dermatological conditions, who had used triple action creams within the

last three months outside of the prescribed duration or with no prescription at all, and remembered their usage history and was able to provide informed consent. Subjects who did not meet these criteria or could not provide adequate information concerning their usage history were excluded from the study to maintain the study focus on the local population and minimize confounding variables.

After obtaining informed consent from the subjects, a comprehensive questionnaire addressing preferred cosmetic practices was administered. It encompassed demographic information such as age, gender, educational attainment, residence status, and details regarding the type of triple-action cream used. Additionally, data on the duration of product use; potential mixing with lightening or acne treatment products; place of purchase; and source of prescription were systematically gathered. The specific triple-action creams employed were recorded by noting both brand names and composition. A skin analysis was conducted by a licensed aesthetician on some subjects with less physically obvious side effects to determine the extent of adverse effects. The aesthetician held consultations and assessed physical variables like hydration levels, acne, hyperpigmentation, sun damage, skin sensitivity, and the presence of erythema. Complaints reported by all subjects were also meticulously documented with particular emphasis on cosmetic considerations. Appropriate subject written consent was obtained and certain subjects gave consent to their images being used in the paper.

The data collected was analyzed using univariate and bivariate methods, with statistical analysis including chi-squared and Fisher tests at a significance threshold of <0.05 . All statistical procedures were carried out using the IBM Statistical Package for the Social Sciences.

RESULTS AND DISCUSSION

In the study, 326 subjects who were interviewed met the inclusion criteria. Among the 326 subjects, 267 respondents (81.9%) were female, while 59 (18.1%) were male. Furthermore, 275 respondents (84.4%) were aged between 21 and 30 years, with 43 individuals (13.2%) aged 31 to 40 years, and 4 individuals (1.2%) aged over 40 years. Educational attainment analysis showed that 206 respondents (63.2%) had tertiary education, 98 (30.1%) possessed postgraduate degrees, 10 (3.1%) attained secondary education, and 11 (3.4%) had no formal schooling. Furthermore, 319 (67.2%) of the respondents used creams containing Betamethasone, while 107 respondents (32.8%) used Clobetasol-containing creams as shown in Table 1.

Table 1: Table showing the distribution of sociodemographic characteristics of respondents.

Demographic Characteristics	Frequency	Percentage (%)
Age		
18-20 Years	4	1.2
21-30 Years	275	84.4
31-40 Years	43	13.2
>40	4	1.2

Gender		
Female	267	81.9
Male	59	18.1
Level of Education		
No schooling	11	3.4
Post-graduate	98	30.1
Secondary	10	3.1
Primary	1	0.3
Tertiary	206	63.2

As shown in Table 2, 258 participants (79.2%) purchased creams from hospital pharmacies, trusted online and offline pharmacies, while 68 (20.8%) sourced them from open markets and supermarkets due to their non-prescriptive availability. Among the respondents, 160 respondents (49.1%) were introduced to TACs by friends/family, while 120 respondents (36.8%) received recommendations from pharmacy professionals and 20 respondents (6.1%) received a prescription from medical practitioners. 55.5% of respondents used steroids for over a month, a duration exceeding the recommended period of 1-2 weeks, with about 31% using them for almost a year and 2.5% for over five years. However, 87.7% of participants did not combine steroid usage with other acne or dark-spot treatments.

Furthermore, 136 respondents (41.7%) utilised triple-action creams to address acne, while 57 respondents (17.5%) employed them to treat hyperpigmentation. The use of triple-action creams showed no gender-related effects. However, when used to treat folliculitis, there were statistically significant associations with patient gender, with more men seeking this treatment.

While 206 (63.2%) of the participants experienced skin sensitivity and 97 participants (29.8%) reported having erythematous skin, macular hyperpigmentation was the more common adverse effect, experienced by 121 respondents (37.1%), followed by steroid-induced acne, which was reported by 70 individuals (21.5%). Additionally, respondents reported various types of dermatitis, striae, hypopigmentation, telangiectasia, and purpura.

Table 2: Table showing respondents' profiles.

Respondents Profile	Frequency	Percentage (%)
Steroid Type		
Betamethasone dipropionate	185	56.8
Betamethasone valerate	34	10.4
Clobetasol propionate	107	32.8
Source of prescription		

Doctor	20	6.1
Friend/Relative	160	49.1
Pharmacist/Chemist	120	36.8
Self-Prescribed	2	0.6
Seller	24	7.4
Indications for use (*)		
Acne	136	41.7
Hyperpigmentation	57	17.5
Dermatitis (multiple forms of)	149	45.7
Folliculitis	5	1.5
Duration of use		
Over 1 month	181	55.5
Less than 1 year	100	30.7
1-2 years	20	6.1
2-5 years	17	5.2
More than 5 years	8	2.5
Combination with other treatments		
No	286	87.7
Yes	40	12.3
Adverse effects (*)		
Macular Hyperpigmentation	121	37.1
Telangiectasia	6	1.8
Skin sensitivity	206	63.2
Purpura	14	4.3
Steroid induced acne	70	21.5
Hypopigmentation	11	3.4
Striae	35	3.1
Dermatitis	55	16.9
Erythema	97	29.8

(*) Some respondents complained about more than one indication for use and/or side effect.

The Chi-square analysis revealed no significant association between gender and acne as a motivation for using triple-action creams ($\chi^2 = 0.032$, $p = 0.858$). Similarly, the analysis found no significant association between gender and hyperpigmentation as a motivation for using triple-action creams ($\chi^2 = 3.147$, $p = 0.076$). Gender does not seem to be a significant factor influencing the motivation to use these creams. A significant relationship was found between age groups to acne treatment ($\chi^2 = 8.537$, $p = 0.036$) and hyperpigmentation treatment ($\chi^2 = 41.748$, $p < 0.001$). Younger age groups, particularly those aged 21-30, exhibit higher usage for acne and hyperpigmentation treatment compared to older age groups. A significant relationship exists between the level of education and misuse of TAC for acne ($\chi^2 = 17.853$, $p = 0.001$) and hyperpigmentation treatment ($\chi^2 = 19.507$, $p = 0.001$). Respondents with higher education levels, particularly post-graduate and tertiary education, demonstrate a lower prevalence of misusing TACs for the treatment of hyperpigmentation compared to those with lower education levels, especially respondents with no schooling.

Table 3: Table showing bivariate test results

Gender vs Motivations of Use										
	Acne					Hyperpigmentation				
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.032	1	.858			3.147	1	.076		
Continuity Correction	.001	1	.974			2.511	1	.113		
Likelihood Ratio	.032	1	.858			2.914	1	.088		
Fisher's Exact Test				.885	.489				.088	.060
N of Valid Cases	326					326				

Age group vs Motivations of Use										
	Acne					Hyperpigmentation				
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.537	3	.036	-	-	41.748	3	.000	-	-
Continuity Correction	11.399	3	.010	-	-	34.085	3	.000	-	-
Likelihood Ratio	326	-	-	-	-	326	-	-	-	-

Level of education vs Motivations of Use									
	Acne					Hyperpigmentation			
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)

Pearson Chi-Square	17.853	4	.001	17.853 ^a	4	19.507	4	.001
Continuity Correction	22.083	4	.000	22.083	4	18.534	4	.001
Likelihood Ratio	326			326		326		

The misuse of triple-action creams is a cause for concern in many regions and Nigeria is no different. These affordable and easily available creams, used for treating acne and hyperpigmentation, are being promoted without proper consultation with dermatologists as shown in our study population. In this study, 84.4% of the study population aged between 21-30 years of age misused triple action creams which is similar to numbers reported where authors reported up to 83.7% in their study populations (Onuchukwu and Osahon, 2022; Inakanti *et al.*, 2015; Swaroop *et al.*, 2019; Varshney *et al.*, 2019). Awareness campaigns would be beneficial to people in this age bracket through the use of social media to sensitise them on the dangers of misusing topical corticosteroids in general. We believe that this is due to the people at that age dealing with acne and by extension hyperpigmentation at that age. Females (81.9%) were also more likely to misuse these creams and for a longer period compared to men, as indicated in many similar studies, this is likely because women use these creams with more cosmetic considerations as they are often marketed as such, women also use cosmetic products more than men do and are subject to stricter beauty standards (Onuchukwu and Osahon, 2022; Dey, 2014). The opposite was however observed in another study (Varshney *et al.*, 2019) where men constituted the majority at 54.3%. This may be because the most common indication was dermatophytosis. Furthermore, women in our study tended to utilize these creams for prolonged durations when compared to men. Interestingly, a high level of education did not serve as a deterrent against the misuse of triple action creams, with 93.3% of respondents in our study possessing some form of post-secondary education, contrasting with the prevalence observed in many studies (Varshney *et al.*, 2019; Kunduru *et al.*, 2023; Chauhan *et al.*, 2019; Bains, 2016) where individuals with lower levels of formal education were more likely to misuse these creams. This may likely be because of the proximity of one of the pharmacies where we collected data to a major university in Lagos, as many students frequented the pharmacy.

A significant number of respondents (41.7% and 17.5%) used these creams specifically to treat acne and hyperpigmentation, respectively, which compared with findings from several other studies is lower than the norm. This may show that trends might be moving away from misusing TACs (Nnoruka and Okoye, 2006; Onuchukwu and Osahon, 2022; Chauhan *et al.*, 2019; Swaroop *et al.*, 2019; Chohan *et al.*, 2014; Ambika *et al.*, 2014). The growing influence of aestheticians and dermatologists promoting safe skincare practices via social media platforms presents an opportunity for positive change in this regard, especially in medically underserved areas where dissemination of best practices concerning topical corticosteroids is difficult to come by. Expanding awareness through various channels could contribute significantly to improving the situation. Potent or Class II steroids, such as betamethasone dipropionate or betamethasone valerate, were the most commonly misused corticosteroids found in triple-action creams, with 67.2% of participants using them. The use of Clobetasol propionate was also widespread, with a reported usage rate of 32.8%. Our exploration of topical corticosteroids was limited to triple action creams only, and only a

few brands using similar ingredients are popular in the market. As majority of recommendations for triple action creams came from relatives and friends (49.1%), pharmacists and chemists (36.8%), and doctors (6.1%), people were more likely to purchase the brand specifically recommended. Medical professionals were noted to indiscriminately prescribe these creams with up to 42.9% of our study population having received professional recommendations for various indications including acne and hyperpigmentation as shown in a multitude of studies (Jain *et al.*, 2020; Inakanti *et al.*, 2015; Swaroop *et al.*, 2019; Dey, 2014; Varshney *et al.*, 2019) highlighting the necessity for improved regulation as recommended by Nigerian researchers who recognize that this is a pressing issue in our region (Ibekwe *et al.*, 2018; Nnoruka and Okoye, 2006; Onuchukwu and Osahon, 2022; Joda *et al.*, 2017; Emeka *et al.*, 2021). Side effects such as skin sensitivity were experienced by a majority of the study population as expected and erythema was experienced by 29.8% of respondents but was outweighed by macular hyperpigmentation (37.1%) and then steroid-induced acne (21.5%). These results are consistent with broader trends identified in studies conducted by others (Nnoruka and Okoye, 2006; Inakanti *et al.*, 2015; Kunduru *et al.*, 2023) that emphasise the prevalence of misuse-related complications. In our study, all the respondents answered saying that they were not fully aware of the long-term side effects of TACs misuse and would have adhered to the recommended duration or not made the decision to self-medicate having been told that the creams were cosmetic products. This is where stricter regulation and the support of governmental bodies like the National Agency for Food and Drug Administration and Control (NAFDAC) play a crucial role in addressing the misuse of triple action creams through comprehensive education initiatives targeting not only medical professionals and the populace but also reinforcing regulatory measures, particularly concerning prescription practices and sales. These bodies can mandate clear and accurate labeling and marketing of topical corticosteroid-containing products to ensure informative and easy-to-understand information concerning them.

Chi-squared analysis revealed that gender does not significantly influence the use of triple-action creams for the treatment of acne and hyperpigmentation, this suggests that both men and women are equally susceptible to the perceived benefits of these creams. However, this also implies that interventions aimed at addressing cream misuse should not focus solely on one gender but rather target both men and women equally. Age plays a significant role in determining the motivations for using TACs, with younger age groups showing higher usage for treating both acne and hyperpigmentation which highlights the importance of age-specific interventions. Younger age groups, especially ages 21-30 may be more inclined to misuse TACs due to cosmetic issues caused by hormonal changes (Ayer and Burrows, 2006), societal pressures, or trends. Tailoring educational campaigns and interventions to younger age groups can help raise awareness about the risks associated with steroid misuse and promote healthier skincare practices. Level of education is associated with motivations for using TACs, indicating potential differences in skincare practices and preferences among different educational groups. The association between level of education and motivations for using steroids suggests potential differences in skincare knowledge and practices among different educational groups. This iterates the importance of education in influencing skincare behaviors. Interventions targeting individuals with lower levels of education may need to focus more on basic skincare education and dispelling misconceptions about the use of steroids, while those targeting individuals with higher levels of education may focus on more nuanced aspects of skin care and the risks associated with the misuse. Statistical analysis of several variables in this study revealed that individuals using betamethasone for shorter periods reported fewer and less severe side

effects, while those using clobetasol, regardless of duration, had a higher chance of developing steroid-induced acne, this may be as a result of clobetasol propionate having a recommended use period of less than 14 days (Mehta *et al.*, 2016). Generally, associations were noted between the length of usage and various adverse effects. Extended use of triple-action creams was connected with a higher occurrence of telangiectasia, hypopigmentation, purpura, steroid-induced acne, striae, and dermatitis. Conversely, shorter durations of using triple-action creams were linked to fewer side effects. Interestingly, no significant associations were found between macular hyperpigmentation and the length of usage; individuals who used these creams for shorter periods still experienced some form of hyperpigmentation. There is a significant link between the duration of using triple action creams and the residence. Particularly, individuals residing in rural areas were more inclined to use steroids for prolonged periods. This suggests that access to healthcare services and knowledge about the appropriate use of topical corticosteroids may vary in different regions, leading to longer durations of usage and increased risk of adverse effects (Dey, 2014). The study found that 100% of participants were unaware of the long-term side effects of triple-action creams, and many developed addictions to this formula, making discontinuation difficult.

The main limitation of this study is that data was collected in a pharmacy and the study population might not be a true reflection of the main population. Limiting the study on topical corticosteroids to just TACs leaves out other forms of the product, however, this was necessary for this study to avoid confounding factors because most readily available on our market topical corticosteroids are paired with tretinoin and/or hydroquinone that may cause similar adverse effects.

CONCLUSION

Summarily, this study sheds light on the prevalent misuse of triple-action creams for treating acne vulgaris and hyperpigmentation in Lagos, Nigeria. Our findings underscore the widespread availability of these creams and the alarming rates of misuse, particularly among young adults and individuals with higher levels of education. Despite their classification as drugs, these creams are often marketed as cosmetic products and are readily accessible without prescription, contributing to their widespread misuse. Our research highlights the need for targeted interventions to address this public health concern. Educational campaigns aimed at raising awareness about the risks associated with steroid misuse and promoting healthier skincare practices are crucial, especially among younger age groups. Additionally, stricter regulation of cream sales and prescription practices, along with improved labeling and marketing standards, can help mitigate the misuse of triple-action creams. Healthcare professionals play a vital role in promoting safe skincare practices and providing accurate information to consumers. Collaboration between regulatory bodies, healthcare providers, and the public is essential to address the root causes of cream misuse and protect the well-being of individuals in Nigeria.

CONFLICT OF INTEREST DISCLOSURE

None declared.

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