Clinicomycological Profile of Dermatophytosis in a Tertiary Care Hospital

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KEYWORDS

Dermatophytes, Sabouraud Dextrose Agar, *Trichophyton*, *Microsporum*, *Epidermophyton*.

ABSTRACT

Background: Dermatophytosis is a prevalent cutaneous fungal infection affecting the superficial keratinized layers of the skin, hair, and nails. This study aimed to isolate and identify dermatophytes in clinically suspected cases, assess the frequency of various species, and evaluate the age- and sex-related prevalence in a specific locality. **Methods:** The study was conducted in the Department of Microbiology at DSIMSH, Perambalur. involving 150 clinically diagnosed cases of dermatophytosis. Samples (skin, hair, and nails) were aseptically collected and subjected to potassium hydroxide (KOH) mount examination and culture. Identification of dermatophytes was performed using macroscopic and microscopic examination of cultures, complemented by physiological tests, including the urease test. **Results:** Tinea corporis (41.3%) emerged as the most common clinical type, with a male-to-female ratio of 1.05:1. Dermatophytes were isolated in 108 cases, yielding an overall isolation rate of 72%. Seven species of dermatophytes were identified, with *T. mentagrophytes* (49.1%) being the most prevalent, followed by *T. rubrum* (20.4%). **Conclusion:** The identification of dermatophyte species and their ecological and host preferences is crucial for effective patient management. Rapid and accurate laboratory diagnosis is essential for timely treatment, preventing chronicity and further disease transmission.

INTRODUCTION

Dermatophytes are fungi with a unique affinity for keratinized tissues, such as the skin, hair, and nails. They induce an inflammatory response, often causing intense itching and posing significant cosmetic concerns[1]. Dermatophytosis has become a noteworthy clinical condition warranting public health attention in recent years. The causative agents of dermatophytosis belong to three anamorphic genera: *Trichophyton*, *Microsporum*, and *Epidermophyton*. Infection occurs when arthrospores or hyphae are deposited on the skin of susceptible individuals[2]. Upon inoculation, favourable conditions promote infection progression. The skin responds by accelerating basal cell layer proliferation, resulting in scaling and epidermal thickening[3,4].

Factors such as heat, humidity, overcrowding, and poor hygiene significantly increase the incidence of dermatophytosis, especially in tropical regions like India[5]. The clinical manifestations, although typical of ringworm infections, are often misdiagnosed due to the widespread use of broad-spectrum steroid-containing skin creams. Misdiagnosis leads to improper management, emphasizing the need for efficient laboratory diagnosis[6]. Despite the availability of highly effective antifungal agents, treatment failures are reported in about 20% of cases, potentially due to antifungal resistance. Accurate identification of fungal species is vital for definitive diagnosis, appropriate treatment, and preventing recurrence and chronic infection[7,8].

MATERIALS AND METHODS

Study Design and Sample Collection: The study included patients of all age groups and genders with a clinical diagnosis of dermatophytosis who visited the Department of Dermatology and Venereology at DSIMSH, Perambalur. A thorough clinical history and examination were performed to assess the number, type, and extent of lesions.

Samples were collected aseptically from active lesion margins using a sterile scalpel blade. Hair samples were collected using UV light (Wood's lamp) to identify fluorescing, distorted, or fractured hair. Nail samples were obtained by scraping deeper parts of affected nails or collecting nail clippings.

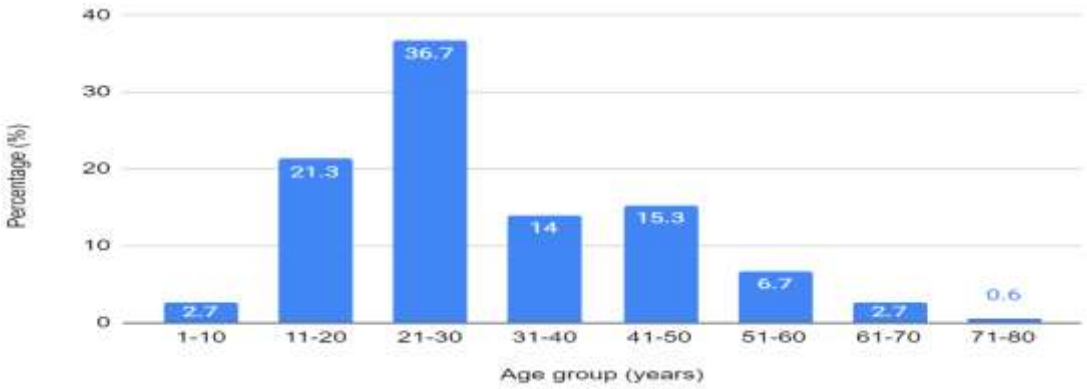
Laboratory Examination

1. **KOH Mount Examination:** Samples were treated with 10% or 40% potassium hydroxide (KOH) solution and examined microscopically for hyphae, spores, budding yeasts, or other fungal elements.
2. **Culture:** Samples were inoculated onto Sabouraud Dextrose Agar (SDA), SDA with chloramphenicol and cycloheximide, and Potato Dextrose Agar (PDA). Cultures were incubated at 25–30°C and monitored for growth over four weeks.
3. **Identification:** Dermatophytes were identified based on colony morphology, color, texture, and microscopic examination for conidia, hyphae, and other fungal structures. Additional tests, including urease activity and in vitro hair perforation, were used to differentiate *T. mentagrophytes* from *T. rubrum*.

RESULTS

The present study of dermatophytosis was carried out by the Department of Microbiology, Medical College, for a period of one year .In total of 150 clinically diagnosed cases of dermatophytosis were taken for this study. Out of the total samples collected, 114 were skin scrapings (76%), 23 nail clippings (15.3%) and 13 were hair stubs (8.7%).

Figure 1:Distribution of Dermatophytosis in various age groups



Total number of 150 cases were distributed between the age group range of 3-72 years. Age group of 21-30 years showed the highest incidence accounting for a total of 55 cases (36.7%) as seen in Figure 1.

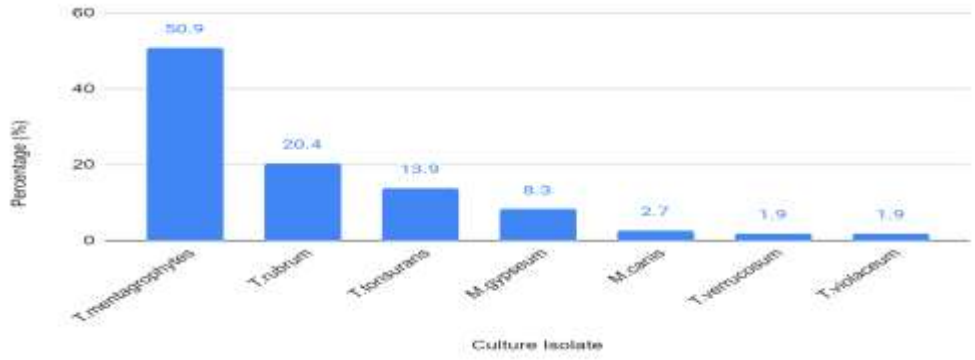
Out of the total 150 cases of dermatophytosis, males were slightly more affected with 77 cases (51.3%) than females with 73 cases (48.7%). The incidence was almost equal in both sexes with a male to female ratio of 1.05:1.

Table 1: Comparison of KoH and Culture

KOH MOUNT	CULTURE	TOTAL NO(%)
Positive	Positive	98(65.3%)
Negative	Positive	10(6.67%)
Negative	Negative	42(28%)

Out of 150 samples, both KOH and culture were positive for dermatophytes in 98 cases (65.3%). In 10 cases KOH was negative but culture was positive for dermatophytes (6.67%). Both KOH and culture were negative for dermatophytes in 42 cases (28%).Figure 2

Figure 2: Comparison of KOH positivity with culture positivity



Out of 150 cases, tinea corporis was the highest incidence with 62 cases (41.3%) followed by tinea unguium with 23 cases (15.3%).Tinea cruris and tinea capitis followed with 14 cases (9.3%) each. Figure 3 Among the total dermatophytes isolated, *T.mentagrophytes* was the most common species 55 (50.9%). This was followed by *T.rubrum* 22 (20.4%), *T.tonsurans* 15(13.9%), *M.gypseum* 9 (8.3%), *M.canis* 3 (2.7%),*T.verrucosum* 2 (1.9%) and T.violaceum 2 (1.9%).

Figure 3: Various clinical types of Dermatophytosis

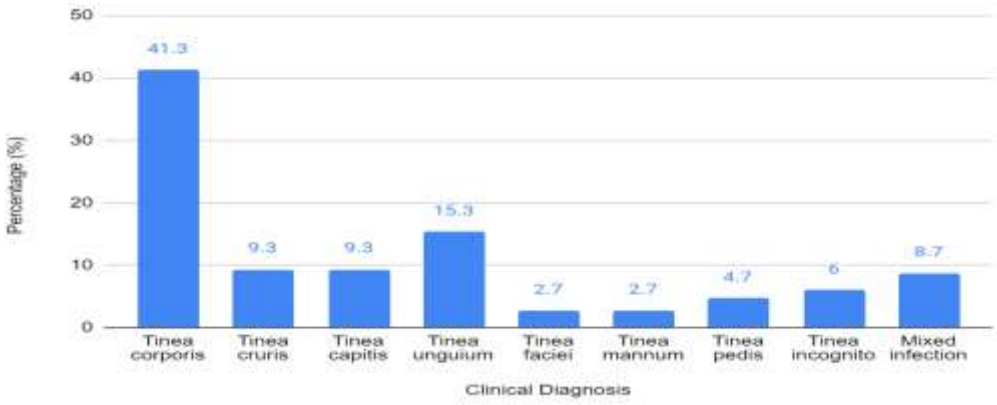


Table 2 : Dermatophytes isolated from various clinical types

Clinical types	**Total No.**	*T.mentagrophyte*	*T.rubrum*	*T.tonsurans*	*M.gypseum*	*M.canis*	*T.verrucosum*	*T.violaceum*	**Total isolated**
Tinea corporis	62	32(54.2%)	15(25.4%)	7(11.9%)	3(5.1%)	1(1.7%)	-	1(1.7%)	59(95.2%)
Tinea cruris	14	8(66.7%)	-	4(33.3%)	-	-	-	-	12(85.7%)
Tinea capitis	14	-	-	3(30%	5(50%)	1(10%)	-	1(10%)	10(71.4%)
Tinea unguium	23	1(33.3%)	2(66.7%)	-	-	-	-	-	3(13.1%)
Tinea faciei	4	1(25%)	1(25%)	-	-	-	2(50%)	-	4(100%)
Tinea manuum	4	1(33.3%)	2(66.7%)	-	-	-	-	-	3(75%)

Tinea pedis	7	3(100%)	-	-	-	-	-	-	3(42.9%)
Tinea incognito	9	2(33.3%)	2(33.3%)	-	1(16.7%)	1(16.7%)	-	-	6(66.7%)
Mixed infection	13	7(87.5%)	-	1(12.5%)	-	-	-	-	8(61.5%)

In tinea corporis, out of 62 cases, *T.mentagrophytes* was the common species isolated 32(54.2%) followed by *T.rubrum* 15(25.4), *T.tonsurans* 7(11.9%), *M.gypseum* 3(5.1%) and *M.canis* and *T.violaceum* 1 each (1.7% each). In tinea unguium, out of 23 cases, *T.rubrum* was the common species isolated 2(66.7%) followed by *T.mentagrophytes* 1(33.3%). In tinea incognito, out of 9 cases, *T.mentagrophytes* and *T.rubrum* were the common species isolated with 2 cases each (33.3%) followed by *M.gypseum* and *M.canis* 1 case each (16.7% each).In mixed infection, out of 13 cases, *T.mentagrophytes* was the common species isolated 7(87.5%)

Table 3: Correlation between associated medical disorders and clinical diagnosis

Associated Disorders	Tinea corporis	Tinea incognito	Tinea unguium
DM type II	1	-	5
Hypertension with hypothyroidism	-	1	-
Hypertension with DM type II		1	
Pregnancy	2	-	-
Total	**3**	**2**	**5**

Out of 150 cases, 10 were associated with other medical disorders and conditions. Diabetes mellitus type II was commonly associated with tinea unguium. Pregnancy was associated with tinea corporis in 2 cases. Tinea incognito was seen in patient with hypertension and hyperthyroidism and another patient with diabetes mellitus type II and hypertension.

DISCUSSION

This study analyzed 150 clinically diagnosed cases of dermatophytosis, with dermatophytes isolated in 108 cases, yielding an overall isolation rate of 72%. These findings are consistent with the study by Gopi et al[6]., which reported a comparable range of dermatophytosis incidence. Factors such as heat, humidity, overcrowding, and poor hygiene may contribute to this high prevalence. The rising cases of tinea incognito can be attributed to the misuse of broad-spectrum steroid-containing skin ointments and indigenous creams. These practices often obscure the clinical and laboratory diagnosis of dermatophytosis. Dermatophytosis affects individuals across all age groups, with the highest incidence observed in the 21–30-year age group. Similar results were reported in studies by Doddamani et al[13]. and Gopi et al[6]. This trend can be explained by increased participation in fieldwork, higher susceptibility to trauma, hyperhidrosis, and regular use of closed footwear in this age group. A slight male

predominance was noted in this study, with a male-to-female ratio of 1.05:1, aligning with findings by Majeed et al[7]., Rao et al[15]., and Kumar et al[14]. The higher incidence in males is likely due to increased outdoor physical activity and subsequent exposure to infection sources.

Among clinical types, tinea corporis was the most common, consistent with studies by Majeed et al[7]. and Ramaraj V et al[16]. In contrast, Karmakar et al[17]. reported tinea cruris**,** while Abu-Elteen and Malek et al[18] found tinea pedis to be the most prevalent. The second most common type in this study was tinea unguium, possibly due to trauma inflicted on nails during physical labor and walking barefoot.

Regarding etiological agents, *T. mentagrophytes* (50.9%) was the most common species isolated, followed by *T. rubrum* (20.4%). While most studies in India report *T. rubrum* as the predominant species, species distribution often varies geographically. For instance, Amel et al[21]. identified *T. violaceum* as the most common causative agent, followed by *M. canis***,** whereas Asticcioli et al[20]. in a study outside India reported *T. rubrum* as the leading isolate. The study also observed dermatophytosis in 6.67% of cases with underlying medical conditions, such as diabetes mellitus type II, systemic hypertension, hypothyroidism, or pregnancy. This aligns with findings by Ranganathan et al[23]., who reported an 8.7% association with medical disorders, particularly immunocompromised states.

CONCLUSION

The incidence of dermatophytosis is on the rise in India and is often misdiagnosed as other skin disorders. Improper use of corticosteroids, steroid-based skin ointments, and antibiotics without microbiological evaluation exacerbates the number of tinea incognito cases.There is an urgent need for accurate, rapid, and efficient laboratory diagnostic methods to ensure appropriate and timely treatment. These measures can help identify the source of infection, prevent disease spread, and avoid chronicity. Effective laboratory practices are essential to address the growing burden of dermatophytosis in India.

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