

A clinicomycological study of dermatophytic infection in a tertiary care hospital

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Abstract

Introduction: Dermatophytosis is a mycotic infection of the hair, skin or nails. Although dermatophytic infection doesn't cause mortality, it can lead to morbidity and result in a major public health issue usually in tropical countries like India, because of the supporting climatic conditions like high temperature and air moisture.

The present study was undertaken to know the clinical status of dermatophytic infection and to isolate and identify the species commonly seen in our area.

Materials and Methods: A total of 166 clinically suspected cases of dermatophytosis sent for department of Microbiology were studied over a period of one year. KOH for microscopy and culture on Sabouraud's dextrose agar slopes was done. Species identification was done by studying growth morphology, slide culture and biochemical tests like urease test.

Results: Among 166 patients, the dermatophytosis was more common among the age group of 21-30 years. Males (55.5%) were more affected than females (44.5%). The most common clinical type was tinea corporis (36.2%) followed by tinea incognito (10.3%). Out of 166 patients, 125 cases (75.3%) were positive for fungi by KOH and 118 cases (71.1%) showed growth in culture. *Trichophyton spp* are predominantly isolated (88%).

Conclusion: The prevalence of dermatophytosis usually differ with respect to various geographical locations. India due to high humidity and temperature acts as a rich ground for the heavy growth of dermatophytes. Idea regarding the fungal infections prevalent in the particular region is important to know the burden of infection and its course of infection. This helps to plan for the proper infrastructure required for various epidemiological and laboratory studies, and further to evaluate interventions required for treatment.

Keywords: Dermatophytosis, Trichophyton, Tinea.

Introduction

The dermatophytes are among the commonest infectious agents of man. Dermatophytosis is a mycotic infection of the hair, skin or nails. Although dermatophytic infection doesn't cause mortality, it can lead to morbidity and result in a major public health issue usually in tropical countries like India, because of the supporting climatic conditions like high temperature and air moisture. Overall calculated lifetime risk for acquiring a dermatophyte infection is around 10 to 20 percent.¹

Dermatophytes usually do not affect the mucus membranes instead affects the keratinized tissues of the body. The infection is acquired due to direct contact with an infected individual (anthropophilic organisms), or contact with animals (zoophilic organisms) or soil exposure (geophilic organisms) or by formites in indirect way. Although, the clinical signs of dermatophytosis differs according to the area of the body involved, itching is the most common symptom in humans.² Dermatophytes consist of three genera *Trichophyton*, *Microsporum* and *Epidermophyton*.³ *Trichophyton rubrum* is the most common cause of tinea corporis, tinea pedis, tinea unguium, tinea cruris, tinea manuum and tinea faciei worldwide. Other frequently isolated agents are *Trichophyton mentagrophytes*, *Microsporum canis*, *Microsporum gypseum* and *Epidermophyton floccosum*.⁴

Though, there are many studies available from across India and world, there is very little data of

dermatophytosis from our region. The present study was carried out to find out the clinical & mycological pattern of fungi causing dermatophytosis in our tertiary care hospital.

Materials and Methods

166 clinically diagnosed cases of dermatophytosis sent to department of microbiology was studied for a period of one year. A detailed clinical history including age, sex, occupation, socio – economic status, distribution of lesion and duration of illness and any associated risk factors contributing for the illness was elicited from the patients. Verbal consent was taken from all the patients. Patients previously treated or on treatment were excluded from the study.

The affected area is first rubbed with 70% alcohol to remove any skin contaminants. Clean white paper packet was used to collect the samples taken like skin scrapings or nail clippings or plucked hair. Skin scrapings were collected by scraping along the inflammatory margin of the lesion including the healthy skin by the use of sterile scalpel or a clean glass slide. Nail specimen was collected by taking the infected nail clippings and is scraped deeply enough to obtain the recently invaded nail tissue. Hair specimen was collected by plucking the infected hair along with the base of hair shaft.

Sample was subjected for direct microscopic examination using 10% /40% KOH. Samples was

inoculated on Sabouraud's dextrose agar slopes and dermatophyte test media. The growth in SDA tubes was studied and further identification of species was done by performing slide culture, hair perforation test, rice grain test and biochemical test like urease test. Statistical analysis was done by using Chi-square test.

Results

A total of 166 patients were studied. The age range was 3-70 years. Maximum number of cases were in the age group of 21 to 30 years (26%) followed by 31 to 40 years (25%). In our study males (55.5%) were more commonly affected than females (44.5%). Male to female ratio was 1.33:1. Infection was most common in low income group (83%) and commonly seen in labour class (45%) followed by homemakers (28.5%), students (17%), professionals (6%) and others (3.5%). The cases peaked during the month of August – September (22.5%). Out of 166 patients, 125 cases (75.3%) were positive for fungi by KOH and 118 cases (71.1%) showed growth in culture.

Tinea corporis was the commonest clinical type encountered (36.14%) followed by tinea incognito (10.24%), tinea cruris (9.64%), tinea pedis (9.04%), tinea manum (7.23%), tinea capitis & tinea unguium

(6.63% each), tinea corporis+ tinea cruris (6.02%), tinea faciae (5.42%) and tinea barbae (3.01%) [Table 1].

The commonest age group affected was 31 to 40 years in tinea corporis. Tinea capitis was mainly seen in children below 10 yrs (90.90%). Males were more commonly affected than females in tinea corporis, tinea cruris and tinea incognito. Females were affected more in tinea faciae since they seek medical attention more than males for cosmetic reasons, also in tinea pedis and tinea manum because of more exposure to water during their household works.

Among 134 culture positive cases, *T. rubrum* (63.63%) [Fig. 1], was the commonest aetiological agent isolated in majority of clinical types followed by *T. mentagraphytes* (21.49%) [Fig. 2], *M. gypseum* (4.96%) [Fig. 5], *E. floccosum* (4.13%) [Fig. 7], *M. audouinii*, *T. violaceum* (2.47% each) [Fig. 4 and 3] and *M. nanum* (0.83%) [Fig. 6]. *T. rubrum* was isolated in all the cases of tinea faciae (100%). *T. rubrum* was the commonest isolate in tinea corporis (63.16%), tinea incognito (76.92%), tinea pedis (76.92%), tinea manum (77.78%), tinea cruris (78.58%) and tinea unguium (50%). *M. audouinii*, *T. violaceum* and *M. nanum* were isolated only in tinea capitis (3, 3, 1 cases each resp) [Table 2].

Table 1: Age and sex wise distribution of cases in relation to clinical types

Clinical types	≤10	11-20	21-30	31-40	41-50	>51	Total	Total	%
	M F	M F	M F	M F	M F	M F			
T.corporis	1 -	6 2	12 1	11 9	3 7	5 3	38 22	60	30
T.incognito	--	3 3	3 2	2 -	- 1	3 -	11 6	17	8.5
T.cruris	--	1 -	6 2	3 -	2 1	- 1	12 4	16	8
T.pedis	--	3 1	1 4	- 1	- 4	1 -	5 10	15	7.5
T.manum	--	- 1	- 5	2 2	1 -	1 -	4 8	12	6
T.capitis	6 4	1 -	--	--	--	--	7 4	11	5.5
T.unguium	--	--	1 -	1 2	2 3	2 -	6 5	11	5.5
T.cruris+ T.corporis	--	--	2 -	2 3	3 -	--	7 3	10	5
T.faciaei	--	- 8	1 -	--	--	--	1 8	9	4.5
T.barbae	--	--	1 -	4 -	--	--	--	5	2.5

Table 2: Dermatophytes isolated in relation to the clinical types

Clinical type	KOH positive	Total culture positive	<i>T. rubrum</i>	<i>T. mentagraphytes</i>	<i>T. violaceum</i>	<i>M. audouinii</i>	<i>M. gypseum</i>	<i>M. nanum</i>	<i>E. floccosum</i>
T.corporis n=60	36	38	24	10	-	-	4	-	-
T.pedis n=15	14	13	10	1	-	-	-	-	2
T.manum n=12	10	9	7	1	-	-	-	-	1

T.cruris n=16	16	14	11	2	-	-	-	-	1
T.capitis n=11	11	9	-	1	3	3	1	1	-
T.barbae n=5	4	4	-	4	-	-	-	-	-
T.faciaei n=9	6	6	6	-	-	-	-	-	-
T.unguium n=11	6	6	3	2	-	-	-	-	1
T.incognito n=17	13	13	10	2	-	-	1	-	-
T.cruris+ T.corporis n=10	7	6	3	3	-	-	-	-	-
Total isolates n=166	125	118	74	26	3	3	6	1	5



Fig. 1: *Trichophyton rubrum* – culture on SDA



Fig. 2: *Trichophyton mentagrophytes* - culture on SDA



Fig. 3: *Trichophyton violaceum* – culture on SDA



Fig. 4: *Microsporum audouinii*– culture on SDA



Fig. 5: *Microsporum gypseum* – culture on SDA

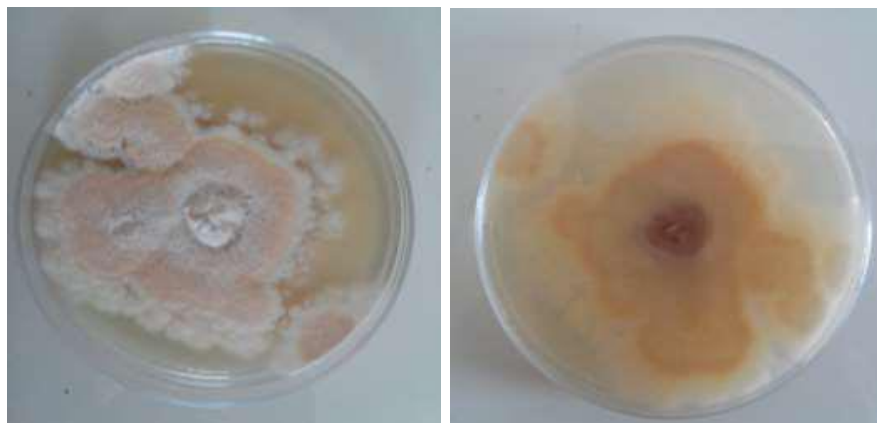


Fig. 6: *Microsporum nanum* – culture on SDA



Fig. 7: *Epidermophyton floccosum* – culture on SDA

Discussion

Cutaneous mycoses are one of the commonest clinical conditions seen by medical practitioners and dermatologists. Various factors contribute for their occurrence, like overcrowding, low socioeconomic status, unhygienic conditions and outdoor activities. It is most common in developing countries, but as such in developed countries the prevalence is low because of better living condition, health education and awareness.

The present study shows that dermatophytosis was more commonly seen in 21 to 30 years (26%) of age group, followed by 31 to 40 years (25%), 41 to 50 years (17%), 11 to 20 years (16.5%), >51 years (10%) and ≤10 years (5.5%). Young adults were more affected because of their greater physical activity and more sweating.⁵ In the present study males (55.5%) were affected more commonly than the females (44.5%). Male to female ratio was 1.33:1. Male predominance is probably due to higher exposure to infection in schools, public bath sporting activities and the type of shoes and socks they use.⁶

In the present study, low income group (83%) was most commonly involved in the infection, followed by middle income group (12%) and high income group (5%), which was also the observation of Ranganathan S⁷

who reported that 69.2% of infected people were of low and very low income group and 23.2% from middle income group. This may be due to the poor hygienic conditions, sharing clothes without washing them properly overcrowding and also because of poor nutritional intake.

Infection was commonly seen in labour class (45%) followed by homemakers (28.5%), students (17%), professionals (6%) and others (3.5%). These were correlating well with findings of Nawal P.⁶ This could be due to increased physical activity, strenuous working conditions in labour class and increased wet work in home makers. The cases peaked during the month of August – September (22.5%) similar to the findings of Bhavsar HK⁸ in September due to the monsoon season which promotes the infection.

T. rubrum (63.63%) was the most common aetiological agent isolated in majority of the clinical types followed by *T. mentagraphytes* (21.49%) which is comparable with other studies done by Nawal P,⁶ Patel P⁹ and Bindu V.¹⁰

Conclusion

Dermatophytosis is very commonly seen in India. Hot and humid climatic condition in association with poor hygiene plays an important role for the growth of fungi. Recently, there is increase in the incidence of

fungal infections because of frequent usage of antibiotics, immunosuppressive drugs and various comorbid conditions like organ transplantations, lymphomas, leukaemia and human immunodeficiency virus (HIV) infections.

The prevalence of dermatophytosis usually differ with respect to various geographical locations. India due to high humidity and temperature acts as a rich ground for the heavy growth of dermatophytes. The commonest cause for dermatophytosis and onychomycosis in India is *Trichophyton* species among which *T. rubrum* is the most common isolate.

Idea regarding the fungal infections prevalent in the particular region is important to know the burden of infection and its course of infection. This helps to plan for the proper infrastructure required for various epidemiological and laboratory studies, and further to evaluate interventions required for treatment.

Abbreviations

E.floccosum: Epidermophyton floccosum

M.audouinii: Microsporum audouinii

M.canis: Microsporum canis

M.gypseum: Microsporum gypseum

T.rubrum: Trichophyton rubrum

T.mentagraphytes: Trichophyton mentagraphytes

T.violaceum: Trichophyton violaceum

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Conflicts of Interest: None.

References

1. Pierard GE, Arrese JE, Pierard-Franchimont C: Treatment and prophylaxis of tinea infections. *Drugs*. 1996;52:209-24.

2. Nweze EI. Dermatophytosis in Western Africa: A Review. *Pakistan J Biological Sciences*. 2010;13(13):649-656.136
3. Weitzman I, Summerbell RC: The dermatophytes. *Clin Microbiol Rev* 1995;8:240-59.
4. Aly R: Ecology and epidemiology of dermatophyte infections. *J Am Acad Dermatol*. 1994;31:521-5.
5. Shah SKD, Kilar, Shah NKS. "Clinico-mycological study of superficial fungal infections in coastal Karnataka, India". *J Evol Med Dent Sci*. 2013;44(2):8638-46.
6. Nawal P, Patel S, Patel M, Soni S, Khandelwal N. A Study of Superficial Mycosis in Tertiary Care Hospital. *NJIRM*. 2012;3(1):95-99.
7. Ranganathan S, Menon T, Selvi GS, Kamalam A. Effect of socio-economic status on the prevalence of dermatophytosis in Madras. *Indian J Dermatol Venereol Leprol*. 1995;61:342-5.
8. Bhavsar HK, Modi DJ, Sood NK, Shah HS. A study of Superficial Mycoses with clinicomycological profile in tertiary care hospital in Ahmedabad, Gujarat. *Nat J Med Res*. 2012;2:160-4.
9. Patel P, Mulla S, Patel D, Shrimali G. A Study of superficial mycosis in south Gujarat region. *Nat J Comm Med*. 2010;1:85-8.
10. Bindu V, Pavithran K. Clinico-mycological study of dermatophytosis in Calicut. *Indian J Dermatol Venereol Leprol*. 2002;68(5):259-61.
11. Singh S, Beena PM. Profile of dermatophyte infections In Baroda. *Indian J Dermatol Venereol Leprol*. 2003;69:281-3.
12. Sumana V, Singaracharya MA. Dermatophytosis in Khammam (Khammam district, Andhra Pradesh, India). *Indian J Pathol Microbiol*. 2004;47(2):287-9.

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