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CLINICOMYCOLOGICAL STUDY OF DERMATOMYCOSES IN A TERTIARY CARE HOSPITAL

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ABSTRACT

BACKGROUND: Dermatomycoses are common superficial fungal infections affecting skin, hair, and nails, caused by dermatophytes, yeasts, and non-dermatophyte moulds. Regional variations in causative agents necessitate periodic clinico-mycological studies to guide diagnosis and treatment. The present study was conducted to assess the clinical patterns and mycological profile of dermatomycosis in patients attending a tertiary care centre.

MATERIALS AND METHODS: This study was conducted on 50 patients with clinically suspected dermatomycosis. Samples (skin scrapings, nail clippings, hair stubs) were subjected to KOH mount and culture on Sabouraud's dextrose agar. Fungal isolates were identified using standard macroscopic and microscopic techniques using LPCB mount and germ tube tests. Data were analyzed using descriptive statistics.

RESULTS: Among 50 patients, 32 (64%) were males and 18 (36%) females. The most affected age group was 21–40 years (44%). Tinea corporis (36%) and tinea cruris (20%) were the predominant clinical types. KOH mount was positive in 34 cases (68%), culture in 30 cases (60%), and overall mycological confirmation was achieved in 38 cases (76%). Dermatophytes accounted for 65.8% of isolates, with *Trichophyton rubrum (39.5%)* and *T. mentagrophytes (26.3%)* predominating. Candida spp. (18.4%) and non-dermatophyte moulds (15.8%) were mainly seen in nail and atypical infections.

CONCLUSION: Dermatophytes, particularly *T. rubrum*, remain the primary pathogens in dermatomycoses. The emergence of Candida and non-dermatophyte moulds, especially in nails, underscores the importance of culture-based diagnosis for effective therapy and prevention of recurrences.

Keywords: Dermatomycoses, Dermatophytes, Candida, Non-dermatophyte moulds, KOH mount, Sabouraud's dextrose agar

INTRODUCTION:

Dermatomycoses are superficial fungal infections involving keratinized tissues such as the skin, hair, and nails. They are among the most common human infections worldwide, affecting an estimated **20–25% of the global population** at any given time [1]. The causative agents include **dermatophytes** (genera *Trichophyton*, *Microsporum*, *Epidermophyton*), **non-dermatophyte moulds** (e.g., *Aspergillus*, *Scopulariopsis*, *Fusarium*), and **yeasts** such as *Candida* spp. [2].

In India, dermatomycoses are particularly prevalent due to hot and humid climate, overcrowding, lower socioeconomic conditions, poor hygiene, and the widespread use of topical corticosteroid–antifungal–antibacterial combinations [3,4]. The prevalence is also influenced by host factors such as immunosuppression, diabetes mellitus, and HIV infection, which predispose individuals to more severe and recurrent infections [5].

The clinical spectrum is diverse and includes **tinea corporis, tinea cruris, tinea pedis, tinea capitis, onychomycosis**, and others [6]. While these infections are rarely life-threatening, they cause significant morbidity in the form of itching, disfigurement, social stigma, and loss of productivity [7].

Traditionally, **dermatophytes, especially *Trichophyton rubrum* and *T. mentagrophytes***, have been recognized as the leading causes of superficial fungal infections worldwide [8]. However, there is increasing evidence of **non-dermatophyte moulds and yeasts** being implicated in superficial mycoses, especially in nail infections [9,10]. This shift in etiological pattern has significant therapeutic implications, as non-dermatophyte fungi often respond poorly to standard antifungal regimens used for dermatophytosis [11].

Accurate diagnosis is essential for effective management. While **direct microscopy with potassium hydroxide (KOH) mount** provides a rapid preliminary diagnosis, it lacks species identification. **Fungal culture on Sabouraud's dextrose agar (SDA)** remains the gold standard for confirming the etiological agent and for differentiating dermatophytes from non-dermatophyte moulds [12].

Considering the changing epidemiology, antifungal resistance trends, and regional variations in causative agents, periodic **clinicomycological studies** are crucial to guide effective therapy and prevent recurrence [13]. Hence, the present study was undertaken to assess the **clinical patterns and mycological profile of dermatomycosis** in patients attending a tertiary care centre.

MATERIALS AND METHODS:

Study Design and Setting

This **study** was carried out in the Department of Microbiology in collaboration with the Department of Dermatology at a tertiary care teaching hospital for a period of **six months** after written informed consent was obtained from all participants (and guardians in the case of minors).

Study Population: A total of **50 consecutive patients** of all age groups and both sexes with **clinical suspicion of dermatomycosis** were enrolled. Patients were recruited from the Dermatology Outpatient Department after detailed clinical evaluation.

Inclusion Criteria:

- Patients presenting with lesions clinically suggestive of superficial fungal infections of the **skin, hair, or nails** (e.g., tinea corporis, tinea cruris, tinea pedis, onychomycosis, tinea capitis, etc.).
- Patients willing to give **written informed consent**.

Exclusion Criteria:

- Patients who had received **topical or systemic antifungal therapy** within the preceding two weeks.
- Patients with lesions due to **other dermatoses** (psoriasis, eczema, bacterial infections).
- Unwilling or non-consenting patients.

Clinical Data Collection
For each patient, detailed demographic and clinical data were recorded on a predesigned proforma, including:
- Age, sex, occupation, personal hygiene practices.
- Duration, site, and type of lesion.
- History of prior antifungal therapy, comorbidities (e.g., diabetes, immunosuppression).

Clinical diagnosis was made by a dermatologist based on morphology and distribution of lesions.

Sample Collection
- **Skin scrapings**: Collected from the active margin of lesions after cleaning with 70% alcohol.
- **Nail clippings and subungual debris**: Obtained from affected nails in cases of onychomycosis.
- **Hair stubs and scales**: Collected in suspected cases of tinea capitis.
  All samples were collected in sterile black paper envelopes, properly labeled, and transported to the laboratory.

Direct Microscopy (KOH Mount)
- Samples were subjected to **10–20% potassium hydroxide (KOH) mount**.
- Slides were examined under light microscopy for **septate hyphae, arthroconidia, blastoconidia, or budding yeast cells**.

Fungal Culture
- All samples were inoculated onto **Sabouraud's Dextrose Agar (SDA) containing chloramphenicol (to inhibit bacteria) and cycloheximide (to suppress saprophytic fungi)**.
- Duplicate sets were incubated: one at **25–28°C** (room temperature) and another at **37°C**.
- Cultures were examined twice weekly for **up to 4 weeks** before being reported as negative.

Identification of Isolates
- **Macroscopic examination**: Colony morphology, surface and reverse pigmentation, texture, and rate of growth.
- **Microscopic examination**: Lactophenol Cotton Blue (LPCB) mount for characteristic structures such as microconidia, macroconidia, and arrangement of hyphae.
- **Dermatophytes** were identified to the species level (e.g., *Trichophyton rubrum*, *T. mentagrophytes*).
- **Candida species** were identified using germ tube test and morphology on Cornmeal agar.
- **Non-dermatophyte moulds** (e.g., *Aspergillus*, *Scopulariopsis*, *Fusarium*) were identified based on colony and conidial morphology.

Data Analysis
- Data were entered into Microsoft Excel and analyzed using descriptive statistics.
- Results were expressed as **frequencies and percentages**.
- Distribution of isolates was correlated with age, sex, and clinical type of infection.

RESULTS:
A total of **50 patients** with clinically suspected dermatomycosis were enrolled. **32 (64%) were males** and **18 (36%) were females**, giving a male-to-female ratio of 1.8:1. Patients' ages ranged from **5 to 65 years**, with a mean age of **32.4 ± 12.6 years**. The most affected age group was **21–40 years (22, 44%)**, followed by 41–60 years (13, 26%), ≤20 years (10, 20%), and >60 years (5, 10%) as shown in Table 1

Table 1. Age and sex distribution of patients

Age group (years)	Male n (%)	Female n (%)	Total n (%)
≤20	6 (12)	4 (8)	10 (20)
21–40	14 (28)	8 (16)	22 (44)
41–60	8 (16)	5 (10)	13 (26)
>60	4 (8)	1 (2)	5 (10)
Total	**32 (64)**	**18 (36)**	**50 (100)**

The most common clinical type was **tinea corporis (18, 36%)**, followed by **tinea cruris (10, 20%)**, **onychomycosis (6, 12%)**, **tinea capitis (2, 4%)**, and other forms including tinea pedis, tinea faciei, and mixed infections (14, 28%) as shown in Table 2

Table 2. Clinical types of dermatomycosis

Clinical type	Number n (%)
Tinea corporis	18 (36)
Tinea cruris	10 (20)
Onychomycosis	6 (12)
Tinea capitis	2 (4)
Others (pedis, faciei, mixed)	14 (28)
Total	**50 (100)**

Out of 50 cases **KOH positive**: 34 (68%), **Culture positive**: 30 (60%) and Both KOH and culture positive: 26 (52%). Overall, **mycological confirmation** (KOH and/or culture) was observed in **38 cases (76%)** as shown in Table 3

Table 3. Mycological Findings in Suspected Dermatomycosis Cases (n = 50)

Mycological Test	Positive n (%)	Negative n (%)
KOH Mount	34 (68)	16 (32)
Fungal Culture (SDA)	30 (60)	20 (40)
Both KOH and Culture Positive	26 (52)	–
Overall Mycological Confirmation (KOH and/or Culture)	38 (76)	12 (24)

Among the 38 confirmed cases, **dermatophytes predominated (25, 65.8%)**, followed by **Candida spp. (7, 18.4%)**, and **non-dermatophyte moulds (6, 15.8%)** as shown in Table 4

Table 4. Distribution of fungal isolates

Fungal Organism	Number of Isolates (n)	Percentage (%)
Trichophyton rubrum	15	39.5
Trichophyton mentagrophytes	10	26.3
Candida spp.	7	18.4
Non-dermatophyte moulds (e.g., *Aspergillus*, *Scopulariopsis*)	6	15.8
Total	38	100

Correlation analysis showed that **dermatophytes were the main pathogens in skin infections**, while **Candida spp. and non-dermatophyte moulds were more frequent in nails and atypical presentations** as shown in Table 5

Table 5. Correlation between clinical type and fungal isolate

Clinical Type	*T. rubrum*	*T. mentagrophytes*	*Candida* spp.	Non-dermatophyte moulds	Total n (%)
Tinea corporis	10	5	2	1	18 (36)
Tinea cruris	3	4	2	1	10 (20)
Onychomycosis	1	1	3	1	6 (12)
Tinea capitis	1	0	0	1	2 (4)
Others (pedis, faciei, mixed)	0	0	0	3	3 (7.9)
Total	15	10	7	6	38 (100)

DISCUSSION:

Dermatomycoses are among the most common superficial fungal infections worldwide, affecting **skin, hair, and nails**, and are a major cause of morbidity due to itching, cosmetic disfigurement, and recurrent infections [1]. The present study provides a **clinicodemographic and mycological profile** of dermatomycosis in a tertiary care setting, highlighting the prevalence of dermatophytes, yeasts, and non-dermatophyte moulds.

Demographics and Clinical Pattern

In this study, **male patients predominated (64%)**, with a male-to-female ratio of 1.8:1. This finding is consistent with previous Indian studies, which reported male predominance due to greater **occupational and outdoor exposure**, increased sweating, and higher likelihood of trauma and fungal inoculation [14,2]. The most affected age group was **21–40 years (44%)**, reflecting the **active working population** who are more prone to dermatophytoses due to sweating, occlusive clothing, and frequent contact with contaminated surfaces [15].

Tinea corporis (36%) and **tinea cruris (20%)** were the most common clinical presentations, in line with multiple Indian and international studies [16,17]. Onychomycosis and tinea capitis were less common (12% and 4%, respectively), which may be attributed to **sample selection and regional variations** in fungal epidemiology.

Mycological Findings

Out of 50 suspected cases, **38 (76%) were confirmed** by KOH and/or culture. **KOH mount positivity (68%)** was slightly higher than culture positivity (60%), reflecting its utility as a rapid screening tool, although culture remains the **gold standard for species identification** [18].

Dermatophytes accounted for 65.8% of isolates, with *Trichophyton rubrum* being the predominant species (39.5%), followed by *T. mentagrophytes* (26.3%). These findings are consistent with studies from various tertiary care centers in India, where *T. rubrum* is consistently the most common dermatophyte [19,20].

Interestingly, **Candida spp. (18.4%)** and **non-dermatophyte moulds (15.8%)** were also isolated, mainly in nail infections and atypical presentations. This aligns with recent reports indicating a **shift in etiological patterns**, possibly due to increased **immunosuppression, diabetes, misuse of topical corticosteroids**, and environmental factors [21,22].

Correlation Between Clinical Type and Fungal Isolates

- *T. rubrum* predominated in **tinea corporis (55.6%)** and **tinea cruris (30%)**, while *T. mentagrophytes* was more frequent in **tinea cruris (40%)**.

- **Candida spp.** were mainly associated with **onychomycosis (50%)**, reflecting the propensity of yeast to infect keratinized nail tissues under moist conditions [23].
- Non-dermatophyte moulds were isolated in 6 cases (15.8%), affecting both skin and nails, emphasizing the **need for culture-based identification**, especially in recalcitrant or atypical cases.

These findings reinforce that while dermatophytes remain the **primary causative agents of skin infections**, **yeasts and non-dermatophyte moulds are emerging contributors**, particularly in nail infections. This has important therapeutic implications, as **non-dermatophytes often respond poorly to standard antifungal therapy** [24].

CONCLUSION: Dermatophytes, particularly *T. rubrum*, remain the most common pathogens in dermatomycoses. However, the emergence of Candida spp. and non-dermatophyte moulds, especially in nail and atypical infections, highlights the need for culture-based diagnosis to guide effective therapy and prevent recurrences

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