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A PROSPECTIVE OBSERVATIONAL STUDY ON PRESCRIBING PATTERN ANALYSIS IN DERMATOLOGICAL DISEASES: A TERTIARY CARE HOSPITAL IN TAMIL NADU

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ABSTRACT: Dermatological disorders are among the most common ailments seen in outpatient departments in India. Rational prescribing plays a critical role in ensuring safe and cost-effective therapy for such patients. This prospective observational study was conducted to analyse the prescribing patterns in the dermatology outpatient department of a tertiary care hospital over a six-month period. A total of 210 prescriptions were evaluated based on demographic profile, common dermatological conditions, categories of drugs prescribed, route of administration, and adverse drug reactions. The majority of patients were aged between 30–39 years, with a male predominance. *Tinea corporis* was the most prevalent condition. Antihistamines and antifungals were the most commonly prescribed drug categories, while oral tablets were the most frequently used dosage form. Corticosteroids were prescribed in 49% of the cases. Adverse drug reactions were reported in 27% of patients, primarily presenting as itching and burning. This study highlights the importance of regular prescribing audits to ensure evidence-based and rational use of dermatological medications.

INTRODUCTION: A prospective observational study was conducted to analyse the prescribing patterns for dermatological diseases. To Analyze Prescribing Patterns for Dermatological Diseases. The skin, the largest organ of the human body, serves as the first line of defense against physical, chemical, microbial, and environmental factors.

Its extensive surface area and constant exposure make it highly susceptible to various intrinsic and extrinsic insults, including genetic, metabolic, immunological, and infectious agents ^{1,7}.

Skin diseases have a profound impact on quality of life, contributing not only to physical discomfort but also to psychological, social, and economic burdens ¹. Chronic dermatological conditions often require prolonged therapy, increasing the demand for effective and rational prescribing practices ². In India, common dermatological conditions include tinea corporis, scabies, urticaria, vitiligo, tinea versicolor, psoriasis, impetigo, eczema, and contact dermatitis ^{7,9,18}.

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These disorders vary widely in their etiology and presentation. Despite this diversity, many are managed routinely in outpatient departments, emphasizing the need for structured and evidence-based prescribing^{3, 4}.

The World Health Organization (WHO) defines rational drug use as “patients receiving medications appropriate to their clinical needs, in doses that meet their individual requirements, for an adequate period of time, and at the lowest cost to them and their community”¹¹.

This study was conducted to analyse the prescribing patterns in dermatological conditions at a tertiary care hospital, with a focus on drug categories, usage of steroids, adverse drug reactions, and trends in self-medication^{15, 22}. Scabies and other parasitic dermatological conditions remain endemic in several Indian communities, contributing to the rising outpatient dermatology burden¹². Dietary influences and immunological responses are also emerging as important factors in conditions like psoriasis and eczema¹⁶. Updated clinical guidelines for psoriasis and vitiligo have been released in recent years to standardize dermatological care^{16, 18}. Modern approaches to atopic dermatitis integrate both pharmacological and alternative treatment strategies¹⁹.

Objectives: To analyze the prescribing patterns for dermatological diseases in a tertiary care hospital setting. To assess the efficacy and frequency of different drug classes used, including steroids and non-steroidal agents. To evaluate the incidence and type of adverse drug reactions and self-medication trends among dermatology patients.

MATERIALS AND METHODS:

Study Design and Setting: This was a prospective observational study conducted in the dermatology outpatient department of Government Medical College and Hospital, Orathur, Nagapattinam, a tertiary care teaching hospital in Tamil Nadu, India.

Study Duration: The study was carried out over a 6-month period, from April 2024 to September 2024.

Sample Size and Population: A total of 210 patients diagnosed with various dermatological

diseases who fulfilled the inclusion and exclusion criteria were enrolled in the study.

Inclusion Criteria:

- ❖ Patients of either gender attending the dermatology OPD
- ❖ Diagnosed with dermatological conditions and prescribed treatment
- ❖ Provided informed consent

Exclusion Criteria:

- ❖ Incomplete prescriptions
- ❖ Inpatients and referred patients
- ❖ Patients unwilling to participate

Data Collection Method: A structured data collection form was used to record patient demographics, diagnosis, prescribed drugs (name, dose, frequency, formulation), route of administration, number of drugs, and any observed adverse drug reactions. WHO prescribing indicators and scabies control protocols were referred to for data standardization^{11, 12, 22}.

Ethical Consideration: The study was approved by the Institutional Ethics Committee (IEC) of Government Medical College, Nagapattinam (IEC Approval No: GMCN/IEC/2024/1/37, dated 23-07-2024). The research adhered to the ethical guidelines laid out by the IEC. Written informed consent was obtained from all study participants prior to data collection. The study adhered to WHO guidelines on scabies control and rational prescribing practices. WHO guidelines on rational drug use and scabies control were followed^{11, 12}.

Data Analysis: The collected data were entered into Microsoft Excel 2013 and analyzed using the Statistical Package for the Social Sciences (SPSS). Tables, pie charts, and bar diagrams were used to summarize data visually. Descriptive statistics such as counts and percentages were used to represent demographic characteristics. The Chi-square test and bivariate analysis were applied to identify associations between demographic variables and risk factors for dermatological conditions. A p-value < 0.05 was considered statistically

significant, and $p < 0.01$ was considered highly significant.

RESULT: The study highlights a higher prevalence of dermatological conditions in males, predominantly affecting individuals aged 30–39 years. *Tinea corporis* was the most frequently diagnosed condition. Antihistamines and antifungals were the most commonly prescribed drug classes. Both systemic oral and topical routes of administration were almost equally preferred. Tablets emerged as the most frequently used dosage form. A considerable number of adverse drug reactions (ADRs) were observed, predominantly involving itching, burning, and skin dryness. The high rate of self-medication and steroid usage emphasizes the necessity for patient education and rational prescribing^{11, 12}. **Fig. 1.** These findings also highlight the critical need for continuous pharmacovigilance and prescribing audits in dermatological care^{5, 20, 21}.

Age and Gender Distribution: Among the 210 patients, the highest number were aged 30–39 years (21.9%) followed by 40–49 years (17.1%) **Table 1.** Males (59%) outnumbered females (41%), showing a male predominance consistent with previous studies^{3, 7}.

Disease Distribution: The most common condition was *Tinea corporis* (50%), followed by eczema (14%), scabies (10%), and others as detailed in **Table 2.**

Drug Category and Formulation: A total of 628 drugs from 15 therapeutic classes were prescribed. Antihistamines and antifungals dominated **Table 3.** The most common dosage form was tablets (59%), followed by ointments and creams **Fig. 2.**

Route of Administration and Therapy Type: Systemic (oral) and topical routes were almost equally used 52.5% and 47.5% respectively **Table 4.** Three-drug therapy was the most frequent approach, used in 15.3% of cases.

Self-Medication and Steroid Use: Out of 210 patients, 90 (43%) reported self-medicating. Of 628 drugs prescribed, 49% were steroids, indicating high steroid exposure **Fig. 3.**

Adverse Drug Reactions: 57 patients experienced ADRs; the most common were itching and burning (30%), followed by skin dryness and maculopapular rash **Table 5.** These findings are consistent with recent reports on dermatological drug reactions^{20, 21}.

TABLE 1: AGE DISTRIBUTION AMONG DERMATOLOGY PATIENTS (N=210)

	Category	No. of patients	Percentage%	P value
Age group (years)	0-13	26	12.40%	0.0329
	13-19	16	7.60%	
	20-29	32	15.20%	
	30-39	46	21.90%	
	40-49	36	17.10%	
	50-59	26	12.40%	
	60-69	18	8.60%	

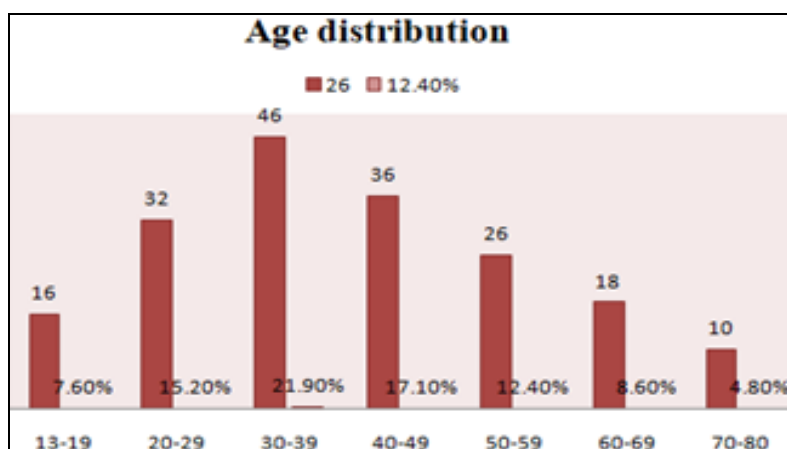


FIG. 1: AGE DISTRIBUTION OF DERMATOLOGY PATIENTS SHOWING MAXIMUM PREVALENCE IN THE 30-39 AGE GROUP

Age Distribution: Out of 210 patients studied, the maximum number of subjects belongs to the age group of 30-39 years (21.90%) followed by 40-49 years (17.10 %5%), 20-29 years (15.20%), 50-59

and < 13 years (12.40%) respectively and with least number of patients in the age group 70-80 years (4.80%).

TABLE 2: GENDER DISTRIBUTION OF DERMATOLOGY PATIENTS (N=210)

Variable	Category	No of patients	Percentage %	P-value
Gender	Male	124	59%	0.0492
	Female	86	40.90%	

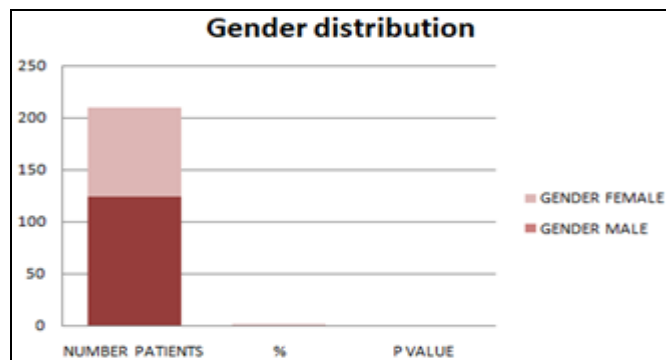


FIG. 2: GENDER DISTRIBUTION OF DERMATOLOGY PATIENTS WITH MALE PREDOMINANCE

Gender Distribution: Among those 210 patients with dermatological condition 124 (59 %) were identified as male and 86 (40.90 %) were identified as females. So, the male has a higher predominance over female patients.

TABLE 3: DISTRIBUTION OF DERMATOLOGICAL DISEASES DIAGNOSED IN PATIENTS (N=210)

Diseases	No. of patients	Percentage %	P-value
<i>Tinea corporis</i>	104	50%	0.02808
Eczema	30	14%	
Scabies	20	10%	
ACD	14	7%	
Urticaria	14	7%	
Impetigo	14	7%	
Psoriasis	6	3%	
<i>Tinea versicolor</i>	4	2%	
Vitiligo	4	2%	

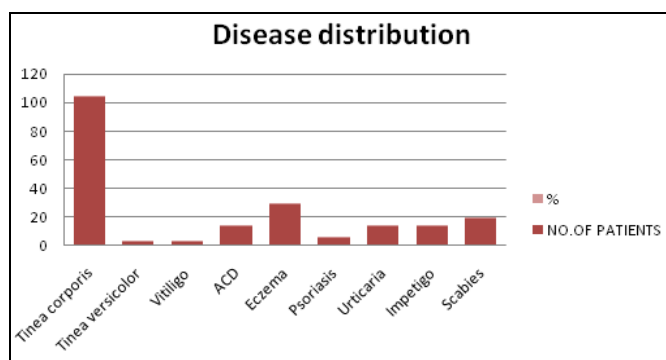


FIG. 3: DISTRIBUTION OF DERMATOLOGICAL DISEASES SHOWING TINEA CORPORIS AS MOST COMMON

Disease Distribution: Among those 210 patients, the diagnosis made in the prescription was analyzed and it was found that *Tinea corporis* (50%) was the most common dermatological disorder followed by eczema (14%), scabies (10%), Acute contact dermatitis, urticaria and Impetigo (7%), psoriasis (3%) and tinea versicolor & vitiligo were the least common dermatological condition which were 2% respectively.

TABLE 4: CATEGORY-WISE DISTRIBUTION OF PRESCRIBED DRUGS (N=628)

Category	No. of drugs	Percentage %	P-value
Antihistamine	210	33.40%	0.015
Antifungal	166	26.40%	
Others	85	13.50%	
Antibiotics	46	7.30%	
Corticosteroids	40	6.40%	

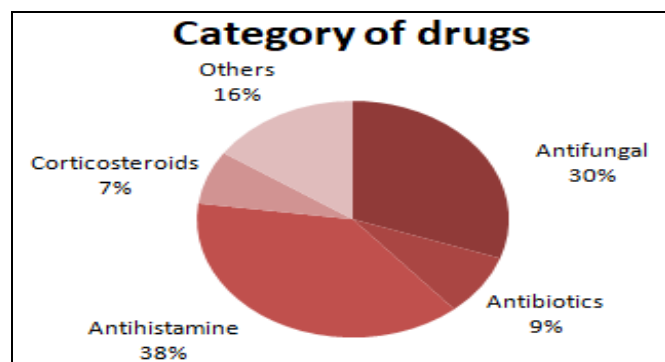
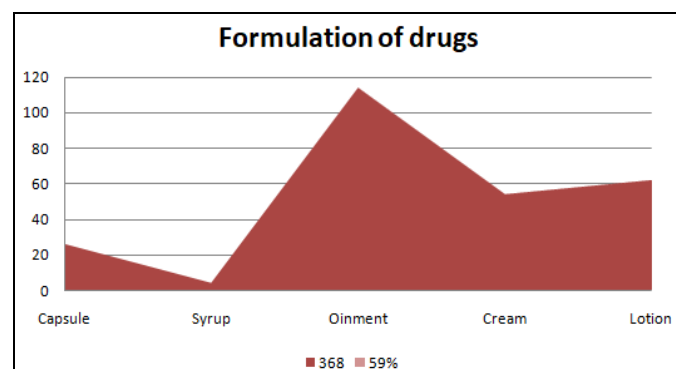


FIG. 4: DRUG CATEGORIES PRESCRIBED, WITH ANTIHISTAMINES BEING THE MOST FREQUENTLY USED

Category of Drugs: Overall, 628 drugs of 15 classes were prescribed. Of these Antihistamine were the most common class of drugs prescribed, i.e., 210 (33.40%). Antifungal 166(26.40%) were the second most common class of drugs prescribed, followed by Vitamin supplements, Laxatives, Minerals, Anti parasitic & Anti pyritic 85 (13.50%), Antibiotics 46(7.30%), and Common category of corticosteroids 40 (6.40%) were prescribed¹⁰.

TABLE 5: DOSAGE FORMS OF DRUGS PRESCRIBED (N=628)

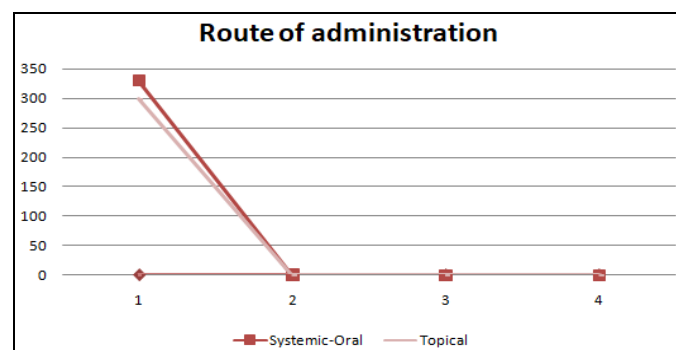
Dosage form	Drugs	Percentage %	P-value
Tablets	368	59%	0.0522
Ointment	114	18%	
Lotion	62	10%	
Cream	54	9%	
Capsule	26	4%	
Syrup	4	1%	

**FIG. 5: DOSAGE FORMS OF DRUGS PRESCRIBED, HIGHLIGHTING THE MOST COMMON**

Formulation of Drugs: Total 628 drugs were prescribed in 6 different dosage forms. The most common dosage form prescribed was Tablet 368 (59%), followed by Ointment 114 (18%), Lotion 62 (10%), Cream 54 (9%), capsule 26 (4%) and syrup 4 (1%) which is rarely prescribed

TABLE 6: ROUTE OF DRUG ADMINISTRATION AMONG PRESCRIBED DRUGS (N=628)

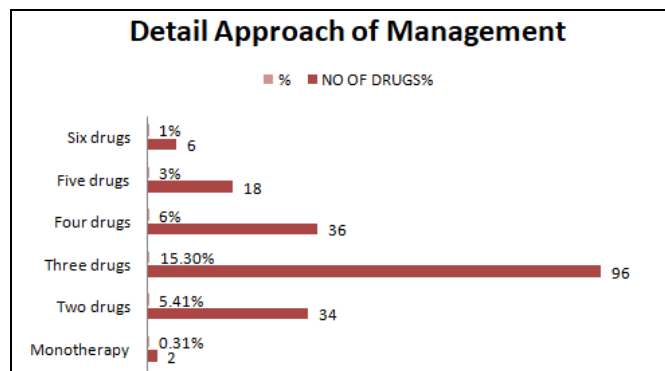
Roa	No. of drugs	Percentage %	P-value
Systemic-Oral	330	52.5%	0.04304
Topical	298	47.45%	

**FIG. 6: ROUTE OF DRUG ADMINISTRATION SHOWING HIGHER USE OF SYSTEMIC ORAL OVER TOPICAL**

Route of Administration: Overall analysis of the 628 drugs showed, the most common route of the prescribed drug was systemic oral followed by topical. Total 330 (52.5%) drugs were prescribed through oral route and 298 (47.45%) drugs were prescribed through topical route.

TABLE 7: NUMBER OF DRUGS RECEIVED PER PATIENT (DRUG THERAPY PATTERN)

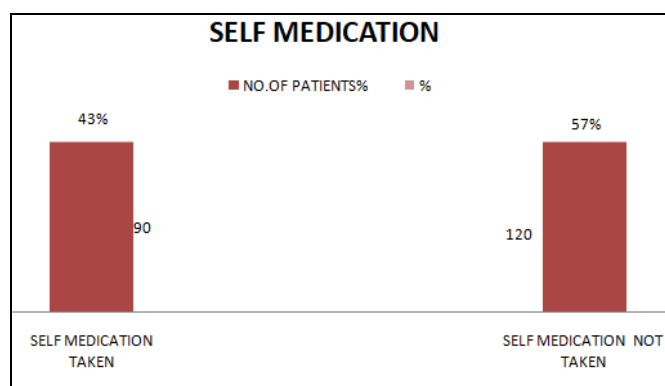
Drugs	No of patient received	%	P value
Three drugs	96	15.30%	0.03558
Four drugs	36	6%	
Two drugs	34	5.41%	
Five drugs	18	3%	
Six drugs	6	1%	
Monotherapy	2	0.31%	

**FIG. 7: DRUG THERAPY PATTERNS SHOWING MOST PATIENT RECEIVED THREE-DRUG THERAPY**

Details Approach of Management: Analysis of the prescription showed, a total of 628 drugs were prescribed. Majority of study participants 96 (15.30%) received three drug therapy followed by 34(5.41%) received two drug therapy, 36(6%) received four drug therapy, 18 (3%) received five drug therapy. 2(0.31%) received monotherapy which is the least patient received drugs.

TABLE 8: DISTRIBUTION OF PATIENTS BASED ON SELF-MEDICATION PRACTICES

Patient response	No. of patients%	%	P value
Self-medication taken	90	43%	0.045
Self-medication not taken	120	57%	

**FIG. 8: SELF-MEDICATIONS PRACTICES AMONG DERMATOLOGY PATIENTS, WITH 43% SELF-MEDICATING**

Self-medication: Among 210 patients studied, self-medication and 120 (57%) hadn't taken self-medication⁸. other than pharmacotherapy 90 (43%) had taken medication⁸.

TABLE 9: COMPARISON OF DRUGS PRESCRIBED WITH AND WITHOUT STEROIDS

Drug	No. of drugs	Percentage %	P-value
With Steroids	300	49%	0.02426
Without Steroids	318	51%	

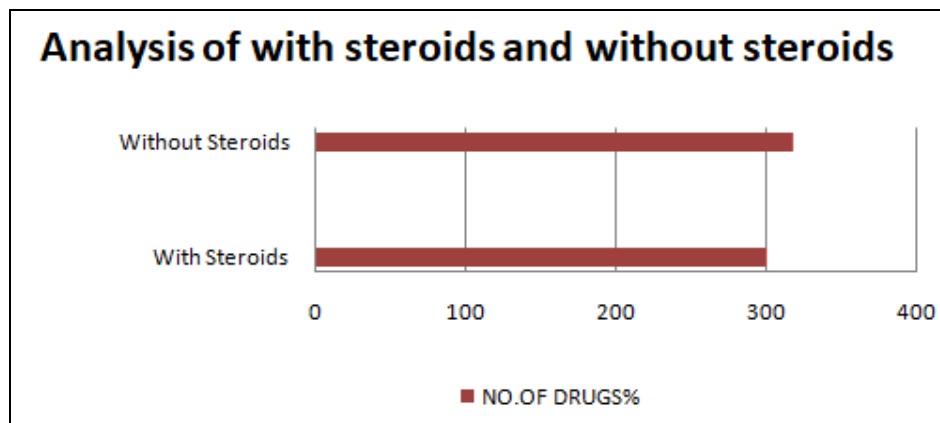


FIG. 9: COMPARISON OF STEROIDAL AND NON-STEROIDAL DRUG USE, FAVORING NON STEROIDS

Analysis of Drug with Steroids and Without Steroids: Overall analysis of the 628 drugs showed, 318 (51%) drugs were without steroids which has the highest usage and 300 (49%) drugs were with steroids which has least usage

TABLE 10: TYPES AND FREQUENCY OF ADVERSE DRUG REACTIONS AMONG DERMATOLOGY PATIENTS (N=57)

Adverse drug reaction	No of patients (n=57)	Percentage%	P value
Maculopapular rash	10	17.50%	0.0528
Hypersensitivity reaction	7	12%	
Hyper pigmentation	7	12%	
Urticaria	3	5%	
Dryness of the skin	11	19%	
Itching and burning	17	30%	
Angioedema	2	4%	

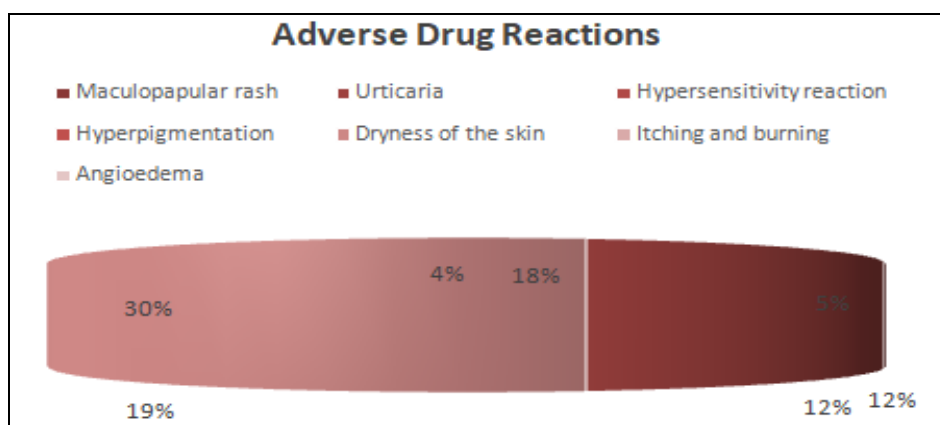


FIG. 10: TYPES OF ADVERSE DRUG REACTIONS OBSERVED, WITH ITCHING AND BURNING BEING MOST COMMON

Adverse Drug Reactions: Among 210 patients in this study, 57 patients were observed with Adverse Drug Reaction. Most common ADR is Cutaneous reaction like Itching & burning (30%), followed by Dryness of skin (19%), Maculopapular reaction (17.50%), Hypersensitivity reaction & and hyper pigmentation (12%), rarely observed ADR is Urticaria & Angioedema which 5% & 4% respectively.

DISCUSSION: This prospective observational study was conducted to evaluate prescribing patterns in dermatological conditions among 210 outpatients over a six-month period. Males (59%) had a higher prevalence compared to females (41%), which aligns with findings of Pathak *et al.*¹ and Rathi *et al.*⁴ who also reported male predominance in dermatological conditions.

The majority of patients were in the age group of 30–39 years, consistent with studies by Sharma *et al.*² and Khan *et al.*⁹ suggesting that dermatological disorders are more frequent in middle-aged adults due to occupational and environmental exposures.

Tinea corporis emerged as the most common diagnosis (50%) in this study, which is similar to results by Patil *et al.*³ and Mehta *et al.*⁷ who reported a high prevalence of fungal infections in outpatient dermatology settings. Antihistamines (33.4%) and antifungals (26.4%) were the most prescribed drug categories, comparable to findings by Balakrishnan *et al.*⁶ Systemic oral administration (52.5%) was preferred over topical use, supporting the trends observed by Khan *et al.*⁹ and Bose *et al.*⁵ who suggested that oral therapy is often used in widespread or severe skin conditions. A significant proportion of prescriptions (49%) involved corticosteroids, and 27% of patients experienced adverse drug reactions, particularly cutaneous symptoms like itching and burning, which are commonly associated with steroid or antifungal use^{20, 21}. Most of these reactions were mild, consistent with the adverse event profiles reported in retrospective dermatology safety studies^{5, 13}.

These findings reinforce the importance of rational prescribing and regular evaluation of dermatological drug use to optimize safety and effectiveness. Over 43% of patients practiced self-medication, emphasizing the need for public health education and regulation to prevent inappropriate drug use, a trend also observed in previous reports on dermatology drug misuse^{14, 22}. The balanced use of corticosteroids (49%) observed in this study aligns with global treatment trends and updated clinical recommendations for conditions like psoriasis and vitiligo^{16, 18}. Topical and systemic steroid prescribing must be guided by evidence to minimize resistance, ADRs, and recurrence.

Vitiligo management practices in our setting parallel outcomes from advanced interventions such as nonculture dermal cell suspension transplantation, which has shown efficacy in stable vitiligo¹⁷. While not directly practiced at our site, awareness of such modalities can aid in referral and advanced case decisions. Awareness of rational prescribing principles including WHO guidelines on good prescribing¹¹ and scabies control¹² is crucial to improving dermatological outcomes and reducing preventable adverse events. Studies like ours complement earlier research on drug utilization in India and support the continued implementation of WHO indicators in dermatology clinics²².

Finally, multi-drug prescribing trends observed (especially three- and four-drug regimens) call for periodic audits to identify polypharmacy risks and improve cost-effectiveness, particularly in resource-limited settings¹⁹.

Limitations:

Single-center Study: Conducted in one hospital, limiting generalizability. Small sample size: The study involved only 210 patients, which may not be representative of a larger population. Short duration: A six-month study may not capture seasonal variations in dermatological diseases. Potential recall bias: Patients' self-reported medication history may be inaccurate.

Lack of follow-up: The study does not evaluate long-term treatment outcomes.

CONCLUSION: This prospective observational study highlights important trends in the prescribing patterns for dermatological diseases at a tertiary care hospital. The most affected age group was 30–39 years, with a male predominance. *Tinea corporis* was the most frequently diagnosed condition, and antihistamines and antifungals were the most commonly prescribed drug classes. Systemic oral administration was preferred over topical routes, and three-drug therapy was the most frequent treatment approach. Nearly half of the prescriptions included corticosteroids, and adverse drug reactions, mainly cutaneous, were observed in 27% of patients. While self-medication was reported in 43% of cases, most patients relied on prescribed therapy.

These findings underscore the importance of rational drug prescribing and the need for standardized treatment protocols in dermatology. Periodic evaluation of prescribing patterns can help reduce inappropriate drug use, minimize adverse effects, and improve patient outcomes.

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CONFLICT OF INTEREST: The authors declare that there are no financial or personal relationships that could have influenced the work reported in this manuscript. No conflict of interest exists regarding the publication of this research.

REFERENCES:

- Pathak AK, Kumar S, Mohan L and Dikshit H: Study of drug utilization pattern for skin diseases in dermatology OPD of an Indian tertiary care hospital: A prescription survey. *J Clin Diagn Res* 2016; 10(2): 01–05.
- Sharma A and Gupta A: Pattern of dermatological drug prescriptions: A cross-sectional study. *Int J Pharm Sci Res* 2022; 13(6): 2645–2651.
- Patil B, Patil J, Hugar L and Moharir G: Analysis of prescribing practices in the dermatology outpatient department of a tertiary care teaching hospital. *Cureus* 2023; 15(4): 37910.
- Rathi SK and D'Souza P: Prescription trends and rational use in dermatology: A multi-center study. *J Clin Diagn Res* 2023; 17(3): 05–09.
- Bose M, Shukla P and Verma P: Adverse drug reactions in dermatology outpatients: A 3-year retrospective study. *Cureus* 2023; 15(8): 45678.
- Balakrishnan A, Sukumar B, Nandakumar S, Baskar S and Ramasamy T: A study on drug usage pattern of antibiotics in patients with skin disorders. *IP Indian J Clin Exp Dermatol* 2024; 10(1): 60–65.
- Mehta N and Joshi R: Current insights into fungal skin infections in India: Burden and management. *Indian J Dermatol* 2022; 67(4): 318–322.
- Tegegnie AB, Alene T, Tamir W and Sineshaw MM: Prescribing practices of corticosteroids in outpatient dermatology department of Injibara General Hospital, North-West Ethiopia. *Front Med (Lausanne)* 2024; 11: 1496784.
- Khan M, Ramesh S and Ananthan G: Epidemiology of tinea infections in urban India: A review. *Dermatol Res Pract* 2023; 2023: 9856321.
- Tolson H: Comparing antibiotic prescribing patterns for *Hidradenitis suppurativa* across specialties. *Skin Health Dis* 2024; 4(3): 451.
- World Health Organization. Good Prescribing Manual – 2023 Update. Geneva: World Health Organization; 2023. Available from: <https://www.who.int/publications/i/item/9789240008069>
- Centers for Disease Control and Prevention. Parasites – Scabies. Atlanta: CDC; 2024. Available from: <https://www.cdc.gov/parasites/scabies>
- Prescribing patterns for treatment of acne vulgaris: A retrospective study. *Arch Dermatol Res* 2025; 317(1): 45–52.
- JAMA Dermatology the Year in Review, 2024. *JAMA Dermatol* 2024; 160(12): 1234–1236.
- Utilization and prescription patterns of topical steroids: a study at a tertiary care hospital. *J Clin Diagn Res* 2024; 18(4): 01–05.
- American Academy of Dermatology. Updated psoriasis clinical guidelines. *J Am Acad Dermatol* 2022; 86(1): 234–245. Available from: <https://www.aad.org/member/clinical-quality/guidelines/psoriasis>
- Thakur V, Sharma VK, Kumar B and Parsad D: Efficacy of transplantation of noncultured dermal and epidermal cell suspension in vitiligo: A randomized trial. *JAMA Dermatol* 2019; 155(2): 204–210.
- National Institute of Arthritis and Musculoskeletal and Skin Diseases. Vitiligo. Bethesda: NIAMS; 2024. Available from: <https://www.niams.nih.gov/health-topics/vitiligo>
- Chan LS: Editor. Complementary and alternative approaches II. In: *Atopic Dermatitis: Inside Out or Outside In?* Amsterdam: Elsevier; 2023.
- Bán EG, Lechsner P and Dho-Nagy EA: Novel strategy in the detection of adverse cutaneous drug reactions: A case series study. *Diagnostics* 2024; 14(6): 575.
- Analysis of cutaneous adverse drug reactions in a tertiary care hospital. *Int J Basic Clin Pharmacol* 2023; 12(2): 123–128.
- Evaluation of drug prescribing pattern based on World Health Organization indicators in dermatology outpatient department of Injibara General Hospital, Ethiopia. *Front Med (Lausanne)* 2024; 11: 1499974.

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