DERMATOPHYTOSIS IN AND AROUND MAHABUBNAGAR

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ABSTRACT

Dermatophytes are one of the most common fungal agents causing superficial skin infections. The prevalence of these infections varies from place to place and is more commonly associated with poor socioeconomic status.

AIMS AND OBJECTIVES

The study aims to know prevalence of dermatophytosis and its distribution patterns among clinical specimens in and around Mahabubnagar.

MATERIALS AND METHODS

Skin, hair and nail samples were collected from all the clinically suspected cases attending the Dermatology OPD from Aug 2013 - July 2014. Samples were examined microscopically under KOH mount. Culture was done on Sabouraud dextrose agar with antibiotics and Dermatophytes test medium and isolates were identified based on the cultural, microscopic and biochemical characteristics.

RESULTS

Out of 88 specimens obtained, 58 (65.9%) were KOH positive and 30 (34%) were KOH negative. Culture positivity was seen in 59 (67%) samples. Tinea corporis was the most common clinical presentation 32 (36%) followed by Tinea cruris 20 (22.7%). Trichophyton mentagrophytes was the most common species isolated 41 (69.5%) followed by Trichophyton rubrum 9 (15.25%).

CONCLUSION

Trichophyton mentagrophytes was identified as the principal aetiological agent in our hospital, predominately presenting with clinical presentation of Tinea corporis.

KEYWORDS

Dermatophytes, T. corporis, T. mentagrophytes, DTM Medium.

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INTRODUCTION

Dermatophytosis refers to superficial fungal infection of keratinized tissues caused by dermatophytes. They are a group of closely related fungi that which invade keratinized tissues like skin, hair and nails to produce an infection known as dermatophytosis.¹

Dermatophytosis is commonly referred to as ringworm or tinea infections. Infection is restricted to the non-living layers of the skin because of the inability of the fungi to penetrate the deeper tissues. Many different species of dermatophytes under the genera Epidermophyton, Microsporum and Trichophyton are implicated in the causation of dermatophytosis.²

Dermatophytosis is one of the most common fungal infections seen throughout the world. In tropical and sub-tropical countries, it occurs in increasing frequencies. The local aetiological pattern of fungal isolates from clinical specimens may vary with time and geographical area and it is important to be familiar with recent local trends in order to improve diagnosis.

Identification of fungal agent and species responsible for dermatophytosis is of importance not only for the epidemiology, but also for therapeutic point of view when treatment is advised for prolonged periods. Hot and humid climate of India predisposes to dermatophytic infection of skin.³ Different studies have been conducted in different parts of the country including Tamilnadu⁴, Madhya Pradesh⁵, Andhra Pradesh^{6,7}, Karnataka⁸ and few other states. The distribution, frequency and the causative agents involved varied from study to study and from place to place depending upon various factors like climatic, socioeconomic conditions and the population density of that particular area for which the present study has been taken in order to know the local distribution patterns of the aetiological agents in our place.

AIMS AND OBJECTIVES

1. To study the prevalence of dermatophytosis and its distribution patterns among clinical specimens in and around Mahabubnagar.
2. To isolate and identify the aetiological agents up to the species level.

MATERIALS AND METHODS

A prospective study was conducted on patients diagnosed clinically as having dermatophytosis in the Outpatient Department of Dermatology from August 2013 to July 2014. A detailed clinical history was elicited from all the patients. Skin, hair and nail samples were collected from all the affected sites under aseptic precautions.

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All the samples were examined microscopically under KOH wet mount (10% for skin, hair and 20% for nail). All the samples (skin scrape, nail clipping and hair clippings) were inoculated directly onto the Sabouraud Dextrose Agar (SDA) containing chloramphenicol (HiMedia MM1067, Lot No. 0000216421) and cycloheximide by pressing the specimen lightly into the surface of the agar. Simultaneously, they were also inoculated on the Dermatophyte Test Medium (DTM) (HiMedia M188, Lot No. 0000143240). These inoculated cultures were incubated at 25° C for 4 weeks. The culture isolates were identified based on the growth characteristics and microscopic morphology of the conidia (Micro and Macroconidia) in Lactophenol Cotton Blue (LPCB) Mount. Supplementary tests like Urease test, Hair perforation test were also done when necessary.^{9,10}

RESULTS

A total of 88 specimens obtained during the period of one year were processed by KOH examination and culture. Among these 88 samples, 58 (65.9%) were KOH positive and 30 (34%) were KOH negative.

In these 58 KOH positive samples, 49 (55.68%) were culture positive and the remaining 9 (10.22%) isolates were culture negative. In the remaining 30 (34.09%) KOH negative samples, 10 (11.36%) were culture positive and 20 (22.72%) were culture negative. In our study, the total culture positivity was slightly higher 59 (67.04%) than the total KOH positivity 58 (65.90%).

Maximum cases were seen in the age group of 21-40 years 43 (48.9%) followed by 41-60 years 23 (26.1%), only 2 cases were above the age of 60 years. Males were more affected 68 (76.86%) than females 20 (26.13%) with male-to-female ratio of 2.82:1.

Sl. No.	Clinical Types	No. of Cases	Percentage
1	Tinea corporis	32	36.4%
2	Tinea cruris	20	22.7%
3	Tinea capitis	8	9.1%
4	Tinea pedis	5	5.7%
5	Tinea unguium	4	4.5%
6	Tinea faciei	3	3.4%
7	Tinea barbae	1	1.1%
8	Multiple sites	15	17%

Table 2: Clinical Analysis of Cases of Dermatophytes

In our study Tinea corporis was the most common clinical presentation 32 (36.4%) followed by Tinea cruris 20 (22.7%), Tinea capitis 8 (9.1%) and Tinea pedis 5 (5.7%). Other sites like Tinea unguium 4 (4.7%), Tinea faciei 3 (3.4%) and Tinea barbae 1 (1.1%) together accounted for less than 10% of total specimens.

Specimens were also obtained from multiple sites contributing to significant percentage 15 (17.04%) among the total specimens. In these clinical types, majority were obtained in the combined sites of Tinea corporis and Tinea cruris 10 (11.36%).

	KOH Positive n (%)	KOH Negative n (%)	Total n (%)
Culture Positive	49 (55.7%)	10 (11.4%)	59 (67%)
Culture Negative	9 (10.2%)	20 (22.7%)	29 (33%)
Total	58 (65.9%)	30 (34.1%)	88 (100%)

Table 1: Correlation of Results of KOH Mount and Culture

Sl. No.	Lesions	Total Cases	Microscopy and Culture Positive	Microscopy and Culture Negative	Microscopy Negative and Culture Positive	Microscopy and Culture Negative
1	Tinea corporis	32	16	4	1	11
2	Tinea cruris	20	14	2	2	2
3	Tinea capitis	8	2	1	2	3
4	Tinea pedis	5	4	-	1	-
5	Tinea unguium	4	-	1	-	3
6	Tinea faciei	3	1	-	1	1
7	Tinea barbae	1	-	-	1	-
8	Multiple sites	15	12	1	2	-
Total		88	49(55.68%)	9(10.22%)	10(11.36%)	20(22.72%)

Table 3: Analysis of Mycological Confirmed Cases

Clinical Type	T. mentagrophytes	T. rubrum	T. tonsurans	T. verrucosum	M. canis	E. floccosum	Total Isolates
T. corporis	12	3	-	-	2	-	17
T. cruris	9	4	-	-	2	1	16
T. capitis	1	-	2	1	-	-	4
T. pedis	3	1	-	-	1	-	5
T. faciei	2	-	-	-	-	-	2
T. barbae	1	-	-	-	-	-	1
Multiple sites	13	1	-	-	-	-	14
Total	41 (69.5%)	9 (15.25%)	2 (3.4%)	1 (1.69%)	5 (8.47%)	1 (1.69%)	59

Table 4: Lesion Wise Distribution of Isolates

Fig. 1: *T. capitis*

Fig. 2: *T. corporis*

Fig. 3: KOH Mount showing Branching, Hyaline, Septate Hyphae

Fig. 4: Culture of *T. rubrum*, *T. mentagrophyte* & *E. floccosum*

Fig. 5: LPCB Mount showing Spiral Hyphae and Conidia of *T. mentagrophyte*

DISCUSSION

Dermatophytosis is one of the most common fungal infections widely distributed throughout the world with increasing frequencies in tropical and sub-tropical countries. In present study, majority of the patients were males 65 (73.86%) and females contributed only 23 (26.13%) of total cases and majority of the patients were the age group of 21-40 years (48.86%) followed by 41-60 years (26.13%), then below 20 years (22.72%) and only 2 (%) patients were above 60 years of age. This correlates well with the studies conducted by Bhatia et al¹¹, Omar B J et al¹² and Nawal et al¹³ The KOH positivity was observed in 58 (65.90%) patients and culture positivity was observed in 59 (67.04%) of total specimens. This finding explains that the culture sensitivity was slightly higher than the KOH in identifying the causative agent.

These findings correlate with the studies done by Omar B J et al¹², Fathi H I et al¹⁴ and Sumathi et al¹⁵, where the culture positivity was slightly higher than KOH positivity (49% and 55%; 45% and 51.4%; 45% and 50% respectively). In contrast Mathur M et al¹⁶, Richa Sharma et al¹⁷ and Neetu J N et al¹⁸ observed higher KOH positivity when compared to culture (KOH and culture: 71.5% and 62%, 85% and 60%, 72.5% and 58.33% respectively).

In a recent study conducted by Surendran et al. KOH.¹⁹ positivity was quite high with 96% were positive by KOH, whereas only 39% were culture positive with only 4 cases of culture positivity observed in KOH negative samples.

	Hanumanthappa et al. (2012). ²⁰	Kamothi et al. (2010). ²¹	Nawal et al. (2012). ¹³	Present Study
KOH +ve, culture +ve	36%	65.21%	55.08%	55.68%
KOH +ve, culture -ve	30.6%	34.72%	17.36%	10.22%
KOH -ve, culture +ve	12.6%	11.29%	7.78%	11.36%
KOH -ve, culture -ve	20.6%	88.77%	19.76%	22.72%
Table 5: Comparative Evaluation of KOH and Culture Positivity in Various Studies				

In our study, the commonest clinical type was T. corporis accounting to 32 (36.36%) out of 88 specimens. The second most common clinical type in our study was T. cruris contributing 22.72% followed by T. capitis contributing to 9.09% of total isolates. Mixed (Multiple) site infections were also commonly encountered in our study accounting to 17.04%. These finding correlates with the Hanumanthappa et al.²⁰, Kamothi et al.²¹, Nawal et al.¹³ and Mathur M et al. The other clinical types, which occurred less frequently in our study were T. pedis (5.68%), T. unguium (4.54%) and T. faciei (3.40%) and T. barbae (1.13%).¹⁶ In Surendran et al.¹⁹ study Tinea corporis (44.3%) was the most common clinical pattern observed followed by tinea cruris (38.2%), tinea pedis (2.7%), tinea manuum (3.3%), tinea unguium (8.1%), tinea barbae (2.1%), and tinea faciei (1.3%). In the present study majority of the isolates belonged to the genera Trichophyton 53 (89.8%), followed by Microsporum 5 (8.47%) and only single case of Epidermophyton floccosum was 1.69% isolated.

In the Trichophyton genus, the predominant species isolated was T. mentagrophytes, accounting to 41 (69.5%) of the total isolates followed by T. rubrum 9 (15.25%). This finding correlates well with the study conducted by Adefemi SA et al.²² where the predominant isolate was T. mentagrophytes 73.3%.

In contrast to our study, majority of the studies conducted in India and elsewhere have shown T. rubrum as the predominant isolate followed by T. mentagrophytes as the second common isolate. The isolation rate of T. mentagrophytes was ranging from 13.4% to 31%. Kamothi, M. N. et al.²⁰ 13.4%, Nawal et al.¹³ 14.1%, Nidhi Prasad et al.²² 21.4%, Madhavi S et al.⁶ 31%. In Surendran et al. study, Trichophyton rubrum (67.5%) was the highest followed by Trichophyton mentagrophytes (20%).

All the remaining Trichophyton species contributed only a minor part accounting to only 5% of total isolates, which include T. verrucosum 1.69% and T. tonsurans 3.39%.

Next to the Trichophyton genus, the second most common genus isolated in our study was Microsporum contributing to 5 (8.47%) of the total isolates. All the 5

isolates were identified as M. canis. Studies conducted by Nidhi Prasad et al.²³, Surendran et al.¹⁹ and Ibrahim et al.¹¹ has showed the M. canis isolation rate of 0.87%, 2.5% and 17.8% respectively. Our findings are similar to the above mentioned studies.

The least common isolate in our study was Epidermophyton floccosum accounting to only 1 (1.69%). Our findings correlate well with the findings of Hanumanthappa et al.¹⁹, where E. floccosum was the least common isolate contributing 0.7%.

Mahbubnagar, the least developed district in the entire Telangana has a diverse group of people with majority of them living in the substandard conditions with poor hygienic practices. The dermatophyte infections are often neglected by many of them as they are not life-threatening and are presented to the hospital only in severe cases with extensive lesions. And also a constant change in the epidemiological and aetiological patterns can be expected in such a diverse cultural, habitual and economically variable population. Identifying the changing epidemiological patterns are always important in the appropriate management of the patients.

CONCLUSION

The present study identifies T. mentagrophytes as the principal aetiological agent in and around Mahbubnagar surpassing T. rubrum, which is the most common agent isolated in major parts of India. This variation in the epidemiological pattern may be associated with environmental factors, local cultural and habitual variants with respect to a particular geographical area, which may change from time to time.

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