

Isolation and Identification of Fungi Causing Dermatophytosis In and Around Patna, Bihar

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ABSTRACT

Introduction: Fungus are eukaryotic Protista. Fungal infections are classified into superficial mycosis, subcutaneous mycosis and systemic mycosis according to the tissues involved. Superficial mycosis are prevalent in most parts of the world. The dermatophytes are closely related keratinophilic fungi causing Tinea infection, by virtue of their ability to degrade keratin and thus to invade the skin, hair and nails. Tinea infection presents as an annular lesion with advancing, inflamed and raised border. Hot and humid climate in the tropical and subtropical countries like India makes dermatophytosis very common superficial fungal skin infection. Inadvertent application of broad-spectrum antibiotics has raised prevalence of dermatophytosis. So, isolation and identification of fungi is essential for appropriate treatment and for epidemiological purposes.

Materials and Methods: 100 patients having a skin, hair and nail infection were selected. Skin scales, crusts and pieces of nails were collected by scrapping across the inflamed margin of the lesion. Hairs were epilated with the sterilised forceps. Samples were examined in microbiology department. All samples were examined for fungal infection by means of microscopy, slide culture, urease test and hair perforation test. Species were identified on the basis of their growth characteristic and microscopic morphology.

Results: Out of 100 clinically diagnosed cases of Tinea 78 cases were positive by culture and microscopy and 22 cases were negative for fungal infection. Tinea corporis (45%) was

the most common clinical type followed by *T. cruris* (19%), *T. unguium* (16%) followed by *T. capitis* (8%) then *T. corporis* with *cruris* (6%) then *T. pedis* (4%). Among Tinea corporis, *T. rubrum* (50%) was the most common dermatophyte isolated followed by *T. mentagrophyte* (33.33%). Among Tinea cruris, *T. rubrum* (60%) was the most common dermatophyte isolated followed by *T. mentagrophyte* (30%). *T. mannum* was the least common clinical type found with 4 cases.

Conclusion: 70 cases were culture +ve out of which 10 were KOH -ve. 22 cases were both culture -ve and KOH -ve. However 8 cases were culture -ve but KOH +ve. In our study *T. rubrum* was the most common (48.57%) followed by *T. mentagrophyte* (30%).


Keywords: Tinea, Dermatophytes, Dermatophytosis.

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INTRODUCTION

Fungal infections are classified according to the tissues involved into superficial mycosis, subcutaneous mycosis and systemic mycosis. Among them superficial mycosis are prevalent in most parts of the world. The dermatophytosis are most significant cutaneous fungi because of their widespread involvement of population at large and their worldwide prevalence.¹ The dermatophytes are closely-related keratinophilic fungi causing dermatophytosis (ringworm or tinea) by virtue, in part of their ability to degrade keratin and thus to invade the skin, hair and nails. The classical presentation of the Tinea infection is an annular lesion, sharply marginated with central clearing and surrounded by an advancing, inflamed, raised border. However there is wide variation in clinical presentation depending upon the

infecting species, size of inoculum, site of infection and immune status of the host.²

In 1910, Sabouraud, the Father of Modern Medical Mycology classified dermatophytoses as Tinea capitis (Ringworm of scalp), Tinea faciei (face), Tinea barbae (beard), Tinea manuum (wrist), Tinea corporis (Ringworm of trunk), Tinea cruris (Ringworm of groin), Tinea pedis (Ringworm of foot). Tinea capitis is predominantly seen in pre-pubertal children. Tinea cruris occurs only in adults especially the males and not in children. Tinea pedis and Tinea unguium are more common among adults.

Hot and humid climate in the tropical and subtropical countries like India makes dermatophytosis or ring worm very common superficial fungal skin infection.^{3,4} The study of dermatophytosis in

the population is important as it may reflect the climatic conditions, customs, hygienic and socio-economic status of the people.⁵

Although it responds to conventional antifungal but inadvertent application of broad-spectrum antibiotic and immunosuppressive drugs have increases its prevalence as well as its tendency to recurrence. Hence correct diagnosis is essential for appropriate treatment and for epidemiological purposes.

The objective of the study is to isolate and identify the fungi causing dermatophytosis.

MATERIALS AND METHODS

This study was carried out in the Department of microbiology Patna medical College, Patna. 100 cases selected for this study were taken from OPD of the Department of Dermatology Patna medical College and Hospital, Patna. Patients selected having a skin, hair or nail infection of all age groups and of both sexes were selected. A detailed history comprising of the name, age, sex,

address, occupation, duration of illness and involvement of sites were taken.

After detailed history, lesion was examined under proper light. The affected area was cleaned with 70% ethyl alcohol and skin scales, crusts and pieces of nails were collected by scrapping across the inflamed margin of the lesion. Hairs were epilated with sterilised forceps. Then the specimen was examined by direct microscopic examination by potassium hydroxide wet preparation of various concentrations (10%, 20% and 40%) depending on type of clinical specimen. Then samples were inoculated on Sabourauds dextrose Agar with antibiotics (0.05%chloramphenicol, 0.1% gentamicin and 0.5% cycloheximide) and incubated at 28°C for up to 4weeks. Fungal isolates were identified based on clinical morphology, pigmentation, growth rate, microscopy (LPCB), slide culture, urease test and hair perforation test.

Species of dermatophytes isolated were identified on the basis of their growth characteristic and microscopic morphology.

Table 1: Comparison of Direct microscopy by KOH and Culture

	KOH+ve Culture +ve	KOH-ve Culture +ve	KOH+ve Culture -ve	KOH-ve Culture -ve
Number of cases	60	10	08	22
Percentage	60%	10%	8%	22%

Table 2: Distribution of different dermatophytes isolated in culture

Dermatophytosis	Number of cases	Tinea rubrum	Taenia mentagrophytes	Taenia tonsurans	Epidermophyton floccosum	Microsporum gypseum	Total isolates
T corporis	45	12 (50%)	8 (33.33%)	2 (8.33%)	2 (8.33%)		24 (34.28%)
T cruris	19	6 (60%)	3 (30%)	1 (10%)			10 (14.28%)
T unguium	16	4 (28.57%)	6 (42.85%)	2 (14.28%)	2 (14.28%)		14 (20%)
T capitis	08	4 (66.66%)	1 (16.66%)	1 (16.66%)			6 (8.57%)
T pedis	04	2 (33.33%)	1 (16.66%)	1 (16.66%)		2 (33.33%)	6 (8.57%)
T mannum	02	2 (50%)	1 (25%)	1 (25%)			4 (5.71%)
T corporis with cruris	06	4 (66.66%)	1 (16.66%)	1 (16.66%)			6 (8.57%)
	100	34 (48.57%)	21 (30%)	9 (12.85%)	4 (5.71%)	2 (2.85%)	70 (70%)

Table 3: Sex wise distribution of cases of dermatophytosis

	Male	Female	Total
Number of cases	72	28	100
Percentage	72%	28%	100

Table 4: Age wise distribution of cases of dermatophytosis

Age (years)	Number of cases	Percentage
<10	6	6%
11-20	11	11%
21-30	32	32%
31-40	28	28%
41-50	19	19%
51-60	03	3%
>60	01	1%
Total	100	100%

RESULTS

Out of hundred clinically diagnosed cases of tinea, 78 cases were positive either by microscopy or culture. 70 cases were culture positive and 8 cases were positive by microscopy. Out of hundred clinically diagnosed cases, 22 cases were negative by culture and microscopy (Table 1). Tinea corporis was the most common clinical type with 45 cases followed by T cruris with 19 cases; this was followed by T. unguium, T. capitis, T. corporis with cruris, T. pedis with 16 cases, 8 Cases, 6 cases and 4 cases respectively. The least common clinical type was T. mannum with only 2 cases. Out of 45 cases of Tinea corporis dermatophytes were isolated in 24 cases. T. rubrum was the most common dermatophyte isolated with 12 cases, followed by T. mentagrophytes with 12 cases, followed by T. tonsurans and Epidermophytes with 2 cases each. Out of 19 cases of T. cruris, dermatophytes were isolated from 10 cases. T. rubrum was the most common dermatophyte isolated with 6 cases, followed by T. mentagrophytes with 3 cases, followed by T. tonsurans with 1 case (Table 2). T. mannum was the least common clinical type found with 4 cases. Out of which T. rubrum was isolated with 2 cases, followed by a T. mentagrophytes and T. tonsurans with 1 case each (Table 2). Out of hundred clinically diagnosed cases of tinea 72 cases were found in males and rest 28 cases in female patients (Table 3). Out of hundred cases maximum numbers of cases were found in 21 to 30 years of age group, this was followed by 28 cases which were found in age group of 31 to 40 years (Table 4).

DISCUSSION

70 cases were culture +ve out of which 10 were KOH-ve. 22 cases were both culture -ve and KOH-ve. However 8 cases were culture-ve but KOH+ve. Our study is similar to previous studies done by Bindu V et al and Singh S et al.^{5,6} Out of 70 isolates of dermatophytes in our study T. rubrum was the most common (48.57%) followed by T. mentagrophyte (30%). Our finding is in accordance with such finding reported earlier by Ranganathan S et al, Dogra Sunil et al and Singh S et al.^{5,7,8} Epidermophyton floccosum was the third causative agent of dermatophytosis to be isolated in 5.7% cases which is also similar to previous studies done by Bindu V et al and Kannan P et al.^{6,9} Out of 100 clinical cases included in our study male preponderance of 72 cases was seen as compare to female (28%) it was similar to other studies.

CONCLUSION

Dermatophyte infection are very common in our country with several contributing factors like hot and humid climate, poor hygiene, increased outdoor activities and occupational hazards. The incidence of dermatophytosis is increasing in India due to indiscriminate use of corticosteroids and antifungal agent. Trichophyton species forms the commonest etiological agent of dermatophytosis of which T. rubrum was the commonest dermatophyte isolated. T. mentagrophytes, M. gypseum and E. floccosum were other isolates from clinical samples.

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