

Clinicomycological Profile of Dermatophytosis in Patients Attending a Tertiary-Care Hospital in Central India: A Descriptive Study

Ms Pooja Chouhan¹, Dr Ramanath K²

¹Research Scholar; Index Medical College Hospital & Research Centre, Indore, Madhya Pradesh, India-452016.

²Professor, Index Medical College Hospital & Research Centre, Indore, Madhya Pradesh, India-452016.

Abstract

Background: Dermatophytosis is a common superficial fungal infection whose clinical distribution and causative species vary with host, environmental, occupational, and healthcare-seeking factors. Laboratory confirmation is useful because clinically similar dermatoses may be misdiagnosed and because species identification supports epidemiological surveillance and treatment planning.

Methods: A descriptive study was conducted in the Department of Microbiology, Index Medical College Hospital & Research Centre, Indore, from October 2022 to April 2025. Two hundred and fifty clinically diagnosed patients with dermatophytosis were enrolled. Patients of all ages and both sexes were eligible; those who had used antifungal agents during the preceding four weeks were excluded. Skin, hair, and nail specimens were examined by potassium hydroxide (KOH) mount and cultured on Sabouraud dextrose agar. Isolates were identified using colony morphology, microscopy, slide culture, and urease testing. Descriptive statistics were used for analysis.

Results: The largest age group was 31–40 years (68/250, 27.2%), and females accounted for 139 cases (55.6%). The most frequent occupation was homemaking (87/250, 34.8%), followed by student status (66/250, 26.4%). Tinea corporis with tinea cruris was the predominant clinical presentation (129/250, 51.6%), followed by tinea corporis alone (73/250, 29.2%). Skin scrapings constituted 239 specimens (95.6%), hair 3 (1.2%), and nail material 8 (3.2%). KOH examination was positive in 114 cases (45.6%), whereas culture yielded dermatophytes in 131 cases (52.4%). Among culture-positive isolates, *Trichophyton mentagrophytes* predominated (68/131, 51.9%), followed by *Trichophyton rubrum* (45/131, 34.3%). Less frequent isolates were *Trichophyton verrucosum* (7/131, 5.3%), *Trichophyton tonsurans* (6/131, 4.6%), *Nannizzia gypsea* (3/131, 2.3%), and *Microsporum canis* (2/131, 1.5%).

Conclusion: In this tertiary-care outpatient population, mixed tinea corporis and tinea cruris was the dominant clinical pattern, and *T. mentagrophytes* was the leading cultured dermatophyte. Culture identified additional positives among KOH-negative specimens and should complement direct microscopy when clinical suspicion is high.

Keywords: Dermatophytosis; Tinea corporis; Tinea cruris; *Trichophyton mentagrophytes*; KOH mount; fungal culture; India

1. Introduction

Dermatophytes are keratinophilic filamentous fungi that infect the stratum corneum, hair, and nails. Their clinical importance extends beyond discomfort and visible lesions because persistent or recurrent infection can affect daily activities, social participation, and quality of life. The clinical spectrum includes *Cinea corporis*, *Tinea cruris*, *Tinea faciei*, *Tinea manuum*, *Tinea pedis*, *Tinea unguium*, and *Tinea capitis*. Host immunity, sweating, maceration, occlusion, contact with infected persons or animals, and local climate all influence acquisition and persistence of infection [1] [2].

The epidemiology of dermatophytosis in India has changed over time. Although *T. rubrum* was historically reported as a frequent cause, several recent Indian studies have described a prominent role for *T. mentagrophytes* and a high burden of chronic or recurrent disease [3]. Differences between studies may reflect geography, climate, referral patterns, diagnostic methods, and the clinical characteristics of the sampled population [4] [5]. Occupation and socioeconomic circumstances may further influence exposure to heat, moisture, shared clothing, household contact, and delayed access to care [6] [7].

Clinical diagnosis alone is not always reliable. Eczematous and inflammatory disorders can resemble tinea, while prior topical corticosteroid use may alter lesion morphology. Direct KOH examination provides a rapid method for detecting fungal elements, but culture remains important when microscopy is negative, when the presentation is atypical, or when species-level epidemiological information is required [8] [9]. Conventional culture and microscopy remain practical approaches in many diagnostic laboratories, especially where molecular identification is not routinely available [10].

The present study describes the demographic characteristics, clinical patterns, specimen distribution, direct microscopy findings, culture yield, and species distribution of dermatophytes among clinically diagnosed patients attending a tertiary-care hospital in Central India.

2. Materials and Methods

2.1 Study design and setting

This descriptive hospital-based study was conducted in the Department of Microbiology, Index Medical College Hospital & Research Centre, Indore, Madhya Pradesh, India, over 18 months from October 2022 to April 2025. Participants were recruited from the outpatient Department of Dermatology and Venereology.

2.2 Participants and clinical information

A total of 250 patients with a clinical diagnosis of dermatophytosis were included. Patients of all age groups and both sexes were eligible. Patients who had used antifungal medication during the preceding four weeks were excluded. After written informed consent, information was recorded on age, sex, occupation, socioeconomic category, clinical site, duration of symptoms, previous similar episodes, treatment history, and comorbidities. Lesions were examined for number, morphology, extent, inflammatory margins, pigmentary alteration, and central clearing.

2.3 Specimen collection and direct examination

Skin scrapings were collected from the active margin of lesions after cleansing the area with 70% alcohol. In suspected hair involvement, infected hairs were plucked and scalp scrapings were collected. For nail disease, the superficial portion was discarded after cleansing and deeper nail scrapings, clippings, or subungual debris were obtained. Samples were transported promptly to the microbiology laboratory in sterile black envelopes.

Skin and hair specimens were examined with 10% KOH. Nail specimens were treated with 40% KOH and examined after overnight digestion. Preparations were assessed for hyaline, septate, branched fungal hyphae and, where applicable, the pattern of hair invasion.

2.4 Culture and identification

Specimens were inoculated onto Sabouraud dextrose agar containing chloramphenicol and cycloheximide. Cultures were incubated at 25°C and 37°C. Growth was examined daily during the first week and twice weekly for a further four weeks. Identification was based on growth rate, colony texture, topography, pigmentation on the obverse and reverse, and microscopic morphology in tease mounts and slide cultures. Urease testing was used as an additional physiological aid for identification.

2.5 Statistical analysis

Data were entered in Microsoft Excel and analysed using SPSS version 26.0. Categorical variables were summarized as frequencies and percentages. The results are presented descriptively because the study objective was to characterise the clinicomycological pattern rather than to develop a predictive model.

3. Results

3.1 Demographic and clinical profile

Among the 250 participants, 68 (27.2%) were aged 31–40 years, 62 (24.8%) were aged 21–30 years, and 45 (18.0%) were aged 41–50 years. Children aged 0–10 years accounted for 7 cases (2.8%), and participants aged 71–80 years accounted for 2 cases (0.8%). Females represented 55.6% of the sample, giving a male-to-female ratio of 0.79:1.

Homemakers were the largest occupational group (34.8%), followed by students (26.4%). The largest socioeconomic category was the middle class, comprising 90 participants (36.0%). A total of 84 participants (33.6%) had at least one recorded comorbidity. Type 2 diabetes mellitus was the most frequent comorbidity, occurring alone in 48 participants (19.2%) and with hypertension in 13 (5.2%).

Characteristic	Number	%
Age group		
0–10 years	7	2.8
11–20 years	36	14.4
21–30 years	62	24.8
31–40 years	68	27.2
41–50 years	45	18.0
51–60 years	18	7.2
61–70 years	12	4.8
71–80 years	2	0.8
Sex		
Male	111	44.4
Female	139	55.6
Occupation		
Homemaker	87	34.8
Student	66	26.4
IT professional	16	6.4

Mechanic	16	6.4
Security worker	13	5.2
Dhobi/laundry worker	13	5.2
Tailor	12	4.8
Coolie/manual worker	11	4.4
Carpenter	11	4.4
Serviceman	5	2.0

3.2 Clinical presentation and specimen distribution

Mixed Tinea corporis with Tinea cruris was the most common diagnosis, affecting 129 participants (51.6%). Tinea corporis alone was recorded in 73 (29.2%), followed by Tinea cruris in 18 (7.2%), Tinea faciei in 8 (3.2%), Tinea pedis in 7 (2.8%), Tinea unguium in 7 (2.8%), Tinea manuum in 5 (2.0%), and Tinea capitis in 3 (1.2%).

Skin was the principal specimen type, with 239 samples (95.6%). Nail specimens accounted for 8 (3.2%), and hair specimens for 3 (1.2%).

3.3 Direct microscopy and culture

KOH examination was positive in 114 of 250 samples (45.6%) and negative in 136 (54.4%). Culture on Sabouraud dextrose agar was positive in 131 (52.4%) and negative in 119 (47.6%). KOH and culture were both positive in 100 cases (40.0%). Fourteen cases were KOH-positive but culture-negative, while 31 were KOH-negative but culture-positive. Thus, culture identified dermatophytes in a subset of patients whose direct examination did not demonstrate fungal elements.

Laboratory finding	n	%
KOH positive	114	45.6
KOH negative	136	54.4
Culture positive	131	52.4
Culture negative	119	47.6
KOH positive and culture positive	100	40.0
KOH positive and culture negative	14	5.6
KOH negative and culture positive	31	12.4
KOH negative and culture negative	105	42.0

3.4 Species distribution

Six dermatophyte species were isolated from 131 culture-positive specimens. *T. mentagrophytes* accounted for 68 isolates (51.9%), followed by *T. rubrum* with 45 isolates (34.3%). Together, these two species represented 86.3% of all culture-positive isolates. The remaining isolates were *T. verrucosum* (5.3%), *T. tonsurans* (4.6%), *N. gypsea* (2.3%), and *M. canis* (1.5%). When calculated against the full cohort of 250 clinically diagnosed patients, the corresponding proportions were 27.2%, 18.0%, 2.8%, 2.4%, 1.2%, and 0.8%, respectively.

Dermatophyte species	n among isolates	% among isolates	% of all 250 patients
Trichophyton	68	51.9	27.2

mentagrophytes			
Trichophyton rubrum	45	34.3	18.0
Trichophyton verrucosum	7	5.3	2.8
Trichophyton tonsurans	6	4.6	2.4
Nannizzia gypsea	3	2.3	1.2
Microsporum canis	2	1.5	0.8
Total	131	100.0	52.4

Among the 68 *T. mentagrophytes* isolates, 40 were obtained from mixed tinea corporis with tinea cruris, 17 from tinea corporis, 4 from tinea cruris, 3 from tinea faciei, 2 from tinea manuum, 1 from tinea pedis, and 1 from tinea capitis. The 45 *T. rubrum* isolates were mainly associated with mixed tinea corporis with tinea cruris (25), tinea corporis (13), and tinea cruris (4). The smaller species groups showed broader variation in clinical site but were too small for reliable comparative inference.

4. Discussion

This study found a culture positivity rate of 52.4% among clinically diagnosed cases. The rate is comparable to reports from other Indian tertiary-care settings, although published estimates vary considerably according to climate, referral population, specimen quality, prior treatment, and laboratory methods [4] [11] [12]. The difference between a clinical diagnosis and laboratory confirmation is expected in superficial fungal disease because inflammatory and eczematous disorders can mimic tinea, while a negative direct examination may result from scanty fungal elements or suboptimal sampling [8] [10].

The largest age group was 31–40 years, followed by 21–30 years. This distribution resembles observations from Indian studies that have identified young and middle-aged adults as important affected groups [11] [12]. Mobility, outdoor activity, sweating, occlusive clothing, household responsibilities, and repeated exposure to warm or humid conditions may contribute to this pattern. The study population also showed a modest female predominance. A female predominance has been reported in some Indian studies, although sex distributions are not uniform across regions [11] [13] [14]. The observed difference should therefore be interpreted as a characteristic of this hospital cohort rather than as evidence of an inherent sex-specific susceptibility.

The predominance of mixed tinea corporis with tinea cruris is clinically important. The groin and adjacent skin are exposed to occlusion, friction, moisture, and close contact, while involvement of multiple sites can facilitate persistence and transmission. Similar predominance of combined corporis and cruris has been reported in recent Indian clinicomycological studies [11] [12] [14] [19]. The high proportion of mixed disease also suggests that clinicians should inspect more than the initially symptomatic site and should reinforce measures that reduce moisture and sharing of clothing or towels. The leading isolate was *T. mentagrophytes*, followed by *T. rubrum*. This pattern agrees with recent Indian reports in which *T. mentagrophytes* has become prominent [3] [12] [13]. The shift from older reports dominated by *T. rubrum* may reflect changes in transmission, treatment practices, population movement, and selective pressure from repeated or inappropriate topical therapy. However, species

distribution is geographically variable, and comparisons should account for differences in identification methods and sampling frames [5] [6].

KOH microscopy was positive in 45.6% of samples, whereas culture was positive in 52.4%. The 31 culture-positive/KOH-negative cases demonstrate the complementary value of culture. Conversely, 14 KOH-positive/culture-negative cases may reflect nonviable fungal elements, inadequate growth, sampling variation, or non-dermatophyte fungal material. Direct microscopy remains useful because it is rapid and inexpensive, but culture should be considered when the clinical diagnosis is uncertain, when disease is extensive or recurrent, or when species-level information is required [8] [9] [10].

The study also identified diabetes mellitus as the most common recorded comorbidity. Diabetes and other chronic illnesses may modify host defence and alter the persistence or severity of superficial infection. The presence of comorbidities in one-third of the cohort supports a clinically attentive approach that includes relevant medical history and, when indicated, evaluation for metabolic disease. The association observed here is descriptive and should not be interpreted as a causal estimate because the study did not include a control group or multivariable analysis.

5. Strengths and Limitations

A strength of this study is the use of both direct microscopy and culture in a defined tertiary-care population, with species identification performed using conventional mycological methods. The study also reports the clinical distribution and specimen type alongside laboratory findings, allowing the diagnostic yield to be interpreted in context.

The study has limitations. It was conducted at a single tertiary-care hospital and therefore may not represent the wider population of Indore or Central India. Participants were clinically diagnosed outpatients, so the culture positivity rate cannot be interpreted as community prevalence. Identification was based on conventional morphology and physiological testing rather than molecular confirmation. The analysis was descriptive and did not assess independent associations between patient factors and culture positivity. Finally, treatment response and longitudinal recurrence were not evaluated.

6. Conclusion

In this tertiary-care hospital cohort, dermatophytosis most often presented as mixed tinea corporis with tinea cruris. Adults aged 21–40 years formed the largest affected group, and females were slightly more represented than males. *T. mentagrophytes* was the predominant isolate, followed by *T. rubrum*. Culture yielded additional positives among KOH-negative specimens, supporting the use of culture as a complementary diagnostic method when clinical suspicion persists. Continued local surveillance using standardized laboratory methods is warranted because the species distribution of dermatophytes changes over time and across regions.

References

1. Jartarkar SR, Patil A, Goldust Y, Cockerell CJ, Schwartz RA, Grabbe S, Goldust M. Pathogenesis, immunology and management of dermatophytosis. *J Fungi (Basel)*. 2021;8(1):39. doi:10.3390/jof8010039.
2. Tainwala R, Sharma Y. Pathogenesis of dermatophytoses. *Indian J Dermatol*. 2011;56(3):259–261. doi:10.4103/0019-5154.82476.

3. Verma SB, Panda S, Nenoff P, Singal A, Rudramurthy SM, Uhrlass S, et al. The unprecedented epidemic-like scenario of dermatophytosis in India: I. Epidemiology, risk factors and clinical features. *Indian J Dermatol Venereol Leprol*. 2021;87:154–175.
4. Poluri LV, Indugula JP, Kondapaneni SL. Clinicomycological study of dermatophytosis in South India. *J Lab Physicians*. 2015;7(2):84–89. doi:10.4103/0974-2727.163135.
5. Bhatia VK, Sharma PC. Epidemiological studies on dermatophytosis in human patients in Himachal Pradesh, India. *Springerplus*. 2014;3:134. doi:10.1186/2193-1801-3-134.
6. Vineetha M, Sheeja S, Celine MI, Sadeep MS, Palackal S, Shanimole PE, et al. Profile of dermatophytosis in a tertiary care center. *Indian J Dermatol*. 2018;63:490–495.
7. Patro N, Panda M, Jena AK. The menace of superficial dermatophytosis on the quality of life of patients attending referral hospital in Eastern India: a cross-sectional observational study. *Indian Dermatol Online J*. 2019;10:262–266.
8. Brun S, Pihet M. Laboratory diagnosis of dermatophytosis. In: Bouchara JP, Nenoff P, Gupta AK, Chaturvedi V, editors. *Dermatophytes and Dermatophytoses*. Cham: Springer; 2021. doi:10.1007/978-3-030-67421-2_17.
9. Indian Council of Medical Research. *Standard Operating Procedures: Mycology*. 2nd ed. New Delhi: ICMR; 2019. Available from: <https://www.icmr.gov.in/guidelines>.
10. Robert R, Pihet M. Conventional methods for the diagnosis of dermatophytosis. *Mycopathologia*. 2008;166(5–6):295–306. doi:10.1007/s11046-008-9106-3.
11. Dammu RKM, Saileela K. Clinico-microbiological study of dermatophytosis in the tertiary care hospital, KMC & H, Chinakondrupadu, Guntur. *Indian J Microbiol Res*. 2020;7(3):258–264.
12. Gaba S, Panigrahi K, Kar HK, Sethy M. Clinicomycological pattern of dermatophytosis in Odisha, a coastal state of Eastern India. *Indian J Dermatol*. 2024;69(4):306–311. doi:10.4103/ijd.ijd_485_23.
13. Das S, De A, Saha R, Sharma N, Khemka M, Singh S, et al. The current Indian epidemic of dermatophytosis: a study on causative agents and sensitivity patterns. *Indian J Dermatol*. 2020;65(2):118–122. doi:10.4103/ijd.IJD_203_19.
14. Nepal, Tyagi, Kushwaha, Agrawal, Kaur. Clinicoepidemiological patterns of dermatophytosis: a cross-sectional study from Western Uttar Pradesh. *Int J Pharm Clin Res*. 2024;16(10):122–127.
15. Gupta A, Alisha, Saini R, Kaur S. Clinical patterns and epidemiological characteristics of dermatophyte infection in Malwa region of Punjab. *Int J Res Dermatol*. 2021;7:91–95.
16. Shenoy MM, Rengasamy M, Dogra S, Kaur T, Asokan N, Sarveswari KN, et al. A multicentric clinical and epidemiological study of chronic and recurrent dermatophytosis in India. *Mycoses*. 2022;65(1):13–23. doi:10.1111/myc.13360.
17. Kumar U, Chauhan MPS, Varma K. A clinico-epidemiological study of dermatophytosis in a tertiary care center, Ujjain. *IP Indian J Clin Exp Dermatol*. 2019;5(1):89–92.
18. Prabhala S, Javadekar T, Pal A. Clinicomycological profile of dermatophytosis in a tertiary care teaching hospital, Vadodara. *Indian J Microbiol Res*. 2023;10(3):155–159.
19. Eddula V, Matety AR, Deepthi CS, Chaudhuri S, Pappula V. Clinical profile and mycological profile of dermatophytosis: a cross-sectional study at a tertiary care hospital in Southern India. *Current Medical Issues*. 2024;22(4):217–221. doi:10.4103/cmi.cmi_69_24.
20. Salahudeen RV, Simi SM, Bhai G. Isolation, identification and antifungal susceptibility of dermatophytes from clinical specimens in a tertiary care hospital in South Kerala. *IP Int J Med Microbiol Trop Dis*. 2023;9(1):36–43.