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Topical Steroid Dependent Face: A Cross-Sectional Study From a Tertiary Care Hospital in Northern India

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Abstract

***Background:** Topical corticosteroids (TCS) are commonly used in dermatology for inflammatory skin conditions. However, it's misuse may cause side-effects like pruritus, burning, and acneiform eruptions. This study aims to evaluate the side-effects of TCS misuse over the face and a detailed analysis of various steroids with their resultant side-effect among patients.*

***Method:** This cross-sectional study was conducted in the Department of Dermatology of a tertiary care teaching hospital in Western Uttar Pradesh. It enrolled 150 patients who met the inclusion criteria, with a history of topical steroid misuse on the face. Data was collected through a detailed history, questionnaire, and physical examination, documenting patient demographics, steroid use history, duration, adverse effects, and steroid potency.*

***Results:** In this study, out of 150 patients, the age ranged from 4 to 56 years, among which 114 (76%) were females. The primary reasons for using TCS were acne (30.7%) and hyperpigmentation (28.0%), with betamethasone valerate 0.1% being the most commonly misused steroid (58.7%). Most participants (47.3%) used TCS based on advice from friends or relatives, followed by pharmacists dispensing creams without a prescription. The duration of use varied, with 44% using TCS for less than six months, 10.7% for 6 months to 1 year, 29.3% for 1 to 3 years and 16% for over 3 years. A significant proportion (90%) were unaware of the side-effects and most common side-effects observed were pruritus (63.3%), erythema (58%), burning (52%), and acneiform eruptions (52%).*

***Conclusion:** This study highlights the widespread misuse of topical corticosteroids, often without medical supervision, and a significant lack of awareness about their side-effects among users.*

***Key words:** Topical corticosteroids (TCS), misuse, topical steroid damaged face.*

Introduction

The term "Topical Steroid Dependent/Damaged Face" (TSDF), coined in 2008, refers to the skin damage caused by prolonged or excessive use of topical corticosteroids (TCS) on the face, often resulting in semi-permanent or permanent side-effects on the skin. Common components of TSDF include erythema, itching, burning, monomorphic acne, atrophy, rosacea, telangiectasia, perioral dermatitis, striae, hypertrichosis, and pigmentation. The misuse of TCS, particularly on the face, is a significant factor contributing to TSDF, especially in India, where these medications are easily accessible and often used without proper medical guidance. This misuse is frequently exacerbated by unlicensed practitioners and the societal obsession with fairness, leading many to apply corticosteroids for cosmetic purposes. The consequences include not only physical damage but also psychological dependence on the medication due to worsening symptoms upon discontinuation. While TCS are highly effective for treating inflammatory skin conditions, their improper use can lead to severe cutaneous side-effects, particularly in sensitive areas like the face.

Material and Methods

The study was conducted in the Department of Dermatology at a tertiary care teaching hospital in western Uttar Pradesh, between August 2022 and February 2024. The sample size of 150 patients was calculated using Cochran's formula. Following approval from the Institutional Ethics Committee, patients meeting the inclusion criteria were enrolled. Comprehensive histories – including demographics, steroid use, and adverse effects – were recorded. General physical examinations and photographs were taken when indicated.

The study included patients diagnosed with TSDF who had applied topical corticosteroids (TCS) on their face and reported experiencing one or more side-effects related to these agents. Patients who had overused TCS for various conditions for at least one month of continuous application or more than three months of intermittent application on the face were enrolled. Exclusion criteria involved patients diagnosed with TSDF but unable to provide adequate documentation or a reliable history of TCS usage. Also patients with co-morbidities that could cause skin changes

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similar to TCS side-effects, such as polycystic ovary syndrome, Cushing's syndrome, or thyroid disorders were excluded.

Statistical analysis

All data was collected in the case record forms and entered in MS excel sheet and analysed using SPSS 26 operating on windows 10. The demographic data were summarised as frequency, percentage, mean and standard deviation and represented using Tables, Figures, and Pie charts. The association between categorical variables was analysed using Chi-square test. A p-value <0.05 was considered statistically significant.

Results

This study encompassed 150 participants who met the inclusion criteria. The mean age of the study population was 30.15 years (SD = 10.061). Sixty-one participants (40.7%), were in the 21 to 30 years age group, followed by 42 (28.0%) in the 31 to 40 years age group. The youngest participant was 4-years-old and the oldest was 56-years-old. Among them, 114 (76.0%) were females while 36 (24.0%) were males.

Forty-three (28.7%) patients had education up to the 10th grade, followed by 37 (24.7%) who completed graduation. Uneducated individuals and those with education up to the 8th and 12th grades made up 21 (14%), 18 (12%), and 22 (14.7%) of the sample, respectively.

The most common reason for TCS application was acne, observed in 46 patients (30.7%), followed by hyperpigmentation in 42 (28.0%). Twenty-five participants (16.7%) used it for itching, 18 (12.0%) as a general face cream, 16 (10.7%) for fungal infections, and 3 (2.0%) for hypopigmentation, as shown in Fig. 1.

In our study, 123 (82%) participants used creams containing single steroid while 27 (18.0%) participants used multiple steroids over time. Betamethasone valerate 0.1% was the most commonly used steroid, used by 88 patients (58.7%), followed by clobetasol propionate 0.05% in 49 patients (32.7%) and mometasone furoate 0.1% in 38 patients (25.3%). Hydrocortisone and fluticasone were used by 2 (1.3%) and 1 (0.7%) patients, respectively (Fig. 2).

The source of information for TCS misuse were friends or relatives, reported by 71 participants (47.3%), followed by pharmacists in 33 (22.0%) and quacks in 32 (21.3%). Only 7 individuals (4.7%) received recommendations from doctors other than dermatologists, 6 (4.0%) from dermatologists, and 1 (0.7%) obtained the information

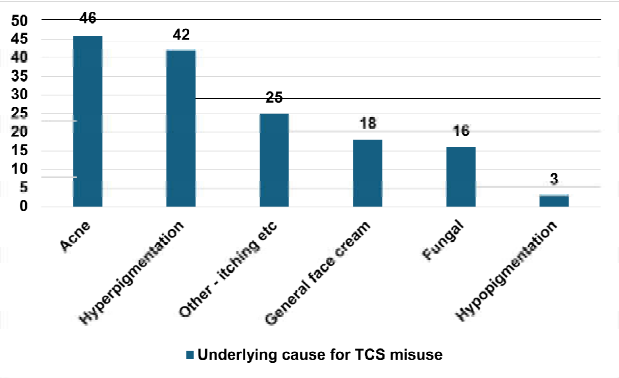

Fig. 1: *Bar graph showing distribution of the underlying cause for TCS misuse.*

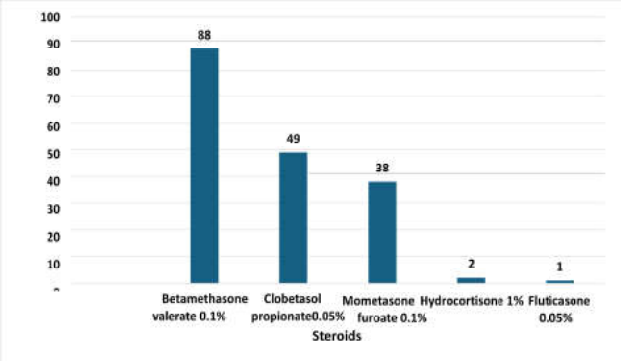

Fig. 2: *Bar graph showing distribution of type of steroids used among the participants.*

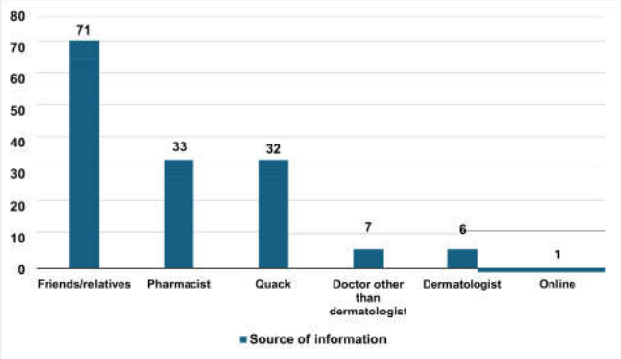

Fig. 3: *Bar graph showing distribution of source of information for TCS.*

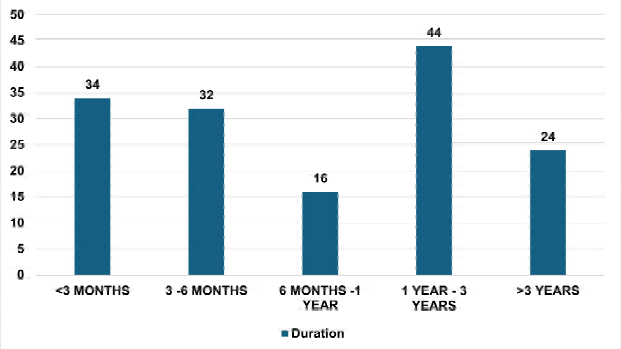

Fig. 4: *Bar graph showing duration of steroids application among participants.*

online as shown in Fig. 3.

Sixty-six (44%) participants used TCS for less than 6 months, 16 (10.7%) for 6 months to 1 year, 44 (29.3%) for 1 to 3 years and 24 (16%) for over 3 years (Fig. 4).

The majority of participants, 119 (79.3%), applied topical corticosteroids once daily, followed by 21 (14.0%) who applied it twice daily. Less frequent usage included 3 (2.0%) twice a week, 5 (3.3%) three times a week, and 2 (1.3%) four times a week.

Fig. 5: *Erythema seen over the cheek due to overuse of betamethasone cream for 6 months.*

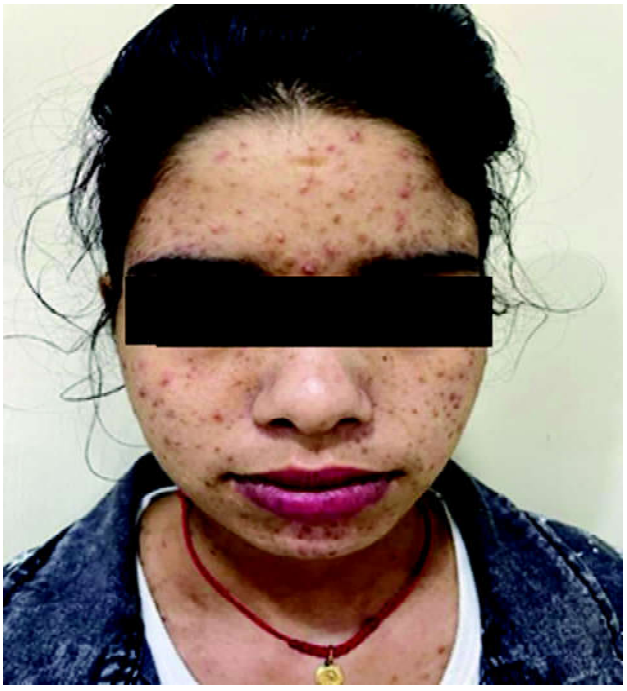

Fig. 6: *Multiple monomorphic papules present over whole face on using mometasone cream for 2 years.*

Fig. 7: *Hyperpigmentation present over bilateral cheeks and chin after using multiple TCS.*

Fig. 8: *Prominent telangiectasia present over cheek and nose after using betamethasone for 3 years*

Thirth-four (22.7%) participants applied TCS only on the lesions while 116 (77.3%) participants applied TCS over whole face.

Out of 150 participants, one hundred and thity-five (90%) were not aware of the side-effects of TCS abuse, while 15 (10%) participants were aware.

The most common side-effect observed was pruritus in 95 participants (63.3%), followed by erythema in 87 (58%), burning sensation and acneiform eruptions in 78 each (52%). Photosensitivity was seen in 71 (47.3%), hyperpigmentation in 46 (30.7%), hypertrichosis in 37 (24.7%), and telangiectasia in 33 (22.0%). Less common effects included hypopigmentation in 5 (3.3%) and atrophy in 3 (2%) (Table I, Figs. 5-9).

Table I: Distribution of side-effects of steroids among the participants.

Side-effect	No. of cases	Percentage (%)
Pruritus	95	63.3
Erythema	87	58
Burning sensation	78	52
Acneiform eruptions	78	52
Photosensitivity	71	47.3
Hyperpigmentation	46	30.7
Hypertrichosis	37	24.7
Telangiectasia	33	22.0
Hypo-pigmentation	5	3.3
Atrophy	3	2

Fig. 9: *Hypertrichosis over the cheeks after application of clobetasol for more than 2 years.*

In this study, we analysed the side-effects reported as per the duration and potency of TCS usage. The participants were divided into two groups based on the duration of their treatment: those who received treatment for less than 6 months and those who received treatment for more than 6 months (Table II, III, IV).

Table II: Distribution of side-effects of betamethasone valerate among participants.

		<6 months	>6 months
	Total	**23**	**21**
Erythema	N (%)	13 (56.50%)	10 (47.62%)
Burning sensation	N (%)	9 (39.10%)	13 (61.90%)
Pruritis	N (%)	14 (60.90%)	13 (61.90%)
Acneiform eruptions	N (%)	15 (65.20%)	8 (38.10%)
Telangiectasia	N (%)	5 (21.70%)	3 (14.29%)
Atrophy	N (%)	2 (8.70%)	0 (0.00%)
Hyperpigmentation	N (%)	7 (30.40%)	5 (23.81%)
Hypopigmentation	N (%)	0 (0.00%)	1 (4.76%)
Photosensitivity	N (%)	7 (30.40%)	9 (42.86%)
Hypertrichosis	N (%)	2 (8.70%)	6 (28.57%).

Table III: Distribution of side-effects of clobetasol propionate among participants

		<6 months	> 6 months
	Total	**13**	**15**
Erythema	N (%)	9 (69.20%)	8 (53.33%)
Burning sensation	N (%)	6 (46.20%)	10 (66.67%)
Pruritis	N (%)	8 (61.50%)	11 (73.33%)
Acneiform eruptions	N (%)	5 (38.50%)	10 (66.67%)
Telangiectasia	N (%)	1 (7.70%)	4 (26.67%)
Hyperpigmentation	N (%)	3 (23.10%)	6 (40.00%)
Hypopigmentation	N (%)	1 (7.70%)	0 (0.00%)
Photosensitivity	N (%)	5 (38.50%)	8 (53.33%)
Hypertrichosis	N (%)	4 (30.80%)	4 (26.67%)

Table IV: Distribution of side-effects of mometasone furoate among participants

		<6 months	> 6 months
	Total	**6**	**14**
Erythema	N (%)	4 (66.70%)	10 (71.43%)
Burning sensation	N (%)	2 (33.30%)	7 (50.00%)
Pruritis	N (%)	4 (66.70%)	4 (28.57%)
Acneiform eruptions	N (%)	2 (33.30%)	4 (28.57%)

Telangiectasia	N (%)	0 (0.00%)	5 (35.71%)
Atrophy	N (%)	1 (16.70%)	0 (0.00%)
Hyperpigmentation	N (%)	0 (0.00%)	5 (35.71%)
Photosensitivity	N (%)	3 (50.00%)	6 (42.86%)
Hypertrichosis	N (%)	1 (16.70%)	5 (35.71%)

Discussion

Topical steroid-dependent face is a significant concern warranting thorough discussion and investigation. Our study reveals widespread misuse of topical corticosteroids, evident from the significant number of patients experiencing related side-effects.

We enrolled 150 patients aged 4 to 56 years, with a mean age of 30.15 years. The 21 - 30 years age group was most common, comprising 40.7% of the participants. Bains *et al*[1] also reported the most common age group was 21 - 30 years with 49% patients. This suggests that the younger population is more attentive to their appearance, leading them to be more vulnerable to misusing topical steroids in pursuit of aesthetic enhancement.

Majority of patients were educated, with most having completed up to the 10th grade or graduation. This highlights that misuse of topical corticosteroids (TCS) was prevalent even among the educated population, indicating a lack of awareness despite higher educational status.

The most common reasons for topical steroid use in the study were acne (30.7%), hyperpigmentation (28%), and itching (16.7%). Similar studies by Manchanda *et al*[2] and Swaroop *et al*[3] also found acne to be the leading cause.

One hundred and twenty four participants had used a single topical steroid while 26 participants used multiple steroids of different potencies. Betamethasone valerate 0.1% was the most commonly used steroid (58.7%), followed by clobetasol propionate 0.05% (32.7%) and mometasone furoate 0.1%(25.3%). Similar studies by Bains *et al*[1], Jain *et al*[4], and Kakroo *et al*[5] also found betamethasone valerate 0.1% and clobetasol propionate 0.05% to be the most frequently misused. In contrast, in a study conducted in Saudi Arabia, noted mometasone furoate 0.1% as the most commonly used steroid[6].

47.3% of patients used TCS based on advice from their friends and relatives. Other sources included pharmacists (22%), unqualified medical practitioners/quacks (21.3%) and non-dermatology doctors (4.7%) (Fig. 3). Similar findings in studies by Mahar *et al*[7], Saraswat *et al*[8], and Kakroo *et al*[5] confirmed that friends, family, and pharmacists were the primary sources of misuse.

The most common duration of TCS usage was 1 - 3 months (22.7%), with 21.3% using it for 3 - 6 months. This is consistent with Bains *et al*[1] findings, but differs from Ambika *et al*, where the average duration ranged from 6 months to 1 year, with some cases lasting up to 8 years.

90% of the participants were unaware of the side-effects while 10% of participants were aware about the potential side-effects of topical corticosteroids (TCS) but proceeded with their usage, suggesting that their persistence in seeking a desirable appearance might have overshadowed their awareness of associated risks.

The most common adverse effects were pruritus (63.3%), erythema (58%), and burning sensations (52%), followed by acneiform eruptions (52%) and photosensitivity (47.3%). Similar studies by Manchanda *et al*[2] and Nyati *et al*[10] reported acneiform eruptions, erythema, and photosensitivity as common side-effects. Other studies, like those by Kakroo *et al*[5] and Mahar *et al*[7], found tinea incognito and acne to be predominant adverse reactions.

In our study, we analysed the side-effects of frequently abused TCS which were – betamethasone, clobetasol propionate 0.05%, and mometasone furoate 0.1% – with respect to their potency, duration of use, and occurrence of cutaneous side-effects. Hydrocortisone and fluticasone were excluded from this analysis due to their lower usage and insufficient sample size. Patients who applied a single TCS once daily were included in the analysis.

For simplification, we classified side-effects as early and late. Side-effects resulting from steroid misuse within a period of less than six months were considered as early side-effects, whereas those arising after a period exceeding 6 months were considered as late side-effects.

In our study, among patients utilising betamethasone valerate 0.1%, the most significant early side-effect seen was acneiform eruptions. While the most significant late side effects observed were hypertrichosis and burning sensation. Among patients using clobetasol propionate 0.05%, the most common late side-effects observed were acneiform eruption, burning sensation, telangiectasia. Among patients using mometasone furoate 0.1%, the predominant early side-effect seen was pruritus while late side-effects observed were hypertrichosis, telangiectasia, and hyperpigmentation.

This detailed analysis and its findings are unique features of our study as we could not find a similar analysis in any other Indian studies on TSDF. In our study, there was no significant correlation found between potencies of the steroid used and resultant cutaneous side-effects. All potencies resulted in pruritus, erythema, telangiectasias, acneiform eruptions and others. However, some correlation between the duration of steroids usage and appearance of side-effects

was observed with respect to the different potencies of TCS.

Conclusion

The study highlights the widespread misuse of topical corticosteroids, particularly among individuals aged 21 - 30 years, with a higher prevalence in females. Acne was the most common reason for steroid use, with betamethasone valerate 0.1% being the most commonly misused steroid. Many patients obtained TCS without proper medical guidance, relying on friends and family for advice. Awareness of potential side-effects was low, and adverse reactions such as pruritus and erythema were common, with side-effect profiles varying based on the steroid type. The study calls for increased public awareness, health care provider education, and stricter regulation of TCS availability, along with further research on mitigating adverse effects and promoting safe usage.

Limitations

While this study provides valuable insights into the misuse of topical corticosteroids and their associated side-effects, it has a few limitations. Recall bias may have influenced the accuracy of self-reported data, as participants might not accurately remember or report their steroid usage history. Additionally, grading of the severity of side-effects was not performed, which could have offered more nuanced insight into the clinical impact. Correlation with dermoscopic findings was also not done, which might have strengthened the clinical observations with objective evidence.

Declaration of patient consent

The authors confirm that all necessary patient consent forms have been obtained. In these forms, the patient(s) have granted permission for their images and other clinical information to be included in the journal. The patients are aware that their names and initials will not be disclosed, and every effort will be made to protect their identity, although complete anonymity cannot be assured.

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