

Optimization of Topical Glucocorticoid Therapy: A Prospective Observational Study Evaluating Formulation, Potency, and Clinical Outcomes in a Tertiary Care Hospital

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ABSTRACT

Background: Dermatological disorders contribute significantly to global morbidity and often require prolonged management. Topical glucocorticoids are widely used as first-line therapy, with treatment outcomes influenced by both formulation and pharmacological potency.

Objective: To evaluate the prescribing pattern of topical glucocorticoids with respect to formulation, potency, and associated clinical outcomes in a tertiary care setting.

Methods: A prospective observational study was conducted in the dermatology outpatient department of a tertiary care hospital. A total of 303 prescriptions containing corticosteroids were analyzed. Data were evaluated using descriptive statistics, and the Chi-square test was applied to assess the association between diagnosis and potency selection.

Results: Creams and ointments were the most frequently prescribed formulations. Very high potency corticosteroids accounted for 48.2% of prescriptions, followed by high potency agents (36.3%). Good to excellent clinical improvement was observed in 79.2% of patients. Adverse effects were not reported in 51.8% of cases, while skin atrophy was the most common adverse event. A statistically significant association was found between dermatological diagnosis and potency selection ($p < 0.05$).

Conclusion: Topical glucocorticoids demonstrate high therapeutic effectiveness; however, rational selection of potency and formulation is essential to optimize clinical outcomes and minimize adverse effects.

Keywords: Topical corticosteroids, Drug utilization study, Dermatology, Potency, Formulation.

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Introduction

Skin disorders are among the most prevalent health conditions globally and contribute substantially to the overall burden of disease.¹ These conditions often result in chronic discomfort, cosmetic concerns, and reduced quality of life. In India, dermatological diseases constitute a significant proportion of outpatient visits, particularly in tertiary care settings where more complex cases are managed.²

Topical glucocorticoids are widely used in dermatology due to their potent anti-inflammatory, immunosuppressive, and antiproliferative effects. These actions are mediated through interaction with intracellular glucocorticoid receptors, leading to modulation of gene expression and suppression of inflammatory pathways.^{3,4} Owing to these properties, they are considered first-line therapy for many inflammatory and immune-mediated skin disorders.

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The effectiveness of topical corticosteroids depends not only on their pharmacological potency but also on the formulation used. The vehicle plays a crucial role in determining drug penetration through the skin barrier. Ointments enhance absorption due to their occlusive nature, whereas creams are generally preferred for their cosmetic acceptability and patient compliance.^{5,6}

Despite their therapeutic benefits, inappropriate use of topical corticosteroids, particularly prolonged application of high-potency agents can lead to adverse effects such as skin atrophy, telangiectasia, and steroid-induced dermatoses.^{7,8} Therefore, rational prescribing based on clinical indication is essential.

Drug utilization studies provide valuable insight into prescribing trends and help identify deviations from rational therapy.⁹ Previous studies have reported variability in prescribing patterns, including frequent use of high-potency corticosteroids in dermatological practice.¹⁰⁻¹¹

The present study was undertaken to evaluate the utilization pattern of topical glucocorticoids with emphasis on formulation, potency, and clinical outcomes in a tertiary care setting.

Materials and Methods

A prospective observational study was conducted in the dermatology outpatient department of a tertiary care teaching hospital.

A total of 303 prescriptions containing topical corticosteroids were included. Patients of all age groups receiving corticosteroids for dermatological conditions were considered. Patients unwilling to participate in the study, Patients not prescribed glucocorticoids and Incomplete or unclear prescriptions were excluded from the study.

Data Collection

- Dermatological diagnosis
- Formulation prescribed
- Potency classification
- Therapeutic response
- Adverse effects

Potency classification was based on standard dermatological guidelines [5].

Statistical Analysis

Data were analyzed using SPSS version 26. Descriptive statistics were used to summarize the data. The Chi-

square test was applied to assess associations between variables, with $p < 0.05$ considered statistically significant.

Ethical Considerations

Prior to the initiation of the study, **ethical clearance** was obtained from the **Institutional Ethics Committee (IEC)** of Shri B.M. Patil Medical College Hospital and Research Centre, Vijayapura (IEC Approval No: BLDE (DU)/IEC-SBMPMC/014/2023-24). All participants were informed about the purpose and nature of the study. Written informed consent were obtained from each participant before data collection. Confidentiality of patient data were strictly maintained, and no identifying information were disclosed in any report or publication.

Results

A total of 303 prescriptions were analyzed.

Pattern of Commonly Prescribed Corticosteroids

Among individual corticosteroids, clobetasol propionate was the most frequently prescribed drug, accounting for 42.9% of cases. This was followed by mometasone furoate (13.9%) and betamethasone dipropionate (12.9%). Moderate use of triamcinolone acetonide (7.9%) and hydrocortisone (6.9%) was observed, while other corticosteroids collectively constituted 15.5% of prescriptions. The predominance of potent agents reflects the prescribing trends in a tertiary dermatology clinic (Table 1, Figure 1).

Table 1: Commonly prescribed corticosteroids (n = 303)

Corticosteroid	Number (n)	Percentage (%)
Clobetasol Propionate	130	42.9
Mometasone Furoate	42	13.9
Betamethasone Dipropionate	39	12.9
Triamcinolone Acetonide	24	7.9
Hydrocortisone	21	6.9
Others	47	15.5
Total	303	100

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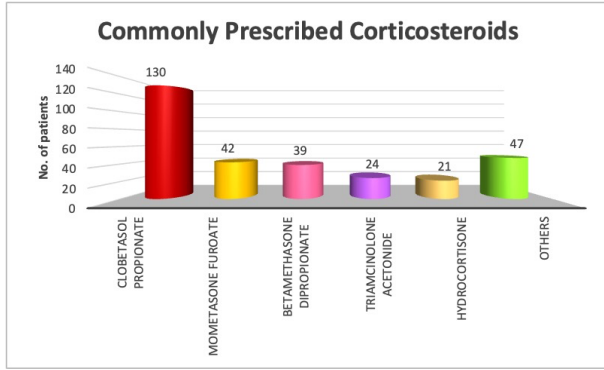


Figure 1: Distribution of commonly prescribed corticosteroids

Formulation Pattern of Corticosteroids Prescribed

Evaluation of corticosteroid formulations showed that creams were the most commonly prescribed dosage form, accounting for 42.2% of prescriptions. Ointments followed closely at 39.6%, indicating frequent use in chronic or lichenified dermatoses. Lotions constituted 13.2% of prescriptions, likely preferred for hairy or large surface areas. Oral tablet formulations were prescribed in 5.0% of cases. This distribution reflects appropriate selection of formulations based on lesion characteristics and anatomical considerations (Table 2, Figure 2).

Table 2: Formulation of corticosteroids prescribed (n = 303)

Formulation	Number (n)	Percentage (%)
Cream	128	42.2
Ointment	120	39.6
Lotion	40	13.2
Tablets	15	5.0
Total	303	100

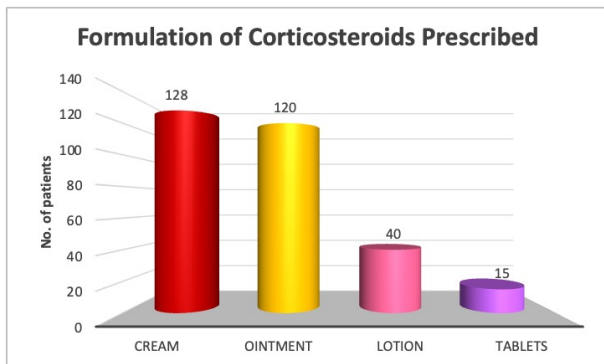


Figure 2: Formulation-wise distribution of corticosteroids prescribed

Potency-wise Distribution of Corticosteroids

Potency-wise analysis demonstrated predominant use of high and very high potency corticosteroids. Very high potency agents constituted the largest share at 48.2%, followed by high potency corticosteroids at 36.3%. Low and medium potency steroids accounted for 10.2% and 5.3% of prescriptions, respectively. This pattern suggests frequent management of moderate to severe inflammatory dermatoses in the tertiary care setting, while also indicating a tendency toward prescribing potent agents (Table 3, Figure 3).

Table 3: Potency-wise distribution of corticosteroids prescribed (n = 303)

Potency	Number (n)	Percentage (%)
Low	31	10.2
Medium	16	5.3
High	110	36.3
Very High	146	48.2
Total	303	100

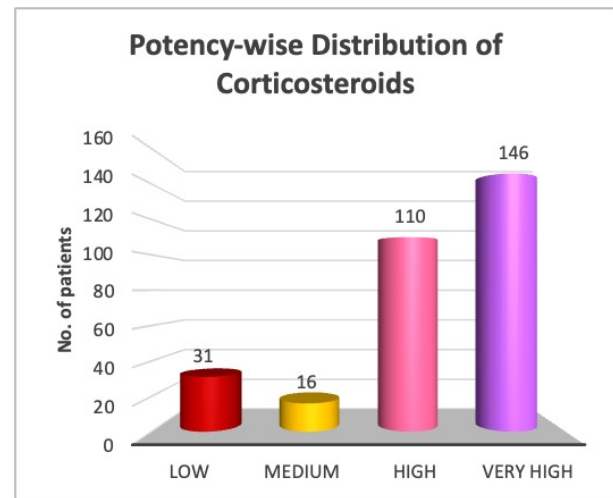


Figure 3: Potency-wise distribution of corticosteroids prescribed

Therapeutic Response to Corticosteroid Treatment

Assessment of therapeutic response demonstrated favorable outcomes in a majority of patients receiving corticosteroid therapy. Excellent response, defined as greater than 75% improvement, was observed in 39.3% of patients, while a good response (50–75% improvement) was noted in 39.9%. Fair response was

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reported in 20.8% of cases. Overall, nearly four-fifths of the study population achieved good to excellent clinical improvement, indicating effective disease control with the prescribed treatment regimens (Table 4, Figure 4).

Table 4: Therapeutic response to corticosteroid therapy (n = 303)

Response Category	Number (n)	Percentage (%)
Excellent (>75%)	119	39.3
Good (50–75%)	121	39.9
Fair (25–50%)	63	20.8
Total	303	100

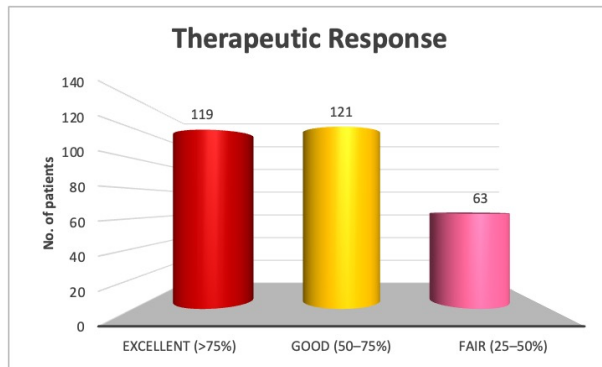


Figure 4: Therapeutic response to corticosteroid therapy

Adverse Effects Associated with Corticosteroid Use

More than half of the patients did not experience any adverse effects during the study period. Absence of adverse events was noted in 51.8% of cases. Among reported reactions, minimal skin atrophy was the most common (16.8%), followed by mild burning sensation (14.9%) and folliculitis (13.9%). Other adverse effects were infrequent, accounting for only 2.6% of cases. Overall, the adverse effect profile was predominantly

mild, suggesting acceptable tolerability of corticosteroid therapy. (Table 5, Figure 5).

Table 5: Adverse effects observed among study participants (n = 303)

Adverse Effect	Number (n)	Percentage (%)
Nil	157	51.8
Mild burning	45	14.9
Skin atrophy (minimal)	51	16.8
Folliculitis	42	13.9
Others	8	2.6
Total	303	100

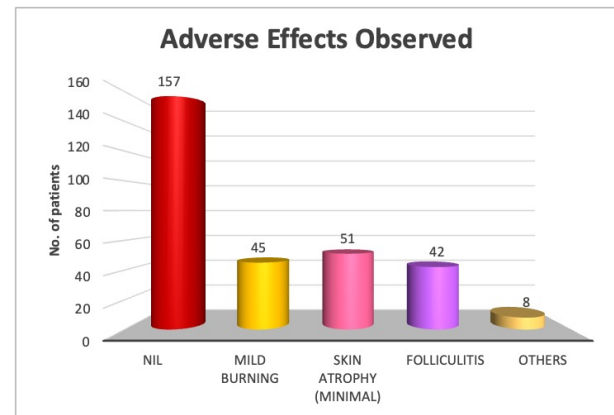


Figure 5: Adverse effects observed among study participants

A statistically significant association was observed between dermatological diagnosis and potency selection ($p < 0.05$). Overall, the prescribing pattern indicates a predominance of higher potency corticosteroids across multiple dermatological conditions.

Discussion

Glucocorticoids remain one of the most frequently prescribed drug classes in dermatology worldwide. Their proven efficacy across a wide range of inflammatory, allergic, and autoimmune dermatoses makes them indispensable in clinical practice. However, the same versatility also leads to frequent misuse, overprescription, and dependence, especially in regions with unregulated access to potent formulations. Numerous studies conducted globally and in India have highlighted significant variability in prescribing trends, reflecting differences in clinical practice patterns,

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socioeconomic context, healthcare systems, and awareness among both prescribers and patients.¹⁷

Globally, dermatological prescriptions involving corticosteroids constitute between 30–60% of all dermatology outpatient encounters.¹⁸ The choice of corticosteroid depends on disease type, site, and duration of therapy. In most developed nations, topical corticosteroids are the mainstay, while systemic corticosteroids are reserved for acute flares of autoimmune or generalized inflammatory disorders such as pemphigus, severe eczema, and erythroderma.

The present study provides a comprehensive evaluation of topical glucocorticoid prescribing patterns and their clinical implications in a tertiary care setting. The predominance of creams and ointments observed reflects routine dermatological practice. Creams are widely preferred due to better cosmetic acceptability and ease of application, particularly for exposed areas. Similar findings have been reported in previous studies.¹² Ointments, although less cosmetically acceptable, enhance drug penetration through occlusion and are useful in conditions requiring deeper absorption.¹³ The relatively lower use of lotions may be explained by the limited proportion of scalp or hairy-area dermatoses in the present cohort.

A key finding of this study is the high utilization of very high potency corticosteroids. Comparable trends have been reported in earlier studies conducted in similar settings.^{11,16} This preference may be attributed to the need for rapid control of symptoms in moderate to severe dermatological conditions. However, such practices necessitate careful monitoring due to the increased risk of adverse effects.

The high rate of good to excellent clinical response observed in this study confirms the effectiveness of topical corticosteroids, consistent with previous reports.¹⁵ At the same time, the occurrence of adverse effects such as skin atrophy highlights the importance of judicious use, particularly with potent agents.^{7,8,14}

The statistically significant association between diagnosis and potency selection suggests that clinicians consider disease characteristics when prescribing corticosteroids. However, the overall trend toward higher potency agents indicates scope for further optimization. Encouraging adherence to treatment guidelines, conducting regular prescription audits, and improving patient education regarding appropriate use can help reduce adverse effects and enhance therapeutic outcomes.

Furthermore, the study supports the need for developing standardized prescribing protocols and reinforces the importance of corticosteroid stewardship in dermatology practice. Future multicentric studies with larger populations and longer follow-up periods are necessary to validate these findings and better understand long-term safety outcomes.

Limitations

This study was conducted in a single tertiary care center and lacked long-term follow-up, limiting generalizability and assessment of delayed adverse effects.

Conclusion

Topical glucocorticoids remain a fundamental component of dermatological therapy due to their proven efficacy in controlling inflammatory skin conditions. The present study demonstrates a predominant use of higher potency corticosteroids, which was associated with favorable clinical outcomes in most patients. However, this prescribing pattern highlights the need for careful selection of potency and formulation to minimize the risk of adverse effects.

The findings emphasize the importance of individualized, guideline-based therapy and rational prescribing practices in routine clinical settings. Furthermore, the study provides useful baseline data that can support the development of standardized treatment protocols and educational interventions. Regular drug utilization audits, reinforcement of standard treatment guidelines, and focused patient education are essential to sustain rational glucocorticoid use and prevent long-term complications.

In summary, while glucocorticoids remain indispensable in dermatology due to their proven efficacy, continuous evaluation of their utilization through structured drug utilization studies is crucial. Such efforts can promote safer prescribing practices, enhance patient outcomes, and support the broader goal of rational pharmacotherapy in dermatological care. Future multicentric studies with long-term follow-up are recommended to further evaluate safety profiles and optimize corticosteroid use in dermatology.

References

1. Hay RJ, Johns NE, Williams HC, et al. The global burden of skin disease in 2010. *J Invest Dermatol.* 2014;134(6):1527–1534.
2. Gangadharan C, Joseph A. Pattern of skin diseases in Kerala. *Indian J Dermatol Venereol Leprol.* 1976;42(2):49–51.

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3. Katzung BG. Basic and Clinical Pharmacology. 15th ed. New York: McGraw-Hill; 2021.
4. Barnes PJ. Anti-inflammatory actions of glucocorticoids. *Clin Sci (Lond)*. 1998;94(6):557–572.
5. Ference JD, Last AR. Choosing topical corticosteroids. *Am Fam Physician*. 2009;79(2):135–140.
6. Bologna JL, Schaffer JV, Cerroni L. *Dermatology*. 4th ed. Philadelphia: Elsevier; 2018.
7. Hengge UR, Ruzicka T, Schwartz RA, Cork MJ. Adverse effects of topical glucocorticosteroids. *J Am Acad Dermatol*. 2006;54(1):1–15.
8. Coondoo A, Phiske M, Verma S, Lahiri K. Side-effects of topical steroids. *Indian Dermatol Online J*. 2014;5(4):416–425.
9. World Health Organization. *Introduction to Drug Utilization Research*. Oslo: WHO; 2003.
10. Axon E, Chalmers JR, Santer M, Ridd MJ, Lawton S, Langan SM, et al. Safety of topical corticosteroids in atopic eczema: an umbrella review. *BMJ Open*. 2021;11(7): e046476.
11. Thadanki M, Kumar CP, Tejaswi M, Baburao R, Charitha K. Drug utilisation evaluation of corticosteroids in tertiary care teaching hospital. *Int J Pharm Sci Res*. 2019;10(3):1468–76. doi:10.13040/IJPSR.0975-8232.10(3).1468-76.
12. Uwase IMA, Ananthi S, Mohanta GP, Kaviyarasan PK. Study on drug utilization pattern in dermatology department, Rajah Muthiah Medical College Hospital, Annamalai University, Tamil Nadu. *Pharma J*. 2019;8(3):45–49.
13. Prausnitz MR, Elias PM, Franz TJ, et al. Skin barrier and transdermal drug delivery. *Nat Rev Drug Discov*. 2008;7(7):615–627.
14. Saraswat A, Lahiri K, Chatterjee M, Barua S, Coondoo A, Mittal A, et al. Topical corticosteroid abuse on the face: a prospective, multicenter study of dermatology outpatients. *Indian J Dermatol Venereol Leprol*. 2011;77(2):160–166.
15. Gupta R, Malhotra P. Prescribing pattern of corticosteroids among dermatology inpatients in a tertiary care teaching hospital of North India: a retrospective, observational study. *Natl J Physiol Pharm Pharmacol*. 2018;8(2):158–162.
16. Narwane SP, et al. Survey of drugs prescribed in department of dermatology of a tertiary care center. *Natl J Physiol Pharm Pharmacol*. 2023;13(11):2442–2449.
17. Haeck IM, de Bruin-Weller MS, Rouwen TJ. Global patterns of topical corticosteroid utilization: A review. *Clin Exp Dermatol*. 2019;44(7):777–785.
18. Smith SD, et al. Patterns of corticosteroid prescribing in dermatology outpatient practice. *Australas J Dermatol*. 2018;59(4):273–279.