DOI: 10.7860/JCDR/2026/87930.23575

Original Article

Pharmacology Section

Drug Utilisation Pattern in the Inpatient Management of Psoriasis: A Retrospective Study from a Tertiary Care Centre in Karnataka, India

D KARTHIK[1], ANIL PANDHRINATH HOGADE[2]

ABSTRACT

Introduction: Psoriasis is a chronic immune-mediated inflammatory disorder that often requires multidrug therapy during hospitalisation. Evaluation of drug utilisation patterns helps assess rational prescribing practices and adherence to treatment guidelines, especially in inpatient settings where polypharmacy is common.

Aim: To analyse the prescription pattern of drugs used in hospitalised psoriasis patients using World Health Organisation (WHO) prescribing indicators and to assess adherence to standard treatment guidelines.

Materials and Methods: The present retrospective study was conducted over a period of two years from October 2023 to October 2025 in the Dermatology Inpatient Department of a tertiary care teaching hospital in Karnataka, India. Medical records of 82 psoriasis patients admitted during the study period were reviewed. Demographic details, type of psoriasis, co-morbidities, drug classes, route of drugs, WHO core prescribing indicators and adherence to National Institute for Health and Care Excellence (NICE) guidelines were analysed using descriptive statistics.

Results: The mean age of patients was 51.9±16.4 years, with male predominance (44 patients, 53.66%). Plaque psoriasis was the most common clinical type observed among the study population. The mean duration of hospital stay was 5.8±4.0 days. A total of 640 drugs were prescribed across 82 prescriptions with an average of 7.80±3.52 drugs per prescription. Antibiotics were prescribed in 32 prescriptions (39.02%). At the drug level, 192 drugs (30.00%) were prescribed by generic name and 277 drugs (43.28%) were from the essential medicines list. Fixed-dose combinations constituted 130 drugs (20.31%) of the total prescribed drugs. Corticosteroids were the most frequently prescribed class of drugs, predominantly in topical formulations. Adherence to NICE treatment guidelines was observed in 50 prescriptions (60.98%). Immunosuppressive agents were used in 35 patients (42.68%), most commonly Cyclosporine in 17 patients (20.73%) and Methotrexate in 16 patients (19.51%). No adverse drug reactions were documented during the study period.

Conclusion: Polypharmacy was common among hospitalised psoriasis patients, with corticosteroids and immunosuppressive agents forming the mainstay of therapy. Moderate adherence to NICE guidelines and low generic prescribing indicate the need for regular prescription audits and reinforcement of guideline-based prescribing to promote rational drug use.

Keywords: Dermatologic agents, Hospitalisation, Immunosuppressive agents, Physicians, Polypharmacy, Practice patterns

INTRODUCTION

Psoriasis is a chronic, immune-mediated inflammatory dermatological disorder characterised by hyperproliferation of keratinocytes and inflammatory changes involving both the epidermis and dermis. Clinically, it presents as well-demarcated erythematous plaques covered with silvery scales and is frequently associated with pruritus and discomfort [1]. The disease follows a relapsing- remitting course and imposes a substantial physical, psychological, and social burden on affected individuals, significantly impairing quality of life [2].

Globally, psoriasis affects approximately 2-3% of the population [1]. In India, the reported prevalence ranges from 0.44% to 2.8%, with considerable regional variation. Although the disease can occur at any age, it commonly manifests in early to middle adulthood. Several environmental and genetic factors, including infections, emotional stress, and certain medications, are known to precipitate or exacerbate the condition [3]. Plaque psoriasis represents the most prevalent clinical subtype, followed by guttate, pustular, erythrodermic, and scalp psoriasis [1].

The management of psoriasis is guided by disease severity, extent of body surface involvement, patient age, comorbid conditions, and previous treatment response [1]. Mild disease is usually managed with topical therapies such as corticosteroids, vitamin D analogues, coal tar preparations, and keratolytic agents. Moderate to severe psoriasis often necessitates systemic therapy, including Methotrexate, Cyclosporine, Acitretin, or newer agents such as Apremilast [1]. In recent years, biologic therapies targeting Tumour Necrosis Factor-α (TNF-α) and Interleukins (IL-17 and IL-23) have emerged as highly effective options for refractory or extensive disease; however, their use in developing countries remains limited due to high cost, need for monitoring, and restricted accessibility [1,4]. Phototherapy also continues to play an adjunctive role in selected patients [1,5].

Rational prescribing is essential in chronic diseases such as psoriasis, where long-term therapy, combination regimens, and frequent hospitalisations are common [1,6]. Important considerations while prescribing include the clinical type of psoriasis, site of involvement, patient-specific factors, and pharmacological properties of drugs, particularly their potency, safety profile, and frequency of administration [7]. Inappropriate use of potent topical corticosteroids, irrational fixed-dose combinations, unnecessary antibiotics, and excessive polypharmacy have been widely reported

in dermatological practice and may lead to avoidable adverse effects, increased treatment costs, and poor adherence [6,8].

Drug utilisation studies serve as an effective tool for evaluating prescribing practices and promoting rational drug use [6]. The WHO has proposed standardised core prescribing indicators to assess parameters such as the average number of drugs per prescription, use of generic names, and frequency of antibiotic and injection use [7]. Furthermore, these indicators incorporate the prescription of essential medicines as a key measure of rational therapy [9]. In addition, evidence-based clinical guidelines, such as those issued by the NICE, provide structured recommendations for psoriasis management and can be used to evaluate the appropriateness of therapy [5].

While several prescription pattern studies have been conducted in dermatology outpatient settings in India [10,11], data on inpatient prescribing practices remain limited. Hospitalised psoriasis patients often receive more intensive and complex pharmacotherapy owing to severe disease, acute exacerbations, or associated co-morbidities, making evaluation of inpatient drug utilisation patterns particularly important [12]. Previous Indian studies among psoriasis inpatients have reported high levels of polypharmacy, low rates of generic prescribing, and frequent use of fixed-dose combinations, emphasising the need for systematic prescription audits in this setting [10,11]. Assessing such patterns not only helps identify areas of irrational drug use but also supports the development of targeted interventions to improve prescribing quality.

Therefore, the present study was undertaken to evaluate the prescription patterns of pharmacological agents used in hospitalised psoriasis patients and to assess adherence to NICE treatment guidelines in a tertiary care setting, using WHO core prescribing indicators as an objective assessment tool.

MATERIALS AND METHODS

The present retrospective study was conducted in the inpatient unit of the Department of Dermatology at a tertiary care teaching hospital in Belagavi, Karnataka, India. Medical records of patients admitted with a confirmed diagnosis of psoriasis during the period October 2023 to October 2025 were reviewed. Data extraction and analysis were performed between November 2025 and January 2026. The study protocol was approved by the Institutional Ethics Committee of the study institution (Ref. No. MDC/JNMCIEC/289; dated 12 September 2025). Retrospective data extraction from medical records was initiated after obtaining ethics approval. As the current study was retrospective and record-based, the requirement for informed consent was waived. Patient confidentiality and anonymity were strictly maintained throughout the present study. Medical records of psoriasis patients admitted to the dermatology ward during the study period were screened based on predefined eligibility criteria.

Inclusion criteria:

- Patients of either sex and all age groups;
- Patients admitted to the dermatology ward with a primary diagnosis of psoriasis;
- Availability of complete medical records in the medical records department.

Exclusion criteria:

- Patients managed exclusively on an outpatient basis;
- Patients with incomplete or illegible medical records;
- Patients admitted for conditions other than psoriasis or where psoriasis was not the primary reason for hospitalisation.

Sample size calculation: As the present study was retrospective and record-based, all eligible inpatient records that met the inclusion criteria during the current study period were included using a universal sampling technique; therefore, formal sample size calculation was not performed. A total of 82 patient case records were included in the final analysis.

Study Procedure

Data collection: Data were collected retrospectively from Inpatient case records retrieved through the Medical Records Department using a predesigned and pretested data extraction proforma. Information recorded included demographic details (age and sex), clinical characteristics (type of psoriasis and associated co-morbidities), duration of hospital stay, and detailed prescription information such as drug name (generic/brand), drug class, dosage form, strength, route of administration, frequency, duration, quantity, and use of fixed-dose combinations. Details regarding the use of corticosteroids, immunosuppressive agents, antibiotics, and biologics were documented. Prescription completeness was assessed based on the presence of dose, route, frequency, and duration, and any documented adverse drug reactions were noted.

Drug utilisation assessment: Prescription data were evaluated using the WHO core prescribing indicators to assess rational drug use. These indicators included the average number of drugs per prescription, the proportion of prescriptions containing at least one antibiotic, the proportion of prescriptions containing at least one injectable preparation, the percentage of drugs prescribed by generic name, the percentage of drugs prescribed from the essential medicines list, and the proportion of prescriptions containing fixed-dose combinations [7].

Assessment of guideline adherence: Prescriptions were assessed for adherence to the NICE guidelines for the management of psoriasis. NICE recommends topical treatment as first-line therapy and suggests second-or third-line treatment options (phototherapy, conventional systemic treatments, or targeted immunomodulatory treatments) when topical treatment alone is unlikely to adequately control psoriasis, such as in extensive disease involving more than 10% of body surface area or in the presence of nail disease. NICE also recommends narrowband ultraviolet B phototherapy for patients with guttate or plaque psoriasis that cannot be controlled with topical treatments alone, which may be administered 2-3 times per week. Treatment regimens were categorised as compliant or non-compliant based on concordance with recommended therapeutic approaches according to disease severity and clinical presentation [5].

STATISTICAL ANALYSIS

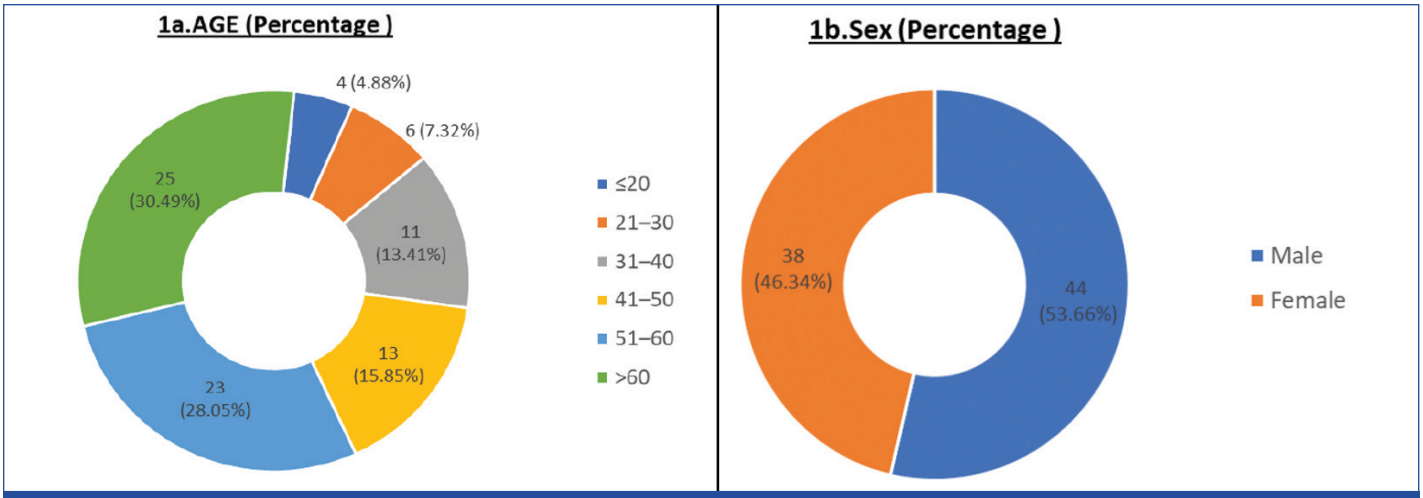
Data were entered into Microsoft Excel and analysed using descriptive statistics. Continuous variables were expressed as mean±standard deviation, while categorical variables were summarised as frequencies and percentages.

RESULTS

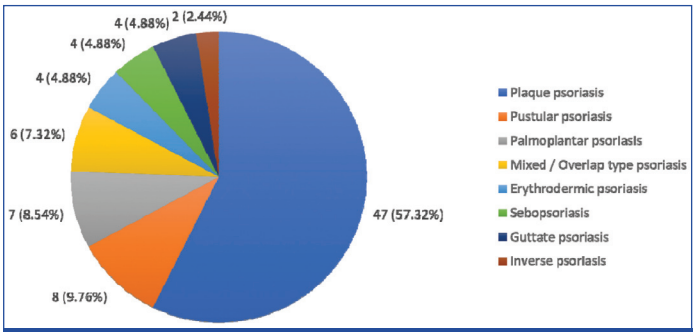
A. Study population and demographics: A total of 82 inpatient records of psoriasis were included in the analysis. The mean age of the patients was 51.9±16.4 years (range: 7-82 years). Male patients constituted 44 (53.66%), while females accounted for 38 (46.34%) of the study population. The age and sex distribution of the study population is shown in [Table/Fig-1].

B. Clinical profile and hospital stay: Plaque psoriasis was the most common clinical type observed among hospitalised patients, followed by other variants including erythrodermic, pustular, guttate, and scalp psoriasis. The distribution of clinical types of psoriasis among hospitalised patients is presented in [Table/Fig-2]. Multiple co-morbidities were observed in a considerable proportion of patients, with diabetes mellitus and hypertension being the most frequently documented. The clinical co-morbidities observed are summarised in [Table/Fig-3].

The mean duration of hospital stay was 5.8±4.0 days (range: 1-16 days). More than half of the patients 46 (56.10%) had a hospital



[Table/Fig-1]: Age group: (1a) and sex distribution; (1b) of psoriasis inpatients (n=82).
Note: Values are expressed as number (percentage). Mean age of the study population was 51.9±16.4 years.



[Table/Fig-2]: Distribution of clinical types of psoriasis among hospitalised patients (n=82).

Co-morbidity	Count (n)	Percentage (%)
No co-morbidity	48	58.54
Diabetes mellitus	8	9.76
Hypertension	11	13.41
DM + HTN	2	2.44
Psoriatic arthritis	2	2.44
Psoriatic arthritis + DM	4	4.88
Others*	7	8.54
Total	82	100

[Table/Fig-3]: Clinical co-morbidities observed in psoriasis patients (n=82).
*Others include: cellulitis, hypothyroidism, asthma, rheumatoid arthritis, depressive disorder, bronchopneumonia, seizure disorder, and prurigo nodularis.

stay of ≤5 days, while 20 (24.39%) stayed for 6-10 days and 16 (19.51%) for more than 10 days.

C. Drug utilisation pattern: A total of 640 drugs were prescribed across 82 prescriptions, with a mean of 7.80±3.52 drugs per prescription, indicating a moderate to high degree of polypharmacy. Corticosteroids constituted the most frequently prescribed class of drugs, predominantly in topical formulations. Other commonly prescribed drug classes included antihistamines, antibiotics, emollients, systemic immunosuppressants, antimetabolites, and vitamin/mineral supplements. Antibiotics were prescribed in 32 (39.02%) prescriptions. In the overall study population, 28 (34.15%) patients received systemic antibiotics and 6 (7.32%) received topical antibiotics, with some patients receiving both. Immunosuppressive agents were prescribed in 35 (42.68%) patients. Among these, Cyclosporine was prescribed in 17 (20.73%) patients and Methotrexate in 16 (19.51%) patients, making them the most frequently used immunosuppressants, followed by Azathioprine in 2 (2.44%) patients. Among other anti-psoriatic drugs, Apremilast was prescribed in 17 (20.73%) patients, while Tofacitinib was used in 6 (7.32%) patients and systemic retinoids, including Acitretin and occasional off-label use of Isotretinoin, were used in 4 (4.88%) patients. The distribution of major drug classes according to route of administration (topical versus systemic) is presented in [Table/Fig-4]. Overall, topical formulations constituted the majority of prescribed dosage forms, followed by oral preparations and injectable formulations.

Drug name/group		Topical n (%)	Systemic n (%)
Antibiotics		6 (7.32%)	28 (34.15%)
Corticosteroids		51 (62.20%)	17 (20.73%)
Emollients		66 (80.49%)	0 (0.00%)
Immunosuppressants (Methotrexate, Cyclosporine, Azathioprine)		0 (0.00%)	35 (42.68%)
Other systemic anti-psoriatic agents	Apremilast	0 (0.00%)	17 (20.73%)
	Tofacitinib	0 (0.00%)	6 (7.32%)
	Retinoids (Acitretin or off-label Isotretinoin)	0 (0.00%)	4 (4.88%)

[Table/Fig-4]: Distribution of major drug classes prescribed by route of administration in psoriasis inpatients (n=82 patients).

Among topical corticosteroids, Clobetasol propionate was the most frequently prescribed agent, used in 34 (41.46%) patients, followed by Mometasone furoate in 9 (10.98%) patients, Fluticasone propionate in 4 (4.88%) patients, and Halobetasol propionate in 3 (3.66%) patients. Betamethasone-based combination preparations were prescribed in 4 (4.88%) patients.

Among systemic corticosteroids, injectable Dexamethasone was used in 11 (13.41%) patients, while oral Prednisolone and Methylprednisolone were prescribed in 5 (6.10%) and 2 (2.44%) patients, respectively. The detailed distribution of corticosteroids according to dosage form and generic name is presented in [Table/Fig-5].

Dosage form	Generic name	Brand name (s)	Patients n (%)
Topical	Clobetasol propionate	Clonate, Clop, Clop-S, Clop-G	34 (41.46%)
	Halobetasol propionate	Halovate	3 (3.66%)
	Mometasone furoate	Momate, Sorvate	9 (10.98%)
	Fluticasone propionate	Flutivate	4 (4.88%)
	Betamethasone combinations	Dipsalic, Propsalic	4 (4.88%)
Oral	Prednisolone	Wysolone	5 (6.10%)
	Methylprednisolone	Zempred	2 (2.44%)
Injectable	Dexamethasone	Dexa, Dexamethasone	11 (13.41%)

[Table/Fig-5]: Distribution of corticosteroids prescribed among psoriasis inpatients according to dosage form and generic name (n=82).

D. WHO prescribing indicators and guideline adherence: According to WHO prescribing indicators, antibiotics were prescribed in 32 (39.02%) encounters, predominantly among patients with severe clinical presentations such as erythrodermic and pustular psoriasis, particularly in those with suspected secondary bacterial skin infections or systemic features; third-generation cephalosporins and macrolides were the most frequently prescribed agents. Injectable formulations were used in 25 (30.49%) prescriptions. At the drug level, 192 (30.00%) drugs were prescribed by generic name and 277 (43.28%) drugs were from the essential medicines list. Fixed-dose combinations constituted 130 (20.31%) drugs of the total drugs prescribed, while 43 (52.44%) prescriptions contained at least one fixed-dose combination. Complete prescriptions with all essential parameters were observed in 64 (78.05%) cases.

Adherence to NICE treatment guidelines was observed in 50 (60.98%) prescriptions. The detailed WHO core prescribing and clinical quality indicators observed in the study are summarised in [Table/Fig-6] [7,13].

Category	Indicator	Finding (n/N)	Result	Optimum WHO value
WHO prescribing indicators (patient-level)	Average number of drugs per prescription	640/82	7.80	1.6-1.8
	Prescriptions with ≥1 antibiotic	32/82	39.02%	20-26.8%
	Prescriptions with ≥1 injection	25/82	30.49%	13.4-24.1%
	Prescriptions with ≥1 essential medicine (EML)	72/82	87.80%	100%
	Prescriptions with ≥1 fixed-dose combination (FDC)	43/82	52.44%	-
WHO prescribing indicators (drug-level)	Drugs from Essential Medicine List	277/640	43.28%	100%
	Drugs prescribed as FDCs	130/640	20.31%	-
	Drugs prescribed by generic name	192/640	30.00%	100%
Clinical quality indicators	Prescriptions written completely (dose, route, frequency, duration)	64/82	78.05%	-
	Adherence to standard treatment guidelines (NICE)	50/82	60.98%	-

[Table/Fig-6]: WHO core prescribing and clinical quality indicators among psoriasis inpatients (n=82 prescriptions; 640 drugs).
Optimum values are based on published standard values and WHO prescribing indicators [7,13]. WHO does not specify optimum values for fixed-dose combinations, prescription completeness, or guideline adherence.

E. Adverse drug reactions: No adverse drug reactions were documented in the inpatient records during the study period.

DISCUSSION

The present retrospective study evaluated drug utilisation patterns among hospitalised patients with psoriasis using WHO core prescribing indicators and assessed adherence to NICE guidelines [5,7]. The study demonstrated moderate to high polypharmacy (7.80±3.52 drugs per prescription), predominant use of topical corticosteroids, frequent utilisation of systemic immunosuppressants, substantial antibiotic exposure, low generic prescribing, and moderate adherence to guideline-recommended therapy, reflecting the multifaceted nature of inpatient psoriasis management [14].

The demographic profile with predominance of middle-aged adults and a slight male preponderance is consistent with previous Indian reports [3,11,12]. Plaque psoriasis was the most common clinical subtype, in line with global epidemiological trends, and metabolic co-morbidities (such as diabetes and hypertension) were frequent, contributing to increased medication burden during hospitalisation [1,2].

The average number of drugs per prescription was higher than values generally reported for rational prescribing in general patient populations [14]. Polypharmacy is commonly defined in clinical studies as the prescription of more than five drugs per encounter; accordingly, the average of 7.8 drugs per prescription observed in the present study indicates polypharmacy [14]. Similar findings have been reported in psoriasis and dermatology inpatient studies from India, attributable to severe disease, co-morbidities, secondary infections, and supportive therapy requirements [10,11]. Comparable inpatient drug utilisation patterns have also been documented in other tertiary care dermatology settings in India [10,11]. Excessive drug use increases the risk of adverse effects, interactions, and treatment cost, emphasising the importance of prescription audits and rational drug-use strategies [14].

Topical corticosteroids, particularly Clobetasol propionate, were the most frequently prescribed agents, consistent with current therapeutic practice in India [12,15,16]. However, irrational or prolonged use of potent topical corticosteroids is associated with several local adverse effects, including skin atrophy, striae, purpura, telangiectasia, acneiform eruptions, and pigmentary changes, as well as systemic complications such as hypothalamic-pituitary-adrenal axis suppression, Cushing's syndrome, increased risk of glaucoma and cataracts, and growth retardation in children, underscoring the need for appropriate potency selection and duration of therapy [15]. The frequent use of fixed-dose combinations reported in similar settings further raises concerns regarding safety, potential adverse effects, and cost-effectiveness, particularly when such combinations lack clear therapeutic justification [8,17].

Among systemic therapies, Methotrexate and Cyclosporine were the most commonly utilised immunosuppressants, in accordance with recommended management strategies for moderate to severe psoriasis [16]. Prolonged use of Methotrexate may lead to adverse effects such as hepatotoxicity, bone marrow suppression, pancytopenia, and increased susceptibility to infections [18,19]. Similarly, Cyclosporine is associated with adverse effects including nephrotoxicity, hypertension, hyperlipidaemia, hyperuricaemia, and an increased risk of opportunistic infections, along with cosmetic effects such as hirsutism and gingival hyperplasia, necessitating careful monitoring during therapy [20,21]. Biologic agents were rarely prescribed in the study population, a pattern also observed nationally, largely due to high acquisition costs, the need for stringent pre-biologic screening, and restricted accessibility in routine clinical practice [12,16].

Antibiotics were prescribed in 39.02% of encounters, exceeding WHO reference values for general patient populations [7]. The most frequently prescribed antibiotics in the present study included third-generation cephalosporins such as Ceftriaxone, along with Amoxicillin-Clavulanate, Metronidazole, and Piperacillin-Tazobactam. Their use may be justified in severe forms of psoriasis such as erythrodermic or pustular psoriasis with suspected secondary bacterial infection, however, unnecessary exposure may contribute to antimicrobial resistance, highlighting the need for antibiotic stewardship programs in dermatology wards [22].

Evaluation of WHO prescribing indicators revealed suboptimal generic prescribing and moderate utilisation of essential medicines, findings comparable to earlier Indian studies [13,23]. Brand-name prescribing and use of irrational fixed-dose combinations increase treatment costs and may adversely affect adherence [8,14]. Moderate adherence to NICE guidelines suggests partial translation of evidence-based recommendations into routine practice, possibly influenced by drug availability and affordability [5].

No adverse drug reactions were documented in the inpatient records. However, adverse reactions may be expected due to polypharmacy and the use of systemic immunosuppressive agents, which are associated with potential drug-related toxicities [18,21]. Nevertheless, under-reporting of adverse drug reactions is common in retrospective hospital-based studies because ADR documentation in case records may be incomplete and spontaneous reporting systems are often underutilised, therefore, these findings

should be interpreted cautiously [24,25]. Strengthening institutional pharmacovigilance systems is therefore essential, particularly for patients receiving long-term systemic immunosuppressive therapy [24]. Furthermore, the relatively short duration of hospitalisation for most patients may have reduced the likelihood of detecting delayed adverse drug reactions during inpatient follow-up [26].

Overall, the findings highlight the need for regular prescription audits, clinician education, and development of institution-specific treatment protocols to promote rational drug use and optimise patient safety in psoriasis management [7,14].

Limitation(s)

The present study was retrospective and single-centered, with a relatively small sample size, which may limit generalisability. Disease severity scores were not uniformly available, preventing correlation between severity and prescribing patterns. Clinical outcomes and pharmacoeconomic aspects were not evaluated.

CONCLUSION(S)

In conclusion, inpatient management of psoriasis in this tertiary care setting was characterised by moderate to high polypharmacy, predominant use of topical corticosteroids and conventional systemic immunosuppressants, substantial antibiotic exposure, and moderate adherence to NICE treatment guidelines. Continuous monitoring of prescribing practices using WHO indicators, promotion of generic medicines, and implementation of antibiotic stewardship initiatives are recommended to enhance rational drug use and improve patient safety and quality of care.

REFERENCES

[1] Griffiths CEM, Armstrong AW, Gudjonsson JE, Barker JNWN. Psoriasis. Lancet. 2021;397(10281):1301-15.
[2] Parisi R, Iskandar IYK, Kontopantelis E, Augustin M, Griffiths CEM, Ashcroft DM; Global Psoriasis Atlas. National, regional, and worldwide epidemiology of psoriasis: Systematic analysis and modelling study. BMJ. 2020;369:m1590.
[3] Thappa DM, Munisamy M. Research on psoriasis in India: Where do we stand? Indian J Med Res. 2017;146(2):147-49.
[4] Smith CH, Yiu ZZN, Bale T, Burden AD, Coates LC, Eckert E, et al. British Association of Dermatologists guidelines for biologic therapy for psoriasis 2023: A pragmatic update. Br J Dermatol. 2024;190(2):270-72.
[5] National Institute for Health and Care Excellence (NICE). Psoriasis: Assessment and management (CG153) [Internet]. London: NICE; 2012 Oct 24 [updated 2017 Sep 1]. Available from: https://www.nice.org.uk/guidance/cg153.
[6] Biswas S, Lal NR, Mukhopadhyay K, Chatterjee C. Prescription audit in a dermatology outpatient setting in a tertiary care hospital of Eastern India. Bengal Physician Journal. 2025;12(4):211-12.
[7] World Health Organization. How to investigate drug use in health facilities: Selected drug use indicators. Geneva: WHO; 1993.
[8] Rajitha M, Shaik AH, Simpson GB, Shanthi AV. Study on rationality of different fixed dose drug combinations in tertiary care hospital: An evaluation study. Int J Basic Clin Pharmacol. 2020;9(3):422-25.
[9] World Health Organization. WHO model list of essential medicines - 23rd list, 2023. Geneva: World Health Organization; 2023.
[10] Bushra S, Manali N, Vishalakshi V, Bagle TR, Hire RC, Sakhare PP. Drug utilization pattern and adherence to drugs used for the treatment of psoriasis in outpatient department of dermatology at a tertiary care hospital. Int J Sci Res. 2023;12(5):53-55.
[11] Rashed MR, Muneersha TKM, Khan AKA, Mirshad PV. Pattern of drug use in psoriasis inpatients in the department of dermatology at a tertiary care teaching hospital. Int J Basic Clin Pharmacol. 2016;4(5):903-06.
[12] Rajagopalan M, Chatterjee M, De A, Dogra S, Ganguly S, Kar BR, et al. Systemic management of psoriasis patients in indian scenario: An expert consensus. Indian Dermatol Online J. 2021;12(5):674-82.
[13] Isah A, Laing R, Quick J, Mabadeje AFB, Santoso B, Hogerzeil H, et al. The Development of reference values for the WHO Health Facility Core Prescribing Indicators. West African Journal of Pharmacology and Drug Research. 2001;18(1):06-11. Doi: 10.4314/wajpdr.v18i1.14718.
[14] Kshirsagar NA. Rational use of medicines: Cost consideration & way forward. Indian J Med Res. 2016;144(4):502-05.
[15] Gabros S, Nessel TA, Zito PM. Topical Corticosteroids [Internet]. PubMed. Treasure Island (FL): StatPearls Publishing; 2025. Available from: https://www.ncbi.nlm.nih.gov/books/NBK532940/.
[16] Elmets CA, Leonardi CL, Davis DMR, Gelfand JM, Lichten J, Mehta NN, et al. Joint AAD-NPF guidelines of care for the management and treatment of psoriasis with awareness and attention to comorbidities. J Am Acad Dermatol. 2019;80(4):1073-113.
[17] Phung TL, Ong DT, Ngo NTN, Pham TT, Nguyen HT, Duong KNC, et al. Economic evaluation of fixed-dose drug combinations: A systematic review. J Appl Pharm Sci. 2024;14(12):1-26.
[18] Hamed KM, Dighriri IM, Baomar AF, Alharthy BT, Alenazi FE, Alali GH, et al. Overview of Methotrexate Toxicity: A Comprehensive Literature Review. Cureus. 2022;14(9):e29518.
[19] Marri SS, Sekar M, Adya KA, Inamadar AC, Janagond AB. Acute methotrexate toxicity managed with leucovorin and pegylated granulocyte colony-stimulating factor: A report of two cases and review of literature. Clin Dermatol Rev. 2024;8(2):149-53.
[20] Rajagopalan M, Saraswat A, Chandrashekar BS, Dhar S, Dogra S, Tahiliani S, et al. Role of cyclosporine (CsA) in immuno-dermatological conditions. Indian Dermatology Online Journal. 2022;13(5):585-99.
[21] Tapia C, Nessel TA, Zito PM. Cyclosporine. [Updated 2023 Aug 28]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK482450/.
[22] MacGibeny MA, Jo J, Kong HH. Antibiotic Stewardship in Dermatology-reducing the risk of prolonged antimicrobial resistance in skin. JAMA Dermatology. 2022;158(9):989-91.
[23] Badar V, Chavan RR, Mrunalini Chokhandre, Pradhan K. Evaluation of disease distribution and drug utilization for management of psoriasis patients in dermatology OPD of a tertiary care centre: A retrospective observational study. International Journal of Research in Medical Sciences. 2023;11(6):2000-05.
[24] Tandon VR, Mahajan V, Khajuria V, Gillani Z. Under-reporting of adverse drug reactions: A challenge for pharmacovigilance in India. Indian J Pharmacol. 2015;47(1):65-71.
[25] García-Abeijon P, Costa C, Taracido M, Herdeiro MT, Torre C, Figueiras A. Factors associated with underreporting of adverse drug reactions by health care professionals: A systematic review update. Drug Safety. 2023;46(7):625-36.
[26] Gupta PK, Kaur J, Devi G, Chaudhary S, Maria J. The pattern of adverse drug reaction reporting at a regional pharmacovigilance center in North India: A retrospective observational study. Cureus. 2025;17(9):e91812.

PARTICULARS OF CONTRIBUTORS:
1. Postgraduate Student, Department of Pharmacology, Jawaharlal Nehru Medical College, KLE Academy of Higher Education and Research (Deemed to be University) Belagavi, Karnataka, India.
2. Professor and Head, Department of Pharmacology, Jawaharlal Nehru Medical College, KLE Academy of Higher Education and Research (Deemed to be University) Belagavi, Karnataka, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. D Karthik,
Department of Pharmacology, Jawaharlal Nehru Medical College, KLE Academy of Higher Education and Research (Deemed to be University) Belagavi, Karnataka, India.
E-mail: karthikd1879@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Feb 15, 2026
- Manual Googling: Apr 02, 2026
- iThenticate Software: Apr 04, 2026 (1%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? NA
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Feb 08, 2026**
Date of Peer Review: **Mar 02, 2026**
Date of Acceptance: **Apr 06, 2026**
Date of Publishing: **Jun 01, 2026**