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CLINICO-MYCOLOGICAL PROFILE OF DERMATOPHYTOSIS

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Abstract: Introduction - Dermatophytosis is a major public health problem in the world today affecting millions of people. Hot and humid climate in the tropical and subtropical countries like India makes dermatophytosis or ringworm a very common superficial fungal skin infection. **Aims and Objectives** – This study was aimed to study the clinical profile, isolate and identify the causative fungal agents of dermatophytosis. **Materials and Methods** – This prospective study was conducted on 100 clinically suspected cases of dermatophytosis attending outpatient department of Skin & VD, Dayanand Medical College & Hospital, Ludhiana. Specimens like skin scrapings, hair pluckings and nail clippings were collected depending on the site of lesion and were subjected to microscopic examination and culture. **Results** - Tinea corporis was the most common clinical presentation followed by concomitant tinea infections. Young adults in the age group of 21-30 years were mainly affected. The male to female ratio was 1.5:1. Overall KOH positivity and culture positivity was 75% & 56% respectively. *Trichophyton rubrum* (91.07%) was the most common isolate followed by *Trichophyton mentagrophytes* (3.57%), *Trichophyton tonsurans* (3.57%) and *Trichophyton violaceum* (1.78%). **Conclusion** - Tinea corporis was the most common clinical form of dermatophytosis prevalent in this region and *Trichophyton rubrum* was the predominant fungus isolated.

Keywords: Dermatophytosis, Dermatophytes, Tinea, *Trichophyton* spp



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INTRODUCTION

Dermatophytosis is one of the major skin diseases prevalent all over the world. ^[1] They are assuming greater significance both in developed and developing countries particularly due to advent of immunosuppressive drugs and diseases. Recently, there has been an increase in the incidence of fungal infections. This increase may be a result of frequent usage of antibiotics, immunosuppressive drugs and various conditions like organ transplantation, lymphoma, leukemia and human immunodeficiency virus (HIV) infection. ^[2]

Dermatophytosis is more prevalent in India, due to favourable climatic conditions like temperature and humidity. In India, which is a tropical country, the cause of dermatophytosis is adversely influenced by economic factors like poverty, poor hygiene and social conditions like overcrowding. Nature of dermatophytosis may change with the passage of time, living population, evolution of preventive measures and hygienic conditions in society. ^[3]

Although dermatophytosis does not cause mortality, it does cause morbidity and poses a major health problem and also is of cosmetic importance. The clinical presentation, though very typical of ringworm infection, is very often confused with other skin disorders, making laboratory diagnosis and confirmation necessary. ^[4] Identification at the species level is useful to initiate an appropriate treatment or for setting prophylactic measures. A definitive diagnosis of dermatophyte infection needs to be done before the initiation of antifungal therapy because of the long duration of the treatment and its high cost, and of the potential side effects of the drugs. In addition, knowledge of the zoophilic or anthropophilic origin of the dermatophyte allows setting up prophylactic measures such as treatment of pets whose owners develop skin disease. ^[5]

Thus, the present study was undertaken to study the clinical profile, to isolate and identify the aetiological agents responsible for dermatophytosis.

MATERIALS AND METHODS - A total of 100 clinically suspected cases of dermatophytosis attending Skin & VD, outpatient department of Dayanand Medical College & Hospital, Ludhiana (Jan 2010 to Sept 2011), were included in this study. Data of patients including name, age, sex, CR no., lab no., history (past, personal, family, treatment), date of collection of sample, provisional clinical diagnosis, etc was collected. Specimens including skin scrapings, hair pluckings and nail clippings were collected depending on the site of lesion. The direct microscopic examination of the samples was done by 10% potassium hydroxide (KOH) mount preparation for skin and hair samples and 20% KOH for nail clippings. The samples were inoculated on Sabouraud dextrose agar (SDA) with antibiotics, with and without cycloheximide and were incubated at 25°C and 37°C. The SDA slants were kept for a minimum period of three weeks. The growth obtained was identified on the basis of colony morphology, pigment

production and microscopic examination by lactophenol cotton blue preparation (LCB). Hair perforation test and slide culture were performed wherever necessary. Results were subjected to descriptive statistical analysis and p value of <0.5 was taken as significant.

RESULTS

Out of 100 clinically suspected cases of dermatophytosis, the commonest clinical type was found to be tinea corporis (27%) (Figure 1) followed by concomitant tinea infections (26%) while the least common types were tinea faciei and tinea barbae (1% each). Out of the total cases, 60 were males and 40 were females. The male:female ratio was 1.5:1. The age of the patients ranged from 2 years to 73 years (mean age 36.61 ± 17.59 years). The most affected age group was 21 - 30 years (24%) while the least affected age group was of 71 – 80 years (1%) while all the cases of tinea capitis were present in the age group of 0-10 years. Maximum number of cases were seen in the months of July – Sept. (45%) while least number of cases (14%) were seen in Jan – March. In our study housewives (27%) were most commonly affected followed by service class and students (20% each)(Table1). Most of the patients in our study were of urban background (82%) as compared to rural (18%). Family history of tinea infections was seen in 12 % of the cases. Out of the 100 samples taken, maximum were skin scrapings (70), followed by nail clippings (25) and hair samples (5). Positivity of direct KOH mount examination (75%) (Figure 2) was higher in comparison to culture positivity (56%) (Table 2). Positivity of direct microscopic examination by KOH preparation of skin scrapings was significantly higher in comparison to culture positivity as compared to nail and hair samples (Table 3). *Trichophyton rubrum* was the most common isolate in our study, followed by *Trichophyton mentagrophytes*, *Trichophyton tonsurans* and *Trichophyton violaceum* (Figure 3). *T. rubrum* (Figure 4) was isolated from all samples, most predominantly from skin samples. *T. mentagrophytes* and *T.violaceum* were isolated only from skin while *T. tonsurans* was isolated only from hair samples.

DISCUSSION – Dermatophytosis forms a large fraction of ailments in patients attending the skin OPD of our centre. The commonest clinical types of dermatophytosis that presented to us were tinea corporis followed by concomitant tinea infections. Tinea corporis has been reported as the most predominant type by various other authors also.^[3,6,7]

The incidence of tinea infections was more in males (60%) as compared to females (male:female ratio 1.5:1). The higher incidence in young males could be attributed to greater physical activity and hence increased sweating. Male preponderance has been observed in several earlier works too.^[3,8] Whereas, in a study done in Saudi Arabia, equal number of males

and females were affected by dermatophytes.^[9] Female preponderance has been reported by Perea *et al* and a study done in North Iran.^[10,11]

Persons of all ages were susceptible but most of the patients were seen in the third decade. The results of our study are in accordance with various other studies done in India and abroad.^[12,13,14,15,16,17] In contrast to our results a study from Calicut has reported that the age group 11-20 years was the most affected group (23.3%).^[18] Whereas, in studies done by Gupta *et al* and Jain *et al*, tinea infections were more common in 31-40 years age group.^[19,6]

Dermatophytosis is a common disease in tropical countries due to factors like heat and humidity. High humidity and temperature provides a fertile ground for the abundant growth of dermatophytes.^[12] Maximum number of cases in our study were seen in the monsoon (i.e. July - Sept.) and post-monsoon (i.e. October-November) season. Similar findings were reported by Patwardhan *et al*.^[3]

Our study comprised more of urban patients (82%) as compared to patients from rural background (18%). This maybe because our institute is a tertiary care hospital, situated in a city. Therefore, most of the patients attending the OPD are from urban background and are more aware about the disease. Similar findings have been reported by a study in Calicut.^[6] Urban patients seek medical advice sooner due to more awareness and easy accessibility of medical care. While in rural areas, early lesions are neglected and only chronicity compels people to seek medical advice.^[20]

The duration of disease of patients varied from 5 days to 12 years in our study. Most of the cases (55%) presented with duration of less than 6 months. Our results are comparable with the two studies which reported the duration of lesions from 3 months to 15 years and 20 days to 10 years respectively.^[21,22] while on the other hand Madhavi *et al* found duration of 5 days to 5 years with most of the patients presenting within 2 months of onset of symptoms.^[17]

An infected family member is an important source of infection in dermatophytosis. In our study, history of contact with infected family members was 12% which could be because of sharing of clothes, towels, combs etc. among members of a family. Our results are consistent with two previous studies, which have reported positive family history in 29% cases.

In our study, overall KOH and culture positivity was 75% and 56% respectively. Other studies revealed positivity on direct microscopic examination ranging from 37.71% - 100%^[3,12,23,24,25,2] and culture positivity ranging from 28.98% - 76%.^[26,24,2,27]

The genus *Trichophyton* especially *T. rubrum* was the predominant etiological agent of dermatophytosis (91.07% of isolates). This coincides with the findings of most of the earlier

works. [7, 29,30,31,32] *T. mentagrophytes* and *T. tonsurans* were the second most common isolates with 3.57% each.

CONCLUSION - Dermatophytosis is a chronic disease and its incidence is very high. The exact nature of the fungus can be determined only by direct microscopic examination (KOH) and culture.

Dermatophytosis require early diagnosis and treatment with antifungal drugs for a prolonged period of time and this study signifies the importance of timely diagnosis of dermatophytoses by clinicomycological examination for its effective treatment.

Table 1: Demographic profile of clinically suspected cases of dermatophytosis (n=100)

Age (years)	
• 0 – 10	7
• 11 - 20	12
• 21 – 30	24
• 31 – 40	17
• 41 – 50	17
• 51 – 60	13
• 61 – 70	9
• 71 – 80	1
Sex	
• Male	60
• Female	40
Season	
• Jan-Mar	17
• April-June	14
• July-Sept.	45
• Oct.-Dec.	24
Occupation	
• Housewife	27
• Service class	20
• Student	20
• Farmers	13
• Labourers	8
• Unemployed	8
• Businessclass	4
Urban/Rural	
• Urban	82
• Rural	18

<i>Clinical presentation</i>	
• Tinea corporis	27
• Tinea unguium	24
• Tinea cruris	13
• Tinea capitis	4
• Tinea pedis	4
• Tinea faciei	1
• Tinea barbae	1
• Concomitant tinea	26

Table 2: Correlation of KOH examination with growth on SDA

KOH results(n=100)	Growth on SDA	
	Positive (n=56)	Negative (n=44)
Positive (n=75)	54	21
Negative (n=25)	2	23
p value=0.00115 (significant)		

Table 3: Sample-wise positivity on direct microscopy and culture

	KOH positive n (%)	Culture positives n (%)	p-value
Skin (n=70)	60 (85.7)	51 (72.8)	0.00148 (significant)
Nail (n=25)	11 (44)	2 (8)	0.0992 (not significant)
Hair (n=5)	4 (80)	3 (60)	0.12050 (not significant)



Figure 1- Tinea corporis with typical ringworm lesions on chest and abdomen

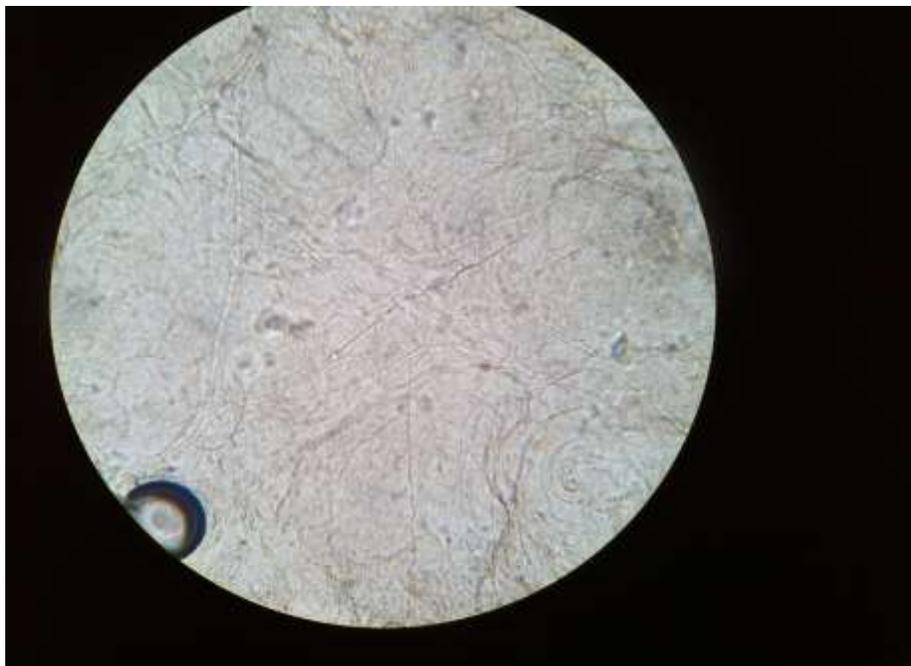


Figure 2 - KOH mount preparation showing thin septate hyaline hyphae of dermatophytes (x400)

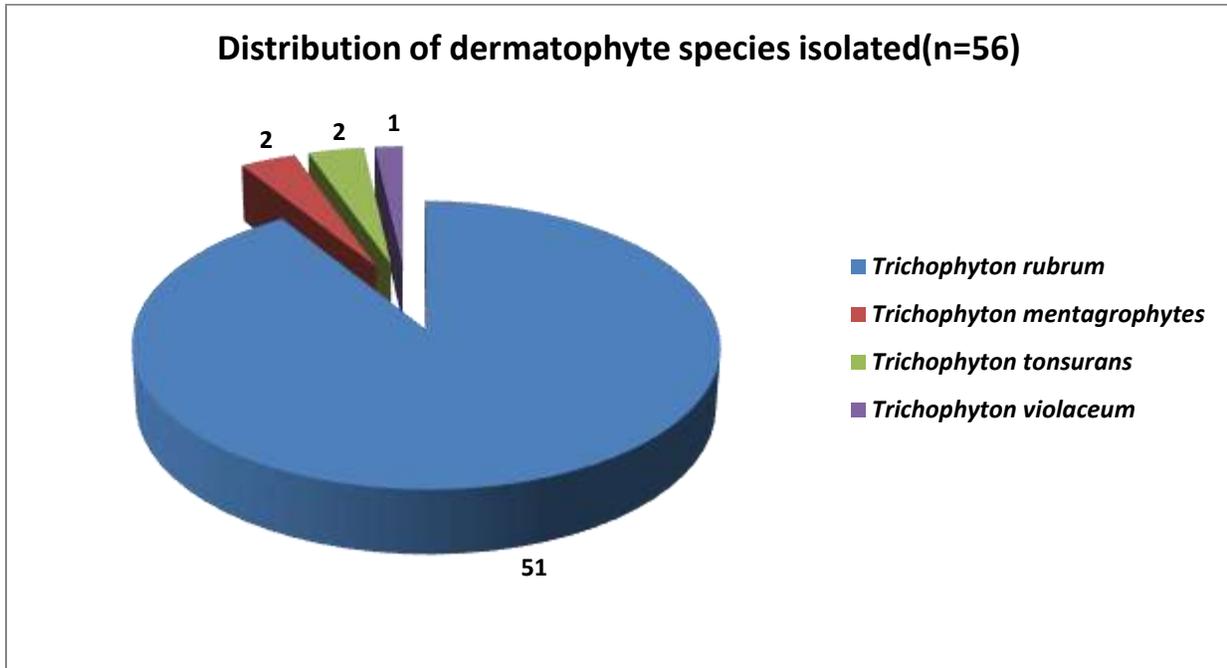


Figure 3

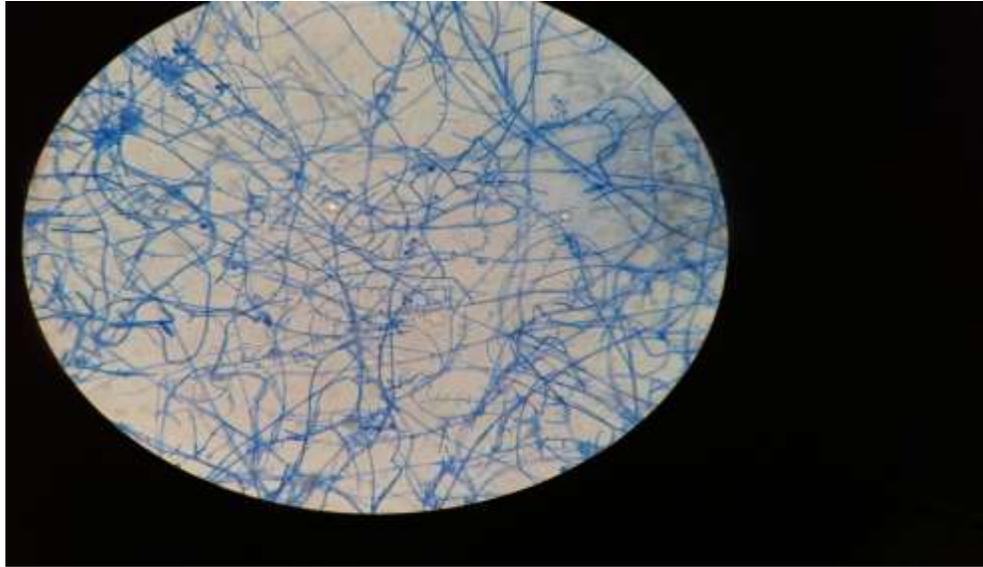


Figure 4- Lactophenol cotton blue preparation of *T. rubrum* showing small tear drop shaped microconidia on the sides of hyphae giving a bird on fence arrangement (x400)

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