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CLINICO-MYCOLOGICAL EVALUATION OF DERMATOPHYTES IN SUPERFICIAL FUNGAL INFECTIONS IN A TERTIARY CARE CENTRE, WEST UTTAR PRADESH

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Abstract

Background: Dermatophytes are group of fungi that infect keratinized tissues of human and animals. The group consist of three different genera namely, Trichophyton, Microsporum, Epidermophyton and several species within each genera. Among Trichophyton, Trichophyton rubrum is predominant, followed by various strains of Trichophyton mentagrophytes, which include both anthropophiles and zoophiles. Prevalence of dermatophytes varies with location and environmental condition. The infection is common worldwide with higher prevalence in tropical countries like India. The main objective of this study was to determine the prevalence of dermatophytoses, isolate and identify the dermatophyte from samples of clinically suspected cases attending tertiary care centre. **Methods**: Patients showing lesions typical of dermatophytes infection from outpatient Department of dermatology were sent to mycology unit for the KOH and culture in the Department of Microbiology for the period of 12 months. **Results:** A total of 60 samples suspected of dermatophytosis were received in the lab for KOH and culture. Out of these 60 samples, 26 (43.33%) were skin, 14 (23.33%) hair and 20 (33.33%) nails. Trichophyton was found to be the predominant etiological agent with 18 isolates out of 25 dermatophyte isolates, as only negligible number of isolates of Microsporum and Epidermophyton were grown, prevalence of *T. mentagrophytes* is increasing gradually as shown in our study in which we have obtained (24%) isolates and is second most common isolate next to *T. rubrum*. **Conclusions:** Among dermatophytes, *T. rubrum* was the predominant organism and followed by *T. mentagrophytes*. People are unaware of such dermatophytic infection due to their negligence which may deteriorate the quality of their lives. Proper diagnosis and timely treatment of such infections may improve the morbidity related to such infections.

INTRODUCTION

Dermatophytosis is the most common superficial fungal infection seen in humans and animals affecting skin, hair, and nails. It is caused by dermatophytes. Dermatophytes are a group of keratinophilic fungi that can live in moist area of skin, on the environmental surface and on

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household items such as clothing, bedding, towels. They are assuming greater significance both in developed and developing countries particularly due to the advent of immunosuppressive drugs and disease[1]. The clinical presentation of these infections depends on several factors including the site of infection, the immune response of host and species of the infecting fungus. The studies of the predominating species in a particular region and its relation with various factors affecting its distribution are of considerable importance in implementing preventive measures and arresting spread of infection [2].

Dermatophytosis or tinea or ringworm are caused by a group of closely related fungi that invade the keratinised tissues of skin, hair, nails. These fungi are called dermatophytes which are classified into three genera: 1) Trichophyton; 2) Epidermatophyton; and 3) Microsporum. According to WHO, the prevalence rate of superficial mycotic infection worldwide has been found to be 20-25%. The estimated life risk of acquiring tinea infections is 10-20%. The distribution of dermatophytosis and their aetiological agents vary from one ecological niche to another and depends on several factors such as lifestyle, socio-economic status, occupation, and climatic conditions, therefore some species are widely distributed whereas others are geographically restricted [3,4,5]. A particular dermatophyte species may produce lesions at multiple anatomic sites. Moreover, clinically similar lesions may be produced by different species. It is now well recognised that appropriate mycological diagnosis of clinically suspected cases of dermatophytosis is essential before initiation of antifungal therapy. Identification of the dermatophyte up to the species level helps in epidemiological assessment as well as guidance in therapy, particularly when long duration treatment is planned [6,7].

The outbreaks of infections can occur in schools, households and institutional settings. Such infections can spread usually through direct contact with and infected person or animal, clothing, bedding and towels can also become contaminated and spread the infection. Dermatophyte infections can affect the skin on almost any area of the body, such as the scalp, legs, arms, feet, groin and nails. These infections are usually itchy, redness, scaling, or fissuring of the skin, or a ring with irregular borders and a cleared central area may occur. If the infection involves the scalp, an area of hair loss may result. More aggressive infections may lead to an abscess or cellulitis. Areas infected by dermatophytes may become secondarily infected by bacteria. Symptoms typically appear between 4 and 14days following exposure [8].

MATERIALS AND METHODS

The study was conducted at Sharda hospital in the department of microbiology at West Uttar Pradesh. The study was approved by the Ethical Committee of Sharda hospital for the period of 12 months in the Microbiology laboratory. It is cross-sectional study which is from 2022-2023.

Specimen collection

Skin, hair and nail were the sample which were collected during the study period. The skin sample was scraped with the blunt edge of scalpel at the margin of the lesion after cleaning the area with 70% ethyl alcohol. Nails were clipped with the nail cutter, and hair were plugged

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with the tweezer. All the samples were collected on clean paper.

Procedure

Samples were kept in KOH and were cultured on Dermatophyte Testing Medium (DTM). The growth of fungus on DTM was identified on the basis of morphology macroscopically and by preparing Lactophenol cotton blue mount. A cover glass was then pressed gently over the slide and slide was examined under a microscope using lowered light, at low power or high power for the presence of specialized hyphal structures and conidia.

RESULT

Sex distribution

Out of 25 culture positive samples, 15 were from male patients whereas 10 were from female patients. Hence, the ratio of male: female was 3:2.

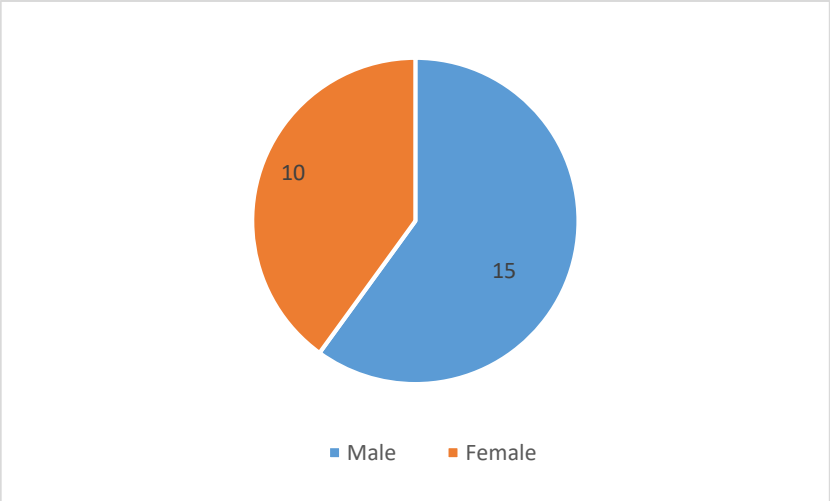

Fig 1: Sex wise distribution of total positive samples

Demographic profile

Most of the dermatophytes were isolated from patients in the age group of 21-40years, followed by 41-60years, 0-20years, 61-80years, 81year above (Table 1).

Table 1: Age-wise distribution of patients with dermatophytosis

Age	Number of Patients (%)
0-20 years	5 (20.00)
21-40 years	8 (32.00)
41-60 years	7 (28.00)
61-80 years	4 (16.00)
Above 81 years	1 (4.00)
Total	**25**

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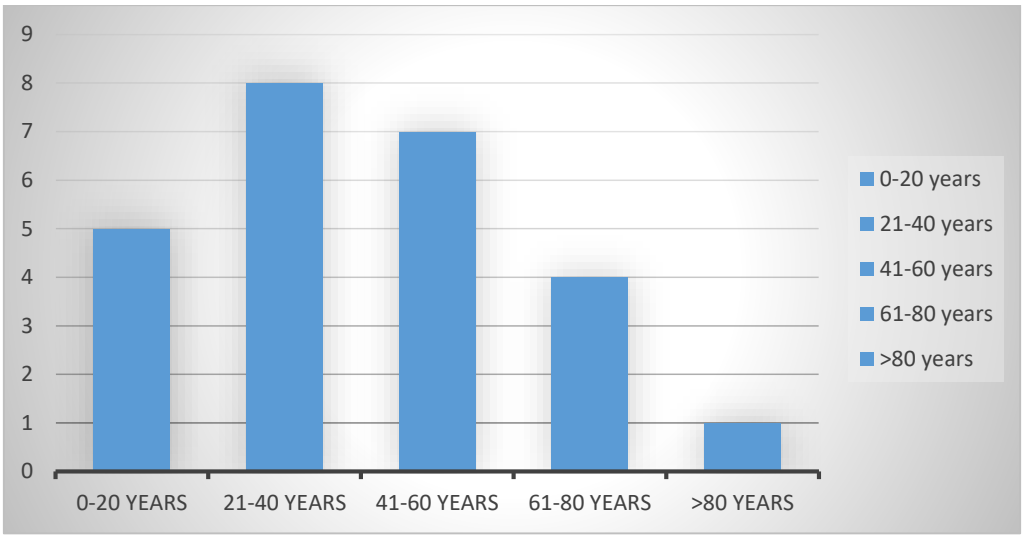

Fig 2: Age wise distribution of patients with dermatophytosis

Clinical manifestations of patients with dermatophytosis is as shown in table 2 and figure 3.

Table 2: Clinical presentation of the patients with dermatophytosis

Clinical manifestation	Number of samples n (%)
Tinea corporis	9 (36.00)
Tinea cruris	2 (8.00)
Tinea unguium	5 (20.00)
Tinea manuum	2 (8.00)
Tinea pedis	2 (8.00)
Tinea capitis	5 (20.00)
Total	**25 (100)**

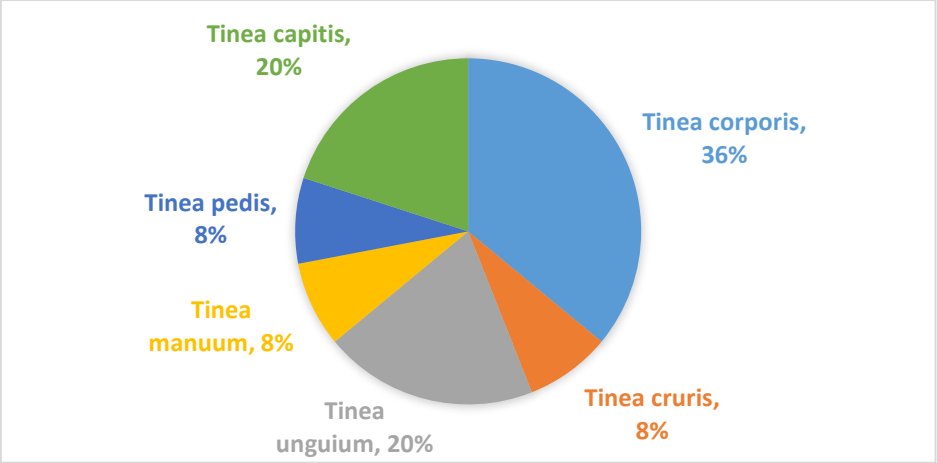

Fig 3: clinical presentation of patients with dermatophytosis in percentage.

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Table 3: Types of dermatophytes isolated from different clinical conditions

Dermatophyte	Tinea corporis	Tinea cruris	Tinea unguium	Tinea manuum	Tinea pedis	Tinea capitis	Total
T. rubrum	3	1	2	1	1	1	9
T. mentagrophytes	2	1	2	-	-	1	6
T. tonsurans	1	-	-	1	-	1	3
M. gypseum	2	-		-		1	3
M. canis	-	-	-	-	-	1	1
E. floccosum	1	-	1	-	1	-	3
Total	**9**	**2**	**5**	**2**	**2**	**5**	**25**

Growth of dermatophytes on DTM is shown in the figures given below

Fig 4: *T. rubrum*

Fig 5: *T. mentagrophyte*

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Fig 6: KOH mount of *T. rubrum*

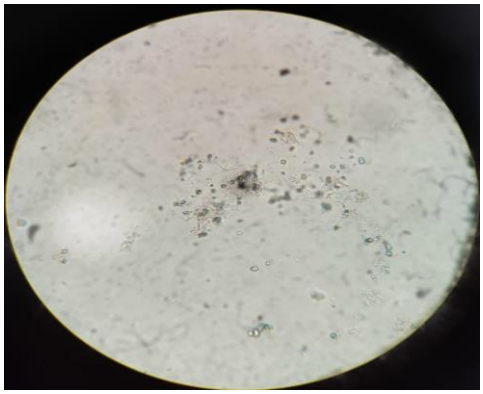

Fig 7: KOH mount of T. mentagrophyte

DISCUSSION

In the present study, 60 clinically suspected dermatophytoses cases were studied, out of which 25 were confirmed by KOH and culture showing the prevalence rate of 41.67%. Another study conducted by Jitendra Kumar Chaudhary *et al*. also showed the prevalence rate of 55% which is similar to our study. Among 25 patients who were diagnosed with dermatophytoses infection, the males were 15(61.66%) which is higher than the percentage of females 10 (38.33%) with the male to female ratio 3:2. A study was conducted by Vandana Upadhyay, Ankur Kumar *et al*. in which out of 220 isolates, 172 samples were obtained from 108 (49.05%) males ,64 (29.09%) females, were positive for skin fungal infections by either KOH mount or culture. The reason for increased percentage of males may be due to the fact of increased outdoor exposure and more physical work that results in increased sweating and less cosmetic consciousness compared to females [9,10].

The present study also showed that the dermatophytic infection is predominant in the adult age group (21-40 years) followed by (41-60 years). The study conducted by Vijaya Kumar Ramaraj et, al. showed that the dermatophytic infection is predominant in the adult age group (21 - 40 years). The reason for this may be due to increased level of physical activity in the particular age group and this leads to excessive sweating which favours the growth of dermatophytes.

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Socialization with different people is also high compared to other age groups which eventually help in spreading of infection[11]. Trichophyton species have been a major causative agent of dermatophytosis than the other two genuses, Microsporum and Epidermophyton. In our study, among 60 dermatophytosis cases studied, Trichophyton was found to be the predominant etiological agent with 18 isolates out of 25 dermatophyte isolates, as only negligible number of isolates of Microsporum and Epidermophyton were grown. *T. rubrum* was the most predominant isolate (36.00% growth) like demonstrated by other studies done by Vijay Kumar Ramaraj *et al*. earlier in India. In recent years, prevalence of *T. mentagrophytes* is increasing gradually as shown in our study in which we have obtained (24%) isolates and is second most common isolate next to *T. rubrum*. Similar studies have been conducted which also show that *T. mentagrophytes* was the second most common isolated dermatophyte. [11] [12,13,14] Apart from *T. rubrum* and *T. mentagrophytes*, *Microsporum* was also isolated from 4 samples, *T.tonsurans* was isolated in 3 samples , one *M. gyseum was* isolated, and one *E. floccosum* was isolated. The study conducted by Vijay kumar Ramaraj *et al*. showed that the *Microsporum* and *Epidermophyton* accounted for very low percentage compared to *Trichophyton* species as shown in our study[13].

Tinea corporis was found 8(32.00%) in number followed by *tinea unguium* 6(24.00%) whereas, *tinea capitis* 4(16.00%), *tinea pedis* 3(12.00%%), *tinea cruris* 2(8.00%), *tinea manuum* 2(8.00%), respectively (Table 3). A study conducted by Anna Claudia A *et al*. in which *Tinea corporis* were isolated more 48(22.85%) in number followed by *tinea pedis* 6 (2.85%) which is the most common clinical form of dermatophytosis in adults[15]. In this study, majority of the samples received were from skin 15(60.00%) which was in concordance with a study conducted by Sweta R Prabhu *et al*[16].

CONCLUSION

Dermatophytes are worldwide distributed with increased incidence especially in tropical countries like India. Several factors such as age, sex, illiteracy, poor hygiene and social economy influence the infection with dermatophytes. In the present study, *Tinea corporis* was the predominant clinical manifestation. *T. rubrum* and *T. mentagrophytes* was found to be the major etiological agents and that has been evinced by our study. People are unaware of such dermatophytic infection due to their negligence which may deteriorate the quality of their lives. Proper diagnosis and timely treatment of such infections may improve the morbidity related to such infections.

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