

Unmasking the Burden of Topical Corticosteroid Misuse: Clinical Harm, Patient Safety, and Economic Consequences of Self-Medicated Versus Prescribed Use

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ABSTRACT

Background:

Topical corticosteroids (TCS) are commonly used for inflammatory dermatoses, however, when used inappropriately and without supervision, they can lead to substantial cutaneous complications, diagnostic challenges, and cost of healthcare. There is limited evidence comparing the clinical and economic outcomes of self-medicated versus physician-prescribed TCS use.

Objective:

To compare the pattern of TCS use, clinical adverse effects, patient safety outcomes, and economic burden between self-medicated and physician-prescribed TCS users.

Methods:

A comparative cross-sectional observational study was done in the Dermatology Out Patient Department of NIIMS, Greater Noida from June to November 2026. A total of 220 consecutive patients who had been exposed to TCS within the last 6 months were included, with 110 in each of the two groups (self-medicated and physician-prescribed). A structured questionnaire and clinical examination were used to gather data on the potency, duration, frequency, indication, application site, and source of recommendation for TCS. Direct health care costs and work-loss days were also evaluated. The factors independently associated with TCS-related adverse effects were identified by between-group comparisons and multivariable logistic regression.

Results:

Participants who self-medicated had significantly higher inappropriate TCS-use patterns, such as using the TCS for >4 weeks (69.1% vs. 34.5%), potent/very potent corticosteroids (61.8% vs. 35.5%), fixed-dose combinations (51.8% vs. 21.8%), using the TCS ≥ 2 times/day (44.5% vs. 21.8%), and using the TCS without a confirmed diagnosis (57.3% vs. 13.6%) (all $p < 0.001$). The number of self-medicated users who recommended TCS from a pharmacy was 64.5% while physician-prescribed users were 7.3%. The median total direct expenditure was significantly higher in the self-medicated group (INR 3,400 vs. INR 1,900; $p < 0.001$) and the median work lost was also greater (3 days vs. 1 day; $p = 0.002$). Self-medicated TCS use was independently associated with TCS-related adverse effects (AOR 6.4, 95% CI 3.4–12.1; $p < 0.001$) on multivariable analysis. Prolonged use >4 weeks

(AOR 3.1, 95% CI 1.7–5.7; $p < 0.001$) and potent/very potent TCS use (AOR 2.7, 95% CI 1.5–4.9; $p = 0.001$) were also independently associated with adverse outcomes.

Conclusion:

Self-medicated TCS use was correlated with inappropriate treatment patterns, higher risk of cutaneous adverse events, and higher healthcare costs than physician-prescribed use. Improving patient education, responsible dispensing, rational TCS prescribing and timely dermatological assessment can contribute to minimising preventable TCS-related harm and its economic impact.

Keywords: Topical corticosteroids, corticosteroid misuse, self-medication, physician-prescribed use, adverse drug reactions, patient safety, economic burden.

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Introduction

Appropriate use of topical corticosteroids (TCS) is the mainstay of therapy for many inflammatory dermatoses due to their efficacy and favorable therapeutic profile. However, their irrational and uncontrolled use has become a serious public health issue particularly in countries where they are easily available over the counter, fixed dose combinations and recommended by social media and dispensed by pharmacists, encouraging self-medication. This abuse has resulted in an increasing burden of avoidable dermatological morbidity and patient safety concerns. The impacts of wrongful use of TCS are far-reaching[1]. May cause skin atrophy, striae, telangiectasia, acneiform eruptions, rosacea, perioral dermatitis and hypothalamic-pituitary-adrenal axis suppression in susceptible individuals with long-term or excessive use. Steroids modified dermatophytosis (tinea incognito) is of particular concern as it obscures clinical signs, delays diagnosis, encourages recurrence and makes treatment more complex[2]. These complications often mean that treatment is prolonged, patients have to visit health care providers more often, and additional tests and direct costs are incurred. Although inappropriate use of TCS is well documented, most studies have examined prevalence or adverse effects, and have not directly compared the results of self-medicated versus physician-prescribed use. There is limited evidence of clinical harm, patient safety outcomes and economic consequences in these two patterns of use. A comparative assessment is necessary to measure the actual impact of the misuse of TCS in the real world and to inform regulatory policies, pharmacist involvement, and patient education campaigns to ensure rational use of corticosteroids[3,4].

Methods: Study Design and Setting

The present study was a comparative cross sectional observational study conducted in the Dermatology Out Patient Department (OPD), a tertiary care teaching hospital of India for six months from March to August, 2026. The study compared clinical outcomes, patient safety and economic burden of patients who self-medicated with topical corticosteroids to those who were prescribed topical corticosteroids by a physician.

Study Population

Consecutive patients who had applied topical corticosteroid in the past 6 months were screened in the dermatology OPD.

Inclusion Criteria:

Adults aged ≥ 18 years.

Use of topical corticosteroids for any skin disorder in the past six months.

Ability to give informed consent and reliable treatment history.

Exclusion Criteria:

Patients who are unable to recall the information about the medicine.

Those whose cognitive or psychiatric condition is such that they are unable to take part in the interview.

Patients who are not using topical corticosteroid(s) and are using systemic corticosteroid(s) only.

Inadequate clinical or economic information.

Exposure Definition:

The participants were divided into two non-overlapping groups.

Self-medicated group: Participants who started and/or continued topical corticosteroid use without a qualified physician's prescription, such as a prescription from a pharmacist, family member, friend, social media, or previous prescription that was reused without a medical consultation.

Physician prescribed group: People taking the topical steroids as prescribed by a qualified registered medical practitioner and who have a prescription or history of treatment.

Sample Size:

The sample size was determined by the formula for comparing two independent proportions:

$$n = \frac{(Z_{\alpha/2} + Z_{\beta})^2 [p_1(1 - p_1) + p_2(1 - p_2)]}{(p_1 - p_2)^2}$$

A difference in prevalence of adverse events of 20%, a 95% confidence level, 80% power and 10% non-response resulted in a minimum sample size of about 220 participants (110 per group).

Data Collection:

Data was collected using a prevalidated structured questionnaire and standard dermatological examination with trained clinicians conducting the examination. Data on age, sex, educational level, indication for use of TCS, potency, duration, frequency, application site and source of recommendation were collected. The clinical evaluation was focused on the side effects of TCS including skin atrophy, striae, telangiectasia, acneiform eruptions, rosacea, pigmentary changes and steroid modified dermatophytosis. Potassium hydroxide (KOH) examination was done when clinically indicated. Direct costs were defined as out-of-pocket costs for consultations, medicines, investigations and transportation, and indirect costs were estimated from self-reported work-loss days during the treatment episode.

Statistical Analysis

The data were analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY). Continuous variables were tested for normality using the Shapiro-Wilk test and are reported as mean $\pm$ SD or median (IQR) depending on the normality of the data. Categorical variables were presented as frequencies and percentages. Chi-square or Fisher's exact test was used for categorical variables for between-group comparisons. If the variable is continuous: Independent t-test or Mann-Whitney U test. Multivariable logistic regression was used to determine independent predictors of corticosteroid-related adverse outcomes after adjustment for age, sex, education, duration of use, corticosteroid potency and indication. Odds ratios (ORs) were reported after adjustment (Adjusted ORs [AORs]).

Ethical Approval:

The study was approved by the NIIMS Institutional Ethics Committee, Greater Noida (Ref No-NIIMS/IEC/DEC/2025/71) and all procedures followed the Declaration of Helsinki.

Results

The mean age of the subjects in the study was 38.6 $\pm$ 11.2 years. There were 54.1% females and 45.9% males. There were no significant differences between the two groups in terms of age or sex.

Table 1. Baseline characteristics and topical corticosteroid-use pattern

Variable	Self-medicate d (n=110)	Physician- prescribe d (n=110)	p- value
Mean age, years	37.8 $\pm$ 10.7	38.3 $\pm$ 10.6	0.35
Female sex, n (%)	58 (53.6)	61 (54.1)	0.88
Education $\geq$ graduate, n (%)	62 (55.5)	66 (60.9)	0.41
TCS use >4 weeks, n (%)	77 (69.1)	39 (34.5)	<0.001

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Potent/very potent TCS, n (%)	67 (61.8)	38 (35.5)	<0.001
Fixed-dose combination preparation, n (%)	58(51.8)	23(21.8)	<0.001
Application ≥ 2 times/day, n (%)	50 (44.5)	23 (21.8)	<0.001
Use without confirmed diagnosis, n (%)	64 (57.3)	16 (13.6)	<0.001
Pharmacy as source, n (%)	70(64.5)	9 (7.3)	<0.001

Prolonged use of TCS, use of potent/very potent preparations, fixed dose combination creams and frequent application were significantly higher in self-medicated than in physician-prescribed participants.

Topical corticosteroids have not been consistently used.

Inappropriate topical corticosteroid use between self-medicated and physician-prescribed users, illustrated.

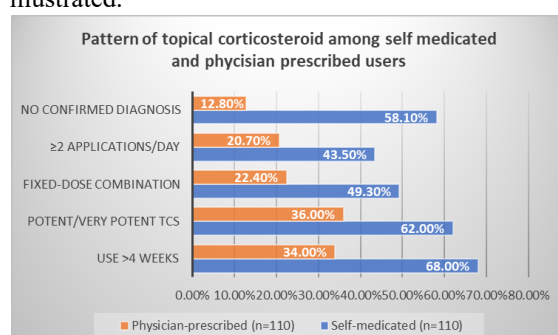


Figure 3. Pattern of topical corticosteroid use among self-medicated and physician-prescribed users. Self-medicated participants demonstrated a higher frequency of prolonged use, potent/very potent corticosteroid use, fixed-dose combination use, frequent application, and use without a confirmed dermatological diagnosis

Table 2. Economic burden and multivariable analysis

Economic outcome	Self-medicated	Physician-prescribed	p-value
Median medication expenditure, INR	1,950	1,050	<0.001
Median consultation/investigation cost, INR	1,700	950	<0.001
Median total direct expenditure, INR	3,400	1,900	<0.001
Median work-loss days	3	1	0.002

Patients who used TCS alone incurred greater direct health care costs and more work-loss days than patients who used TCS prescribed by their physicians. This difference was greater among those with complications related to corticosteroid use. After controlling for age, sex, indication, and other relevant covariates, self-medicated TCS use, duration of use, and potent/very potent corticosteroid use were independently associated with corticosteroid-related adverse effects in multivariable logistic regression. The adjusted odds ratio for self-medicated use was about 6.4 (95% CI: 3.4–12.1; $p < 0.001$) for the development of an adverse effect related to the TCS. The use of potent/very potent corticosteroid was also associated with higher odds of adverse outcomes (AOR 2.7, 95% CI: 1.5–4.9; $p = 0.001$) and prolonged use (> 4 weeks) was independently associated with adverse outcomes (AOR 3.1, 95% CI: 1.7–5.7; $p < 0.001$). In general, the results indicate that the use of unsupervised TCS is associated with greater clinical complications and treatment costs.

Clinical adverse effects of topical corticosteroid use

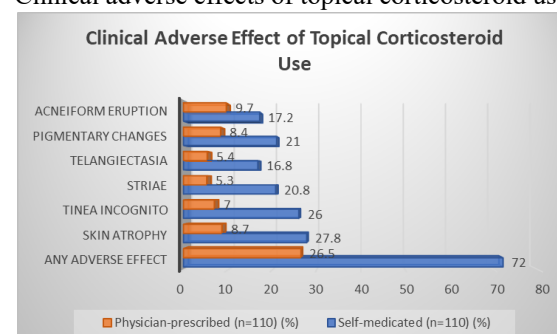


Figure 2. Clinical adverse effects associated with topical corticosteroid use. Self-medicated users demonstrated a higher frequency of overall and individual corticosteroid-related adverse effects compared with physician-prescribed users.

Discussion

The present study reveals a high clinical and economic cost associated with the inappropriate use of topical corticosteroid (TCS), particularly in the case of self-medication. The proportions of prolonged use of corticosteroids, potent or very potent preparations, fixed dose combinations, frequent application, and self-medication without a confirmed dermatological diagnosis were significantly higher in the self-medicated group[5]. In addition to these patterns of inappropriate use, there was a significantly higher rate of adverse effects from corticosteroid use, and higher treatment-related costs. Taken together, these results indicate that the primary issue with TCS misuse is not just the wrong drug, but the wrong potency, duration, frequency and indication[6].

The most obvious clinical difference was that self-medicated users were more likely to have experienced any adverse effect of any corticosteroid than were patients prescribed by a physician. The self-medicated group had a higher prevalence of skin atrophy, tinea incognito, striae, telangiectasia and pigmentary changes[7]. This pattern is clinically probable as repeated use, inappropriate potencies, topical application on inappropriate anatomical sites and exposure for prolonged periods can gradually damage the epidermis and dermis[8]. The high prevalence of tinea incognito is especially significant because the inflammatory reaction of dermatophyte infection may be suppressed by the use of corticosteroids, thereby masking the symptoms of erythema and pruritus, and permitting the underlying infection to continue or progress[9]. This may result in delayed diagnosis, re-infection and extended antifungal therapy. The increased use of potent and very potent corticosteroids by self-medicated participants is an important patient-safety issue. The potency should be determined by diagnosis, anatomical site, severity of the disease, age of the patient and the duration of treatment. Patients might choose a product for perceived quick effect, instead of therapeutic appropriateness, without clinical evaluation. Similarly, repeated and prolonged use of corticosteroid can result in more exposure and/or local side effects. It is also significant that the fixed dose combination group is a group that is used frequently in the self-medicated group. These preparations may contain antibiotics or antifungal drugs and include corticosteroids, and can result in unnecessary antibiotic or antifungal exposure and treatment failure if the diagnosis is incorrect[10].

The high percentage of TCSs used without a dermatological diagnosis was one of the major findings. This emphasises that TCS use is often a diagnostic rather than a pharmacological problem.

There are several inflammatory and infectious dermatoses which may have similar initial symptoms, but have very different treatment. Empiric use of corticosteroid may help to alleviate symptoms but not cure the underlying disease[11]. Dermatophytosis can appear as an unusual clinical presentation after corticosteroid treatment, which results in temporary cure and recurrence. Thus, better access to suitable dermatological diagnosis and better patient counselling might be as significant as limiting access to inappropriate corticosteroids.

The economic burden is another dimension to the clinical burden. The self-medicated participants were more likely to have higher medication expenditure, consultation and investigation costs, and total direct health care expenditure, and more work loss. Self-medication might appear to be a cost saving measure, as it does not involve a visit to a doctor, but if the treatment is incorrect, then there can be downstream costs associated with continuing with the disease, side effects, re-consultations, diagnostic testing, and additional medications. Thus, in the short-term, the convenience of unsupervised TCS use may lead to increased overall health care utilization.

The multivariable analysis also supports the association between use of inappropriate corticosteroid and adverse clinical outcomes. After adjusting for other key exposure factors, self-medicated use was also highly correlated with adverse effects[12]. The use of very potent or potent preparations and the duration of treatment were also associated with higher odds of adverse effects, independently. The findings are clinically significant as they indicate that the excess burden seen may not be attributed to a single factor, but may be attributed to unsupervised treatment, excessive dosage and/or treatment duration[13].

The results impact antimicrobial and medication-safety practices. TCS-containing fixed-dose combinations are frequently used to treat undiagnosed skin eruptions, resulting in unnecessary exposure to other antibacterial or antifungal agents and/or corticosteroids. Minimizing exposure may be achieved through pharmacy-level counselling, medical evaluation of persistent or recurrent skin lesions and increased awareness of the potency and duration of appropriate TCS[14]. Patient education should focus on the fact that quick symptomatic improvement does not always mean that the treatment is correct.

The use of TCS should be considered a preventable medication-safety issue, rather than simply a prescribing issue. Pharmacists and other medicine dispensers have an important role to play in

identifying inappropriate repeat purchases and referring patients with chronic dermatological problems for appropriate medical evaluation. Clinicians should also clearly communicate about potency, frequency of use, duration of treatment, anatomical sites and situations for re-evaluation. These measures may be able to lower the impact and unnecessary health care costs.

Last, the findings indicate that the problems of inappropriate use patterns, clinically significant adverse effects on the skin and healthcare costs of unsupervised use of topical corticosteroids are greater than those of physician-supervised use. This is a serious patient safety problem because of the prolonged exposure, inappropriate potency, frequent application and treatment without a confirmed diagnosis. A patient education, responsible dispensing, rational prescribing and early dermatological assessment strategy can help minimise preventable harm and the downstream economic costs of TCS misuse.

Conclusion

Self-medication with topical corticosteroids is not only a patient safety and economic issue, it is a preventable one. Self-medicated use was associated with longer and inappropriate use of corticosteroid, increased skin complications (particularly skin atrophy and tinea incognita) and increased healthcare costs. To prevent avoidable harm and maintain the therapeutic value of topical corticosteroids, patient education, rational prescribing, responsible dispensing and early dermatological assessment are critical.

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