



## CUTANEOUS ADVERSE EFFECTS OF TOPICAL CORTICOSTEROIDS ABUSE: A CROSS-SECTIONAL STUDY

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### ABSTRACT

Topical corticosteroids are the commonly prescribed drug in dermatological outpatient settings. Wrong use of topical corticoids, leading to cutaneous side effects has been a subject of interest for the dermatologists. It is a hospital based observational cross-sectional study including 370 patients with history and signs suggestive of topical corticosteroid abuse, presenting to the outpatient department of dermatology in a tertiary care hospital. Out of the 370 patients included in the study, the most common indication for which topical steroids were abused was various cutaneous infections followed by various pigmentary concerns. Clobetasol propionate of strength 0.05% was the most commonly abused topical steroid and face was the most usual region of application. The most usual side effect noted in our research was erythema followed by cutaneous atrophy. With the development of this miracle drug, comes exploitation, in turn resulting in avoidable adverse effects. Therefore, it is of utmost importance that consistent steps be taken against the misuse and exploitation of topical corticosteroids through edification of the general community, medical and para-medical personnel and pharmacists and by discouraging over-the-counter dispense of topical corticoids.

**KEYWORDS :** Topical corticosteroids, Cutaneous, Adverse, Effects

### INTRODUCTION

Corticosteroids are a significant class of naturally arising and synthetic steroid hormones that affect practically every facet of human physiology. They make a common part of our prescriptions, either in physiological doses or for pharmacological therapy.<sup>1</sup>

It is considered to be a significant point in the history of treatment of various dermatological disorders with the introduction of topical corticosteroids in 1952 by Sulzberger and Witten.<sup>2,3</sup> They were considered as a solution for all ills by doctors and patients and gathered rapid popularity.<sup>4</sup> This event in history was gradually followed with the introduction of variety of newer topical corticosteroid molecules of varying strength making the treatment of various dermatological disorders more effective and less time consuming.<sup>2</sup> Availability of variety of formulations and potency gives flexibility to treat different group of patients, diverse stages of ailments, and diverse regions of body.<sup>5</sup> But after this initial period of honeymoon the unfavorable properties of topical corticoids gradually become evident.<sup>6</sup>

Because of their bleaching and anti-inflammatory effect, they have been abused commonly.<sup>7</sup> They are abused for several reasons such as acne vulgaris, melasma, fungal infection, pruritus, and also as a cosmetic or a skin cream for any type of rash.<sup>8</sup> Cutaneous adverse effects, unlike systemic ones, are more frequent and include atrophy, striae, telangiectasia, purpura, erythema, perioral dermatitis, rosacea, acne, rebound erythema, steroid addiction, topical steroid dependent face, hypo pigmentation, hypertrichosis, photosensitization, milia, tinea incognito, contact dermatitis, and tachyphylaxis.<sup>3</sup>

Over the years, it has become evident that topical corticosteroids are being misused by general physicians, patients and even dermatologists.<sup>5</sup> This is because of the quick relief of symptoms of many skin diseases by the application of topical corticosteroids in the first instance and also due to their easy obtainability without a prescription at a very cheap price.<sup>10</sup>

This very usefulness of topical corticosteroids has now become a double-edged sword.<sup>2</sup> Thus, as a dermatologist, the accountability lies on us, for whom these medicines are a strong weapon to fight many skin diseases, to correctly educate the society about ethical and rational usage of topical corticoids including our non-dermatological medical

fraternity.<sup>5</sup> Wrong use of topical corticoids has been a subject of interest for the dermatologists. However, limited literature is available on this focus in India as well as abroad. Hence this study aims to learn the cutaneous manifestations by Topical glucocorticoids in the region of Western Uttar Pradesh.

### Methodology

This is a hospital based observational cross-sectional study carried out in Outpatient Department of Dermatology, Venereology and Leprosy, Rohilkhand Medical College and Hospital, Bareilly, U.P from November 2019–October 2020.

Minimum of 370 patients was studied according to the sample size formula for descriptive clinical study in finite population i.e.,  $N = 4pq/l^2$

### Inclusion Criteria:

1. Those who are consenting for the study.
2. Patients of all ages and both sexes presenting with cutaneous adverse effects of topical corticosteroid application.
3. Wrong indication, undiagnosed dermatoses, inappropriate potency or more than one month use after the last consultation are criteria used to define inappropriate or unjustifiable use (abuse).

### Exclusion Criteria:

1. Patients with pre-existing co-morbidities that could resemble or cause changes similar to the side effects caused by the application of topical corticosteroids (example- Cushing's syndrome, thyroid disorders, polycystic ovary disease);
2. Patient on systemic corticosteroids

An informed consent was taken from patient/ guardian. The studied variables included demographic data, indication for primary use, details about the exploited topical corticosteroid, source of recommendation of use, and the related symptoms and signs suggestive of topical steroid abuse. Data collected was analyzed, using descriptive statistical methods like mean, standard deviation, percentage analysis and was displayed using appropriate graphs and charts.

### RESULTS

In the present study, age of the patient ranged from 5 years to 78 years with a mean of 31.06 years. Majority i.e., 164 patients were in the age group of 16 – 30 years, constituting 44.32% of the total. Out of the 370 patients, 230 patients (62.16%) were

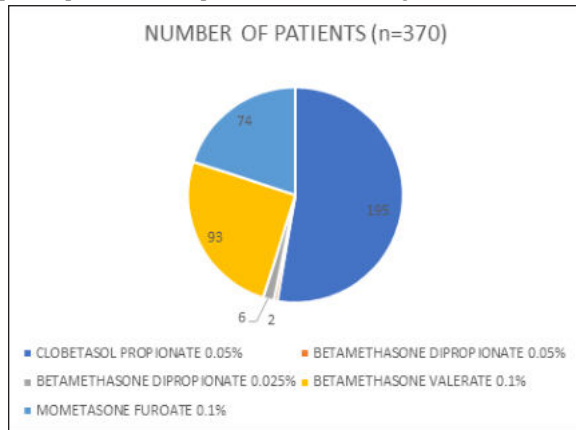
males and 140 (37.83%) were female patients; equating the male: female ratio to 1.6:1. Illiteracy was noted in 35.94% of patients. 162 patients (43.78%) belonged to the rural areas whereas maximum number of the patients i.e., 208 (56.21%) belonged to urban areas.

Majority of the patients, i.e., 172 patients, exploited the concerned product for various infections (46.48%). 134 patients had used various topical corticosteroid-based products for various pigmentary issues (36.21%), mostly as a fairness cream. 43 patients (11.62%) were applying them for acne vulgaris. 12 patients (3.24%) give history of using them for specific dermatological conditions such as psoriasis and lichen planus and 9 patients (2.43%) were using them as a routine moisturizer (Table 1).

**Table 1: Primary Indication Of Use Of Topical Corticosteroid Containing Product By The Study Group**

INDICATIONS	NUMBER OF PATIENTS N = 370	PERCENTAGE (%)
<b>Infections</b>	172	46.8
Fungal mainly dermatophytic infection	155	90.11
Viral – warts, molluscum contagiosum	8	4.65
Parasitic – scabies	7	4.06
Bacterial – folliculitis, furuncle	2	1.16
<b>Pigmentary issues</b>	134	36.21
As a fairness cream	68	50.74
Hypo-pigmentary disorders (vitiligo)	2	1.49
Hyper-pigmentary disorders (freckles/melasma)	64	47.76
<b>Acne vulgaris</b>	43	11.62
<b>Specific dermatological conditions (psoriasis/lichen planus)</b>	12	3.24
<b>Other (routine moisturizer)</b>	9	2.43

Most patients, i.e., 195 patients (52.70%), revealed using clobetasol propionate of strength 0.05%, and classified as potency class I (ultra-potent) as shown in figure 1.



**Figure 1: About The Exploited Topical Corticosteroid**

Face was the most common region of application, accounting for 294 patients (79.45%), followed by lower limb especially groins in 75 patients (20.27%), trunk in 26 (7.02%), and upper limbs in 24 patients (6.48%). Period of application ranged from 1 weeks to > 1 year. Most patients, i.e., 132 patients had applied the product for the period of < 1 month (35.67%). Maximum patients had applied the concerned product twice daily (52.16%), with 61.89% of patients using them intermittently. Quantity of the topical corticoid used mainly ranged between one to two fingertip unit (60.27%).

The source of reference for topical corticosteroid usage for varied reasons was revealed to be non-allopathic doctors in 42.16% of cases, followed by friends/relatives in 24.05%, medical store in 18.10%, non-dermatologist allopathy doctors in 7.29% cases, beautician in 3.24%, dermatologists prescribing the use for unrelated dermatoses in 2.70% cases, TV/newspaper in 1.89% and through other sources in 0.54%.

In the present research work, the pattern of cutaneous adverse effects induced by topical corticoids was studied under 10 sub-headings. Many patients had > 1 cutaneous sign at the time of examination. The most usual side effect noted in our research was erythema in 68.91%, followed by cutaneous atrophy in 45.67%, exacerbation of infection in 44.86%, followed by acneiform eruptions on the upper body in 42.43%, hypertrichosis in 38.91%, telangiectasia in 29.45%, pigmentary changes in 27.02%, and xerosis and milia formation in 23.78%. (Table 2)

**Table 2: Incidence Of Cutaneous Adverse Effects Of Topical Corticosteroids In Our Study**

SIGNS	NUMBER (n = 370)	% OF SIGNS *
ERYTHEMA	255	68.91
ACNEIFORM ERUPTIONS	157	42.43
TELANGIECTASIA	109	29.45
CUTANEOUS ATROPHY	169	45.67
HYPERTRICHOSIS	144	38.91
HYPER/HYPO/DE - PIGMENTATION	100	27.02
PERI-ORAL DERMATITIS	4	1.08
AGGRAVATION OF INFECTIONS (FUNGAL, BACTERIAL, VIRAL, PARASITIC)	166	44.86
CONTACT DERMATITIS	13	3.51
OTHERS (XEROSIS, MILIA)	88	23.78

\* MORE THAN ONE SIGN WAS OBSERVED IN MOST OF THE PATIENTS



**Figure 2: Erythema With Telangiectasia**      **Figure 3: Steroid Induced Striae**      **Figure 4: Tinea Incognito**



**Figure 5: Aggravation Of Molluscum Contagiosum**      **Figure 6: Disseminated HPV infection (plane warts)**      **Figure 7: Aggravation of sycosis barbae**



**Figure 8: Acneiform eruptions**      **Figure 9: Hypertrichosis**

**DISCUSSION**

The present work has been done to witness the clinical pattern and relative frequency of cutaneous harmful effects of topical corticoids, and correlating it with literature in India and with similar studies conducted in other countries.

In the current research work, the patient's age ranged from 5 years to 78 years. The most usual age group affected was between 16 and 30 years with 31.06 years being the mean age. Edith Nnoruka in his study reported the mean age of 29.0 +/- 11.8 years, which was comparable with our study.<sup>11</sup> However, in research by Anup K Mishra and Devesh Saraswat, a slightly higher mean age of 32.3 years was observed.<sup>12</sup> In current research work, of 370 patients, 230 patients (62.16%) were males and 140 patients (37.83%) were females, equating the male to female ratio to 1.6:1. While, Dey VK (2014) reported that maximum patients in his study were females, i.e., 78.89%.<sup>13</sup> However, Anup K Mishra and Devesh Saraswat (2016) on topical corticoid misuse in dermatology reported a slight male predominance (57%) which is in accordance to the current research.<sup>12</sup>

In current study, the primary indication of steroid use was classified into the following categories: infections, pigmentary issues, acne vulgaris, specific dermatological conditions like psoriasis vulgaris, lichen planus and other, for instance, as a routine moisturizer. A similar assessment of reasons for use of topical corticoids was conducted by Vivek Kumar Dey and Naina Jain et al in their studies as shown in the following table. (Table 3)

**Table 3: Comparison Of Primary Indication Of Use**

S. NO.	INDICATIONS	PRESENT STUDY (%)	VIVEK KUMAR DEY <sup>13</sup> (%)	NAINA JAIN ET AL <sup>14</sup> (%)
1.	INFECTIONS:	46.8	23.73	30.66
A.	FUNGAL: DERMATOPHYTIC, CANDIDIASIS	41.89	14.77	27.66
B.	VIRAL - WARTS, MOLLUSCUM CONTAGIOSUM	2.16	-	00.66
C.	PARASITIC - SCABIES	1.89	3.95	02.00
D.	BACTERIAL - FOLLICULITIS, FURUNCLE	0.54	2.90	00.33
2.	ACNE VULGARIS	11.62	17.94	39.66
3.	PIGMENTARY CONCERNS:	36.21	76.24	20.66
A.	AS A FAIRNESS CREAM	18.37	50.39	06.33
B.	VITILIGO	0.54	-	00.33
C.	MELASMA, FRECKLES	17.29	25.85	14.00
3.	SPECIFIC DERMATOLOGICAL CONDITIONS - PSORIASIS, LICHEN PLANUS	3.24	-	02.00
4.	OTHER - ROUTINE MOISTURIZER	2.43	7.91	07.00

The inappropriate usage of topical corticoids was observed involving various parts of the body, with majority applying it on the face (79.45%) in the current research work for varied concerns, for example, for melasma/freckles, or as a fairness cream or for tinea faciei. Usually, other referred studies are also on the evaluation of wrongful use of topical corticoids on the face, such as, research work by Saraswat A et al, Bhat Y J et al.<sup>15,16</sup> While, largely, research conducted in India highlighted the misuse on the face, Edith Nnoruka study noted application of topical corticoids as depigmenting agent all over the body

in 81.3% of cases, while 18.7% applied them directly to the face only.<sup>11</sup>

Clobetasol propionate 0.05% was the most abused corticosteroid by the patients in the present study (52.70%) which is contrary to the data provided by Vivek Kumar Dey (34.83%) and Abir Saraswat et al (58.9%) where betamethasone valerate 0.1% was the most abused topical corticosteroid.<sup>13,15</sup> In an attempt to trace the source of advice for the unsuitable use of topical corticosteroids, it was found that in our study, the most common source arose from non-allopathic doctors, constituting about 42.16% of the total. However, according to Ammar F. Hameed, the major centers for dispensing the topical corticoids inaptly were beauty parlors (34%) and within family or neighborhood (36%) as reported by Naina Jain et al.<sup>11,14</sup>

As per the present study, erythema was the most common adverse effect noted with topical corticosteroid abuse (68.91%). But, according to study by Anup K Mishra and Devesh Saraswat in 2016, aggravation of infections was the most common adverse effect (44.3%), and acneiform eruptions (37.99%) as per study by Vivek Kumar Dey in 2014.<sup>12,13</sup> According to study by Naina Jain et al (2020), hypertrichosis was the most common side effect noted (49.33%).<sup>14</sup>

**CONCLUSION**

Corticosteroids, both topical and systemic, remains the mainstay treatment modalities in many dermatological conditions and have been a dominant portion of our prescriptions. Topical corticoids have acted like an elixir in the therapy of numerous dermatological conditions.

However, with the development of this miracle drug over time, comes exploitation, in turn resulting in avoidable adverse effects. Therefore, it is of utmost importance that consistent steps be taken against the misuse and exploitation of corticosteroids, particularly through edification of the general community, medical and para-medical personnel and pharmacists and by discouraging over-the-counter dispense of topical corticoids, especially as beauty products.

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