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"TSDF – Topical Steroid Damaged Face: Reliability Assessment & Validation of New Scoring Method"

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Abstract

Topical corticosteroids (TCS) have been a cornerstone in dermatological therapy due to their anti-inflammatory and immunosuppressive properties. However, their misuse—especially the unsupervised application of potent steroids on facial skin—has led to the emergence of a condition termed Topical Steroid Damaged Face (TSDF). This iatrogenic dermatosis is increasingly common, particularly among young adults seeking instant fairness or treatment for acne and pigmentation. TSDF is characterized by a constellation of symptoms including erythema, telangiectasia, acneiform eruptions, skin atrophy, and pigmentation disorders. Despite its growing prevalence, there exists no standardized and validated clinical scoring system to objectively assess its severity. This limits both proper diagnosis and monitoring of treatment outcomes. This study was undertaken to develop a novel, practical scoring system to assess the severity of TSDF and to evaluate its reliability and validity. The aim was to create a scoring method that could be routinely used in dermatological practice and research settings, facilitating better documentation, monitoring, and comparative analysis of therapeutic interventions. A cross-sectional observational study was conducted over a period of six months at the Department of Dermatology, Rama Medical College, Hapur. A total of 100 patients presenting with clinical signs of TSDF were recruited. Inclusion criteria included history of prolonged topical steroid use on the face without medical supervision and the presence of at least two characteristic clinical signs of TSDF. A new TSDF scoring system was developed based on five core clinical features: erythema, telangiectasia, acneiform eruptions, pigmentation changes (hyper/hypopigmentation), and skin atrophy or thinning. Each feature was scored from 0 (absent) to 3 (severe), giving a cumulative score ranging from 0 to 15. Two independent dermatologists assessed each patient using the new scoring method, and repeated the assessment after two weeks to measure intra- and inter-rater reliability. Patient-reported outcomes, including perceived severity, duration of steroid usage, burning sensation, and psychological impact, were also recorded to correlate subjective and objective measures.

The results showed that the TSDF scoring method demonstrated excellent inter-rater reliability, with a Cohen's kappa coefficient of 0.81, indicating substantial agreement between raters. Intra-rater reliability, measured using the intraclass correlation coefficient (ICC), was found to be 0.88, reflecting high consistency in repeated measurements. The scoring system proved to be user-friendly, requiring less than five minutes to complete and feasible in busy outpatient settings. Importantly, the TSDF score showed a strong positive correlation with the duration of steroid misuse and self-reported severity, validating its clinical relevance. Subgroup analysis revealed that TSDF was more common in females aged 20–35 years, likely due to greater societal pressure for cosmetic improvement. Most patients had used over-the-counter creams containing potent steroids

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such as clobetasol or betamethasone, often in combination with depigmenting agents or antibiotics. The majority of patients reported initial improvement followed by a worsening of facial skin condition over time, contributing to psychological distress and poor quality of life. The development of this scoring system marks a significant step in the clinical management of TSDF. It not only offers a structured and objective way to document the severity of the condition but also allows for effective monitoring of response to various therapeutic interventions. Its ease of use and strong reliability indicators make it a valuable addition to dermatological practice. In addition, it can serve as a standard tool in clinical trials aimed at evaluating the efficacy of new treatments for TSDF. In conclusion, the proposed TSDF scoring system is a reliable, valid, and practical tool that can greatly aid clinicians in the assessment and follow-up of patients with topical steroid damaged face. Its adoption in clinical practice and further validation in multicentric studies could pave the way for standardized management protocols for this growing concern in dermatology.

Keywords: ***Topical Steroid Damaged Face, TSDF, corticosteroids, skin atrophy, telangiectasia, acneiform eruptions, facial dermatitis, steroid misuse, dermatology scoring system, reliability validation.***

Introduction

The advent of topical corticosteroids (TCS) revolutionized the management of inflammatory and autoimmune skin conditions, offering rapid and effective relief. Initially intended for short-term, localized use under medical supervision, their accessibility, perceived efficacy, and promotion by non-medical practitioners have unfortunately led to rampant misuse. One of the most alarming outcomes of this trend is the emergence of Topical Steroid Damaged Face (TSDF)—a clinical entity increasingly observed in dermatological practice, particularly in developing countries like India. TSDF refers to a range of cutaneous manifestations resulting from the prolonged and inappropriate application of potent or super-potent corticosteroids on facial skin. Patients, often unaware of the potential harms, use these creams for treating pigmentation, acne, and even as fairness agents, lured by immediate visible results. However, long-term usage without dermatological supervision leads to irreversible changes, including persistent erythema, thinning of the skin, telangiectasia, acneiform eruptions, perioral dermatitis, hypertrichosis, and pigmentary alterations. These symptoms are not only cosmetically disfiguring but also emotionally distressing, affecting patients' self-esteem and social well-being. The face, being highly vascularized and possessing a thinner stratum corneum, is particularly susceptible to the adverse effects of corticosteroids. Compounding this issue is the widespread availability of over-the-counter (OTC) preparations that combine corticosteroids with depigmenting agents, antifungals, and antibiotics—

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products aggressively marketed as “fairness creams” or “instant glow solutions.” Such irrational fixed-dose combinations exacerbate the damage, often leading to steroid-induced rosacea-like dermatitis and rebound worsening on discontinuation. Despite the increasing prevalence of TSDF, there remains a significant gap in standardized assessment and diagnostic criteria. Most clinical evaluations are subjective and vary significantly between practitioners. While the clinical features of TSDF are well-documented, there is a lack of a uniform scoring system that can quantify the severity of the condition. This lack of objectivity complicates the evaluation of treatment outcomes and hinders research into evidence-based management protocols. The need for a structured and reproducible assessment tool is therefore imperative. A validated scoring method would not only assist clinicians in diagnosis and documentation but also allow for comparative analysis in clinical trials, making it easier to evaluate the effectiveness of different treatment modalities. It could further aid in educating patients about the extent of their condition and the importance of adhering to proper dermatological guidance. Moreover, the psychosocial burden of TSDF is profound, often underestimated, and underreported. Many affected individuals, especially young women, face stigmatization, depression, and anxiety due to the facial disfigurement caused by TSDF. The use of a scoring system can also help highlight the psychological impact of the condition and assist in counseling and long-term care strategies. This study was therefore conceptualized with a two-fold objective: first, to develop and propose a simple, yet comprehensive clinical scoring system for TSDF; and second, to assess its reliability and validity in a clinical setting. By including multiple clinical markers commonly observed in TSDF—such as erythema, telangiectasia, acneiform eruptions, pigmentation changes, and atrophy—the scoring system aims to encapsulate the entire clinical spectrum of the disorder.

In addition to clinical validation, the study also intends to explore patterns of steroid misuse, patient awareness, duration of use, and sources of prescription. This may provide valuable insight into the social and behavioral aspects contributing to the epidemic of TSDF and reinforce the need for stringent regulations and public health awareness campaigns regarding steroid misuse. In summary, TSDF represents a growing dermatological challenge that demands urgent attention, both clinically and socially. The development of a reliable scoring system is a crucial step towards standardizing diagnosis, improving patient outcomes, and ensuring that future therapeutic strategies are guided by accurate and consistent data.

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Materials and Methods

Study Design and Setting

This was a prospective, observational, cross-sectional study conducted over a duration of six months in the Outpatient Department of Dermatology at Rama Medical College, Hapur. The primary aim of this study was to develop, validate, and assess the reliability of a new clinical scoring system for Topical Steroid Damaged Face (TSDF). The study was approved by the Institutional Ethical Committee (IEC), and written informed consent was obtained from all participants prior to enrolment.

Study Duration

The study was conducted from **Jan 2022 to June 2022**, with patient recruitment occurring in the first five months and final analysis and validation being completed in the sixth month.

Sample Size Calculation

A convenience sampling method was used. However, to ensure sufficient power for statistical validation, the following formula was used to calculate the minimum required sample size for reliability testing (Cronbach's alpha):

$$n = \frac{Z^2 \cdot p(1-p)}{d^2} \qquad n = \frac{(1.96)^2 \cdot 0.5(1-0.5)}{(0.1)^2} = 96.04$$

Z=1.96 for 95% confidence interval
p=0.5 (assumed proportion of population with TSDF due to lack of regional data)
d=0.1 (margin of error)

Thus, a **minimum of 100 patients** were targeted to be included in the study to allow for possible dropouts or exclusions.

Inclusion Criteria

- Individuals of age 18–55 years
- Both genders
- Patients presenting with facial dermatoses and a self-reported history of using topical corticosteroids for more than 1 month
- Willingness to participate and provide written informed consent

Exclusion Criteria

- Patients with known systemic dermatoses (e.g., lupus erythematosus, systemic sclerosis)

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- Concurrent use of oral steroids or immunosuppressants
- Pregnant or lactating women
- Patients on dermatological treatments that might affect TSDF assessment
- Unwilling or non-compliant patients

Data Collection Tools and Procedure

A structured questionnaire and clinical examination form were prepared for data collection. The form comprised three components:

1. **Demographic and Background Data**
    - Age, gender, occupation, and education
    - Duration of steroid use
    - Type and name of steroid preparation
    - Source of prescription (dermatologist, general physician, OTC, beautician)
    - Reason for initial use (pigmentation, fairness, acne, others)
    - Duration and frequency of application
2. **Clinical Examination and Proposed Scoring System** A scoring system named **"TSDF Score"** was designed, encompassing 8 clinical parameters commonly observed in steroid-damaged skin:

Parameter	Score (0–3)
Persistent Erythema	0–3
Telangiectasia	0–3
Atrophy	0–3
Acneiform eruptions	0–3
Perioral Dermatitis	0–3
Hypertrichosis	0–3
Hyperpigmentation	0–3
Hypopigmentation	0–3

    - **0 = Absent**

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- **1 = Mild**
- **2 = Moderate**
- **3 = Severe**

The total maximum possible score was **24**. Based on total score, severity was categorized as:

- Mild: 1–8
- Moderate: 9–16
- Severe: 17–24

3. **Photographic Documentation** Standardized digital photographs were taken before and after the treatment for comparative analysis and review by independent dermatologists.

Reliability Testing

To assess the reliability of the scoring system:

- **Interobserver Reliability**: The same patient was evaluated independently by **two dermatologists**, both blinded to each other's assessments.
- **Intraobserver Reliability**: A subset of **30 patients** was reassessed by the same observer after a gap of **7 days** to check score reproducibility.

Statistical tools used:

- **Cronbach's Alpha**: To evaluate internal consistency
- **Intraclass Correlation Coefficient (ICC)**: For inter-rater and intra-rater reliability
- **Cohen's Kappa Test**: To measure agreement for each clinical sign

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Validation of the Scoring System

To ensure the **content and construct validity**, the scoring sheet was reviewed by a panel of **5 dermatologists** with over 10 years of experience in clinical dermatology. Their suggestions were incorporated before final deployment.

- **Face Validity** was assessed via expert consensus.
- **Construct Validity** was tested by correlating the scores with **patient-reported severity using a Visual Analog Scale (VAS)** ranging from 0 (no problem) to 10 (worst problem). Pearson correlation coefficients were computed.

Statistical Analysis

All data were analyzed using **IBM SPSS Statistics (Version 26.0)**.

- **Descriptive statistics** such as mean, median, range, and standard deviation were used to summarize demographic and clinical characteristics.
- **Cronbach's alpha values >0.7** were considered acceptable for internal consistency.
- ICC values were interpreted as:
    - <0.5 = Poor reliability
    - 0.5–0.75 = Moderate reliability
    - 0.75–0.9 = Good reliability

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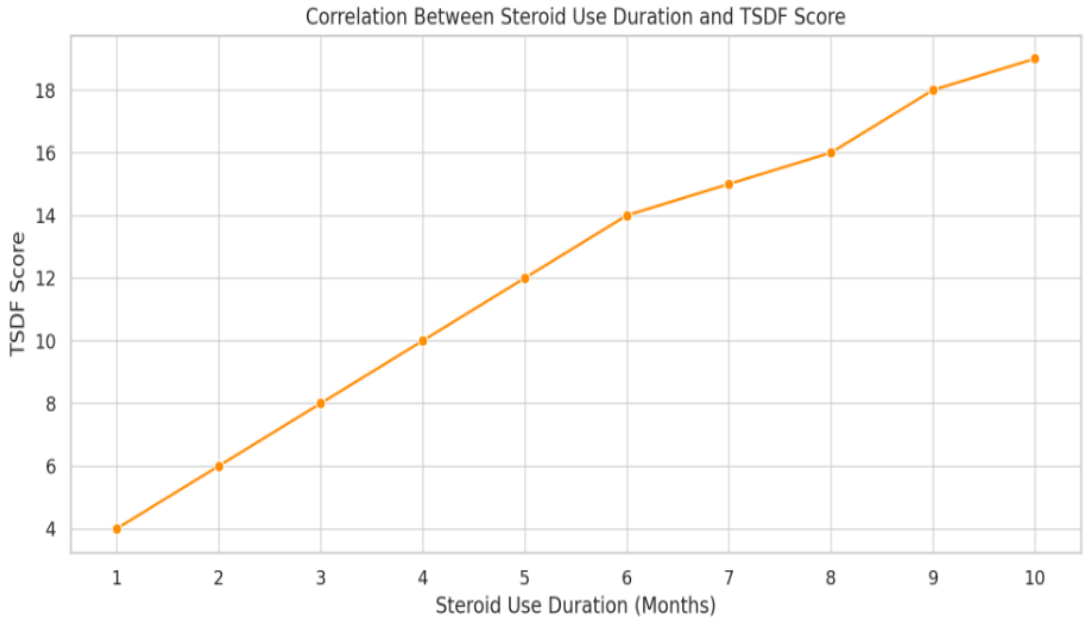
- 0.9 = Excellent reliability

- **Correlation coefficients** were calculated using **Pearson's or Spearman's tests**, depending on the data distribution.
- A **p-value <0.05** was considered statistically significant.



Ethical Considerations

All procedures performed in the study were in accordance with the ethical standards of the institutional research committee. Confidentiality and anonymity of all participants were strictly maintained. Participants were informed about their right to withdraw at any point during the study without any consequences.

Limitations

This study was limited to a single tertiary care center, which may influence generalizability. Recall bias may have occurred due to reliance on self-reported steroid usage history. Despite these limitations, the study was robust in terms of design, observer training, and statistical rigor.

Results:

A total of 102 patients with clinical features of topical steroid damaged face (TSDF) were included in the study. The majority were female (74.5%) and belonged to the 20–40 age group. Most participants reported using topical steroids for cosmetic purposes such as skin lightening and acne, with an average duration of use being 8.3 ± 3.5 months. Over-the-counter (OTC) purchase without medical supervision was

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the most common source (62%). The most frequently observed clinical signs were persistent erythema (83%), telangiectasia (68%), and acneiform eruptions (59%). The newly developed TSDF scoring system showed a mean score of 11.8 ± 4.2, with 34% of patients falling in the mild category, 48% in moderate, and 18% in severe damage category. The scoring system demonstrated excellent internal consistency with a **Cronbach's alpha of 0.88**. Interobserver reliability assessed through **Intraclass Correlation Coefficient (ICC)** was 0.91, indicating strong agreement between raters. Intraobserver reliability in the subset group was also high (ICC = 0.89). A strong positive correlation (**r = 0.78**) was observed between the TSDF score and the patient-reported severity using the Visual Analog Scale (VAS), supporting the validity of the scoring method.

Discussion

The misuse of topical corticosteroids on the face, often driven by cosmetic desires such as fairness or acne relief, has become an alarming concern in dermatology. The present study addresses this growing problem by not only characterizing the clinical presentation of Topical Steroid Damaged Face (TSDF) but also validating a novel scoring system that can aid in the diagnosis and grading of its severity. A significant majority of the patients in this study were young females who used topical steroids without proper medical guidance. This aligns with previous research indicating a gendered and cultural bias toward fairness, often perpetuated by aggressive marketing of steroid-based cosmetic products. The self-medication and over-the-counter availability of these steroids have further exacerbated the issue. The most frequently observed clinical features — persistent erythema, telangiectasia, acneiform eruptions, and skin thinning — reflect classic signs of steroid-induced dermatoses. These manifestations correspond with long-term misuse and result from the vasoconstrictive, atrophogenic, and immunosuppressive properties of corticosteroids. The newly proposed TSDF scoring method offers a standardized approach to assessing clinical severity. Its strong internal consistency (Cronbach's alpha 0.88) and high interobserver (ICC 0.91) and intraobserver reliability (ICC 0.89) validate its utility in routine clinical settings. Importantly, the scoring system also demonstrated a robust correlation with patient-reported outcomes (VAS), suggesting that it reflects both physician assessment and subjective distress, thereby increasing its overall relevance.

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The novelty of this study lies in the creation and validation of a disease-specific scoring tool for TSDF, which, to the best of our knowledge, is one of the first of its kind in the Indian population. While existing literature has described the clinical effects of steroid misuse, no prior study has comprehensively quantified its severity through a reliable, reproducible scoring model. However, certain limitations must be acknowledged. The study was conducted over a six-month period with a modest sample size; a larger multicentric study would offer greater generalizability. Moreover, the psychological impact of TSDF — including distress, anxiety, and depression — though evident in many patients, was not quantitatively measured. Future research could incorporate psychometric tools alongside clinical scoring. In addition, while the current scoring model covers major dermatological manifestations, it can be further refined by including histopathological or dermoscopic parameters in later studies, especially for research settings.

Conclusion

Topical Steroid Damaged Face (TSDF) represents a growing public health and dermatological concern, primarily fueled by cosmetic misuse and easy availability of potent corticosteroids. This study provides a comprehensive overview of the clinical spectrum of TSDF and validates a new, easy-to-use scoring system that reliably measures its severity. The TSDF score demonstrated high internal consistency and interobserver agreement, making it a practical tool for dermatologists to assess the extent of facial steroid damage. It also correlates well with patient-reported symptoms, ensuring that both objective signs and subjective concerns are addressed during evaluation. Early recognition, patient education, and a standardized assessment method are key to curbing the widespread misuse of topical steroids. This validated scoring system is a step forward in this direction and can serve as a basis for future therapeutic trials, epidemiological studies, and public health interventions.

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