Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 15 [4] March 2026. 48-52
©2026 Academy for Environment and Life Sciences, India
Online ISSN 2277-1808
Journal's URL: http://www.bepls.com
CODEN: BEPLAD

ORIGINAL ARTICLE **OPEN ACCESS**

Topical Steroid Misuse as a Growing Cause of Facial Dermatoses in Pakistan: Dermatologic Burden and Plastic Surgery Challenges

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ABSTRACT

Topical steroid misuse has emerged as a significant public health concern in Pakistan, contributing to a growing prevalence of facial dermatoses and subsequent challenges in plastic surgery. This study aimed to evaluate the dermatologic burden of facial steroid-induced dermatoses and assess the surgical complexities in patients presenting with steroid-induced skin changes. A cross-sectional observational study was conducted over 18 months, including 312 patients from three tertiary dermatology centers in Karachi and Lahore. Data were collected on demographics, duration of steroid use, clinical manifestations, and prior interventions. Standardized dermatologic assessments and photographic documentation were performed. Statistical analyses included chi-square tests, ANOVA, and logistic regression, with significance set at $p < 0.05$. Results demonstrated that 72.4% of patients exhibited steroid-induced acneiform eruptions, 58.3% had telangiectasia, and 36.5% showed facial atrophy. Mean duration of misuse was 9.7 ± 3.2 months. Plastic surgery interventions were required in 24.7% of cases, with complications including delayed wound healing (13.8%) and poor scar remodeling (9.2%). Logistic regression identified prolonged steroid use (>6 months) as a significant predictor of surgical complexity (OR 3.92, 95% CI 2.11–7.28, $p < 0.001$). These findings highlight the high dermatologic burden of topical steroid misuse in Pakistan and underscore the importance of early recognition, patient education, and careful planning of reconstructive procedures. Enhanced regulatory measures and dermatologic awareness campaigns are recommended to mitigate this growing public health issue.

Keywords: *topical steroids, facial dermatoses, steroid misuse, plastic surgery, Pakistan*

Received 20.01.2026 Revised 24.02.2026 Accepted 08.03.2026

INTRODUCTION

Topical corticosteroids have long been a cornerstone of dermatologic therapy due to their potent anti-inflammatory and immunosuppressive properties. They are routinely prescribed for conditions such as eczema, psoriasis, and allergic dermatitis [1]. However, inappropriate usage, over-the-counter availability, and self-medication have led to widespread misuse, particularly in low- and middle-income countries such as Pakistan [2,3]. Steroid-induced facial dermatoses (SIFD) are now emerging as a prominent dermatologic concern, manifesting in a spectrum of cutaneous complications including acneiform eruptions, telangiectasia, hyperpigmentation, hypopigmentation, and skin atrophy [4,5]. These dermatoses not only impact the quality of life but also present formidable challenges for reconstructive and plastic surgical interventions [6,7].

The epidemiology of topical steroid misuse in Pakistan has not been comprehensively documented. Existing literature largely focuses on case reports or small cross-sectional studies with limited sample sizes [8,9]. A national survey conducted in 2020 indicated that approximately 40% of dermatology outpatients had used topical steroids without a prescription, highlighting the scale of misuse [10]. Despite the prevalence, systematic evaluations quantifying the dermatologic burden and associated surgical implications remain scarce. Most prior research emphasizes clinical presentation but does not correlate duration of misuse with the severity of skin damage or surgical complexity [11,12].

Facial dermatoses induced by prolonged steroid application are unique due to the thinness of facial skin, high vascularity, and exposure to environmental insults. Chronic misuse leads to irreversible changes such

as dermal atrophy, telangiectasia, and compromised wound healing [13]. These changes complicate standard surgical approaches, demanding meticulous planning and specialized reconstructive techniques. Moreover, patients often present late due to social stigma or lack of awareness, further complicating management [14].

The literature also reveals a gap in understanding patient behavioral factors contributing to misuse. Socioeconomic status, urbanization, and access to healthcare facilities influence the prevalence and duration of inappropriate steroid use [15]. Studies in neighboring countries suggest that self-medication is driven by the desire for rapid cosmetic improvement, particularly in the treatment of acne, melasma, and other pigmentary disorders [1]. In Pakistan, the combination of aggressive marketing by pharmaceutical companies and widespread availability of over-the-counter potent corticosteroids has amplified the problem [2].

Given these challenges, there is an urgent need for an integrated study that quantifies the dermatologic burden of steroid-induced facial dermatoses and evaluates the implications for plastic surgery. Understanding the relationship between misuse duration, clinical severity, and surgical complexity can inform public health interventions, regulatory policies, and clinical guidelines. Additionally, identifying high-risk patient populations enables targeted education and early intervention, potentially reducing both dermatologic morbidity and surgical complications [3,4].

This study was therefore designed to systematically assess the prevalence, severity, and clinical patterns of steroid-induced facial dermatoses in a representative Pakistani population. It also aimed to evaluate the associated challenges in reconstructive and plastic surgical procedures, identify predictors of surgical complexity, and provide evidence-based recommendations for dermatologists, surgeons, and policymakers [5–15]. By addressing these gaps, this research seeks to contribute to the emerging understanding of topical steroid misuse as a public health and surgical concern in Pakistan.

MATERIAL AND METHODS

Study Design

This cross-sectional observational study was conducted over 18 months (January 2022–June 2023) at Niazi Medical and Dental College. Ethical approval was obtained from the National Institute of Health Ethics Committee, Pakistan (Ethical Approval No. NIH/DERM/2022/1345). The study adhered to the Declaration of Helsinki guidelines.

Sample

A total of 312 patients aged 15–55 years presenting with facial dermatoses attributed to topical steroid misuse were included. Sample size calculation assumed a 95% confidence interval, 5% margin of error, and estimated prevalence of 40% steroid misuse.

Inclusion/Exclusion Criteria

Inclusion Criteria:

- Patients with a documented history of topical steroid application for >1 month
- Presence of facial dermatoses consistent with steroid-induced changes
- Willingness to provide informed consent

Exclusion Criteria:

- Dermatoses due to systemic corticosteroids
- Concurrent severe dermatologic or systemic illness
- Patients who had prior facial surgery unrelated to steroid use

Data Collection

Demographic data, duration and frequency of steroid use, prior dermatologic interventions, and comorbidities were recorded. Clinical evaluation included standardized dermatologic scoring for acneiform eruptions, telangiectasia, hyperpigmentation, and atrophy. Photographic documentation was performed at baseline and follow-up visits.

Plastic Surgery Assessment

Patients requiring reconstructive intervention were evaluated by a board-certified plastic surgeon. Parameters assessed included wound healing potential, tissue integrity, and risk of postoperative complications. Surgical complexity was graded as mild, moderate, or severe based on standard reconstructive criteria.

Laboratory Investigations

Routine hematologic and biochemical panels were performed to rule out systemic corticosteroid effects. Skin biopsies were taken in 25% of patients with atypical lesions to confirm steroid-induced histopathologic changes.

Statistical Analysis

Data were analyzed using SPSS version 26. Continuous variables were expressed as mean ± standard deviation; categorical variables as frequencies and percentages. Associations between duration of steroid use and clinical severity were analyzed using chi-square tests and ANOVA. Logistic regression identified predictors of surgical complexity, with significance set at $p < 0.05$.

RESULTS

Table 1: Demographic and Clinical Characteristics of Patients (n=312)

Parameter	Value
Mean Age (years)	28.4 ± 9.2
Gender (M/F)	112/200
Mean Duration of Steroid Use (months)	9.7 ± 3.2
Steroid-Induced Acneiform Eruption	226 (72.4%)
Telangiectasia	182 (58.3%)
Facial Atrophy	114 (36.5%)
Hyperpigmentation	98 (31.4%)

Table 2: Plastic Surgery Interventions and Complications

Surgical Parameter	Frequency (%)
Reconstructive Surgery Required	77 (24.7%)
Delayed Wound Healing	43 (13.8%)
Poor Scar Remodeling	29 (9.2%)
Infection	12 (3.8%)

Table 3: Logistic Regression Analysis for Predictors of Surgical Complexity

Variable	OR	95% CI	p-value
Duration of Steroid Use >6 months	3.92	2.11–7.28	<0.001
Telangiectasia Presence	2.41	1.34–4.33	0.004
Facial Atrophy	4.12	2.05–8.27	<0.001

Table 1 shows that the majority of patients were young adults (mean age 28.4 years) and predominantly female (64%), reflecting social and cosmetic motivations for steroid misuse. Steroid-induced acneiform eruptions were the most common manifestation, followed by telangiectasia and atrophy.

Table 2 highlights the surgical burden, with nearly a quarter requiring reconstructive procedures. Delayed wound healing and poor scar remodeling were the most frequent complications, emphasizing the impact of chronic steroid-induced dermal changes on surgical outcomes.

Table 3 demonstrates that prolonged steroid use (>6 months), presence of telangiectasia, and facial atrophy were significant predictors of surgical complexity, confirming that both duration and severity of dermatoses are critical determinants of reconstructive challenges.

DISCUSSION

This study confirms the high prevalence of steroid-induced facial dermatoses in Pakistan and establishes a direct correlation between duration of misuse and surgical complexity. The predominance of acneiform eruptions aligns with prior regional reports [15,16], reflecting the potent lipophilic nature of corticosteroids that induces sebaceous gland hyperactivity.

Telangiectasia and atrophy were observed in over one-third of patients, consistent with known histopathologic sequelae of prolonged topical corticosteroid exposure [17,18]. These findings corroborate the pathophysiologic understanding that chronic steroid application leads to dermal collagen degradation, vascular fragility, and impaired wound healing [19].

The requirement for plastic surgery in nearly 25% of patients underscores the clinical significance of steroid misuse. Delayed wound healing (13.8%) and poor scar remodeling (9.2%) mirror observations from previous studies in India and Bangladesh, though our study demonstrates higher complication rates, likely due to longer mean misuse duration [20,21]. Logistic regression highlights duration >6 months, telangiectasia, and atrophy as independent predictors, suggesting that early intervention could substantially reduce surgical burden.

Novelty of this study lies in the integrated assessment of dermatologic burden and surgical implications. While prior studies addressed only clinical features [22–24], this research provides evidence linking misuse patterns to reconstructive challenges, offering actionable insights for both dermatologists and surgeons. The findings support public health interventions, including stricter regulation of topical corticosteroids, patient education campaigns, and incorporation of dermatology-surgery multidisciplinary clinics.

Comparison with global literature reveals similar trends in misuse-driven dermatoses but underscores unique challenges in Pakistan, where over-the-counter steroid availability, socio-cultural cosmetic pressures, and limited awareness exacerbate disease burden [25,26]. These findings warrant national guidelines on safe steroid prescription, coupled with monitoring systems to track misuse prevalence.
Future research should explore longitudinal outcomes post-surgery, psychosocial impacts, and efficacy of educational interventions. Multicenter collaborations could enhance generalizability and guide policy. In sum, steroid-induced facial dermatoses represent a preventable dermatologic epidemic with tangible surgical consequences, highlighting the need for proactive strategies [27–30].

CONCLUSION

Topical steroid misuse in Pakistan results in a high burden of facial dermatoses and significant plastic surgery challenges. Early recognition, patient education, and regulatory measures are critical to reduce dermatologic morbidity and optimize reconstructive outcomes. This study provides novel evidence linking duration and severity of misuse with surgical complexity, underscoring the importance of preventive strategies.

ACKNOWLEDGEMENTS

The authors thank all participating patients and the dermatology and plastic surgery departments of Karachi and Lahore centers for their collaboration and support in data collection.

ETHICS STATEMENT

Ethical approval was obtained from the National Institute of Health Ethics Committee, Pakistan (Ethical Approval No. NIH/DERM/2022/1345).

INFORMED CONSENT

Written informed consent was obtained from all patients prior to enrollment in the study.

COMPETING INTERESTS

The authors declare no competing interests.

FINANCIAL DISCLOSURE

No funding was received for this study.

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CITATION OF THIS ARTICLE

Saira N, Anza M M, Mahwish A, Sana Y, Aneela G, Sameera I. Topical Steroid Misuse as a Growing Cause of Facial Dermatoses in Pakistan: Dermatologic Burden and Plastic Surgery Challenges. Bull. Env. Pharmacol. Life Sci., Vol 15 [4] March 2026.48-52