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Original Article

DRUG UTILIZATION PATTERN OF ANTIFUNGAL AGENTS IN PATIENTS WITH DERMATOPHYTOSIS

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ABSTRACT

Objective: Using WHO prescribing indicators, to investigate the drug usage pattern of antifungal drugs used in patients with dermatophytosis attending Outpatient Department of Dermatology in a Tertiary Care Hospital.

Methods: A prospective, observational, and cross-sectional study was carried out over three months (April to June 2024) in the Dermatology Outpatient Department at Silchar Medical College and Hospital, Assam after obtaining approval from Institutional Ethics Committee (vide no. SMC/ETHICS/M1/2024/36). WHO prescribing indicators, including the average number of drugs per encounter, percentage of generics, and essential drug list compliance, were employed to evaluate prescription quality.

Results: Among the 250 analyzed cases, Tinea corporis emerged as the most prevalent clinical form (65.2%). Miconazole was the most commonly prescribed topical agent (50.8%), while Itraconazole was the predominant systemic antifungal (79.04%). The average number of drugs per prescription was 1.42, with antifungal-specific average at 1.11. Notably, 90.42% of drugs were prescribed by generic name, and 72.11% were from the National List of Essential Medicines (NLEM) 2022. Antibiotics were co-prescribed in 30.8% of encounters, while injectable formulations were entirely absent.

Conclusion: While prescribing practices showed strength in terms of avoiding unnecessary injections and favoring generics, areas such as adherence to the NLEM and minimizing unnecessary antibiotic use require further improvement.

Keywords: Dermatophytosis, Antifungal agents, Drug utilization, WHO prescribing indicators, Rational prescribing, Prescription pattern

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INTRODUCTION

Dermatophytosis, often known as ringworm, is a superficial fungal infection that targets keratinized tissues, including the skin, hair, and nails. This dermatological ailment is among the most widespread internationally, affecting an estimated 20% to 25% of the population at some stage in their life [1]. In recent years, India has had a significant increase in dermatophytosis cases, both in incidence and in complexity and resistance patterns. The illness currently manifests in more chronic, recurrent, and treatment-resistant forms, resulting in considerable public health issues and impacting quality of life across various age groups and socioeconomic levels [2, 3].

A primary problem in controlling dermatophytosis is the indiscriminate use of antifungal agents. Excessive use, inappropriate medication selection, and inadequate treatment durations lead to antifungal resistance, therapeutic failure, and heightened healthcare expenses [4]. This concern is particularly critical in areas like Northeast India, where climatic conditions, hygiene practices, and limited access to dermatological care further complicate disease control. Notwithstanding the significant illness burden in this region, information regarding antifungal prescribing practices is limited.

Drug use studies provide insight into contemporary prescribing patterns and facilitate the evaluation of rationality through standardized instruments as the World Health Organization (WHO) core prescribing indicators [5]. These indicators—namely the average number of medications per encounter, the incidence of generic prescriptions, and adherence to the National List of Essential Medicines (NLEM)-offer actionable metrics for enhancing prescription quality and ensuring patient safety.

This study aimed to assess the prescription patterns of antifungal drugs for patients with dermatophytosis at a tertiary care hospital in Northeast India. This study seeks to enhance antifungal prescribing practices by analyzing existing prescribing trends in relation to WHO-recommended criteria, thereby promoting more rational, cost-effective, and evidence-based approaches. The objective is toanalyze the medication consumption patterns of antifungal medicines administered to patients with Dermatophytosis in the Outpatient Department of Dermatology at a Tertiary Care Hospital, utilizing WHO prescribing indicators.

MATERIALS AND METHODS

This research was conducted as a prospective, observational, cross-sectional study over a three-month period from April to June 2024. The research was performed in the Outpatient Department of Dermatology and Venereology, in collaboration with the Department of Pharmacology at Silchar Medical College and Hospital, a tertiary care teaching institution located in Assam, Northeast India. The research began after receiving approval from the Institutional Ethics Committee (permit number: SMC/ETHICS/M1/2024/36).

Patients visiting the dermatology outpatient clinic, diagnosed with dermatophytosis and meeting the established eligibility criteria, were recruited after obtaining informed written consent. Individuals aged 18 years or older, irrespective of gender, presenting for the first time with dermatophytosis and receiving antifungal therapy, were included. Participants receiving simultaneous corticosteroid treatment, individuals with a previous diagnosis of immune-mediated skin conditions, or those who declined to give consent were excluded from the study.

The requisite sample size was ascertained using Daniel's approach for prevalence studies, with a confidence level of 95%, an estimated prevalence (p) of 20%, and a margin of error (d) of 5%. This necessitated a minimum required sample size of 246; nevertheless, a

total of 250 prescriptions were ultimately analyzed to ensure data integrity.

Data were collected from each prescription using a standardized case record form, which included patient demographics, diagnosis, kind and quantity of antifungal drugs administered, and other relevant therapeutic information. The WHO core prescribing indicators were employed to evaluate the rationality of prescriptions, including the average number of medications per encounter, the percentage of drugs prescribed by their generic names, the proportion of prescriptions containing antibiotics or injectables, and the use of medications listed in the National List of Essential Medicines (NLEM) 2022 [5]. A descriptive statistical analysis was performed using Microsoft Excel 2021 to comprehend and report the results efficiently.

RESULTS

A total of 250 prescriptions for patients diagnosed with dermatophytosis were assessed. The mean age of the patients was 29.24±11.26 years, with men representing 60.8% of the cohort, indicating a little male predominance. The primary clinical presentation was tinea corporis, accounting for 65.2% of all cases, followed by additional types such as tinea cruris and tinea faciei (table 1).

Table 1: Distribution of clinical variants of dermatophytosis (n = 250)

Clinical type	Frequency	Percentage (%)
Tinea corporis	163	65.2
Tinea cruris	48	19.2
Tinea faciei/others	39	15.6

Topical antifungal agents were often prescribed, with miconazole being the most commonly used (50.8%). Supplementary agents included gentamicin-based combinations, luliconazole, ciclopirox oleamine and amorolfine formulations (table 2 and fig. 1).

Table 2: Prescribed topical antifungal agents

Topical antifungal	Frequency	Percentage (%)
Miconazole	127	50.8
Gentamicin-based combinations	77	30.8
Luliconazole	24	9.6
Ciclopirox oleamine	17	6.8
Amorolfine	5	2

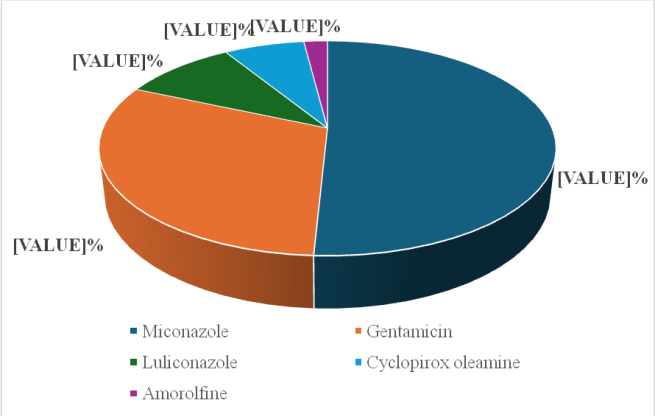

Fig. 1: Distribution of topical antifungals, itraconazole was the most often prescribed systemic antifungal, employed in 79.04% of cases. Other systemic medications were employed somewhat less often (table 3 and fig. 2)

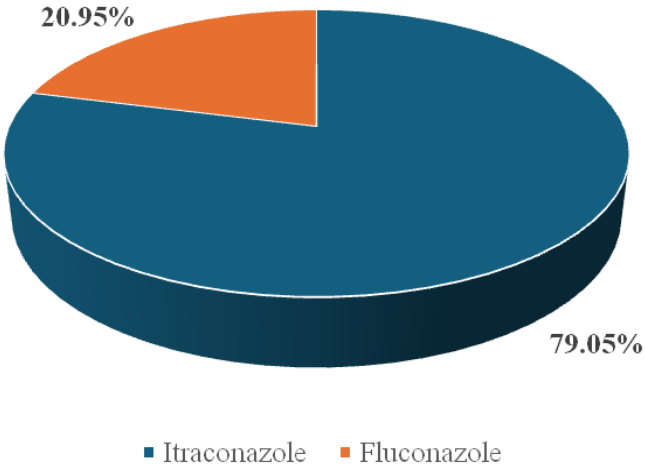

Fig. 2: Distribution of systematic antifungal medications

Table 3: Prescribed systemic antifungal agents

Systemic antifungal	Frequency	Percentage (%)
Itraconazole	198	79.04
Fluconazole	52	20.95

The WHO prescribing statistics revealed that the average number of drugs per prescription was 1.42, whereas the average number of antifungal agents per prescription was 1.11. A substantial proportion of drugs (90.42%) were prescribed under their generic names. Moreover, 72.11% of the pharmaceuticals were listed on the National List of Essential Medicines (NLEM) 2022. Nevertheless, 30.8% of encounters used antibiotics, exceeding the WHO's recommended threshold. No injectable formulations were administered during the research period.

Table 4: WHO prescription indicators (n = 250)

Indicator	Value
Average quantity of medications per prescription	1.42
Average number of antifungal medications per prescription	1.11
Proportion of pharmaceuticals administered by their generic names	90.42%
Proportion of pharmaceuticals prescribed from the NLEM 2022	72.11%
Proportion of prescriptions that include an antibiotic	30.8%
Proportion of prescriptions that include an injection	0%

These findings indicate a somewhat logical prescribing practice, especially in the avoidance of superfluous injections and the preference for generic medications. Nonetheless, there is a necessity for enhancement in adherence to important medications and the reduction of empirical antibiotic co-prescription.

DISCUSSION

This study elucidates the contemporary antifungal prescribing procedures for dermatophytosis in a tertiary care facility in Northeast India, a location where such data have traditionally been scarce. Dermatophytosis, a superficial fungal illness of increasing public health significance in India, remains a concern due to escalating resistance, recurrent infections, and illogical treatment approaches. Our findings—both promising and troubling—offer a chance to synchronize clinical practices with evidence-based prescribing standards. The prevalence of tinea corporis in this research corresponds with trends noted in several regions of India, where this clinical manifestation has become more frequent due to humidity, overcrowding, and evolving hygiene standards. A comparable proportion was observed in a 2022 study by Dey *et al.*, which analyzed 300 dermatophytosis patients in Eastern India, revealing tinea corporis in 68% of cases, hence corroborating the uniformity of regional patterns across states [6].

Our observation that miconazole was the most commonly prescribed drug (50.8%) in topical therapy is significant. Miconazole is a broad-spectrum imidazole antifungal agent characterized by excellent local tolerance. Recent studies have indicated a shift in preference towards clotrimazole or luliconazole. Sharma *et al.* discovered that clotrimazole was administered in around 60% of cases at a tertiary dermatological center in Punjab [7]. Luliconazole, although more recent and expensive, was identified as the primary topical option in a research by Patel *et al.* done in Gujarat, owing to its once-daily administration and expedited clinical response [8]. Our dependence on miconazole may be attributed to institutional availability, financial considerations, or local prescriber knowledge rather than its relative clinical efficacy.

The systemic antifungal profile in our analysis was predominantly characterized by itraconazole (79.04%), consistent with evidence-based preferences. Its fungistatic properties, superior tissue penetration, and demonstrated efficacy in resistant situations render it a preferred option for chronic or extensive infections. A 2023 multicentric investigation by Basak *et al.* corroborates this prescribing pattern, revealing that itraconazole was utilized in over 70% of dermatophytosis prescriptions at four government medical colleges in India [9]. In contrast, terbinafine, despite being regarded as a first-line treatment by worldwide criteria, was utilized significantly less often in our group. This corroborates the observations of Mahajan and Bhatia, who reported a decrease in terbinafine utilization in India attributed to developing resistance and recurrent relapses [10].

The evaluation of our setting using WHO prescription indicators yielded generally excellent results. The mean number of medications each encounter (1.42) is within the advised WHO range of 1.6–1.8, signifying negligible polypharmacy. The 90.42% rate of generic prescribing is praiseworthy, albeit marginally below the optimal 100% standard. Encouragingly, injectable formulations were not administered, aligning with sensible outpatient care. The 72.11% adherence to the National List of Essential Medicines (NLEM) indicates potential for enhancement. Jain *et al.* reported a mere 55% compliance with the National List of Essential Medicines (NLEM) in their antifungal prescribing audit in Madhya Pradesh, suggesting that our center is comparatively aligned with essential medicine standards [11].

A notable worry derived from our data is the elevated rate of antibiotic co-prescription (30.8%), exceeding the WHO's recommended range of 20–26.8%. While antibiotics may be essential for secondary bacterial infections, their habitual use without explicit clinical justification poses concerns for antimicrobial stewardship. A recent study by Verghese *et al.* in Kerala underscored comparable issues, revealing that 38% of antifungal prescriptions were inappropriately coupled with antibiotics, resulting in heightened resistance and financial burden [12].

The merits of our study are in its prospective design, real-world context, and implementation of WHO core prescribing indicators, rendering it a practical drug utilization evaluation. It provides regional perspectives from Northeast India, an area that is comparatively under-explored in dermatological pharmacotherapy. The data produced here can guide local policy and prescriber education efforts to enhance reasonable antifungal utilization. Nonetheless, certain limits must be recognized. Due to its single-center design and limited observation duration, our findings may lack generalizability to larger populations or seasonal fluctuations. Furthermore, the cross-sectional design of the study inhibited the evaluation of long-term treatment outcomes, relapse rates, or side effects. Moreover, patient compliance with prescribed treatments was not assessed, which is an essential factor in evaluating therapeutic efficacy, especially in chronic dermatological disorders.

Future directions include expanding this study to multiple centres with larger and more diverse patient groups to yield more robust results. Integrating microbiological culture and antifungal susceptibility testing may improve clinical correlation and facilitate the monitoring of evolving resistance patterns. Moreover, including qualitative methods-such as interviews with prescribers—may reveal behavioural aspects influencing illogical prescribing. Our findings highlight both favourable trends and areas for improvement. They emphasize the importance of institutional

protocols, continuous prescriber education, and routine evaluations to promote more logical, effective, and patient-centered antifungal treatment in India.

CONCLUSION

This study provides a comprehensive assessment of antifungal prescribing practices for patients with dermatophytosis at a tertiary care hospital in Northeast India. It underlines the strengths and deficiencies in contemporary dermatological prescribing procedures when evaluated against WHO core prescribing parameters. The prevalence of tinea corporis as the principal clinical manifestation underscores national trends, whereas the common utilization of miconazole and itraconazole indicates prescriber dependence on recognized antifungal medications. The low average number of medications per contact and the total lack of injectable formulations suggest compliance with rational outpatient care concepts. Nonetheless, apprehensions persist over the concomitant prescription of antibiotics and partial compliance with the National List of Essential Medicines (NLEM 2022). The findings indicate the necessity for focused prescriber education, localized treatment protocols, and regular audits to guarantee the safe, effective, and evidence-based application of antifungals, especially in high-burden and neglected areas such as Northeast India. In the future, broadening the scope of this research through multicentric and longitudinal investigations, while integrating antifungal resistance patterns, will be essential for enhancing treatment outcomes and mitigating the proliferation of chronic and resistant dermatophytosis.

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AUTHORS CONTRIBUTIONS

All authors have contributed equally

CONFLICT OF INTERESTS

The authors assert that there are no conflicting interests that may have affected the results or presentation of this research.

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