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# Clinico-mycological profile of diagnosed cases of dermatophytosis in a tertiary care hospital, Pune: A Cross-Sectional Study

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## Abstract

**Background:** Dermatophytes are keratinophilic fungi that cause superficial infections of the skin, hair, and nails. The prevalence of dermatophytosis is influenced by factors, such as climate, age, gender, lifestyle, and socioeconomic status. In tropical and subtropical regions, like India, hot and humid conditions contribute to its high incidence. This study aimed to isolate and identify dermatophytes from clinically diagnosed cases of dermatophytosis.

**Methods:** A total of 100 clinically diagnosed cases were examined by direct microscopy (KOH mount) and fungal culture on Sabouraud dextrose agar (SDA) and Dermatophyte Test Medium (DTM).

**Results:** The most common clinical presentation was Tinea corporis (42%), followed by Tinea cruris (25%) and Tinea unguium (21%). Out of 100 samples, 53 were culture-positive. The predominant isolates were *Trichophyton rubrum* (30%), *Trichophyton mentagrophytes* (20%), and *Trichophyton violaceum* (13.3%). Among culture media, SDA yielded 92.45% isolates, while DTM showed higher sensitivity (96.22%).

**Conclusion**: Isolation and identification of dermatophytes are crucial for accurate diagnosis, effective treatment, and epidemiological surveillance. Understanding the local prevalence and etiological agents aids in managing therapeutic challenges and preventing transmission.

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## Introduction

Dermatophytosis, commonly known as "Tinea" or "Ringworm" infection, is a superficial fungal infection caused by dermatophytes, filamentous fungi that thrive on keratinized tissues. These fungi belong to seven primary genera: *Arthroderma*, *Epidermophyton*, *Lophophyton*, *Microsporum*, *Nannizia*, *Paraphyton*, and *Trichophyton*. They infect the stratum corneum, hair, and nails in humans and animals, leading to a highly prevalent yet non-fatal condition with significant morbidity and cosmetic concerns. The lifetime risk of acquiring dermatophytosis is estimated at 10-20%, making it one of the most frequent cutaneous fungal infections worldwide (1). The prevalence of dermatophytosis varies depending on environmental factors, personal hygiene, age, gender, and socioeconomic status. Tropical and subtropical regions, such as India, with hot and humid climates, report higher incidences due to favorable conditions for fungal growth (2). Although not life-threatening, dermatophytosis remains a major public health concern due to its chronic nature, recurrence, and impact on quality of life.

Accurate diagnosis is crucial, as the clinical presentation of dermatophytosis often mimics other dermatological disorders. Misdiagnosis can lead to inappropriate treatment, exacerbating the condition. Therefore, understanding the clinico-mycological profile of dermatophytosis is essential for initiating targeted therapy and epidemiological surveillance (3,4).

Given these considerations, the present study aimed to evaluate the clinico-mycological profile of dermatophytosis, providing insights for effective management and contributing to broader public health knowledge.

## Methods

This cross-sectional study included 100 clinically diagnosed dermatophytosis cases across all age groups and both sexes, recruited from the Outpatient Department of Dermatology and Venereology at a tertiary care hospital in Pune, India. Patients on antifungal therapy or with Tinea nigra or Tinea versicolor infections were excluded.

Skin scrapings were collected from lesion borders using a sterile scalpel after cleaning the area with 70% alcohol, while scalp hair samples were epilated with sterilized forceps. Affected nails were cleaned with 70% alcohol before scraping. All specimens were stored in sterile paper envelopes and transported to the microbiology laboratory for analysis.

In the laboratory, specimens underwent potassium hydroxide (KOH) wet mount microscopy and were cultured on Sabouraud's dextrose agar (SDA) and dermatophyte test medium (DTM) (HiMedia Laboratories Pvt. Ltd.). Fungal isolates were identified based on colony morphology, pigmentation, growth rate, microscopic features (Lactophenol cotton blue mount and slide culture), urease test, and hair perforation test. Data were entered into an Excel sheet and expressed in numbers and percentages, compiled in a table and figures.

## Results

This study analyzed 100 clinically suspected dermatophytosis cases, comprising skin scrapings (73%), nail clippings (18%), and hair strands (9%). Dermatophytes were isolated in 53% of cultures, while 47% were culture-negative. Males (62%) were more frequently affected than females (38%), with a male-to-female ratio of 1.63:1. The highest prevalence occurred in the 21-30-year age group (36%), followed by 31-40 years (20%). Occupationally, manual workers constituted the largest affected group (44%), followed by students (23%), household workers (15%), and professionals/service workers (18%).

Among the various clinical types of dermatophytosis, tinea corporis (42%) was the most common presentation, followed by tinea cruris (25%), tinea unguium (21%), tinea capitis (4%), mixed tinea corporis and cruris (6%), and tinea pedis (2%) (Figure 1). The dermatophytes isolated from these infections are detailed in Table 1, and their species-specific incidence is illustrated in Figure 2.

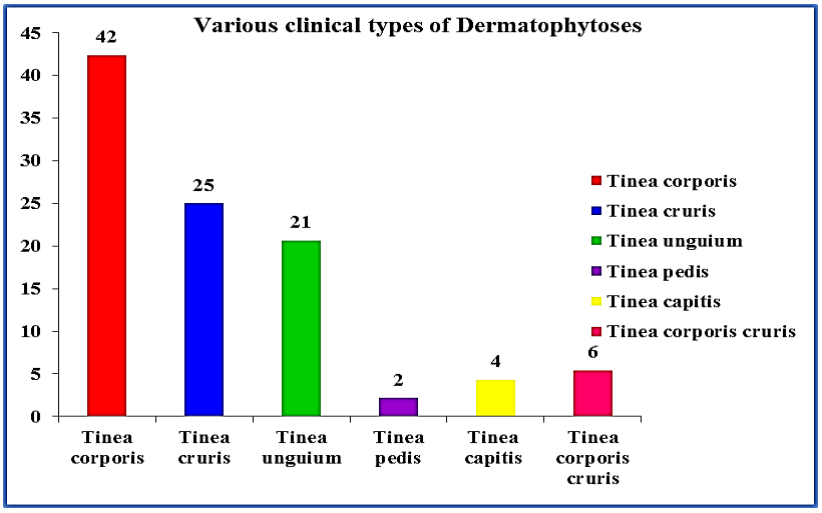


**Figure 1**. Various clinical types of dermatophytosis

**Table 1**. Dermatophytes isolated from various clinical types of dermatophytosis

| Dermatophytosis type | No. of samples | *T. rubram* | *T. mentagrophyte* | *T. violaceum* | *T. verrucosum* | *T. interdigitalae* | *T. tonsurans* | *T. soudanense* | *T. equinum* | *T. erinacae* | *Microsporum canis* | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tinea corporis** | 42 | 11 | 4 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 2 | 29 |
| | | 37% | 13% | 10% | 7% | 10% | 3% | 3% | 3% | 6% | 6% | 69% |
| **Tinea cruris** | 25 | 3 | 4 | 3 | 1 | 0 | 1 | | 0 | 0 | 0 | 12 |
| | | 12% | 33% | 25% | 8% | | 8% | | | | | 48% |
| **Tinea unguium** | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | | | 0% |
| **Tinea corporis-cruris** | 6 | 1 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 6 |
| | | 16% | 16% | 16% | 33% | | 16% | | | | | 100% |
| **Tinea capitis** | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 3 |
| | | | 25% | | | | | 25% | 25% | | | 75% |
| **Tinea pedis** | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| | | 50% | 50% | | | | | | | | | 100% |
| **Total** | 100 | 16 | 11 | 7 | 5 | 3 | 3 | 2 | 2 | 2 | 2 | 53 |
| | | 30% | 20% | 13% | 10% | 6% | 6% | 3% | 3% | 3% | 3% | 100% |

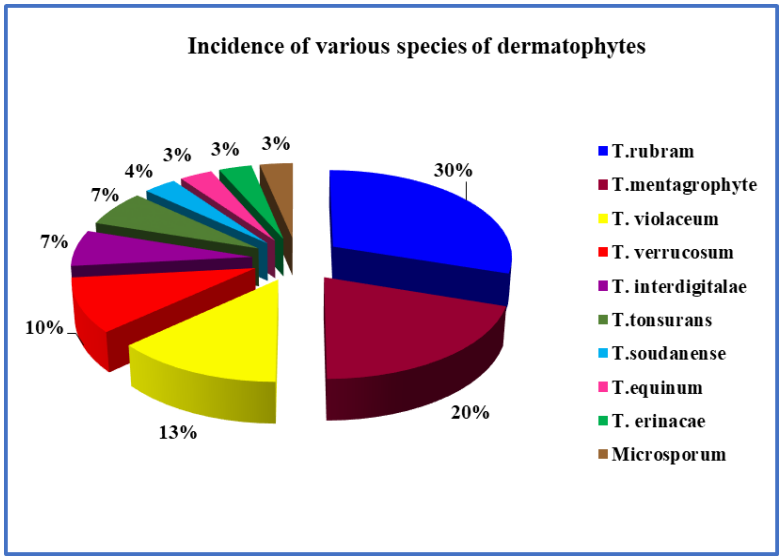


**Figure 2.** Incidence of various species of dermatophytes

In tinea corporis cases (n=42), dermatophytes were isolated in 69% (n=29) of the samples. The predominant species was *Trichophyton rubrum* (37.93%), followed by *T. mentagrophytes* (13.7%) and *T. violaceum* (10.3%). Among tinea cruris cases (n=25), 48% (n=12) had positive cultures, with *T. mentagrophytes* (33.33%) being the most frequently isolated, followed by *T. rubrum* (12%). Both tinea pedis cases (n=2) showed an equal distribution of *T. rubrum* (50%) and *T. mentagrophytes* (50%). In tinea capitis (n=4), the cultured dermatophytes included *T. mentagrophytes* (25%), *T. soudanense*, and *T. equinum*. For mixed tinea corporis and cruris (n=6), *T. verrucosum* (33.33%) was the most commonly identified species.

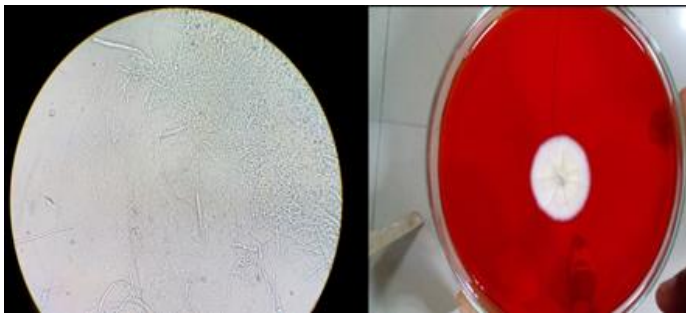

**Figure 3.** *T. rubram* tubular macroconidia and growth on dermatophyte test medium

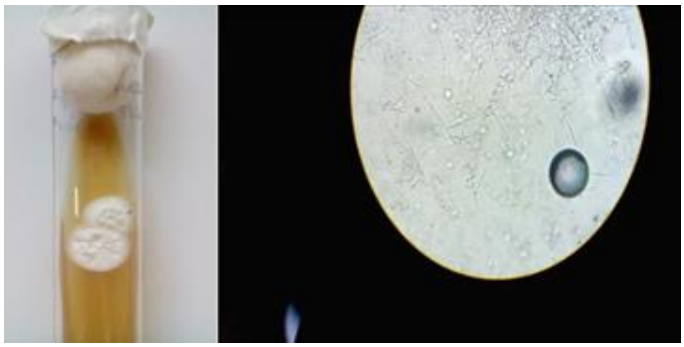

**Figure 4.** Growth of *Trichophyton mentagrophytes* on Sabouraud dextrose agar (SDA) and spiral hyphae

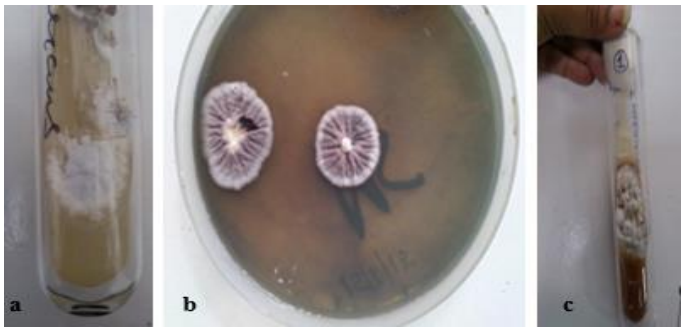


**Figure 5.** a. *Trichophyton tonsurans*; b. *Trichophyton violaceum*; c. *Trichophyton verrucosum*

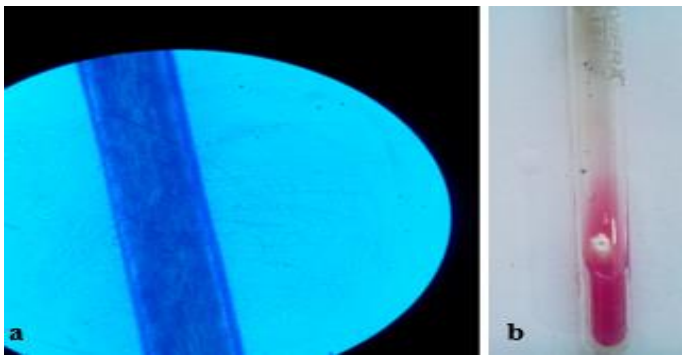


**Figure 6.** a. Hair perforation test; b. Urease test

The results of identification tests including culture, hair perforation, and urease tests are presented in Figures 3-6.

Microscopic examination with KOH correlated with culture results in 85% of cases: 50% were positive by both methods, while 35% were negative by both. The discrepancies included KOH-positive/culture-negative (12%) and KOH-negative/culture-positive (3%) results (Figure 7). Dermatophyte isolation rates were higher on dermatophyte test medium (DTM; 96.22%) than on Sabouraud dextrose agar (SDA; 92.45%).

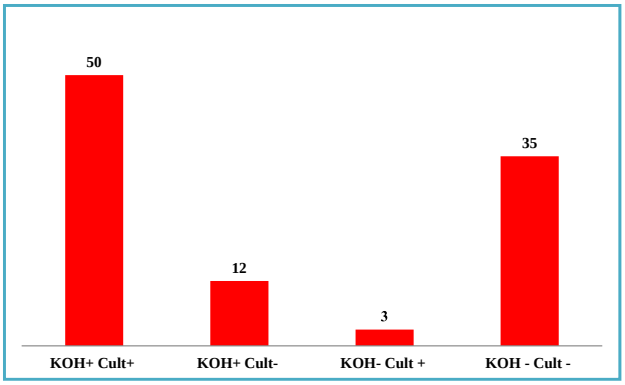


**Figure 7.** Correlation of results from microscopic preparation and culture

## Discussion

In this study, 100 clinically suspected cases of dermatophytosis were evaluated over one year, comprising skin scrapings (73%), nail clippings (18%), and hair samples (9%). Dermatophytes were isolated in 53% of cases, aligning with the findings of Sudip Das et al. (5).

Consistent with most studies (6,7), males were more frequently affected (62%) than females (38%), yielding a male-to-female ratio of 1.63:1. This disparity may reflect greater outdoor exposure among males (1,3,8), while underreporting in females could stem from social stigma in the Indian context. Manual workers (44%), particularly agricultural laborers, constituted the largest affected group, likely due to occupational exposure to heat, humidity, and trauma. Students (23%) and professionals/service workers (18%) followed, corroborating earlier reports linking dermatophytosis to physical activity and environmental factors.

The 21-30-year age group was the most susceptible (36%), consistent with studies by Sahai et al. (9), Singh et al. (8), and Hanumanthappa et al. (10). This predilection may arise from heightened physical activity, excessive sweating, and tropical climates (11). Tinea corporis (42%) and tinea cruris (25%) dominated clinically, mirroring findings of Doddamani et al. (12) (54.5% corporis, 25.5% cruris) and Singh et al. (8) (58% corporis, 12.3% cruris). The symptomatic nature of these variants (e.g., pruritus) likely drives higher hospital attendance (13).

*Trichophyton rubrum* (30%) was the predominant isolate, followed by *T. mentagrophytes* (20%) and *T. violaceum* (13.3%). These results align with those of Pandey et al. (14) (*T. rubrum*: 42.25%; *T. mentagrophytes*: 12.7%) and Saxena et al. (7). However, studies from Iran (Bassiri-Jahromi S et al. (15)) and India (Karmarkar et al. (16)) reported *Epidermophyton floccosum* (32%) and *T. violaceum* as the leading agents, respectively, highlighting regional variability. The global shift toward *Trichophyton* species, particularly *T. rubrum*, may reflect its chronicity and host adaptation (17).

KOH microscopy and culture showed 50% concordance (Positive in both), while 12% were KOH-positive/culture-negative and 3% were KOH-negative/culture-positive. Similar discrepancies were noted by Singh et al. (8) and Sumana V et al. (18). DTM (96.22% isolation rate) outperformed SDA (92.45%), consistent with Yavuzdemir et al. (19) (DTM: 95.4%; SDA: 93.5%). DTM's faster diagnosis (10-12 days vs. SDA's 14-21 days) underscores its utility, although larger studies are needed for validation.

## Conclusion

This study found that *Trichophyton rubrum* (30%) was the most common causative agent of dermatophytosis, primarily presenting as Tinea corporis (42%) and Tinea cruris (25%), with a higher

prevalence in young males (21-30 years, 36%), particularly manual laborers. KOH microscopy and fungal culture showed good diagnostic agreement (85%), while DTM proved superior to SDA (96.22% vs. 92.45% isolation rate). These findings emphasize the importance of accurate mycological diagnosis and targeted antifungal treatment to manage this highly prevalent infection effectively.

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This study was not funded.

## Ethical statement

This study was approved by the Ethical Committee, B.V.D.U. Medical College Pune.

## Conflicts of interest

The authors declared that they have no competing interests.

## Author contributions

MS: Literature search, Sample collection and Processing, Identification of isolates, Data acquisition, Data analysis, and Manuscript writing. BD: Designing the study, Identification of isolates, Data analysis, and Manuscript editing. MM: Manuscript editing and Review.

## Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## References

1. Namidi MH, Ananthnaraja T, Satyasai B. Antifungal susceptibility testing of dermatophytes by ABDD and E-Test, a comparative study. Open J Med Microbiol. 2021;11(3):129-43. [View at Publisher] [DOI] [Google scholar]
2. Chander J. In: Chapter 10, Textbook of Medical Mycology. 3rd ed. New Delhi:The Health Sciences Publisher;2009. p.122-147 [View at Publisher] [Google Scholar]
3. Kannan P, Janaki C, Selvi GS. Prevalence of dermatophytes and other fungal agents isolated from clinical samples.Indian J Med Microbiol. 2006;24(3):212-5 [View at Publisher] [DOI] [PMID] [Google scholar]
4. Bhatia VK, Sharma PC. Epidemiological studies on Dermatophytosis in human patients in Himachal Pradesh, India. Spingerplus. 2014;3:134 [View at Publisher] [DOI] [PMID] [Google scholar]
5. 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):118-22. [View at Publisher] [DOI] [PMID] [Google scholar]
6. Surendran K, Bhat RM, Boloor R, Nandakishore B, Sukumar D. A clinical and mycological study of dermatophytic infections.Indian J Dermatol. 2014;59(3):262-7 [View at Publisher] [DOI] [PMID] [Google scholar]
7. Saxena G, Sadawarte K, Songara P, Mehta A. Clinico-mycological profile of dermatophytoses at a tertiary care teaching hospital of central India. SVU-International Journal of Medical Sciences. 2022;5(2):216-27. [View at Publisher] [DOI] [Google scholar]
8. Singh S, Beena PM. Comparative study of different microscopic techniques and culture media for isolation of dermatophytoses. Indian J Med Microbiol. 2003;21(1):21-4. [View at Publisher] [PMID] [Google scholar]
9. Sahai S, Mishra D. Change in spectrum of dermatophytes isolated from superficial mycoses cases: First report from central India.Indian J Dermatol Venereol Leprol. 2011;77(3):335-6. [View at Publisher] [DOI] [PMID] [Google scholar]
10. Hanumanthappa H, Sarojin K, Clinicomycological study of 150 cases Dermatophytosis in a tertiary care hospital in South India. Indian J Dermatol. 2012;57(4):322-3. [View at Publisher] [DOI] [PMID] [Google scholar]
11. Chanyachailert P, Leeyaphan C, Bunyaratavej S. Cutaneous fungal infections caused by dermatophytes and non-dermatophytes: an updated comprehensive review of epidemiology, clinical presentations, and diagnostic testing. J Fungi (Basel). 2023;9(6):669. [View at Publisher] [DOI] [PMID] [Google scholar]
12. Doddamani PV, Harshan KH, Kanta RC, Gangane R, Sunil KB. Isolation identification and prevalence of dermatophytes in tertiary care hospital in Gulbarga district. People's J of Scientific Research. 2013;6(2):10-13 [View at Publisher] [Google Scholar]
13. Verenkar MP, Pinto MJ, Rodrigues S, Roque WP, Singh I. Clinico-Microbiological study of dermatophytoses. Indian J Pathol Microbiol. 1991;34(3):186-92. [View at Publisher] [PMID] [Google Scholar]
14. Pandey A, Pandey M. Isolation and characterization of dermatophytes with tinea infections at Gwalior (MP). Int J Pharm Sci Investig. 2013;2(2):5-8. [View at Publisher] [Google Scholar]
15. Bassiri-Jahromi S, Khaksari AA. Epidemiological survey of dermatophytosis in Tehran, Iran, from 2000 to 2005. Indian J Dermatol Venereol Leprol. 2009;75(2):142-7. [View at Publisher] [DOI] [PMID] [Google Scholar]
16. Karmarkar S, Kalla G, Joshi KR, Karmarkar S. Dermatophytoses in a desert district of Western Rajasthan. Indian J Dermatol Venereol Leprol. 1995;61(5):280-3. [View at Publisher] [PMID] [Google Scholar]
17. Jain N, Sharma M, Saxena VN. Clinico-mycological profile of dermatophytosis in Jaipur,Rajasthan. Indian J Dermatol Venereol Leprol. 2008;74(3):274-5 [View at Publisher] [DOI] [PMID] [Google Scholar]
18. Sumana V, Singaracharya MA. Dermatophytosis in Khammam (Khammam district, Andhra Pradesh, India). Indian J Pathol Microbiol. 2004;47(2):287-9. [View at Publisher] [PMID] [Google Scholar]
19. Yavuzdemir S. Comparative evaluation of the isolation of the dermatophytes by direct laboratory evidence and MSDA with MDTM culture media. Mikrobiyol Bul. 1992;26(4):367-72 [View at Publisher] [PMID] [Google Scholar]

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