



## Clinico-epidemiological profile of dermatophytosis

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### Abstract

**Introduction:** Dermatophytosis have always been among the commonest infective dermatoses affecting nails, hairs and skin and is one of the common problems for which dermatology consultation is sought. The prevalence of dermatophytosis has been increasing since last decade because of environmental factors, irrational use of topic steroids and irregular systemic anti-fungal treatment.

**Aim:** To determine clinical profile of dermatophytosis. **Methods:** The study was conducted in the Department of Dermatology, Venereology, Leprosy and Department of Microbiology, I.G.M.C, Shimla (H.P) between 1st July 2017 to 1st June 2018. All newly clinically suspected diagnosed patients of dermatophytosis above the age of 12 years.

**Results:** A total of 315 clinically diagnosed patients with dermatophytosis were enrolled into the study. Majority of the patients were young adults aged 20-30 years (n=116) followed by aged between 50-60 years (n=72). The youngest and oldest age reported was 12 and 70 years, respectively. Majority of study group subjects were males i.e., 222 (70.47%) with male to female ratio 2.39:1. Approximately 81% patients had family history of the dermatophytosis. Approximately 13% patients had history of contacts with pets (dogs, cats and cattle). Diabetes mellitus (n=15) (53.5%) was the most common co-morbidity followed by psoriasis vulgaris (n=4) (14.2%). KOH positivity was reported in 48% (n=151) of the study subjects. Fungal culture was positive in 61% (n= 87) study subjects out of followed up patients (n=142). *T. mentagrophytes* was the most common dermatophyte isolated in 86.2% (n=75) of patients followed by *T. rubrum* in 12.6% (n=11) of the cases.

**Conclusion:** Climatic conditions of Himachal Pradesh favour dermatophytosis in the population. Younger group of male population were having high prevalence.

**Keywords:** dermatophytes, fungi, age

### Introduction

The dermatophytes are a group of closely related fungi that have the capacity to invade keratinized tissue (skin, hair, and nails) of humans and other animals to produce an infection, dermatophytosis, commonly referred to as ringworm. Infection is generally cutaneous and restricted to the nonliving cornified layers because of the inability of the fungi to penetrate the deeper tissues or organs of immunocompetent hosts [1]. Reactions to a dermatophyte infection may range from mild to severe as a consequence of the host's reactions to the metabolic products of the fungus, the virulence of the infecting strain or species, the anatomic location of the infection and local environmental factors. They are assuming greater significance both in developed and developing countries due to conditions like diabetes, HIV infection, use of immunosuppressive drugs and other immunocompromising states.

Clinically dermatophytosis is seen as annular plaque with erythematous, scaly lesions with elevated margin and central clearing associated with itching [2] Dermatophytosis being a truly contagious mycotic infection and is transmitted by direct contact with infected host or from indirect contact with, hair, clothes, combs, fomites, bed sheets, sanitary facilities, fallen hair and loosened infected squames. High humidity, poor hygiene, sharing of clothes or towels, tight foot-wears, misuse and abuse of over-the-counter available topical preparations containing

corticosteroids are some of the important risk factors associated with dermatophytosis [3]. Diagnosis can be established by direct microscopy of the specimen with 10% potassium hydroxide (KOH) wet mount and fungal culture to identify the causative species.

There is a rising prevalence of dermatophytosis, especially in tropical countries, with a concomitant increase in the number of difficult to treat cases [4]. A recent review suggests that *T. rubrum* and *T. mentagrophytes* complex are the most frequent agents affecting skin and nail, whereas *T. tonsurans*, *T. violaceum*, and *M. canis* are the predominant pathogens responsible for tinea capitis [5].

Epidemiology is changing at a continuous pace with reports of rising trends in prevalence of *Trichophyton mentagrophytes* in some parts of India [6]. Thus the need for species identification in clinical settings is of great epidemiological concern.

### Methods

The study was conducted in the Department of Dermatology, Venereology, Leprosy and Department of Microbiology, I.G.M.C, Shimla (H.P) between 1<sup>st</sup> July 2017 to 1<sup>st</sup> June 2018. All newly clinically suspected diagnosed patients of dermatophytosis above the age of 12 years. Exclusion criteria were nail infections, pregnancy and lactation, and refusal to participate into the study.

Clinical details regarding age, gender, occupation, duration of infection, site involved, aggravating factors, personal history, family history and history of recurrent fungal infections in the past were taken. A thorough clinical examination of site and type of lesions were recorded on a designed proforma.

After explaining the procedure and obtaining written consent, the skin scrapings of the clinically suspected cases were collected aseptically in a sterile container. Some parts of sample were transferred on a drop of 10% KOH solution placed on the glass slide and covered with a cover slip to prepare a wet mount. As soon as specimen was cleared, it was examined microscopically using the 10x and 40x objective with condenser iris diaphragm closed sufficiently to get a good contrast.

Visualization of arthroconidia was taken as presumptive diagnosis of dermatophytosis. The other part of skin scrapings was sent to the department of microbiology for fungal culture to isolate the species. Each sample was inoculated in a set of Sabouraud's dextrose agar (SDA) media with chloramphenicol and another set of SDA with chloramphenicol (0.05) and cycloheximide (0.1 to 0.4 mg/ml). SDA is a glucose (4%) peptone medium with pH of 5.6. The cultures were incubated at 25°C and examined biweekly for 4 weeks. Most of the dermatophytes revealed growth within 1-2 weeks. The cultures were retained for 4 weeks before discarding them as negative. Culture tubes showing white, tan or yellowish powdery growth resembling dermatophytes were identified by studying microscopic morphology in lactophenol cotton blue (LCB) tease mount and

microslide culture, urease test and hair perforation test.

### Data analysis

Data were presented as frequency and percentages.

### Results

#### Baseline characteristics

A total of 315 clinically diagnosed patients with dermatophytosis were enrolled into the study. Table 1 shows baseline characteristics of the study participants. Majority of the patients were young adults aged 20-30 years (n=116) followed by aged between 50-60 years (n=72). The youngest and oldest age reported was 12 and 70 years, respectively. Majority of study group subjects were males i.e., 222 (70.47%) with male to female ratio 2.39:1. Males were more common in the age group of 25-45 years while females were common in the age group of 35-55 years. Approximately 81% patients had family history of the dermatophytosis. Approximately 13% patients had history of contacts with pets (dogs, cats and cattle). Of these study subjects, 90% reported history of hair fall, broken hairs and itching in their pets. Twenty-eight (8.8%) patients had associated co-morbidity. Diabetes mellitus (n=15) (53.5%) was the most common co-morbidity followed by psoriasis vulgaris (n=4) (14.2%). Vitiligo, alopecia areata, rheumatoid arthritis and pityriasis versicolor were seen in 2 patients each. Systemic lupus erythematosus was present in only one patient.

**Table 1:** Baseline characteristics (n=315)

	n (%)
<b>Age-group (Years)</b>	
0-10	0
11-20	20 (6.3%)
21-30	104 (33%)
31-40	60 (19%)
41-50	53 (16.8%)
51-60	66 (20.9%)
61-70	12 (3.8%)
<b>Gender</b>	
Male	222 (70.47%)
Female	93 (29.53%)
<b>Family history of dermatophytosis</b>	
Yes	60 (19.05%)
No	255 (80.95%)
<b>Contacts with Pets</b>	
Yes	41 (13.02%)
No	274 (86.98%)
<b>Associated Co-morbidity</b>	
Diabetes mellitus	15 (53.5%)
Psoriasis Vulgaris	4 (14.2%)
Vitiligo	2 (7.1%)
Alopecia Areata	2 (7.1%)
Rheumatoid Arthritis	2 (7.1%)
SLE	1 (3.6%)
P. Versicolor	2 (7.1%)

**Table 2:** Clinical spectrum

Clinical spectrum	n (%)
T corporis/T cruris	142 (45%)
T corporis	77 (24%)
T cruris	60 (19%)
T faciei	26 (8%)
T Mannum	3
T pedis	3
T barbae	2
T capitis	1

Data shown as frequency and percentages

**Table 3:** Fungal culture

Fungal culture	n (%)
Positive	87(61.2%)
Negative	55(38.7%)

### Clinical spectrum of Dermatophytosis

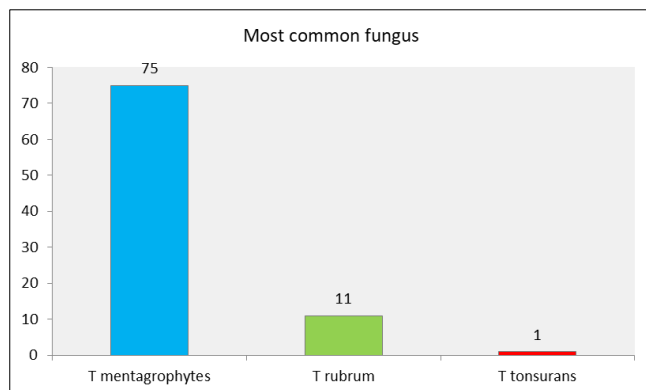
Trunk and groin were the most common sites to be involved with combination of tinea corporis and tinea cruris accounting for 45% cases (n=142). Face was involved in 7% patients among the study subjects. Bullous tinea infection was present only in one patient (Table 2).

### Laboratory investigations

KOH positivity was reported in 48% (n=151) of the study subjects. Fungal culture was positive in 61% (n= 87) study subjects out of followed up patients (n=142) (Table 3).

### Dermatophyte species isolated on culture

*T. mentagrophytes* was the most common dermatophyte isolated in 86.2% (n=75) of patients followed by *T.rubrum* in 12.6% (n=11) of the cases (Figure 1).



**Fig 1:** Distribution of patients on the basis of most common dermatophyte isolated; X-axis shows type of fungus and Y-axis shows number of patients.

### Discussion

Dermatophytes, the most common causative agents, are assuming high significance in developing countries like India.<sup>7</sup> Young adults were the target of dermatophytosis in our study with 33% (n=104) patients in the age-group of 21-30 years. Our results are in concordance with Surendran et al<sup>[8]</sup> who assessed the clinical profile of dermatophytic infection and observed that 44% of the patients were aged between 16-30 years. Age group of 21–30 year

has higher prevalence for dermatophytosis as the individuals in this group are often most active because of their involvement in the outdoor activities such as sports, jobs etc.

In our study, males had higher prevalence (70.47%) of dermatophytic infection with male to female ratio of 2.39:1. The increased outdoor physical activity being part of their occupation accounts for males being more prone to acquire infection. Tight-fitted trousers and occlusive footwear worn by men leads to increased sweating creating a favorable environment for fungus to flourish. Moreover, females are reluctant/shy to undergo examination for tinea cruris which may be one of the reasons of underestimation of incidence of infection in them. In the study by Naglot et al<sup>[9]</sup>, tinea was more common in males (81.43%) than in females (18.57%) with a ratio of 4.38:1 and the majority of the patients were between 21 and 50 years contributing 78.77% of the total dermatophytosis.

In our study, 19% of the patients had history of dermatophytosis amongst the family members. Frequent sharing of towel, footwear and clothes could contribute to the spread of dermatophytic infection. Objects such as clothing, bed sheets and towel harbor the fungal spores and are capable of transmitting the disease among family members. In addition, fungal spores remain viable for months in household dust leading to recurrent episodes of clinical disease.

In our study, 13% of the patients had contacts with pets. It has been suggested that unhygienic conditions in which the cats and dogs are kept may be responsible for more dermatophyte carriage. In eastern India, Debnath et al<sup>[10]</sup> detected moderate (21%) occurrence of dermatophytes in the companion dog population and moderately higher (37.33%) occurrence of dermatophytes in healthy cats without any skin lesions. An increased tendency of keeping companion animals such as dogs and cats may be very closely associated with the daily life of their owners and lead to infection.

In our study, diabetes mellitus was the most common co-morbidity in 53.5% subjects followed by psoriasis in 14.2% subjects. Diabetic patients are very often prone to various fungal infections including dermatophytosis due to higher blood glucose levels which promote growth of fungi. Further, amongst diabetics cellular immune response in particular is hampered so that the system cannot fight against fungal infections.

Coexistence of tinea corporis and tinea cruris was the most commonly observed pattern in 42% of the patients in our study. This is similar to the study by Bhatia et al<sup>[11]</sup> who observed that tinea corporis was the most common clinical subtype (39%) in Himachal Pradesh. Tinea faciei is usually misdiagnosed due to its atypical clinical symptoms. It is prone to present with atypical features, probably due to complex anatomy of face. In our study, 40% of patients with tinea faciei had single lesion and 40% had multiple lesions. Two patients presented with bilateral symmetrical lesions. Only 40% had typical circinate, arcuate, annular plaques with raised margins. *T. mentagrophytes* was the predominant fungus isolated from the lesion on face. Tinea incognito was observed in 4.7% (n=15) patients and clinically, the lesions had less raised margins and were not as scaly as classic dermatophytosis. They tend to be extensive, pruritic, erythematous and mimicked another dermatosis. Extensive body involvement was observed in 5.07% (n=16) study subjects and abuse of topical steroids was reported in eleven of them. Tinea

imbricata involving trunk and buttocks was seen in 1.9% (n=6) of the study subjects. Clinically, lesions presented as multiple overlapping concentric, annular plaques without erythema. Three patients in age group of 50-55 years reported involvement of feet.

### Conclusion

Climatic conditions of Himachal Pradesh favour dermatophytosis in the population. Younger group of male population were having high prevalence owing to their increased involvement in the outdoor activities which may be one of the contributing epidemiological factors. *T.mentagrophytes* has emerged as predominant pathogen with an increased prevalence in comparison to what was seen in the recent past.

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