Original Article

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Dermatophytoses: Prevalence, Isolation and Identification at a Tertiary Care Hospital in Hyderabad Karnataka Region

Roopa C[1], Guruprasad K.Y[2], Siddesh B.S.[3]

Author Affiliation
[1]Assistant Professor, Department of Microbiology, Khaja Bandanawaz Institute of Medical Sciences, Gulbarga, Karnataka 585104, India.
[2]Professor amd Head, Department of Dermatology, Venerology and Leprosy, Khaja Bandanawaz Institute of Medical Sciences, Gulbarga, Karnataka 585104, India
[3]Professor and Head, Department of Microbiology, Khaja Bandanawaz Institute of Medical Sciences, Gulbarga, Karnataka 585104, India.

Corresponding Author
Guruprasad K.Y.,
Professor and Professor, Department of Dermatology, Venerology and Leprosy, Khaja Bandanawaz Institute of Medical Sciences, Gulbarga, Karnataka 585104, India.
E-mail Address:
gprasadyel@rediffmail.com

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Abstract

Introduction: Dermatophytosis is superficial fungal infection caused by dermatophytes. North Karnataka is well known for its hot and humid conditions making its population at risk for many fungal infections. Hence this study was undertaken to know the prevalence of dermatophytoses in our tertiary care hospital at Gulbarga and to isolate and identify the most common dermatophyte causing tinea infection in the said population. *Materials and methods:* This is a nine months study where a total of 195 samples from patients who were clinically suspected to have dermatophytoses were collected. Direct examination for fungal elements was done by using 10% KOH for skin and hair samples and 20% KOH for nail samples. Samples were cultured on Sabouraud's dextrose agar (SDA) with gentamicin and cycloheximide (SDA with actidione). Samples were inoculated and incubated at 37^{0}C and another set at 25^{0}C in BOD incubator. Identification of fungal growth was done by macroscopic examination of colony morphology, pigment production and microscopic examination by lactophenol cotton blue preparation. *Results:* In this study, out of 195 clinically suspected cases, 142 (72.82%) samples were positive in direct examination and 66 (33.84%) cases were culture positive. Most number of clinical cases was observed between age groups of 0–20 (57.43%) years and in males (62.05%). The most common clinical presentation of tinea infection in the patients coming to our hospital was T.corporis (35.38%). Most of the culture positive samples were from the age group of 0-10 years and most common clinical presentation among the culture positive samples was T.corporis. Out of 66 culture positive cases, the most common dermatophyte species isolated was Trichophyton rubrum (21, 31.81%), followed by Trichophyton mentagrophytes (17, 25.75%).*Conclusion:* Most common dermatophyte causing infection was Trichophyton and most common species causing infection in patients coming to our hospital was Trichophyton rubrum.

Keywords: Dermatophytes; Trichophyton; Trichophyton Rubrum; Trichophyton Mentagrophytes; Tinea Corporis.

Introduction

Dermatophytosis is superficial fungal infection caused by dermatophytes, a group of fungi that are capable of growing by invading keratin of skin, hair, and nails and include three genera Trichophyton, Microsporum, and Epidermophyton. Invasion of keratin is aided by keratinases found exclusively

in dermatophytes [1]. Infection is acquired by the deposition of viable arthrospores or hyphae on the skin surface of the predisposed individual. Arthroconidia adhere to the keratinized tissue and once established, the spores germinate and penetrate the stratum corneum causing infection.

Depending on their natural habitat, dermatophytes are classified as anthropophilic, zoophilic and geophilic species [2]. Anthropophilic species are derived from human hosts, zoophilic species are natural parasites of animals and geophilic species occur naturally in soil. The severity and chronicity of infection varies depending on the source, with anthropophilic species causing mild but chronic lesions, where as zoophilic species causing severe inflammatory lesions but readily curable [2].

Overcrowding, poor hygiene, low standards of living and high humidity contribute to the increased prevalence of dermatophytic infections [3]. Our tertiary care hospital caters to population from especially low socioeconomic status in Gulbarga. Moreover, Gulbarga district, situated in North Karnataka is well known for its hot and humid conditions making its population at risk for many fungal infections. Hence this study was undertaken to know the prevalence of dermatophytoses in our tertiary care hospital at Gulbarga and to isolate and identify the most common dermatophyte causing tinea infection in the said population.

Materials and Methods

This is a nine months study where a total of 195 samples from patients who came to Dermatology OPD of our hospital and were clinically suspected to have dermatophytoses were collected. A detailed history about age, gender, occupation, social status, duration of complaint and significant past history were taken.

After cleaning the lesions with 70% alcohol, scales were collected from erythematous growing margins of the lesion with a sterile blunt scalpel. Hairs were plucked with sterile forceps. Scrapings from the infected nail bed and from the undersurface of the nail as proximal to the cuticle were collected with a no.15 scalpel blade. Samples were collected in black sterilized Whartman paper and transported to the microbiology laboratory [3,4].

Direct examination for fungal elements was done by using 10% KOH for skin and hair samples and 20% KOH for nail samples. Samples were cultured on Sabouraud's dextrose agar (SDA) with gentamicin and cycloheximide (SDA with actidione). Samples were inoculated in two sets of culture media. One set was incubated at 37^0C and another set at 25^0C in BOD incubator. Cultures were examined twice weekly for the appearance of growth. Identification of fungal growth was done by macroscopic examination of colony morphology, pigment production and microscopic examination by lactophenol cotton blue preparation. Urease test was performed to differentiate Trichophyton species [3,4].

Results

In this study, out of 195 clinically suspected cases, 142 (72.82%) samples were positive in direct examination and 66 (33.84%) cases were culture positive. Most number of clinical cases was observed between age groups of 0–20 (57.43%) years and in males (62.05%). The age and gender distribution of collected samples are displayed in Table 1 and Figure 1 respectively

The most common clinical presentation of tinea infection in the patients coming to our hospital was T.corporis (35.38%), followed by T.capitis (21.53%), T.faciei (11.79%), T.cruris (7.69%), Onychomycosis (4.61%), T.pedis (4.61%), T.incognito (3.58%) and T.mannum (3.07%). Nine patients (4.61%) presented with extensive dermatophytoses with both T.corporis as well as T.cruris types and six patients

Table 1: Age distribution of samples in study

Age group	Number of samples	Percentage
0-10 years	61	31.28%
11-20 years	51	26.15%
21-30 years	20	10.25%
31-40 years	24	12.30%
41-50 years	9	4.61%
51-60 years	9	4.61%
Above 60 years	21	10.76%

(3.07%) presented with both T.pedis and T.mannum. The clinical presentations of dermatophytoses in our study are demonstrated in Table 2.

Sixty six samples were culture positive, among which 42 (63.63%) samples were from male patients and the remaining 24 (36.36%) samples were from female patients. Most of the culture positive samples were from the age group of 0-10 years (Fig 2) and most common clinical presentation among the culture positive samples was T.corporis in our study. (Table 3)

Out of 66 culture positive cases, the most common dermatophyte species isolated was Trichophyton rubrum (21, 31.81%), followed by Trichophyton mentagrophytes (17, 25.75%), Trichophyton schoenleinii (16, 24.24%), Trichophyton tonsurans (7, 10.60%), Epidermophyton floccosum (3, 4.54%) and Microsporum gypseum (2, 3.03%). (Table 4)

Fig. 1: Gender distribution of samples in study

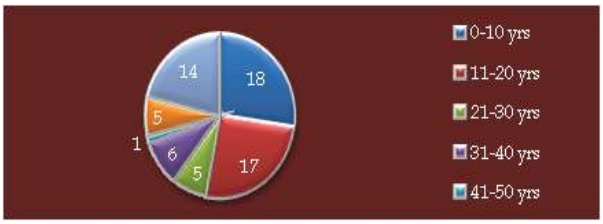

Fig. 2: Age distribution of culture positive samples

Table 2: Clinical presentations of dermatophytoses

Dermatophyte infection	Number of patients	Percentage
T.corporis	69	35.38%
T.capitis	42	21.53%
T.faciei	23	11.79%
T.cruris	15	7.69%
T.corporis/T.cruris	9	4.61%
Onychomycosis	9	4.61%
T.pedis	9	4.61%
T.incognito	7	3.58%
T.pedis/T.mannum	6	3.07%
T.mannum	6	3.07%

Table 3: Clinical presentations of culture positive cases

Dermatophyte infection	Number of cases	Percentage
T.corporis	23	34.84%
T.capitis	21	31.81%
T.cruris	8	12.12%
T.corporis/T.cruris	8	12.12%
Onychomycosis	4	6.06%
T.incognito	1	1.51%
T.faciei	1	1.51%

Table 4: Dermatophyte species isolated

Dermatophyte species	Number of isolates	Percentage
Trichophyton rubrum	21	31.81%
Trichophyton mentagrophytes	17	25.75%
Trichophyton schoenleinii	16	24.24%
Trichophyton tonsurans	7	10.60%
Epidermophyton floccosum	3	4.54%
Microsporum gypseum	2	3.03%

Discussion

In this study, highest incidence of dermatophytosis was observed in the age group of 0-20 years and in males. Similar findings were found in studies by Bindu et al and Huda et al [8,9]. Males are involved in increased physical and outdoor activities associated with exposure to hot and humid conditions causing increased sweating favoring the growth of dermatophytes [5,67]. The lower incidence in females could be due to apprehension to report to hospital because of conservative practices in India [10]. The incidence of dermatophytic infections in our study was observed in the low socioeconomic group of people and rural background similar to studies done in our country [5,6,7,10]. This is because of unhygienic living conditions, overcrowding,

Image 1: Tinea capitis in a 8 year old boy

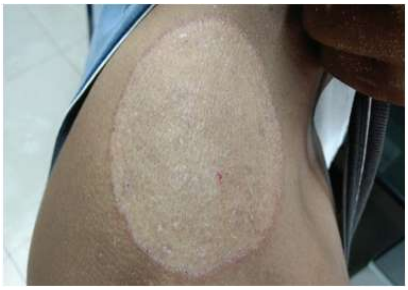

Image 2: Tinea corporis in a 28 year old man

Image 3: Tinea corporis in a 6 year old girl

Image 4: KOH mount showing arthrospores

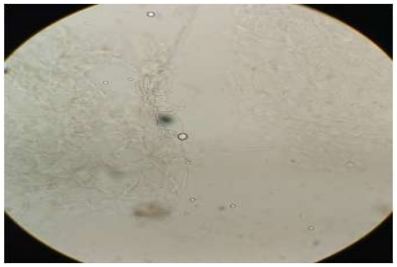

Image 5: KOH mount showing fungal elements in nail sample

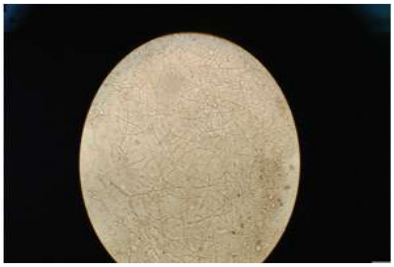

Image 6: KOH mount showing fungal elements in scalp scrapings

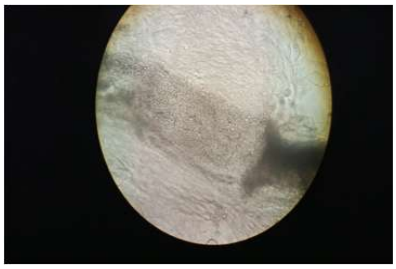

Image 7: KOH mount showing endothrix infection of hair

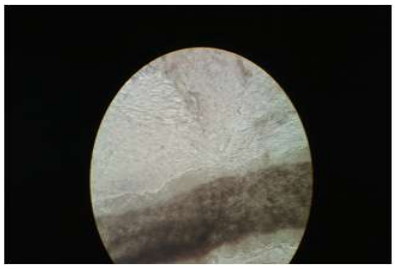

Image 8: KOH mount showing ectothrix infection of hair

Image 9: SDA slant showing growth of Trichophyton rubrum

Image 10: SDA slant showing growth of Trichophyton mentagrophytes

Image 11: LPCB mount showing Trichophyton rubrum

Image 12: LPCB mount showing spiral hyphae in Trichophyton mentagrophytes

illiteracy and poor nutrition among them. Increased humid weather and dusty environment of our district also predisposes the population for dermatophyte infections.

Tinea corporis was the most common clinical presentation of dermatophytosis in the present study which correlates with several studies done in India [6,7,8,9,10]. Most of the culture positive samples were from the age group of 0-20 years and most common clinical presentation among the culture positive samples was T.corporis in our study followed by T.capitis. This could be because the population coming to our hospital is predominantly Muslim population which is again predisposed to dermatophyte infections because of their cultural norms. The children aged 5-15 years are educated at religious schools (Madarasas) where they wear round caps causing increased sweating and moisture in the scalp region. These findings correlate with findings of Bindu et al and Noronha et al where higher incidence of T capitis was found in 0-10 years age group [8,10,11].

In this study, out of 195 clinically suspected cases, 142 (72.82%) samples were positive in direct examination and 66 (33.84%) cases were culture positive. This could be because of non viable fungal elements which fail to grow on artificial culture media. There was no KOH negative sample which showed growth on culture in our study. These figures are comparable to the KOH and culture findings of study done by Noronha et al [10].

Sixty six samples were culture positive, among which 42 (63.63%) samples were from male patients and the remaining 24 (36.36%) samples were from female patients. Most of the culture positive samples were from the age group of 0-10 years and most common clinical presentation among the culture positive samples was T.corporis in our study. This is similar to the findings of Siddappa et al. [12].

Out of 66 culture positive cases, the most common dermatophyte species isolated was Trichophyton rubrum (21, 31.81%), followed by Trichophyton mentagrophytes (17, 25.75%) in this study. This finding correlates with study of Singh et al and Bindu et al but is in contrast with Noronha et al where Trichophyton mentagrophytes was the predominant isolate [7,8,10]. This study shows Trichophyton mentagrophytes as the second most common isolate and the higher isolation rate may be due to changing trends in the prevalence of dermatophyte species in this part of Karnataka [10].

Preventive measures such as maintenance of personal hygiene, avoidance of tight and restrictive clothing and early diagnosis and treatment of clinically suspicious cases plays a major role in control of these infections in tropical countries.

Conclusion

Most common dermatophyte causing infection was Trichophyton and most common species causing infection in patients coming to our hospital was Trichophyton rubrum. This study shows Trichophyton mentagrophytes as the second most common isolate and the increased isolation rate may be due to changing trends in the prevalence of dermatophyte species in this part of Karnataka. Diagnosis of dermatophytic infections requires precise clinical examination supported by appropriate laboratory diagnostic aids. Early diagnosis and prevention of predisposing factors play a major role in control of dermatophyte infection.

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