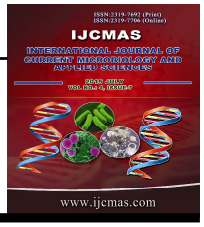
Int.J.Curr.Microbiol.App.Sci (2015) 4(7): 541-549

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 4 Number 7 (2015) pp. 541-549**
http://www.ijcmas.com



Original Research Article

Prevalence of Nondermatophytes in Clinically Diagnosed Taeniasis

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A B S T R A C T

Dermatomycosis are mycotic diseases of skin caused by a few mycetes – dermatophytes and some opportunistic fungi. A mycological study was conducted on 125 clinically diagnosed cases of dermatomycoses in patients attending the out-patient department of dermatology, Government General Hospital, Vijayawada. The collected samples (skin, nail and hair) were subjected to direct microscopy with potassium hydroxide and cultured on Sabouraud's dextrose agar to identify the fungal isolates. Highest age incidence was seen in the age group of 31-40 years(26.4%). Females were more affected than males in the ratio of 1:1.1. Among the clinically diagnosed dermatomycoses, *Tinea corporis* (50.4%) was the commonest followed by *Tinea unguium* and *Tinea capitis*. Direct microscopy was positive in 88(70.4%) and culture was positive in 72(57.6%). Of the total 80 isolates, 55(68.7%) were dermatophytes and 25(31.3%) were Non dermatophyte fungi. *Trichophyton rubrum (36.4%)* was the commonest dermatophyte isolated. The Non dermatophyte fungi isolated were *Alternaria* (20%), *Fusarium* (20%), *Curvularia* (12%), *Candida* (12%), *Malassezia* (12%), *Aspergillus, Mucor, Cladosporium* and *Penicillium.* Besides dermatophytes, non-dermatophytic fungi are also an important emerging pathogen causing superficial mycosis.

Keywords

Dermatomycoses,
Nondermatophytic,
Fungi,
Tinea,
Commonest

Introduction

Fungal infections are extremely common and with the control of most bacterial infections in the developed countries, fungal infections have assumed greater importance. Superficial fungal infections are the most common fungal infections. According to WHO, the prevalence rate of superficial mycotic infections world-wide has been found to be 20–25%. Its prevalence varies in different countries and is most prevalent in tropical countries like India, where the heat and humidity is high for most part of the year. Fungi are only facultative pathogens.

Adjuvant factors like trauma, maceration, warmth and other factors facilitate the development of pathogenic fungal lesions. Invasive fungal infections are more prevalent in individuals with immunosuppression, underlying disease or chronic conditions like cancer, organ transplantation, HIV infection and chronic corticosteroid administration. Wide spread use of implanted devices and administration of broad-spectrum antibiotics have increased the incidence of Nosocomial fungal infections.

Dermatophytosis is most important group of superficial fungal infection caused by dermatophytes, fungi which are capable of growing by invading the keratin of skin, hair & nails.

Non-dermatophytic fungi produce lesions clinically similar to those caused by dermatophytic fungal infections. The non-dermatophytic fungal infections show a lower rate of prevalence.

The present study was undertaken to monitor the clinical pattern of dermatomycoses paying emphasis on non-dermatophytes as the commonest pathogen.

Materials and Methods

The present study includes a total of 125 clinically diagnosed cases of Dermatomycoses. The samples were collected from outpatient department of Dermatology, Government General Hospital, Vijayawada and processed in the department of Microbiology. Samples from skin, nail & hair were collected from suspected patients of all age groups and both sexes.

The site of lesion from a clinically diagnosed case was cleaned thoroughly with 70% alcohol and allowed to dry. Skin scrapings were collected from the active edges of the lesion with a blunt scalpel. The infected nails were clipped and debris along with the nail plate is also collected on a sterile piece of paper. In scalp lesions, the hair stubs were epilated and the samples were processed as per standard mycological techniques. The samples were subjected to direct microscopy in 10% KOH for skin and hair and 40% for nail clippings and examined for hyphae - hyaline or dematiaceous, septate or aseptate, arthroconidia and also arrangement of ectothrix and endothrix. After the sample has been cleared with 10% KOH, another preparation with Lacto-phenol cotton blue is done and observed for Macroconidia and Microconidia.

The collected material is mixed thoroughly with 70% alcohol in a clean sterile petridish and dried. The material is then inoculated into two sets of modified Sabouraud's dextrose agar slants with actidione and one with an antibiotic and the other without an antibiotic (Gentamicin) and incubated at 37^0C and 25^0C. The cultures were observed for the presence of growth, colony morphology and for the presence of any pigmentation. The cultures were examined microscopically by removing a portion of the aerial mycelium with a sterile straight wire, placed on a glass slide in a drop of Lactophenol cotton blue and a cover slip is placed by avoiding air bubbles. The wet mount was observed under low power and high power of the microscope and different morphologic types of fungi were identified. Gram staining was done where the colony morphology shows creamy opaque white or pale colonies and the emulsified colonies on lacto-phenol cotton blue preparation shows budding yeast cells. Slide cultures were prepared for identification of specific fungal isolates.

Results and Discussion

A total of 125 cases of clinically diagnosed dermatomycoses were studied. Clinically *Tinea corporis* 50.4% (63/125) was the commonest superficial fungal infection followed by *Tinea unguium* 12.8% (16/125), *Tinea capitis* 7.2% (9/125), *Tinea cruris* 5.6% (7/125), *Tinea pedis* 5.6% (7/125), *Tinea facei* 4.8% (6/125), *Tinea manuum* 2.4% (3/125) & Mixed infection with *Tinea corporis & Tinea cruris* 5.6% (7/125) *Tinea versicolor* 2.4% (3/125),

Candidiasis 2.4%(3/125) & *Tinea manuum* and *Tinea pedis* 0.8 % (1/125).

The most common age group was (26.4%) 31–40 years followed by (20.8%) 21–30 and (20%) 11–20 years. Among the 125 cases studied (53.6%) 67 were female and (46.4%) 58 were male. Out of the 125 cases, direct microscopy was positive in 88(70.4%) and culture was positive in 72(57.6%). 58(46.4%) were Both KOH and culture positive, 29(23.2%) were KOH positive but culture negative whereas 14(11.2%) were KOH negative and culture positive. 24(19.2%) were both KOH & culture negative.

On the basis cultural characteristics, out of 80 culture positive samples, 55(68.7%) grew dermatophytes and 25(31.3%) grew non-dermatophytes. Among the dermatophytes, *Trichophyton rubrum* was the commonest pathogenic species isolated 20(36.4%) followed by *Trichophyton mentagrophytes* 15(27.3%), *Trichophyton schoenleinii* 5(9.1%), *Trichophyton tonsurans* 4(7.3%), *T. violaceum* 3(5.5%), *T. verrucosum* 2(3.6%), *T. ajelloi* 1(1.8%). *Epidermatophyton floccosum* 3(5.5%), *Microsporum gypseum* 2(3.6%) were the other dermatophytes. The non-dermatophyte fungi *Fusarium & Alternaria* were isolated as 5 each with an incidence of 20% followed by *Curvularia, Candida* and *Malassezia* 3(12%) each. *Penicillium* and *Mucor* 2(8%) each and *Cladosporium* and *Aspergillus* one each (4%).

A total of 125 clinically diagnosed cases of dermatomycosis patients attending dermatology outpatient department were taken. Of them 107 was skin scrapings, 16 nail clippings and 2 hair stubs were subjected to mycological study. Highest incidence was seen in the age group of 31–40 years (26.4%) followed by 21–30 years (20.8%). These findings correlate with the studies reported by Nita Patwardhan, Rashmika dave (1999), Grover and Roy (2003) that infection is more frequent in the age group of 21-40 years as this is the age of maximum outdoor activity. In this study, female predominance was seen which correlated with studies by Sharma *et al.* (1983) attributing female predominance to the increased participation of women in outdoor activities, use of foot wear and higher degree of health awareness. Skin is the commonest site of superficial infection followed by nail and hair. *Tinea corporis* (50.4%) was the most prevalent clinical type followed by *Tinea unguium* and *Tinea capitis* (16%). Usha Rani *et al.* (1983) reported that *Tinea corporis* (52%) as the most prevalent clinical type and Bindu (2002) reported as 54.6%. Direct microscopy was positive in 88(70.4%) and culture was positive in 72(57.6%). Bindu (2002) from Calicut reported 64% positivity by direct microscopy and 45.3% culture positivity. Peerapur *et al.* (2004) from Bijapur reported direct microscope positive in 76 cases and culture positive seen 64 cases. In this study, *T. rubrum* 20(36.4%) was the commonest followed by *T. mentagraphytes* 15(27.3%). This correlates with Gupta *et al.* (1993) with 42.42% and Peerapur *et al.* (2004) with 43.7 and 28.10%.

The isolation of non dermatophyte fungi in *T. corporis* was 28% followed by *T. unguium* & *T. capitis* with 16% each and Candidiasis and *T. versicolor* with 12% each. The Nondermatophyte fungi isolated were *Fusarium* 5(20%), *Alternaria* 5(20%), *Curvularia* 3(12%), *Candida* 3(12%) & *Malassezia* 3(12%) *Penicillium* and *Mucor* (8%) two each and *Cladosporium* and *Aspergillus* (4%) one each. Grover and Roy (2003) reported a high proportion of Non-dermatophyte molds (34%) on different clinical types of Dermatomycosis.

Table.1 Categorical distribution of clinical samples

Type of Samples Collected	Number	Percentage
Skin Scrapings	107	85.6%
Nail Clippings	16	12.8%
Hair Stubs	2	1.6%
Total	125	100%

Figure.1

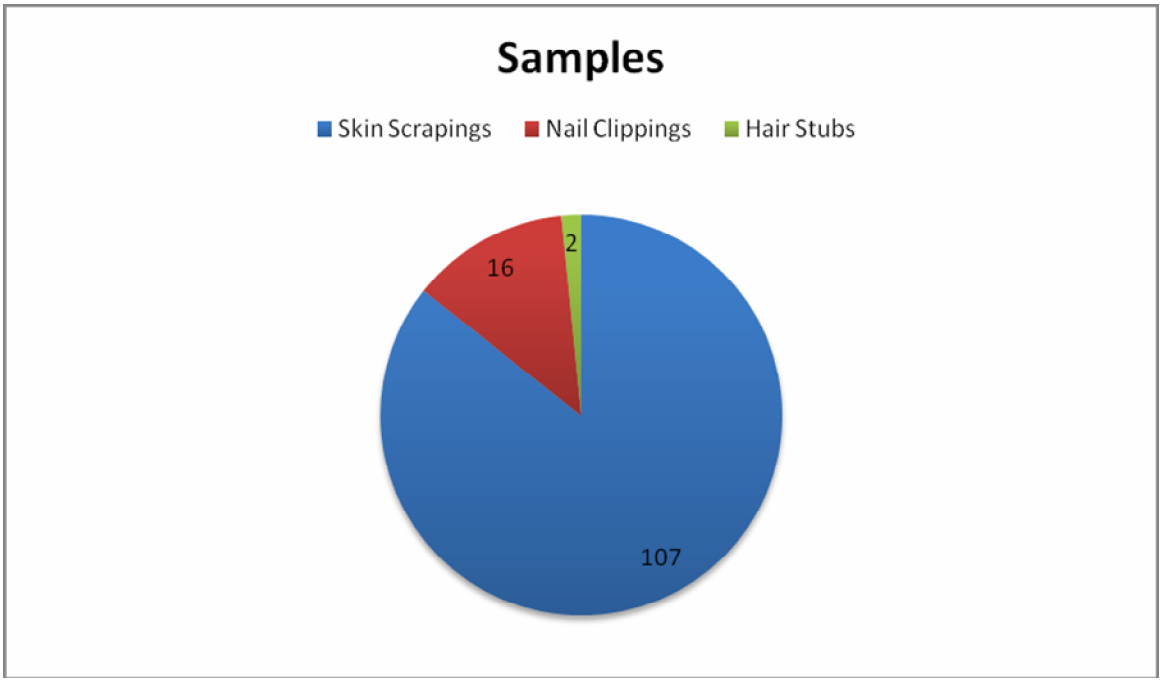


Table.2 Dermatophytes isolated from different clinical samples

Dermatophyte Species	*T. corporis*	*T. unguium*	*T. capitis*	*T. cruris*	*T. pedis*	*T. facei*	*T. manuum*	*T. corporis & T.cruris*	*T. manuum & T. pedis*	Total
T. rubrum	14(45.2%)	-	1(33.3%)	2(50%)	-	1(25%)	1(100%)	-	1(100%)	20(36.4%)
T. mentagrophytes	9(29.1%)	1(25%)	1(33.3%)	1(25%)	1(33.3%)	1(25%)	-	1(25%)	-	15(27.3%)
T. schoenleinii	3(9.7%)	-	-	-	1(33.3%)	-	-	1(25%)	-	5(9.1%)
T. tonsurans	2(6.5%)	-	-	-	-	-	-	2(50%)	-	4(7.3%)
T. violaceum	-	1(25%)	1(33.3%)	1(25%)	-	-	-	-	-	3(5.5%)
T. verrucosum	1(3.2%)	-	-	-	-	1(25%)	-	-	-	2(3.6%)
T. ajelloi	1(3.2%)	-	-	-	-	-	-	-	-	1(1.8%)
M. gypseum	-	-	-	-	1(33.3%)	1(25%)	-	-	-	2(3.6%)
E. floccosum	1(3.2%)	2(50%)	-	-	-	-	-	-	-	3(5.5%)
Total	31(56.4%)	4(7.3%)	3(5.4%)	4(7.3%)	3(5.4%)	4(7.3%)	1(1.8%)	4(7.3%)	1(1.8%)	55(100%)

T: *Trichophyton*, M: *Microsporum*, E: *Epidermophyton*.

Table.3 Nondermatophytes isolated from different clinical samples

Non dermatophytes	*T. corporis*	*Tunguium*	*T. capitis*	*T. cruris*	*T. versicolor*	*T. facei*	*Candidiasis*	*T. manuum & T. pedis*	Total
Fusarium	1(14.3%)	2(50%)	2(50%)	-	-	-	-	-	5(20%)
Alternaria	2(28.6%)	2(50%)	-	-	-	1(100%)	-	-	5(20%)
Curvularia	2(28.6%)	-	1(25%)	-	-	-	-	-	3(12%)
Candida	-	-	-	-	-	-	3(100%)	-	3(12%)
Malassezia	-	-	-	-	3(100%)	-	-	-	3(12%)
Cladosporium	-	-	1(25%)	-	-	-	-	-	1(4%)
Mucor	1(14.3%)	-	-	-	-	-	-	1(50%)	2(8%)
Aspergillus	-	-	-	-	-	-	-	1(50%)	1(4%)
Penicillium	1(14.3%)	-	-	1(100%)	-	-	-	-	2(8%)
Total	7(28%)	4(16%)	4(16%)	1(4%)	3(12%)	1(4%)	3(12%)	2(8%)	25(100)

T: *Tinea*

Figure.2

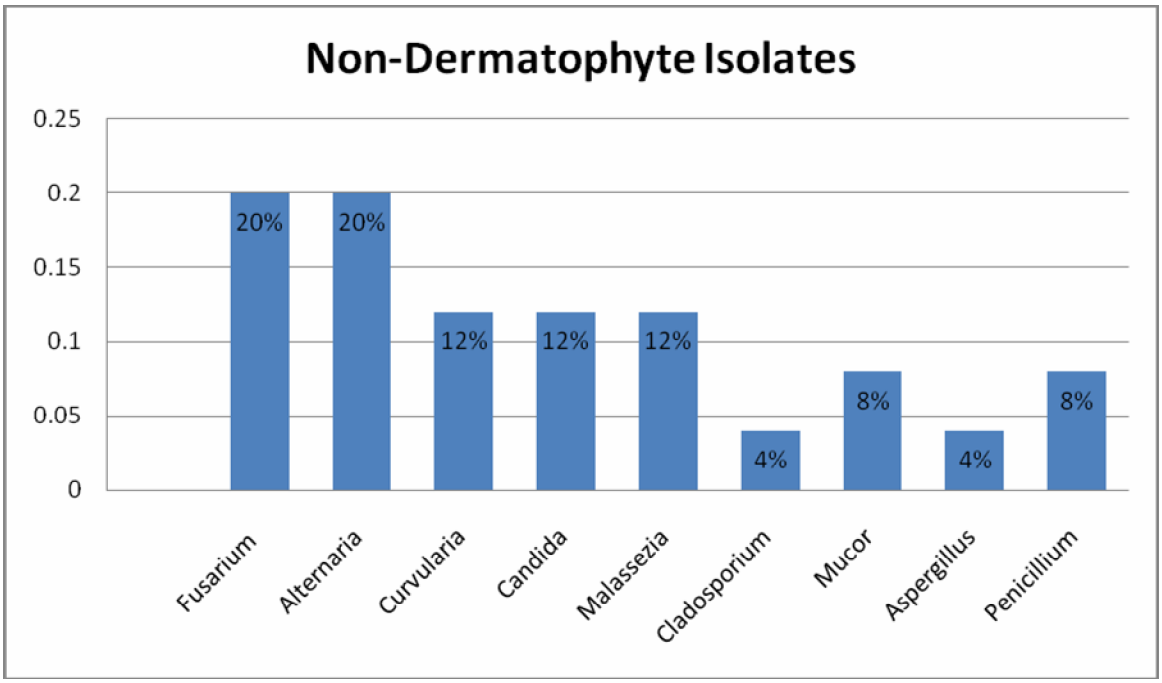


Figure.3 Direct – KOH mount of skin scrappings

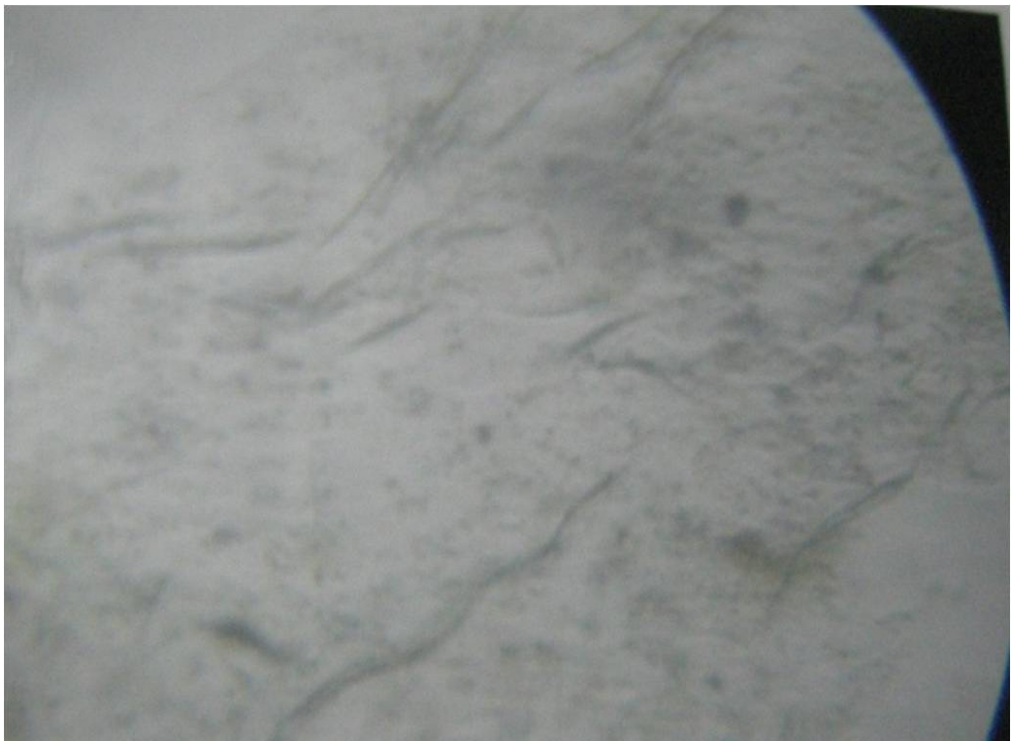
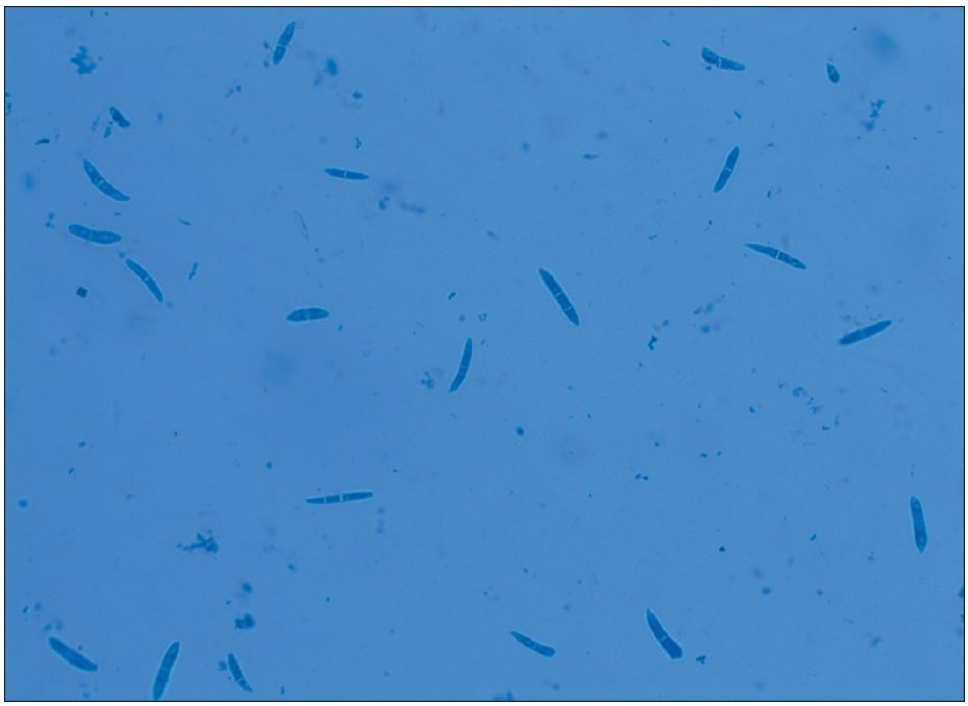


Figure.4 Fusarium species



In this study *Cladosporium* species is highest with 37.1% followed by *Penicillium* 20%, *Fusarium* 11.4%, *Curvularia* and *Acremonium* 8%. In a study by A Lakshmanan *et al.* (2015) isolation of nondermatophytes was reported as 24.4% with *Candida* (60%) as commonest species followed by *Aspergillus, Fusarium, Alternaria and Curvularia* species. Mohammed Azam Bokhari *et al.* (1999) in his study reported 11% isolation of non-dermatophyte molds in samples of Nail clippings which included *Fusarium* 4%, *Aspergillus* 2% and *Alternaria* 1% in addition to other opportunistic fungi. Fungal infections of nails are found to be common in women of 20-40 years age group in this study but *T. unguium* is seen in male population, may be due to environmental conditions. Rama Ramani *et al.* (1993) reported an isolation rate of 4.5% of *Fusarium oxysporum* in Nail clippings. In our study, 3 cases each of *Tinea versicolor* and Candidiasis are seen. All the cases showed culture positivity. Huda *et al.* (1995) reported an incidence rate of 16% of *Tinea versicolor* with a KOH positivity of 81%. Wade Foster *et al.* (2004) in his study could isolate more than 70% of *Candida* species. It is suggested that this subgroup (Non-dermatophyte fungi) may have a direct causative role as it fulfills the criterion of a pathogen by isolation in a pure culture, KOH positive and absence of dermatophytes in the same culture. But their primary pathogenic role in cutaneous fungal infections cannot be proven with certainity.

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