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Original Research Article

Beyond Itch and Ringworm: Clinical Patterns, Steroid Misuse and Recurrence Drivers of Superficial Fungal Infections

Poluri Rama Mani[1], Kruthi Anuhya Agastyaraju[2]

[1]Associate Professor, Department of Dermatology, Venereology and Leprosy, GSL Medical College, Rajahmundry, Andhra Pradesh, India

[2]Consultant Dermatologist, Sri Aditya Hospital, Rajahmundry, Andhra Pradesh, India

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Corresponding Author: Dr. Poluri Rama Mani

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Abstract:

Background: Superficial fungal infections are frequent dermatological problems in tropical regions and are increasingly associated with recurrence, treatment modification and irrational topical steroid use.

Aim: To assess the clinical pattern and associated risk factors of superficial fungal infections among Dermatology OPD patients in a tertiary care hospital.

Methods: This prospective observational study was conducted at GSL Medical College, Rajahmundry, from July 2025 to November 2025. A total of 133 clinically suspected patients were evaluated. Demographic details, clinical pattern, duration, recurrence, comorbidities, hygiene practices, family history, sharing habits and prior topical medication use were recorded. KOH examination was performed where indicated. Data were analysed using descriptive statistics and chi-square test.

Results: The mean age was 34.62 ± 13.48 years, and males constituted 61.7%. Tinea corporis was the commonest pattern (36.1%), followed by tinea cruris (24.8%) and mixed tinea infection (15.0%). KOH positivity was 72.2%. Steroid/steroid–antifungal use was reported in 43.6% and was significantly associated with recurrence and extensive disease. Diabetes was also associated with recurrence.

Conclusion: Steroid misuse, sweating, occlusive clothing, poor hygiene and diabetes were important contributors to superficial fungal infections and recurrence.

Keywords: Superficial fungal infection; Dermatophytosis; Tinea corporis; KOH mount; Topical steroid misuse.

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Introduction

Superficial fungal infections are among the most frequent dermatological conditions encountered in outpatient practice, particularly in tropical countries where humidity, overcrowding, occlusive clothing, poor hygiene, diabetes, and irrational use of topical steroid–antifungal combinations favour persistence and recurrence. Recent literature highlights a rising burden of dermatophytosis, changing clinical patterns, chronicity, relapse, and increasing concern about antifungal resistance, especially with Trichophyton indotineae and related species [1, 2]. In India, dermatophytosis has increasingly presented as extensive, recurrent, and treatment-modified disease, making local clinical and risk-factor profiling important for rational prevention and treatment strategies [3]. Evaluation of demographic factors, site-wise distribution, clinical types such as tinea corporis, tinea cruris, tinea faciei, tinea pedis and onychomycosis, associated comorbidities, treatment history, hygiene practices, family contact, and steroid misuse can provide useful epidemiological information. The present study aimed to assess the pattern of superficial fungal infections and associated risk factors among patients attending the dermatology OPD.

Methods:

This prospective observational study was conducted in the Department of Dermatology, Venereology and Leprosy, GSL Medical College, Rajahmundry, Andhra Pradesh, from July 2025 to November 2025. The study included patients attending the Dermatology outpatient department with clinical features suggestive of superficial fungal infection. Patients of all age groups and both gender who presented with lesions clinically compatible with dermatophytosis, pityriasis versicolor, candidiasis, or other superficial mycoses were considered eligible. Patients who were unwilling to participate, those with incomplete clinical details, and those who had severe systemic illness preventing proper dermatological examination were excluded. After obtaining informed consent, each patient was enrolled consecutively until the required sample size

was achieved. Institutional ethical approval was obtained before initiation of the study, and confidentiality of patient information was maintained throughout the research.

A structured case record form was used to collect demographic, clinical, and risk-factor-related information. Details such as age, gender, residence, occupation, socioeconomic background, duration of symptoms, recurrence, previous treatment history, use of over-the-counter topical preparations, steroid–antifungal combination use, family history of similar lesions, sharing of towels or clothing, personal hygiene practices, excessive sweating, occlusive clothing, diabetes mellitus (DM), obesity, immunosuppression, and other comorbidities were recorded. A complete dermatological examination was performed in adequate light, and lesions were classified according to the site and clinical pattern. The common clinical types assessed included tinea corporis, tinea cruris, tinea faciei, tinea pedis, tinea manuum, tinea capitis, onychomycosis, candidiasis, and pityriasis versicolor. The number of lesions, extent of involvement, inflammatory changes, scaling, itching, secondary infection, and treatment-modified morphology were documented. Where clinically indicated, skin scrapings, nail clippings, or hair samples were collected from the active margin of lesions under aseptic precautions for direct microscopy using potassium hydroxide preparation.

Data were entered into Microsoft Excel and analysed using IBM SPSS Statistics software. Categorical variables such as gender, clinical type, site of infection, risk factors, recurrence, topical steroid use, and KOH positivity were expressed as frequencies and percentages. Continuous variables such as age and duration of illness were summarized as mean, standard deviation, median, and range as appropriate. The association between superficial fungal infection patterns and selected risk factors was assessed using the chi-square test or Fisher's exact test. Student's t-test or Mann–Whitney U test was used for comparison of continuous variables where applicable. $P<0.05$ was considered statistically significant.

Results

Among 133 patients with superficial fungal infections, the mean age was 34.62 ± 13.48 years, with the highest proportion in the 21–30 years age group (30.1%) (Table 1). Male constituted 61.7%, giving a male-to-female ratio of 1.6:1 (Table 1). Most patients were from urban areas (57.9%), and students/manual workers together formed a major occupational group (Table 1). The mean duration of symptoms was 5.84 ± 4.21 weeks. Recurrent infection was reported by 36.1%, while family history of similar lesions was present in 27.8% of cases (Table 3, Table 4). Tinea corporis was the commonest clinical pattern, observed in 36.1%, followed by tinea cruris (24.8%), mixed tinea infection (15.0%), pityriasis versicolor (9.8%), candidiasis (7.5%), tinea pedis/manuum (4.5%), and onychomycosis (2.3%) (Table 2). KOH positivity was observed in 96 cases (72.2%) (Table 4). Major risk factors included excessive sweating (54.1%), occlusive/tight clothing (45.1%), poor personal hygiene (39.8%), sharing of towels/clothes (33.8%), DM (15.0%), and immunosuppressive drug use (6.0%) [Table 3]. Prior topical steroid or steroid–antifungal combination use was reported in 58 patients (43.6%) (Table 3) and was significantly associated with recurrent infection (56.9% vs. 20.0%, $\chi^2 = 19.56$, $p < 0.001$) (Table 4) and extensive/multiple-site involvement (43.1% vs. 18.7%, $\chi^2 = 9.48$, $p = 0.002$). DM was also significantly associated with recurrent disease (55.0% vs. 32.7%, $p = 0.048$) (Table 4). KOH positivity was significantly higher among recurrent cases compared with first-episode cases (85.4% vs. 64.7%, $p = 0.011$) (Table 4).

Table 1.:Demographic profile of patients with superficial fungal infections

Variable	Category	Frequency	%
Age group	≤20	21	15.8
	21–30	40	30.1
	31–40	32	24.1
	41–50	23	17.3
	>50	17	12.8
Gender	Male	82	61.7
	Female	51	38.3
Residence	Rural	56	42.1
	Urban	77	57.9
Occupation	Student	29	21.8
	Manual worker	33	24.8
	Homemaker	26	19.5
	Office worker	24	18
	Others	21	15.8

Table 2: Clinical pattern of superficial fungal infections		
Clinical diagnosis	**Frequency**	**%**
Tinea corporis	48	36.1
Tinea cruris	33	24.8
Mixed tinea infection	20	15
Pityriasis versicolor	13	9.8
Cutaneous candidiasis	10	7.5
Tinea pedis / tinea manuum	6	4.5
Onychomycosis	3	2.3

Table 3: Risk factors among patients with superficial fungal infections; n (%)		
Risk factor	**Present**	**Absent**
Excessive sweating	72 (54.1)	61 (45.9)
Occlusive / tight clothing	60 (45.1)	73 (54.9)
Topical steroid or steroid–antifungal use	58 (43.6)	75 (56.4)
Poor personal hygiene	53 (39.8)	80 (60.2)
Sharing towels / clothes	45 (33.8)	88 (66.2)
Family history of similar lesions	37 (27.8)	96 (72.2)
Diabetes mellitus	20 (15.0)	113 (85.0)
Immunosuppressive drug use	8 (6.0)	125 (94.0)

Table 4: Association of selected risk factors with recurrent fungal infection					
Risk factor		**Recurrent infection**	**First episode**	**Test statistic**	**p-value**
Topical steroid / steroid–antifungal use	Present	33 (56.9)	25 (43.1)	$\chi^2 = 19.56$	<0.001
	Absent	15 (20.0)	60 (80.0)		
Diabetes mellitus	Present	11 (55.0)	9 (45.0)	$\chi^2 = 3.91$	0.048
	Absent	37 (32.7)	76 (67.3)		
Family history	Present	18 (48.6)	19 (51.4)	$\chi^2 = 3.39$	0.066
	Absent	30 (31.3)	66 (68.7)		
Microscopy	KOH positive	41 (42.7)	55 (57.3)	$\chi^2 = 6.41$	0.011
	KOH negative	7 (18.9)	30 (81.1)		

Discussion

In the present prospective study of 133 Dermatology OPD patients with superficial fungal infections, the disease burden was highest among young adults, particularly the 21–30 years age group, and male constituted nearly two-thirds of cases. This pattern is clinically meaningful because young adults are more likely to be exposed to outdoor work, sweating, occlusive clothing, close interpersonal contact, gymnasium or hostel environments, and repeated self-medication. Similar age and gender distributions have been reported from Indian tertiary-care settings, where dermatophytosis commonly affects the economically productive age group and causes repeated OPD visits, treatment expenditure, and impaired quality of life [4, 5]. Jahappriya et al., in a recent clinicomycological study from Tamil Nadu, also reported tinea corporis as the predominant clinical presentation, supporting the current observation that glabrous-skin dermatophytosis remains the commonest superficial fungal infection in routine dermatology practice [6]. The mean symptom duration of 5.84 weeks in the present study suggests that many patients presented after a delay, probably due to self-medication, initial relief with topical steroid-containing preparations, or treatment from non-specialist sources. This is important because the Indian dermatophytosis scenario has changed from short-duration, easily treated tinea to chronic, recurrent, steroid-modified and recalcitrant disease [7].

Tinea corporis was the commonest clinical pattern in this study, followed by tinea cruris, mixed tinea infection, pityriasis versicolor, candidiasis, tinea pedis/manuum and onychomycosis. This distribution is in agreement with Indian studies showing predominance of tinea corporis and tinea cruris, either alone or in combination, among OPD patients with superficial mycoses [8]. Shah et al., in a western Indian clinicomycological study, observed that tinea corporis et cruris was the most frequent presentation, while studies from other Indian regions have similarly reported the trunk, groin and flexural areas as common sites because warmth, moisture and friction favour fungal multiplication [8, 9]. The presence of mixed tinea infection in 15% of patients in the present study is also relevant, as multiple-site involvement is increasingly recognized in the current Indian epidemic-like situation of dermatophytosis [7]. Extensive lesions may reflect delayed consultation, steroid-modified morphology, reinfection from household contacts, inadequate

treatment duration, or poor adherence. The relatively lower frequency of onychomycosis in this study may be due to OPD-based recruitment focused on symptomatic superficial fungal infections of skin rather than nail disease, but nail involvement should not be ignored because it may act as a reservoir for recurrence.

The KOH positivity rate in this study was 72.2%, indicating that bedside mycological confirmation remains useful in routine dermatology practice. Although clinical diagnosis is often straightforward in classical annular scaly lesions, modified morphology after topical steroid use can make diagnosis difficult. KOH examination is inexpensive, rapid, and suitable for tertiary-care and resource-limited Indian settings. Recent real-world Indian data indicate that many dermatologists use KOH mount at initiation of therapy, particularly in recurrent or atypical cases [10]. The current finding that KOH positivity was significantly higher among recurrent cases than first-episode cases suggests that persistent viable fungal elements may contribute to repeated symptoms, especially when treatment is inadequate or interrupted. Saha et al. emphasized the value of clinicomycological evaluation in treatment-naïve, chronic and recurrent dermatophytosis, while other Indian studies have shown that changing species distribution and antifungal susceptibility patterns are contributing to diagnostic and therapeutic complexity [7, 11]. Therefore, KOH examination should be encouraged before prescribing systemic antifungals, in steroid-modified lesions, and in recurrent disease. Where possible, fungal culture and susceptibility testing may further improve management, especially in non-responders.

Risk-factor analysis showed that excessive sweating, occlusive or tight clothing, poor personal hygiene, sharing of towels or clothes, family history, diabetes mellitus, immunosuppressive drug use and topical steroid/steroid–antifungal combination use were important associated factors. These findings are consistent with the Indian literature, which identifies humidity, overcrowding, shared fomites, close family contact, tight clothing, poor hygiene and host-related comorbidities as contributors to persistence and transmission [7]. Dogra and Uprety described chronic and recurrent dermatophytosis in India as a deeper public-health problem, involving host, fungus, drug and environmental factors rather than a simple superficial infection [12]. The significant association between diabetes mellitus and recurrence in the present study is biologically plausible because hyperglycaemia, impaired neutrophil function, altered skin barrier and increased colonization risk can favour fungal persistence. Similarly, excessive sweating and occlusive clothing create a warm, moist microenvironment that promotes dermatophyte growth. The family-history association, although not statistically significant in this dataset, remains clinically important because intra-familial spread and shared linen/clothing may maintain infection reservoirs. Hence, patient counselling should include simultaneous treatment of symptomatic family members, avoidance of shared towels, proper drying of intertriginous areas, use of loose cotton clothing, and adherence to prescribed antifungal duration.

A major finding of the present study was that 43.6% of patients had used topical steroid or steroid–antifungal combination preparations before consultation, and such use was significantly associated with recurrent infection and extensive or multiple-site disease. This observation strongly matches the Indian dermatophytosis literature. Verma and Madhu described a “great Indian epidemic” of steroid-modified dermatophytosis, linking widespread availability of irrational fixed-dose topical combinations with chronicity, altered morphology and poor response [13]. The IADVL Task Force and other Indian authors have highlighted that topical corticosteroids reduce inflammation and itching temporarily but suppress local immunity, enhance fungal proliferation, mask clinical signs, and produce tinea incognito [14, 15]. Shenoy et al., in a multicentric Indian study, reported an alarming increase in chronic, recurrent and steroid-modified dermatophytosis, while Rengasamy et al. noted increasing cases of chronic, recurrent, recalcitrant and steroid-modified glabrous-skin dermatophytosis in India [16,17]. The present association of steroid use with recurrence and extensive disease therefore supports the need for strict regulation of over-the-counter steroid combinations, pharmacist education, public awareness, and clear prescription instructions. Dermatologists should actively ask about prior cream use, because patients often describe such products as “itch cream,” “mixed cream,” or “fairness cream” without knowing the steroid content.

The findings of this study have direct implications for clinical practice and public health. Superficial fungal infections in Indian OPD settings are no longer merely minor infections; they are increasingly associated with recurrence, treatment modification, antifungal exposure and possible resistance. Indian studies have documented terbinafine resistance among Trichophyton isolates and mutations in the squalene epoxidase gene, while recent reviews have discussed the emergence of Trichophyton indotineae as a difficult-to-treat pathogen with suspected South Asian origin and global spread [18 – 20]. Although the present study did not perform culture, species identification or antifungal susceptibility testing, the high recurrence, steroid misuse and multiple-site involvement

observed here indicate the need for rational antifungal stewardship. Treatment should be based on correct diagnosis, adequate dose and duration, avoidance of steroid combinations, counselling regarding hygiene, and follow-up to confirm response. The study was limited by its single-centre design, short duration, OPD-based sampling and lack of fungal culture/speciation, but it provides useful local evidence from a tertiary-care hospital in coastal Andhra Pradesh. Overall, the results reinforce that prevention of recurrence requires not only antifungal therapy but also behavioural change, family-level intervention, control of diabetes, avoidance of occlusive clothing, and elimination of irrational topical steroid use.

Conclusion

Superficial fungal infections were common among young adults attending the Dermatology OPD, with male predominance and tinea corporis as the leading clinical pattern. A high KOH positivity rate supported the usefulness of simple mycological confirmation in routine practice. Excessive sweating, occlusive clothing, poor hygiene, sharing of towels or clothes, diabetes mellitus, family history and immunosuppressive drug use were important associated factors. Prior use of topical steroid or steroid–antifungal combinations was strongly associated with recurrence and extensive disease. Patient education, avoidance of irrational steroid combinations, hygiene improvement, family screening and rational antifungal therapy are essential to reduce recurrence.

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