RESEARCH PAPER

Topical Steroid on Face – Curse or Boon

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ABSTRACT

Background:
Topical corticosteroids provide rapid relief in steroid-responsive dermatoses. Inappropriate facial application, particularly with potent preparations, can produce topical steroid-damaged/dependent face (TSDF), rebound symptoms and permanent cutaneous changes.

Aim:
To assess the pattern of topical corticosteroid use on the face and its associated cutaneous adverse effects among patients attending a tertiary-care dermatology outpatient department.

Materials and Methods:

This hospital-based cross-sectional questionnaire study included 100 patients older than 12 years who had applied topical corticosteroids to the face for at least four weeks. The study was conducted over three months. Sociodemographic characteristics, indication, preparation, potency, duration, source of advice and adverse effects were recorded. Categorical variables were compared using the chi-square test or Fisher's exact test, and continuous variables were compared using Welch's t test. Odds ratios with 95% confidence intervals were calculated. A two-tailed $p<0.05$ was considered statistically significant.

Results:
The mean age was 27.8±8.0 years, and 67.0% were female. TSDF was present in 85.0% (95% CI: 76.7–90.7). Acne was the most frequent indication (58.0%), followed by cosmetic skin lightening (20.0%). Clobetasol was used by 55.0%, fixed-dose combinations by 65.0% and nonmedical sources by 71.0%. Super-potent corticosteroid use (OR: 6.30, 95% CI: 1.66–23.94; $p=0.003$) and nonmedical advice or self-medication (OR: 6.95, 95% CI: 2.12–22.81; $p<0.001$) were significantly associated with TSDF. Participants with TSDF had a longer mean duration of use than those without TSDF (7.1±5.0 versus 2.9±1.3 months; $p<0.001$). Burning or stinging occurred in 63.0%, acneiform eruption in 51.0%, pigmentary alteration in 15.0%, hypertrichosis in 12.0%, telangiectasia in 10.0% and cutaneous atrophy in 8.0%. Prolonged use exceeding six months was associated with multiple adverse effects and rebound symptoms.

Conclusion:
Facial topical corticosteroids functioned as a curse when used without appropriate indication or medical supervision. TSDF was common and was particularly associated with prolonged exposure, super-potent preparations and nonmedical recommendations. Regulation of over-the-counter availability and improved public and professional awareness are required.

Keywords: Topical corticosteroid misuse; topical steroid-damaged face; facial dermatoses.

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INTRODUCTION

Topical corticosteroids have remained an essential component of dermatological treatment since their introduction by Sulzberger and Witten in 1952. Their potent anti-inflammatory, immunosuppressive, antiproliferative and vasoconstrictive actions provide rapid relief in many steroid-responsive conditions, including eczema, allergic and inflammatory dermatoses, psoriasis, vitiligo and autoimmune skin diseases. When prescribed in an appropriate potency for a suitable duration under medical supervision, topical corticosteroids can be highly effective and may be considered a boon in dermatological practice. However, the thin skin and rich vascular supply of the face increase the absorption of topical preparations and make facial skin particularly susceptible to steroid-related adverse effects. Therefore, the choice of corticosteroid, frequency of application and duration of treatment require careful clinical supervision [1,2].

The misuse of topical corticosteroids on the face has emerged as an important public-health and dermatological concern, particularly in countries where potent steroid preparations and irrational fixed-dose combinations can be obtained without a valid prescription. These products are frequently used for acne, melasma, pigmentation, fungal infections and cosmetic skin lightening, although topical steroids are either inappropriate or potentially harmful in these conditions. Their rapid suppression of erythema and inflammation creates an impression of immediate improvement and encourages prolonged use. Patients may consequently increase the frequency of application or shift to more potent formulations to maintain the perceived benefit [1,3].

Social preference for clear or lighter skin, misleading advertisements, advice from friends or relatives, over-the-counter availability and inappropriate dispensing by pharmacists contribute to facial steroid misuse. Some patients unknowingly use products containing corticosteroids because combination creams are promoted as treatments for acne, pigmentation or fungal infections. Inappropriate prescriptions from healthcare providers without adequate counselling may further contribute to the problem. Discontinuation after prolonged use may produce rebound erythema, burning, itching and worsening of the original dermatosis, which compels patients to restart the preparation and establishes a cycle of steroid dependence [3,4].

Prolonged or inappropriate facial application can cause acneiform eruptions, persistent erythema, telangiectasia, hypertrichosis, cutaneous atrophy, perioral dermatitis, pigmentary alterations, rosacea-like dermatitis and tinea incognito. Collectively, these manifestations have been described as topical steroid-damaged or dependent face. The condition may adversely affect appearance, self-esteem and quality of life and can become difficult to manage because patients often experience rebound symptoms after withdrawal [4,5].

AIM

To assess the pattern of topical corticosteroid use on the face and its associated cutaneous adverse effects among patients attending a tertiary-care dermatology outpatient department.

OBJECTIVES

1. To describe the demographic profile and clinical characteristics of patients using topical corticosteroids on the face.
2. To determine the indications, preparations, potency, duration and sources of advice or prescription for facial topical corticosteroid use.
3. To identify the short-term and long-term adverse effects associated with topical corticosteroid application on the face.

MATERIALS AND METHODS

Source of Data

The study data were obtained from patients attending the Dermatology Outpatient Department, with facial dermatoses and a history of topical corticosteroid application on the face for at least four consecutive weeks. Information was obtained through patient interviews, clinical examination, prescriptions or medication containers when available, and clinical photographs taken after obtaining consent.

Study Design

The study was designed as a hospital-based, observational, cross-sectional questionnaire study.

Study Location

The study was conducted in the Dermatology Outpatient of tertiary care institute.

Study Duration

The study was conducted over three months, from 1 March 2025 to 30 May 2025.

Sample Size

The sample size was calculated using the formula for estimating a single population proportion:

$$n = \frac{Z_{1-\alpha/2}^2 \times p \times q}{d^2}$$

where:

- n= required sample size
- $Z_{1-\alpha/2}$= 1.96 at the 95% confidence level
- p= anticipated prevalence of topical steroid-damaged face = 85% or 0.85
- $q = 1 - p = 0.15$
- d= absolute precision = 7% or 0.07

$$n = \frac{(1.96)^2 \times 0.85 \times 0.15}{(0.07)^2}$$

$$n = \frac{3.8416 \times 0.1275}{0.0049} = 99.96$$

Thus, the minimum required sample size was approximately 100 participants. Accordingly, 100 eligible patients were included through consecutive sampling during the study period.

Inclusion Criteria

Patients were included when they:

1. Were older than 12 years.
2. Attended the dermatology outpatient department with a facial dermatosis.
3. Had applied a topical corticosteroid or a corticosteroid-containing combination on the face continuously or repeatedly for at least four weeks.
4. Provided informed written consent to participate in the study.
5. Agreed to undergo clinical examination and photographic documentation.

For participants younger than 18 years, assent and written consent from a parent or legal guardian were obtained.

Exclusion Criteria

Patients were excluded when they:

1. Were unwilling to participate or complete the questionnaire.
2. Had polycystic ovarian disease, thyroid disorder, Cushing syndrome or another condition that could produce clinical features similar to topical corticosteroid adverse effects.
3. Were receiving systemic corticosteroids, antitubercular treatment or other systemic medications capable of producing similar cutaneous changes.
4. Had incomplete information regarding the topical preparation or duration of use.
5. Had severe concurrent facial disease that prevented reliable assessment of steroid-related changes.

Procedure and Methodology

After institutional ethics committee approval, patients attending the dermatology outpatient department were screened for facial topical corticosteroid use. Those satisfying the eligibility criteria received an explanation of the study objectives and procedures. Written informed consent was then obtained.

A predesigned and pretested questionnaire was used to record age, sex, occupation, educational status and relevant clinical history. Details of topical corticosteroid use included the original indication, product name, potency, formulation, frequency of application, duration of use and source of advice. The source was classified as dermatologist, general practitioner, pharmacist, relative or friend, self-medication, advertisement or another source.

The investigator verified the corticosteroid preparation from the prescription, tube, package, photograph or patient description whenever possible. Each product was classified according to its generic corticosteroid, potency and whether it was a single preparation or a fixed-dose combination.

A dermatologist performed a detailed examination under adequate illumination. The original dermatosis and adverse effects such as acneiform eruption, erythema, telangiectasia, hypertrichosis, cutaneous atrophy, perioral dermatitis, pigmentary alteration, rosacea-like dermatitis and tinea incognito were recorded. Topical steroid-damaged or dependent face was diagnosed based on the history of prolonged facial corticosteroid use, compatible clinical findings and rebound symptoms or a perceived need to resume the steroid after discontinuation.

Standardized clinical photographs were obtained during the first visit after specific consent. Participants were advised to discontinue inappropriate corticosteroid preparations. Sunscreen, moisturiser and treatment appropriate for the underlying dermatosis or steroid-associated complication were prescribed. Patients were counselled regarding the possible temporary rebound symptoms following withdrawal and were reviewed as clinically required. Study data were compiled and analysed after completion of the three-month enrolment period.

Sample Processing

No blood, tissue or other biological sample was collected because the study was questionnaire- and clinical examination-based. In this study, “sample processing” referred to the verification and

classification of the topical preparations and the processing of collected information. Product names were matched with their generic ingredients, corticosteroids were categorized according to potency, and preparations were classified as single-drug or combination formulations. Completed questionnaires were checked for completeness, assigned unique study identification numbers and entered into a password-protected database. Clinical photographs were anonymized and linked only through the study identification number.

Data Collection

Data were collected using a structured case-record form containing the following sections:

- Sociodemographic information
- Presenting facial complaint and clinical diagnosis
- Indication for topical corticosteroid use
- Name, formulation and potency of the preparation
- Frequency and duration of application
- Source of recommendation or prescription
- Previous attempts to discontinue treatment
- Rebound symptoms after withdrawal
- Cutaneous adverse effects detected during examination
- Treatment and counselling provided

The investigator checked each form on the day of data collection to minimize missing or inconsistent information. Data confidentiality was maintained by removing personal identifiers before analysis.

Statistical Methods

Data were entered into Microsoft Excel and analysed using an appropriate statistical software package. Categorical variables, including sex, indication, steroid potency, source of advice and adverse effects, were summarized as frequencies and percentages. Continuous variables such as age and duration of use were expressed as mean with standard deviation when normally distributed or median with interquartile range when the distribution was skewed.

The chi-square test or Fisher's exact test was used to assess associations between categorical variables. The independent-samples *t* test or Mann-Whitney *U* test was used for comparisons of continuous variables between two groups, as appropriate. Unadjusted odds ratios with 95% confidence intervals were calculated to examine factors associated with topical steroid-damaged or dependent face. Variables considered clinically relevant or having a univariable *p* value below 0.20 were considered for multivariable binary logistic regression. Adjusted odds ratios with 95% confidence intervals were reported. All tests were two-tailed, and a *p* value below 0.05 was considered statistically significant.

OBSERVATION AND RESULTS

Table 1. Pattern of facial topical corticosteroid use and associated adverse outcomes (N=100)

Exposure or outcome	Total, n (%) or mean (SD)	TSDF present (n=85)	TSDF absent (n=15)	Effect estimate (95% CI)	Test statistic	p value
Age, years	27.8 (8.0)	28.4 (8.1)	24.1 (6.8)	MD: 4.3 (0.22 - 8.38)	Welch t=2.19	0.040
Use for >6 months	20 (20.0)	20 (23.5)	0 (0.0)	Corrected OR: 9.70 (0.55 - 170.7)	Fisher's exact	0.036
Super-potent steroid use	55 (55.0)	52 (61.2)	3 (20.0)	OR: 6.30 (1.66 - 23.94)	χ^2=8.61	0.003
Combination preparation use	65 (65.0)	58 (68.2)	7 (46.7)	OR: 2.46 (0.79 - 7.65)	χ^2=2.56	0.110
Nonmedical advice/self-medication	71 (71.0)	66 (77.6)	5 (33.3)	OR: 6.95 (2.12 - 22.81)	χ^2=12.16	<0.001
Rebound symptoms after withdrawal	63 (63.0)	58 (68.2)	5 (33.3)	OR: 4.29 (1.36 - 13.52)	χ^2=7.08	0.008
Multiple cutaneous adverse effects	36 (36.0)	31 (36.5)	5 (33.3)	OR: 1.15 (0.36	χ^2=0.05	0.816

				-3.65)		
Topical steroid-damaged/dependent face	85 (85.0)			Prevalence: 85.0% (76.7-90.7)		

Among the 100 participants, the mean age was 27.8±8.0 years, and topical steroid-damaged/dependent face (TSDF) was identified in 85.0% (95% CI: 76.7-90.7). Participants with TSDF were significantly older than those without TSDF (28.4±8.1 versus 24.1±6.8 years; MD: 4.3 years, 95% CI: 0.22-8.38; Welch's t=2.19, p=0.040). Use for more than six months was reported exclusively among participants with TSDF and was significantly associated with the condition (corrected OR: 9.70, 95% CI: 0.55-170.7; Fisher's exact p=0.036). Super-potent corticosteroid use was more common in the TSDF group than in the non-TSDF group (61.2% versus 20.0%) and increased the odds of TSDF by approximately sixfold (OR: 6.30, 95% CI: 1.66-23.94; χ^2=8.61, p=0.003). Similarly, nonmedical advice or self-medication was significantly associated with TSDF (77.6% versus 33.3%; OR: 6.95, 95% CI: 2.12-22.81; χ^2=12.16, p<0.001). Rebound symptoms after withdrawal were also significantly more frequent among participants with TSDF (68.2% versus 33.3%; OR: 4.29, 95% CI: 1.36-13.52; χ^2=7.08, p=0.008). However, combination preparation use (p=0.110) and the presence of multiple adverse effects (p=0.816) did not differ significantly between the groups.

Table 2. Demographic profile and clinical characteristics of facial topical corticosteroid users (N=100)

Characteristic	**Total, n (%) or mean (SD)**	**TSDF present (n=85)**	**TSDF absent (n=15)**	**Effect estimate (95% CI)**	**Test statistic**	**p value**
Age group					χ^2=6.10	0.047
12-19 years	13 (13.0)	8 (9.4)	5 (33.3)	Reference		
20-29 years	49 (49.0)	43 (50.6)	6 (40.0)	OR: 4.48 (1.14-17.62)		0.032
≥30 years	38 (38.0)	34 (40.0)	4 (26.7)	OR: 5.31 (1.20-23.49)		0.028
Sex					χ^2=1.49	0.222
Male	33 (33.0)	26 (30.6)	7 (46.7)	Reference		
Female	67 (67.0)	59 (69.4)	8 (53.3)	OR: 1.99 (0.65-6.05)		0.222
Residence					χ^2=1.76	0.184
Rural	38 (38.0)	30 (35.3)	8 (53.3)	Reference		
Urban	62 (62.0)	55 (64.7)	7 (46.7)	OR: 2.10 (0.69-6.34)		0.184
Occupation					χ^2=8.21	0.084
Student	42 (42.0)	37 (43.5)	5 (33.3)			
Sales executive	34 (34.0)	31 (36.5)	3 (20.0)			
Homemaker	10 (10.0)	7 (8.2)	3 (20.0)			
Salaried/service	6 (6.0)	5 (5.9)	1 (6.7)			
Other	8 (8.0)	5 (5.9)	3 (20.0)	Reference		
Burning sensation	63 (63.0)	57 (67.1)	6 (40.0)	OR: 3.06 (0.99-9.47)	χ^2=3.97	0.046
Facial redness	49 (49.0)	45 (52.9)	4 (26.7)	OR: 3.09 (0.91-	χ^2=3.53	0.060

				10.44)		
Facial itching	46 (46.0)	41 (48.2)	5 (33.3)	OR: 1.86 (0.58 - 5.94)	χ^2=1.15	0.284
Worsening after discontinuation	63 (63.0)	58 (68.2)	5 (33.3)	OR: 4.29 (1.36 - 13.52)	χ^2=7.08	0.008
Duration of use, months	6.5 (4.8)	7.1 (5.0)	2.9 (1.3)	MD: 4.2 (2.93 - 5.47)	Welch *t*=6.59	<0.001

Almost half of the participants were aged 20-29 years (49.0%), followed by those aged ≥30 years (38.0%) and 12-19 years (13.0%). Age group was significantly associated with TSDF (χ^2=6.10, *p*=0.047). Compared with participants aged 15-19 years, those aged 20-29 years had 4.48 times higher odds of TSDF (95% CI: 1.14-17.62; *p*=0.032), while those aged ≥30 years had 5.31 times higher odds (95% CI: 1.20-23.49; *p*=0.028). Females constituted 67.0% of the sample, but sex was not significantly associated with TSDF (OR: 1.99, 95% CI: 0.65-6.05; *p*=0.222). Most participants resided in urban areas (62.0%), although residence also showed no significant association with TSDF (OR: 2.10, 95% CI: 0.69-6.34; *p*=0.184). Students and sales executives constituted 42.0% and 34.0% of the sample, respectively, but the overall occupational distribution did not differ significantly according to TSDF status (χ^2=8.21, *p*=0.084). Burning sensation was reported by 63.0% and was significantly more frequent among participants with TSDF (67.1% versus 40.0%; OR: 3.06, 95% CI: 0.99-9.47; *p*=0.046). Worsening after corticosteroid discontinuation was also significantly associated with TSDF (OR: 4.29, 95% CI: 1.36-13.52; *p*=0.008). Facial redness (*p*=0.060) and itching (*p*=0.284) were not significantly associated with TSDF. Participants with TSDF had used topical corticosteroids for a significantly longer duration than those without TSDF (7.1±5.0 versus 2.9±1.3 months; MD: 4.2 months, 95% CI: 2.93-5.47; Welch's *t*=6.59, *p*<0.001).

Table 3. Indications, preparations, potency, duration and sources of advice for facial topical corticosteroid use (N=100)

Pattern of use	**Total, n (%)**	**TSDF present (n=85)**	**TSDF absent (n=15)**	**Effect estimate (95% CI)**	**Test statistic**	**p value**
Indication for use					χ^2=2.43	0.488
Acne	58 (58.0)	49 (57.6)	9 (60.0)	Reference		
Fairness/skin lightening	20 (20.0)	19 (22.4)	1 (6.7)	OR: 3.49 (0.41-29.45)	Fisher's exact	0.438
Pigmentation/melasma	13 (13.0)	10 (11.8)	3 (20.0)	OR: 0.61 (0.14-2.67)	Fisher's exact	0.682
Other dermatoses	9 (9.0)	7 (8.2)	2 (13.3)	OR: 0.64 (0.11-3.61)	Fisher's exact	0.635
Principal corticosteroid					χ^2=11.13	0.004
Betamethasone	44 (44.0)	32 (37.6)	12 (80.0)	Reference		
Clobetasol propionate	55 (55.0)	52 (61.2)	3 (20.0)	OR: 6.50 (1.70-24.81)	χ^2=8.38	0.004
Other corticosteroid	1 (1.0)	1 (1.2)	0 (0.0)	Not estimable	Fisher's exact	1.000
Type of preparation					χ^2=1.87	0.393
Single corticosteroid	13 (13.0)	10 (11.8)	3 (20.0)	Reference		

Fixed-dose combination	65 (65.0)	58 (68.2)	7 (46.7)	OR: 2.49 (0.55-11.25)	χ^2= 1.47	0.357
Modified Kligman-type regimen	22 (22.0)	17 (20.0)	5 (33.3)	OR: 1.02 (0.20-5.21)	Fisher's exact	1.000
Potency category					χ^2= 9.44	0.009
Mild/moderate	9 (9.0)	5 (5.9)	4 (26.7)	Reference		
Potent	36 (36.0)	28 (32.9)	8 (53.3)	OR: 2.80 (0.64-12.33)	Fisher's exact	0.221
Super-potent	55 (55.0)	52 (61.2)	3 (20.0)	OR: 13.87 (2.45-78.50)	Fisher's exact	0.003
Duration of use					χ^2= 15.52	0.001
<3 months	14 (14.0)	7 (8.2)	7 (46.7)	Reference		
3-6 months	66 (66.0)	58 (68.2)	8 (53.3)	OR: 7.25 (2.01-26.13)	χ^2= 10.88	0.001
6-12 months	12 (12.0)	12 (14.1)	0 (0.0)	Corrected OR: 25.00 (1.24-505.3)	Fisher's exact	0.006
>12 months	8 (8.0)	8 (9.4)	0 (0.0)	Corrected OR: 17.00 (0.80-360.5)	Fisher's exact	0.022
Source of advice/prescription					χ^2= 12.65	0.002
Dermatologist	2 (2.0)	1 (1.2)	1 (6.7)	Reference		
General practitioner	27 (27.0)	18 (21.2)	9 (60.0)	OR: 2.00 (0.11-37.86)	Fisher's exact	1.000
Pharmacist/ chemist	32 (32.0)	29 (34.1)	3 (20.0)	OR: 9.67 (0.49-188.8)	Fisher's exact	0.227
Friend or relative	21 (21.0)	19 (22.4)	2 (13.3)	OR: 9.50 (0.43-207.9)	Fisher's exact	0.227
Self-medication/ advertisement	18 (18.0)	18 (21.2)	0 (0.0)	Corrected OR: 37.00 (0.61-2237)	Fisher's exact	0.053
Any nonmedical source	71 (71.0)	66 (77.6)	5 (33.3)	OR: 6.95 (2.12-22.81)	χ^2= 12.16	<0.001

Acne was the most frequent indication for facial topical corticosteroid use (58.0%), followed by fairness or skin lightening (20.0%), pigmentation or melasma (13.0%) and other dermatoses (9.0%). The indication for use was not significantly associated with

TSDF (χ^2=2.43, p=0.488). Clobetasol propionate was the most commonly used corticosteroid (55.0%), followed by betamethasone (44.0%). Clobetasol users had significantly greater odds of TSDF than betamethasone users (OR: 6.50, 95% CI: 1.70-24.81; χ^2=8.38, p=0.004). Fixed-dose combinations were used by 65.0%, modified Kligman-type preparations by 22.0% and single corticosteroid preparations by 13.0%; however, preparation type was not significantly associated with TSDF (χ^2=1.87, p=0.393). More than half of the participants used super-potent corticosteroids (55.0%), and this category was strongly associated with TSDF compared with mild or moderate preparations (OR: 13.87, 95% CI: 2.45-78.50; p=0.003). Duration of use was significantly associated with TSDF (χ^2=15.52, p=0.001). Compared with use for less than three months, use for 3-6 months increased the odds of TSDF more than sevenfold (OR: 7.25, 95% CI: 2.01-26.13; p=0.001). All participants using corticosteroids for 6-12 months or more than 12 months had TSDF. The source of advice was also significantly associated with TSDF (χ^2=12.65, p=0.002). Only 2.0% had received advice from a dermatologist, whereas 71.0% obtained the product from a nonmedical source. Nonmedical advice was associated with nearly sevenfold higher odds of TSDF (OR: 6.95, 95% CI: 2.12-22.81; χ^2=12.16, p<0.001).

Table 4. Short-term and long-term adverse effects according to duration of topical corticosteroid use (N=100)

Adverse effect	Overall, n (%)	Use ≤6 months (n=80)	Use >6 months (n=20)	OR for >6 months (95% CI)	Test statistic	p value
Predominantly short-term effects						
Acneiform eruption	51 (51.0)	37 (46.3)	14 (70.0)	2.71 (0.95-7.77)	χ^2=3.61	0.057
Facial erythema	18 (18.0)	11 (13.8)	7 (35.0)	3.38 (1.10-10.33)	χ^2=4.89	0.027
Burning/stinging	63 (63.0)	45 (56.3)	18 (90.0)	7.00 (1.52-32.21)	χ^2=7.82	0.005
Tinea incognito	9 (9.0)	8 (10.0)	1 (5.0)	0.47 (0.06-4.02)	Fisher's exact	0.683
Perioral dermatitis	7 (7.0)	3 (3.8)	4 (20.0)	6.42 (1.31-31.49)	Fisher's exact	0.028
Predominantly long-term effects						
Hypertrichosis	12 (12.0)	6 (7.5)	6 (30.0)	5.29 (1.49-18.78)	χ^2=7.67	0.006
Telangiectasia	10 (10.0)	4 (5.0)	6 (30.0)	8.14 (2.03-32.62)	Fisher's exact	0.004
Cutaneous atrophy	8 (8.0)	2 (2.5)	6 (30.0)	16.71 (3.06-91.35)	Fisher's exact	<0.001
Pigmentary alteration	15 (15.0)	8 (10.0)	7 (35.0)	4.85 (1.50-15.67)	χ^2=7.84	0.005
Multiple adverse effects	36 (36.0)	23 (28.8)	13 (65.0)	4.60 (1.63-13.00)	χ^2=9.13	0.003
Rebound symptoms on withdrawal	63 (63.0)	45 (56.3)	18 (90.0)	7.00 (1.52-32.21)	χ^2=7.82	0.005
Topical steroid-damaged/	85 (85.0)	65 (81.3)	20 (100.0)	Corrected OR:	Fisher's	

dependent face				9.70 (0.55-170.7)	exact	

Burning or stinging was the most common adverse effect, affecting 63.0% of participants, followed by acneiform eruption in 51.0%. Burning or stinging was significantly more frequent among participants who used topical corticosteroids for more than six months than among those who used them for ≤6 months (90.0% versus 56.3%; OR: 7.00, 95% CI: 1.52-32.21; χ^2=7.82, p=0.005). Facial erythema (35.0% versus 13.8%; OR: 3.38, 95% CI: 1.10-10.33; p=0.027) and perioral dermatitis (20.0% versus 3.8%; OR: 6.42, 95% CI: 1.31-31.49; p=0.028) were also significantly associated with use for more than six months. Although acneiform eruptions were more common with prolonged use, the association was marginally nonsignificant (70.0% versus 46.3%; p=0.057), while tinea incognito showed no significant association with duration (p=0.683). Long-term changes were substantially more frequent among prolonged users, including hypertrichosis (OR: 5.29, 95% CI: 1.49-18.78; p=0.006), telangiectasia (OR: 8.14, 95% CI: 2.03-32.62; p=0.004), cutaneous atrophy (OR: 16.71, 95% CI: 3.06-91.35; p<0.001) and pigmentary alteration (OR: 4.85, 95% CI: 1.50-15.67; p=0.005). Multiple adverse effects were observed in 65.0% of prolonged users compared with 28.8% of those using corticosteroids for ≤6 months (OR: 4.60, 95% CI: 1.63-13.00; p=0.003). Rebound symptoms occurred in 90.0% of prolonged users (OR: 7.00, 95% CI: 1.52-32.21; p=0.005). TSDF was present in all participants with use exceeding six months compared with 81.3% of those with shorter exposure (corrected OR: 9.70, 95% CI: 0.55-170.7; Fisher's exact p=0.036).

DISCUSSION

The present study assessed the pattern of facial topical corticosteroid use and associated adverse effects among 100 dermatology outpatients. Topical steroid-damaged/dependent face (TSDF) was identified in 85.0% of participants (95% CI: 76.7-90.7), indicating a substantial burden of inappropriate corticosteroid use. The high prevalence may be explained by the inclusion of patients with a history of regular facial corticosteroid application for at least four weeks. Lahiri and Coondoo (2016) [1] described TSDF as persistent or semi-permanent facial damage caused by irrational, unsupervised or prolonged topical corticosteroid use, often accompanied by psychological or physical dependence. Hameed (2017) [5] reported TSDF in 44.5% of 200 patients, whereas the higher prevalence in the present study may reflect greater exposure to potent preparations, longer duration of use and frequent self-medication.

The mean age of the participants was 27.8±8.0 years, and nearly half were aged 20-29 years. The odds of TSDF were significantly higher among participants aged 20-29 years and ≥30 years compared with adolescents. Females represented 67.0% of the study population, although sex was not significantly associated with TSDF. Similar demographic patterns were reported by Manchanda et al. (2017) [4], who found that 70% of affected patients were women, and by Sharma et al. (2024) [11], whose participants had a mean age of 27.6 years and were predominantly female. Pal et al. (2018) [7] also found that young adults aged 20-29 years constituted the largest group. Young adults may be more concerned about acne, pigmentation, physical appearance, employment and marriage, making them more susceptible to advertisements and advice promoting rapid cosmetic improvement.

Acne was the most frequent indication for corticosteroid use in the present study, accounting for 58.0%, followed by fairness or skin lightening in 20.0% and pigmentation or melasma in 13.0%. Manchanda et al. (2017) [4] similarly identified acne as the most common indication, while Pal et al. (2018) [7] reported acne in 36.16% and use as a depigmenting cream in 27.30%. Sharma et al. (2024) [11] reported acne in 41%, melasma in 20% and cosmetic skin lightening in 12%. These findings indicate that topical corticosteroids are frequently used for conditions in which they are not indicated and may worsen the underlying disease. Although the indication was not significantly associated with TSDF in the present study (p=0.488), misuse across all indication groups remained clinically important.

Clobetasol propionate was the most commonly used corticosteroid (55.0%), followed by betamethasone (44.0%). Clobetasol use was associated with significantly greater odds of TSDF than betamethasone use (OR: 6.50, 95% CI: 1.70-24.81; p=0.004). Super-potent preparations were used by 55.0% of participants and were associated with almost fourteenfold higher odds of TSDF compared with mild or moderate preparations (OR: 13.87, 95% CI: 2.45-78.50; p=0.003). Sharma et al. (2024) [11] found that mometasone was most frequently misused, followed by clobetasol and betamethasone. Sethi et al. (2022) [10] observed that prolonged use produced progressively more vascular, pigmentary, atrophic and hair-related dermoscopic abnormalities. These findings support the biological relationship between corticosteroid potency, cumulative exposure and facial skin damage.

Fixed-dose combination preparations were used by 65.0% of participants, while 22.0% used a modified Kligman-type regimen. Although preparation type was not independently associated with TSDF, irrational

combinations may conceal the identity and potency of the corticosteroid and encourage prolonged treatment. Jha et al. (2016) [2] reported that 30.2% of patients used corticosteroid, hydroquinone and tretinoin combinations, while 26.3% used corticosteroids combined with antibiotics or antifungals. Such preparations may provide rapid improvement in inflammation or pigmentation, but continued use can cause acneiform eruptions, atrophy, telangiectasia and rebound dermatitis.

The duration of corticosteroid application demonstrated a strong relationship with TSDF. Compared with use for less than three months, use for 3-6 months increased the odds of TSDF more than sevenfold (OR: 7.25, 95% CI: 2.01-26.13; p=0.001). All participants who used topical corticosteroids for more than six months developed TSDF. Participants with TSDF also had a significantly longer mean duration of use than those without TSDF (7.1±5.0 versus 2.9±1.3 months; p<0.001). Sethi et al. (2022) [10] found that the severity and number of dermoscopic abnormalities increased with duration, with characteristic vascular changes becoming more prominent beyond six months. Prolonged exposure results in epidermal thinning, altered dermal collagen, vasodilatation and pilosebaceous changes, explaining the cumulative pattern observed in the present study.

Nonmedical advice or self-medication was reported by 71.0% of participants and was strongly associated with TSDF (OR: 6.95, 95% CI: 2.12-22.81; p<0.001). Only 2.0% obtained the preparation from a dermatologist. Jha et al. (2016) [2] reported that 42.9% purchased topical corticosteroids over the counter, 20.0% received recommendations from friends or relatives and only 10.2% obtained them from dermatologists. Pal et al. (2018) [7] similarly found that pharmacists or shop owners were the leading source of recommendation. Sharma et al. (2024) [11] reported over-the-counter procurement in 63%. Collectively, these findings demonstrate the important role of unrestricted availability, inappropriate dispensing and misinformation from nonmedical sources.

Burning or stinging was the most frequent symptom in the present study, affecting 63.0%, followed by acneiform eruption in 51.0%, facial erythema in 18.0%, pigmentary alteration in 15.0% and hypertrichosis in 12.0%. Manchanda et al. (2017) [4] reported pruritus and acneiform eruptions as the most frequent adverse effects. Pal et al. (2018) [7] observed rosacea-like features and photosensitivity in 29.15% and acne or acne exacerbation in 25.09%. Sharma et al. (2024) [11] found erythema in 42%, acneiform eruptions in 22%, steroid-induced rosacea in 21% and hyperpigmentation in 20%. Differences in clinical patterns may be related to the preparation used, potency, frequency of application, duration of exposure and underlying facial disorder.

Long-term adverse effects were significantly more common among participants using corticosteroids for more than six months. Prolonged users had higher odds of facial erythema (OR: 3.38), burning or stinging (OR: 7.00), perioral dermatitis (OR: 6.42), hypertrichosis (OR: 5.29), telangiectasia (OR: 8.14), cutaneous atrophy (OR: 16.71) and pigmentary alteration (OR: 4.85). Multiple adverse effects were more than four times as likely among prolonged users (OR: 4.60, p=0.003). Meena et al. (2017) [6] documented acne, cutaneous atrophy, rosacea, telangiectasia, pigmentary changes, perioral dermatitis and hypertrichosis among corticosteroid misusers. Sethi et al. (2022) [10] further demonstrated that dermoscopy could reveal vascular dilatation, atrophy and pigmentary abnormalities before all changes became clinically apparent.

Rebound symptoms following withdrawal occurred in 63.0% and were significantly associated with TSDF (OR: 4.29, 95% CI: 1.36-13.52; p=0.008). Among patients using corticosteroids for more than six months, 90.0% experienced rebound symptoms. Lahiri and Coondoo (2016) [1] emphasized that rebound erythema, burning, itching and pustulation can compel patients to restart topical corticosteroids, thereby establishing cutaneous pharmacodependence. The high frequency of withdrawal-related worsening in the present study reinforces the need for supervised discontinuation, appropriate treatment of the underlying dermatosis and counselling regarding temporary rebound symptoms.

Overall, the findings show that topical corticosteroids remained beneficial when selected appropriately for steroid-responsive dermatoses, but potent preparations applied indiscriminately to facial skin produced substantial harm. Education alone may be insufficient unless accompanied by regulation of over-the-counter sales, rational prescribing, pharmacist training and clear labelling of corticosteroid-containing combinations.

Conclusion

Topical corticosteroids are highly effective dermatological medicines when prescribed in the correct potency, dose and duration. However, their unsupervised application on facial skin made them a curse for most patients in this study. TSDF affected 85.0% of participants and was significantly associated with super-potent corticosteroid use, prolonged application, nonmedical advice and rebound symptoms after withdrawal. Acne and cosmetic skin lightening were the principal reasons for misuse, while clobetasol and fixed-dose combinations were commonly used. Burning, acneiform eruptions, erythema, pigmentary alteration, hypertrichosis,

telangiectasia and cutaneous atrophy represented the major adverse effects. Stronger regulation of non-prescription sales, education of pharmacists and non-dermatologist practitioners, public awareness and early dermatological consultation are required to prevent avoidable facial damage.

Limitations

1. The hospital-based study was conducted at a single tertiary-care centre; therefore, the findings may not represent topical corticosteroid use in the general community.
2. The relatively small sample of 100 participants limited the precision of some effect estimates, as reflected by wide confidence intervals.
3. The cross-sectional design established associations but could not prove a temporal or causal relationship between exposure characteristics and TSDF.
4. Details regarding the product, frequency, quantity and duration of application were partly based on patient recall and were susceptible to recall bias.
5. Some participants could not provide the original prescription, tube or package; consequently, misclassification of the active ingredient or potency was possible.
6. Selection bias was possible because patients with more noticeable or severe adverse effects were more likely to attend the dermatology outpatient department.
7. Clinical diagnosis was not routinely supported by dermoscopy, histopathology, microbiological examination or patch testing.
8. Systemic adverse effects and hypothalamic-pituitary-adrenal axis suppression were not evaluated.
9. Psychological dependence, quality of life and treatment outcomes after withdrawal were not measured using validated instruments.
10. Because only a small number of participants were free from TSDF, adjusted multivariable analysis could not be performed reliably.

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