

## ORIGINAL ARTICLE

# Epidemiological and Clinico-Mycolological Profile of Dermatophytosis in a Tertiary Care Hospital, Karimnagar

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## Abstract

**Introduction:** Dermatophytosis refers to fungal infections affecting superficial layers of skin including hair and nails, which is most common in Tropical and Sub-tropical countries.

**Objectives:** To study the prevalence of dermatophytosis among various age groups and their clinico-mycological profile. **Materials & Methods:** Samples from 150 patients with suspected dermatophytosis were collected and subjected to KOH mount and culture on SDA slant. Growth observed regularly for 4-6 weeks. Growth is subjected to LPCB mount for identification. **Results:** The commonest clinical type of infection is *Tinea corporis* with 73 (48.6%) cases followed by *Tinea cruris* 32 (21.3%). Male to female preponderance ratio is 2.1:1, and is more common among age groups 20 to 40 years. *Trichophyton rubrum* is the commonest organism isolated in culture. Our study highlights that *tinea corporis* is the commonest clinical type presentation of dermatophytosis with male predominance and more prevalent among actively working age groups. **Conclusion:** Dermatophytic infections are of concern due to their chronic nature. Socio-economic status, occupation, climatic conditions are the other epidemiological factors contributing to the prevalence of infections.

**Keywords:** Dermatophytosis, *Tinea corporis*, *Trichophyton rubrum*

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## Introduction

Dermatophytosis refers to superficial fungal infection of skin and its appendages including nails and hair. They are caused by a group of fungi called as Dermatophytes which possess a capacity to invade the keratinized tissues of skin [1]. Their prevalence rates are around 20-25% according to World Health Organization [2] and differ in different countries [3-6]. They are more prevalent in Tropical and Sub-tropical countries like India where the heat and humidity lasts for most part of the year [7]. Tinea and 'ringworm' are synonyms for dermatophytosis [8]. Dermatophyte infections are restricted to cornified layers of the skin. The severity of infections caused by them are influenced by factors like the virulence of the infected strain, anatomic location of the lesion, environmental factors and host's reaction to the fungal metabolites [9]. Based on morphological characteristics three genera of dermatophytes

have been identified. They are *Trichophyton*, *Microsporum* and *Epidermophyton*. Based on ecological characteristics dermatophytes are divided into geophilic, zoophilic and anthropophilic types [10]. The classical presentation of the tinea is a lesion with central clear zone surrounded by red, scaly elevated border and is associated with itching. Although, mortality due to these infections has not been reported till date but the chronicity and cosmetic importance should be taken into consideration [11].

## Materials and Methods

The present study was conducted at Department of Microbiology, PIMS, Karimnagar for a period of 12 months from August 2017 to July 2018, after being approved by the Institutional ethical committee. The study group includes the patients with suspected dermatophytosis attending the Dermatology OPD. Patients on

anti-fungal drugs and steroid medication were excluded. Detailed data from the patients was collected which include their socio-economic status, occupation, living conditions, duration of illness, any similar illness in the family and any prior anti-fungal therapy. The specimens collected were skin scrapings from the site of lesion on various parts of the body like trunk, hands, feet, scalp, face and palm, with a blunt scalpel after thorough cleaning with 70% alcohol. Nails were clipped with sterile clippers and hairs epilated with a sterile forceps. All the specimens were collected on black photographic paper for clear visualization [12]. All the specimens were subjected to direct microscopy after performing wet mount with various concentrations of potassium hydroxide (KOH), 10% was used for skin, 20% for hair and 40% for nail. Slides were observed under 10X objective and 40X objective for the presence of fungal elements which appear as hyaline septate branching hyphae [10]. All the samples were cultured on 2 sets of Sabouraud Dextrose Agar slants with and without chloramphenicol and cycloheximide, these antibiotics were used to avoid contamination with bacteria and saprophytic fungi and on Dermatophyte Test Medium (DTM) manufactured by Himedia. Slants were incubated at 28°C in a BOD incubator and were observed regularly for

growth. Culture was considered negative if there was no growth after 4 weeks. Macroscopic examination of the dermatophytes was done by duration of growth, surface morphology, and pigment production on the reverse. Microscopic examination was done using Tease mount technique with LactoPhenol Cotton Blue (LPCB) on a microscopic slide and observing under 10 X and 40 X objective. Slide cultures were performed for identification of the organism. This technique enables the observation of mycelia, conidia, spores in various stages of development without disturbing the morphology.

## Results

In the present study, among 150 cases of suspected dermatophytosis, males were 102 (68%) and 48 (32%) were females. Male to female preponderance ratio is 2.1:1. The predominant age group in both sexes was 21-30 years followed by 31-40 years (Table 1). Out of 150 cases of suspected dermatophytosis, Tinea corporis is the commonest clinical type of presentation with 73 cases (48.66%), followed by Tinea cruris 32 (21.33%), Tinea pedis 17 (11.33%), Tinea unguinum 15 (10%), Tinea capitis 7(4.6%), Tinea faciei 4 (2.66%) and Tinea mannum 2 (1.33%). (Table:2)

**Table:1** Dermatophytosis in relation to age and sex

Age (years)	Male	Females	Total
0-10	5 (3.3%)	4 (2.6%)	9 (6%)
11-20	14 (9.3%)	8 (5.3%)	22 (14.6%)
21-30	40 (26.6%)	16 (10.6%)	56 (37.3%)
31-40	26 (17.3%)	15 (10%)	41 (27.3%)
41-50	9 (6%)	6 (4%)	15 (10%)
51-60	4 (2.6%)	1 (0.6%)	5 (3.3%)
61-70	2 (1.3%)	--	2 (0.6%)
	102	48	150

**Table: 2** Clinical presentations of Dermatophytosis

Clinical type	No. of cases
Tinea corporis	73 (48.6%)
Tinea cruris	32 (21.3%)
Tinea pedis	17 (11.3%)
Tinea unguinum	15 (10%)
Tinea capitis	7 (4.6%)
Tinea faciei	4 (2.6%)
Tinea mannum	2 (1.3%)
<b>Total</b>	150

Out of 150 cases of suspected dermatophytosis 86 (57.3%) were KOH positive and 68 (45.3%) were culture positive. 61 (40.6%) cases are both KOH and culture positive, whereas 7 (4.6%)

were KOH negative and culture positive. 57 (38%) were both KOH and culture negative. (Table 3)

**Table: 3 Results of KOH mount and culture**

	KOH positive	KOH negative	Total
Culture positive	61 (40.6%)	7 (4.6%)	68 (45.3%)
Culture Negative	25 (16.6%)	57 (38%)	82 (54.6%)
	86 (57.3%)	64 (42.6%)	150 (100%)

**Table:5- Dermatophytes in various clinical presentations**

	Tinea carporis	Tinea cruris	Tinea pedis	Tinea unguinum	Tinea faciei	Tinea capitis	Tinea mannum	Total
<i>Trichophyton rubrum</i>	24 (66.6%)	18 (78.2%)	1 (50%)	1 (50%)	1 (100%)	2 (66.6%)		46
<i>Trichophyton mentagrophytes</i>	7 (19.4%)	2 (8.69%)	1 (50%)	1 (50%)			1 (100%)	12
<i>Trichophyton violaceum</i>	3 (8.3%)	1 (4.3%)				1 (33.3%)		5
<i>Microsporium audouinii</i>	1 (2.7%)	1 (4.3%)				1 (33.3%)		3
<i>Epidermophyton floccosum</i>	1 (2.7%)	1 (4.3%)						2
Total	36	23	2	2	1	3	1	68

Among the total 150 cases, 68 (45.3%) were culture positive. In the 68 culture positive cases *Trichophyton rubrum* was the predominant isolate accounting 46 (67.65%) cases, followed by *Trichophyton mentagrophytes* 12 (17.65%), *Trichophyton violaceum* 5(7.35%), *Microsporium audouinii* 3 (4.41%) and *Epidermophyton floccosum* 2(2.94%) Table 4.

**Table:4 Various species if Dermatophytes isolated**

Species	No. of Isolates
<i>Trichophyton rubrum</i>	46 (67.65%)
<i>Trichophyton mentagrophytes</i>	12 (17.65%)
<i>Trichophyton violaceum</i>	5 (7.35%)
<i>Microsporium audouinii</i>	3 (4.41%)
<i>Epidermophyton floccosum</i>	2 (2.94%)
	68 (100%)

Among 73 cases of Tinea carporis, 36 were culture positive and *Trichophyton rubrum* was isolated from 24 (66.6%) cases followed by *Trichophyton mentagrophytes* 7 (19.4%),

*Trichophyton violaceum* 2 (5.5%), *Microsporium audouinii* and *Epidermophyton floccosum* one (1) each (2.7%). In 32 cases of Tinea cruris 23 were culture positive in which *Trichophyton rubrum* predominates in 18 (78.2%) cases followed by *Trichophyton mentagrophytes* 7 (19.4%) and *Trichophyton violaceum*, *Microsporium audouinii* and *Epidermophyton floccosum* one (1) each (4.3%). 2 out of 17 cases of Tinea pedis were culture positive and had grown *Trichophyton rubrum* and *Trichophyton mentagrophytes* one (1) each (50%). Out of 7 cases of Tinea capitis 3 were culture positive, where 2(66.6%) were *Trichophyton rubrum* and one (1) each (33.3%) were *Trichophyton violaceum* and *Microsporium audouinii*. Among 15 cases of Tinea unguinum 2 were culture positive, and *Trichophyton rubrum* and *Trichophyton mentagrophytes* one (1) each (50%). Out of 4 cases of Tinea faciei and 2 cases of Tinea mannum, one (1) each was culture positive and had grown *Trichophyton rubrum* (100%). Table 5.

## Discussion

Dermatophytic infections are more common among the various fungal infections of man in

the world<sup>[13,14]</sup>. As 20-25% population are suffering from these infections<sup>[1]</sup> studies on dermatophytoses have been increasing in recent times. The present study includes 150 cases, out of which maximum number (37.3%) were of age group 21-30 years (37.3%) followed by 31-40 years (27.3%) age group. This results coincides with studies carried by Parameswari et al; who reported 40% and 28.6% respectively<sup>[15]</sup>. Similar results were reported by Kumar et al showing 24% and 17.6% respectively. Our study also relates with studies carried by V.Sumana et al;<sup>[16]</sup> and H. Krishna Santosh<sup>[17]</sup> who also reported that maximum number of cases belong to age group 21-30 years. In our present study, dermatophytic infections are more common in males (68%) than in females (32%). This may be due to more outdoor activities and occupational conditions which result in exposure to fungi in males. Male to female ratio is 2.1:1. Our results co-relates with studies carried out by Neetu Jain et al; who reported that males (67.5%) are more prone to infections than females (32.5%)<sup>[18]</sup>. Kumar et al reported 67.2% males and 32.8% females<sup>[13]</sup>, Lakshmanan et al reported 56% males and 44% females<sup>[19]</sup>.

In the present study, 86 cases (57.3%) were positive for direct microscopy with KOH mount, 68(45.3%) were culture positive, 25(16.6%) were both KOH and culture negative and 57(38%) were both KOH and culture positive. This is in line with studies conducted by Kumar et al who reported 55.2% positive in direct microscopy and 42.4% were culture positive<sup>[13]</sup>, also with study by H.Krishna Santosh et al reported 55.37% KOH positive and 46.97% culture positive<sup>[17]</sup>. S.Singh et al reported 60.38% KOH positive and 44.6% culture positive<sup>[20]</sup>, Parameswari et al reported 80% KOH positive and 46.7% culture positive<sup>[15]</sup>. Among the 68 culture positives, *Trichophyto rubrum* was the commonest isolate accounting 46(67.65%) cases, followed by *Trichophyton mentagrophytes* 12(17.65%). This is in co-relation with studies conducted by Kumar et al reported 65.09% and 17.92%<sup>[13]</sup>, Singh S et al 73.27%,17.94%<sup>[20]</sup>, Bindu et al 66.2% and 25%<sup>[21]</sup>, Lakshmanan et al 79% and 14.5% respectively. *Microsporum audouinii* was isolated in 3(4.41%) cases which is in line with Kumar et al 4.72%<sup>[13]</sup>. and H.Krishna Santosh et

al; 4.29%<sup>[17]</sup>. *Epidermophyton floccosum* was isolated in 2(2.94%) cases which relates to studies by Nidhi Negi et al; (2.3%)<sup>[22]</sup>, but in contrast to study by Kumar et al; 8.49%<sup>[13]</sup>. In our present study, *Tinea carporis* (48.6%) was the commonest clinical form of infection followed by *Tinea cruris* (21.3%). Sumana et al<sup>[16]</sup>, Parameswari et al;<sup>[15]</sup>, BK Gupta et al;<sup>[23]</sup>, also reported *Tinea carporis* as the commonest clinical presentation, however Nagarkatti et al;<sup>[24]</sup>, Kumar et al;<sup>[25]</sup> had reported *Tinea cruris* as the commonest clinical form of infection, followed by *Tinea carporis*. *Tinea pedis* occupied third position (11.3%) in clinical presentation, also reported by CRV Narsimhalu et al;<sup>[26]</sup>. *Tinea unguinum* is seen in 10% cases and *Tinea capitis* in 4.67% cases. Similar results were reported by Kumar et al 9.6% and 4.4%<sup>[13]</sup>, but contrast to studies by Parameswari et al;<sup>[15]</sup> who reported 6.75 and 15.3% respectively.

## Conclusion

Our study highlighted that dermatophytic infections are more common in males, with *Tinea carporis* being the commonest clinical presentation. *Trichophyton rubrum* was the most common aetiological agent. Different species of dermatophytes produce different kinds of lesions but a single species can produce a variety of lesions depending upon the site of infection. Though dermatophytoses are not a fatal but they definitely pose a cosmetic threat and also the treatment is cost-effective.

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## References

1. Weitzman, I., and R.C. Summerbell. The dermatophytes. Clin Micro Rev 1995;8(2):240-259.
2. WHO 2005, Epidemiology and Management of common skin diseases in children in developing countries. World Health Organisation, Geneva. WHO/FCH/CAH/05.12
3. Falahati M, Akhlaghi L, Lari AR, Alaghebandan R. epidemiology of dermatophytoses in an area south of Tehran, Iran. Mycopathologia 2003; 156:279-87

4. Havlickova B, Czaika VA, Friedrich M. Epidemiological trends in skin mycoses world-wide. *Mycoses* 2008;51 (suppl 4): 2-15
5. Djeridane A, Djeridane Y, Ammar-Khodija A. Epidemiological and aetiological study of tinea pedis and onychomycosis in Algeria. *Mycoses* 2006; 49: 190-196
6. Manzano-Gayosso P, Mendez-Tovar LJ, Hernandez-Hernandez F, Lopez-Martinez R. Dermatophytoses in Mexico city. *Mycoses* 1994;37: 49-52
7. Kumar K, Kindo AJ, Kalyani J, Anandan S. clinic-mycological profile of dermatophytic skin infection in a tertiary care centre. *Sri Ramachandra Journal of Medicine* 2007;1:12-5
8. Finegoldand, Elen Jo Baron editors. *Bailey and Scott's diagnostic Microbiology*. 8<sup>th</sup> ed.p.773
9. Esquenazi D., Alviano C.S., De Souza W., Rozental S. The influence of surface carbohydrates during in vitro infection of mammalian cells by the dermatophyte *Trichophyton rubrum*. *Res. Microbiol.* 2004;155, 144-53
10. Jagdish Chander *Text book of medical mycology* 3<sup>rd</sup> edition. Mehta publishers 2009;3: 122-146
11. M Mishra et al. Clinico-Mycological profile of superficial mycosis *Indian J. dermatol venereol and leprol.* 1998;64:283-285
12. BK Gupta et al. Mycological aspects of dermatomycosis in Ludiana *Indian J.pathol and microbial.* 1993;36:233-237
13. Sumit kumar, P Shrikara Mallya, Pallavi Kumari, Clinico-Mycological tudy of Dermatophytosis in a Tertiary Care Hospital. *International Journal of Scientific Study*, 2014;1(6):27-32.
14. Venkateshan G Singh AJAR, Murugesan AG, Janaki C, Shankar SG. "Trichophyton rubrum- the predominant etiological agent in Human dermatophytoses in Chennai India. *Afr J microbial Res.* 2007;1(1):9-12
15. Parameswari K, Prasad Babu KP. Clinico-Mycological study of dermatophytosis in and around Kakinada. *Int J Med and Dent Sci* 2015;4(2):828-33
16. V Sumana, MA Singaracharya. Dermatophytosis in Khammam. *Indain J Micrbiol* 2004;47(2):287-89.
17. H. Krishna Santosh, Kandati Jithendra, et al. Clinico-Mycological Study of Dermatophytosis – Our Experience *Int J CurrMicrobiol.App.Sci* 20154(7):695-702
18. Neetu Jain, Meenakshi Sharma, V N Saxena. Clinic-mycological profile of Dermatophytosis in Jaipur, Rajasthan. *Indian J Dermatol venerol leprol* 2008;74(3):274-75
19. Lakshmanan A, Ganesh kumar P, Mohan SR, Hemamalini M, Madhavan R. Epidemiological and clinical pattern of dermatophytoses in rural India. *Indian J Med Microbiol* 2015;33:S134-6
20. S. Singh, PM Beena. Comparative study of different microscopic techniques and culture media for the isolation of dermatophytes. *Indian J Med Microbiol.*2003;21(1):21-24
21. Bindu V, Pavithran K. Clinico mycological study of dermatophytosis in Calicut. *Indian J Dermatol Venereol and Leprol.* 2002;68(5):259-261
22. Nidhi Negi, Vibha Tripathi, Reshmi Chanda Choudhury, Jitendra Singh Bist, Neeti Kumari and Iva Chandola. 2017. Clinicomycological profile of Superficial Fungal Infections caused by Dermatophytes in a Tertiary care Centre of North India. *Int J.Curr.Microbiol.App.Sci.* 6(8):3220-27
23. Gupta BK, Kumar S, Khurana S. Mycological aspects of Dermatomycosis in Zudhiana. *Indian J Pathol Microbiol* 1993;36(3):233-37
24. Nagarkatti PG, Souzan D, Ramachandraiah V. Dermatophytosis in North Karnataka. *Indian J pathol Bacteriol* 1975;18:26-31
25. Kumar AG, Lakshmi N. Tinea capitis in Tirupathi. *Indian J Pathol Microbiol*1990;33(4):360-63.
26. Narsimhalu CRV, M Kalyani, Somendar S A Cross-sectional, Clinico-Mycological Research Study of Prevalence, Aetiology, Speciation and Sensitivity of Superficial Fungal Infection in Indian Patients. *J Clin Exp Dermatol Res* 2016; 7:324