

Research Article

Clinico – mycological profiles of dermatophytoses in a tertiary care rural hospital

Seema Bose^{*1}, Rekha Barapatre², Atindra Krishna Ghosh³

Department of Microbiology, Rural Medical College, Pravara Institute of Medical Sciences, Deemed University, Loni, Taluka- Rahata Dist- Ahmednagar Maharashtra (India) PIN 413736

***Correspondence Info:**

Professor of Microbiology ,
Rural Medical College,
Pravara Institute of Medical Sciences, Deemed University
Loni, Taluka- Rahata, Dist- Ahmednagar Maharashtra
(India) PIN 413736
Email: -drseema1ghosh@gmail.com

Abstract

Background & Objectives: Dermatophytosis is one of the commonest cutaneous infections and prevalence of different species varies with different geographical locations. The present study was undertaken to detect the etiological agents of Dermatophytosis up to species level by microscopy and culture, in a tertiary care rural hospital of Maharashtra.

Methods: Patients, who attended the outdoor patients department of a tertiary care rural hospital with skin problems, were included in this cross sectional study.

Specimens, such as, hairs, nails and skin scraping were collected from suspected cases. Direct microscopy using potassium hydroxide preparation and culture on Sabouraud's dextrose agar and dermatophytes test agar media were done. Isolates were identified up to species level following conventional methods.

Results: Total 150 specimens were processed for dermatophytes from suspected cases of Dermatophytosis. Culture positive cases were 91(60.67%). *Trichophyton rubrum* (*T rubrum*) was the commonest isolate, i.e., 50(33.33%). Male, female ratio was 4:1. Age group 21 – 30 was most commonly involved. The most prevalent clinical type was *Tinea corporis* (42%).

Conclusion: Dermatophytosis is not uncommon in our setup. Early diagnosis is essential to prevent transmission of infection. Identification up to species level is necessary because some dermatophytes are resistant to azole derivatives.

Keywords: Dermatophytes, *Epidermophyton*, *Microsporium*, *Trichophyton*, *Tinea corporis*

1. Introduction

The dermatophytes are a group of fungi which have the capacity to invade keratin layer of skin, hair, nail, fur etc. of humans and lower animals.¹

The first recorded dermatophytic infection was attributed to Aulus Cornelius Celsus who in a book “De Re Medica” described “Kerion” of the scalp as early as 300 A.D.² Sabouraud classified dermatophytes into four genera- *Achorion* (A), *Trichophyton* (T), *Epidermophyton* (E) and *Microsporium* (M).³

The literal meaning of ‘dermatophyte’ is ‘skin plant’. This can attack various anatomical sites.⁴

Dermatophytosis is seen all over the world, both urban and rural areas.⁵ In India, like other tropical and sub-tropical countries, cases of dermatophytoses are significantly high due to favorable climatic conditions.

Prevalence of infection with different species of dermatophytes varies with geographical locations and conditions. Most of the patients, acquiring dermatophytic infection are diagnosed and treated by clinicians without any laboratory

confirmation.⁶

The present study was undertaken with the aim to determine the prevalence of dermatophytoses in a tertiary care hospital of Maharashtra, serving a rural population and to find out common clinical types of dermatophytes.

2. Material & Methods

The study population consisted of patients attending the dermatology department at a tertiary care rural hospital. The study was carried out in Microbiology department. Only cases with a strong suspicion of cutaneous mycotic infection were selected from patients attending Skin & Venereal department of the same hospital.

Microbiological investigations : A total of 150 patients were included in this study over a period of one year.

Scrapings were taken from the periphery of the lesions after proper sterilization of the surface with 70% alcohol. Samples were collected in sterile paper envelopes or in sterile Petri dishes. Affected hairs were epilated with forceps and nails were cut or clipped. Powdery debris under the nail was also collected. Wood's lamp examination was done in suspected cases of *Tinea capitis*.

Direct examination was done by Potassium Hydroxide (KOH) preparation and Gram staining. Direct microscopy of skin, hair and nail clippings were done using 10% or 20% KOH plus Dimethyl sulfoxide (DMSO).

Gram staining was done in suspected cases of *Candida* infection.

Culture was done on plain Sabouraud's dextrose agar and Sabouraud's dextrose agar with cycloheximide. Tubes and plates were incubated at 37°C and room temperature. For primary isolation of fungus from clinical specimens, Dermatophyte Test Medium was also used. The sterile culture tubes and plates were discarded after four weeks.

The species identification of dermatophytes isolated on culture was done by observing gross morphology, rate of growth, surface texture and pigment production, and microscopically by lacto-phenol cotton blue mounts. Fungal hyphae, size, shape and arrangement of micro and macro conidia and presence of other special structures like racquet hyphae, spiral hyphae etc. were observed. Slide culture was also done to appreciate better morphology. *T. rubrum* was differentiated from *T. mentagrophytes* by urease test, hair perforation test and pigment production.^{1, 3, 7, 8, 9}

Candida albicans (*C. albicans*) was identified by Gram staining, germ tube test and chlamydospore formation test on cornmeal agar. *Tinea versicolor* were diagnose on the basis of microscopy only because causative agent of *Tinea versicolor* i.e. *Malassezia furfur* was difficult to grow in the laboratory.⁸

3. Results

A total of 150 clinically suspected cases of cutaneous mycotic infections were examined for the presence of dermatophytes. In the present study, we observed that dermatophyte infections were more common in the age group of 21-30 years (37.33%), except in *Tinea capitis* infection, which was among the patients of age group 1-10 years. (Table-1)

Table 1. Distribution of clinical cases of dermatophytoses in relation to age and sex incidence.

Clinical types	0-10 yrs		11-20 yrs		21-30 yrs		31-40 yrs		41-50 yrs		> 50 yrs		Total (%)
	M	F	M	F	M	F	M	F	M	F	M	F	
<i>T.corporis</i>	2	0	8	2	21	10	7	1	4	2	5	1	63 (42%)
<i>T.cruris</i>	0	0	5	1	8	2	16	3	4	1	2	0	42 (28%)
<i>T.unguinum</i>	0	0	0	1	3	1	1	0	1	0	0	0	7 (4.66%)
<i>T.mannum</i>	1	0	0	1	2	0	1	0	0	0	0	0	5 (3.33%)
<i>T.pedis</i>	0	0	0	0	1	0	3	0	1	0	0	0	5 (3.33%)
<i>T.barbae</i>	0	0	1	0	2	0	2	0	0	0	0	0	5 (3.33%)
<i>T.capitis</i>	5	0	1	0	0	0	0	0	0	0	0	0	6 (4%)
Mixed	0	1	0	0	1	0	2	1	2	0	3	0	10 (6.66%)
<i>T.versicolor</i>	0	0	1	1	5	0	0	0	0	0	0	0	7 (4.66%)
Total	8	1	16	6	43	13	32	5	12	3	10	1	M=121 (80.6%) F=29 (19.3%) M:F = 4:1
	n=9 6%		n=22 14.66%		n=56 37.33%		n=37 24.66%		n=15 10%		n=11 7.33%		

Male, female ratio of infection was approximately 4:1. (Table-1)

The clinical types prevalent in this area were *Tinea corporis* (42%), *Tinea cruris* (28%), *Tinea unguinum* (4.66%), *Tinea capitis* (4%), *Tinea mannum*, *Tinea pedis* and *Tinea barbae* (3.33% each). Incidence of mixed infection was 6.67%. (Table – 1)

Out of the 150 cases, 81(54%) were both KOH and culture positive and 41(27.33%) were only culture positive. In KOH positive cases, the fungal element appeared as thin, septate, branching filament.

In the present study, the organisms isolated were as follows – *T rubrum* in 50 (33.33%), *T mentagrophytes* in 32(21.33%), *E floccosum* in 3 (2%), *M gypseum* in 2 (1.33%) and *C albicans* in 4 (2.66%). *Tinea versicolor* in 7 (4.66%) cases was identified only on the basis of microscopy. (Table – 2)

Table 2- Clinical types of dermatophytoses in relation with culture positive etiological agents

Clinical types	<i>T.rubrum</i>	<i>T.mentagrophytes</i>	<i>M.gypseum</i>	<i>E.floccosum</i>	<i>C.albicans</i>	Total
<i>T.corporis</i>	33	17	-	-	-	50
<i>T.cruris</i>	12	10	2	3	-	27
<i>T.unguinum</i>	1	1	-	-	4	6
<i>T.pedis</i>	1	-	-	-	-	1
<i>T.mannum</i>	-	2	-	-	-	2
<i>T.barbae</i>	1	-	-	-	-	1
<i>T.capitis</i>	-	1	-	-	-	1
Mixed	2	1	-	-	-	3
Total	50	32	2	3	4	91
%	54.94%	35.16%	2.19%	3.29%	4.39%	60.67%

Total culture positive cases were 60.67%.

In 4 (4.39%) cases, we isolated *C albicans*. All these 4 cases were clinically diagnosed as *Tinea unguinum*. *T rubrum* was mainly isolated from *Tinea corporis* and *Tinea cruris*. All *E.floccosum* isolates were obtained from *Tinea cruris* cases.

4. Discussion

Dermatophytosis is the commonest group of superficial fungal infection seen in the tropics. All races are usually affected and the clinical varieties and prevalence appear to depend mainly on environmental factors.⁷

In our study, male female ratio of infection was approximately 4:1. The reason behind high incidence in male may be due to maceration effect of hyperhidrosis in comparison to females.¹⁰ The males are usually more exposed to infection during their outdoor occupation and females, especially of rural background, rarely seek medical advice for a fungal infection. In case of *Tinea pedis*, higher incidence in male is seen probably due to their use of heavy, closed footwear while females mostly use open, ventilated footwear.^{5, 11, 12}

Infection was commonest in the age group of 21-30 years (37.33%)¹³. Similar finding was observed by other workers.¹³ Exception to this is *Tinea capitis* infection, which was common among the patients of age group 1-10 years. (Table - 1). Grover et al (2010) also reported similar type of findings.¹⁴

Tinea capitis rarely occur in normal healthy adults. This may be due to increased fungistatic triglyceride content of sebum in adults.³ Some authors associated low incidence of *Tinea capitis* in India with use of hair oil.¹⁵

The most prevalent clinical type was *Tinea corporis* (42%) followed by *Tinea cruris* (28%). The least incidence was of *Tinea mannum*, *Tinea pedis* and *Tinea barbae* i.e. 3.3%. The highest incidence of *Tinea corporis* among cases of dermatophytoses was also noted by several researchers.^{12, 13} However some workers found *Tinea cruris* as the commonest clinical type.^{16, 17}

The main reason behind the high prevalence of above mentioned groups i.e., *Tinea corporis* and *Tinea cruris* is the severe itching which induces the patient to seek medical advice. The patients with non-inflammatory *Tinea versicolor* usually seek medical advice for cosmetic reasons and due to fear of early leukoderma.¹⁸ We got 7 (4.66%) cases of *Tinea versicolor*. *T. rubrum* (33.33%) was by far the commonest etiological agent in cases seen in this part of the country followed by *T. mentagrophytes* (21.33%). The incidence of *E. floccosum* infection was only 3.29%. This may be due to climatic differences from other regions, this part of Maharashtra being less humid throughout the year. We had 2 cases of *M. gypseum* (2.19%) infection from the same family. The latter organism, although extremely common in the soil, is a rare human pathogen.¹⁸

We isolated 4 *C. albicans* (4.39%) from cases of *Tinea unguinum*. All of them were females. This most likely reflects the greater burden of wet work performed by the females.¹⁷ Direct detection of dermatophyte DNA (deoxyribonucleic acid) in clinical specimens takes less time and is more sensitive¹⁹ but due to cost constraint, may not be possible in a rural set up. There is evidence that predominance of species of dermatophytes not only differs from region to region but may change with the passage of time.²⁰ Dermatophytosis is not a reportable disease. Because of its contagious nature, an early diagnosis is needed to control transmission of infection. Some of the species of dermatophytes show slower response to azole derivatives. So it is important to find out the etiological agents up to species level.²¹

5. Conclusion

Species identification by microscopy and culture are easy to perform, cost effective and reproducible method and should be done in all suspected cases of Dermatophytosis. Physical and psychosocial problems of Dermatophytosis are not to be underestimated.

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