

Original Article

Pattern of dermatophyte in Bangabandhu Sheikh Mujib Medical University.

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Abstract

Dermatophytes are by far the most significant fungi because of their widespread involvement of population at large and their prevalence all over the world. This is an attempt to observe the spectrum of dermatophytes among the clinically suspected cases of dermatophytosis attending the outpatient department of Dermatology and Venereology, Bangabandhu Sheikh Mujib Medical University, Dhaka. Three hundred and twenty clinically suspected cases of dermatophytosis were subjected to mycological studies. One hundred and five cases (32.8%) were positive for fungus in direct microscopy while 97(30.3%) were culture positive. *Tinea unguium* was the most common clinical type encountered followed by *Tinea corporis*. Dermatophytosis was more common in the age group of 21-30 years. The male to female ratio was 1.54:1. *Trichophyton rubrum* 84(86.6%) was found common etiological dermatophyte species followed by *Trichophyton mentagrophytes* 8(8.2%) and *Epidermophyton floccosum* 5(5.2%).

Key words: Dermatophytes, *Tinea unguium*, *Tinea corporis*

Introduction

Superficial fungal infections are common skin diseases, affecting million of people worldwide¹. The prevalence of superficial mycotic infections has risen to such a level that skin mycoses now affect 20-25% of the world's population and proximately 90% of the fungal skin infections are caused by dermatophytes². Dermatophytes are not part of normal skin flora, but these fungi are particularly well adapted to infecting skin because they can use keratin as source of nutrient³. Tinea infection of skin classically presents as an erythematous annular plaque with a scaly, centrifugally advancing border. Uncommonly, dermatophyte infections may also demonstrate an atypical pattern⁴. The differential diagnosis of dermatophytoses includes seborrhoeic dermatitis, atopic dermatitis, contact dermatitis, psoriasis, candidal intertrigo, eczema etc⁵. Accurate diagnosis of fungal skin and nail infection is based on clinical findings, microscopic examination and mycological culture. If the

diagnosis is not confirmed by culture and improvement does not occur, it is impossible to tell whether this represents treatment failure or an initial incorrect diagnosis⁶.

Bangladeshi population is particularly vulnerable to fungal infection because of the climate, overpopulation, overcrowding, poverty, malnutrition, unhygienic environment and ignorance. Study on different time in Bangladesh showed wide discrepancy in terms of etiological agents causing dermatophytoses which may be due to changing pattern of fungal infection over time⁷. The present study was done to see the spectrum of dermatophyte causing skin and nail infections and to find the most common dermatophyte species.

Material and methods

A total 320 patients with suspected fungal infection of skin and nail who attended the outpatient department (OPD) of Dermatology and Venereology, BSMMU over a period of one year (Jan 2010-Dec 2010) were included in the present study. A detailed clinical history - including age, sex, duration and type of lesion, socio-economic status of the patient were included. Patients were examined and grouped in different clinical types depending upon the site of involvement.

Specimens were obtained from clinically suspected cases of

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dermatophyte infections of various body sites- trunk, groin, scalp, face, hand, toe and finger nails. All collected specimens were analyzed by direct microscopy and culture.

Microscopic examination of these specimens were carried out in 20% potassium hydroxide solution. Three to five bits of skin or nail sample were placed on a clean glass slide and a drop of 20% KOH was added to it. After putting a cover slip over the material, the slide was left for at least one hour. In case of nail sample, the time required for dissolving the nail material was variable and sometimes nail clipping were dripped in 20% KOH solution overnight for study on the next morning. Dermatophytes were easily recognized under microscope by- presence of their long branch like tubular septate hyphae and arthroconidia.

All the specimen (independent of KOH test) were cultured in screw capped test tube containing Sabouraud's Dextrose Agar and Dermatophyte Test Medium. Both media were supplemented with chlortetracycline, gentamicin and cycloheximide. Cultures were incubated at room temperature and examined at every alternate day upto 4 weeks. Negative cultures were confirmed after 4 weeks of no growth. Positive cultures were examined both macroscopically and microscopically for species identification. Special tests like hair perforation, urease production were performed when required.

Results

Age of the study population ranges from 2-91 years with a mean of 32.2 years. Most common age group affected was 21-30 years with 112 cases (35%) followed by 11-20 years with 55 cases (17.18%). Out of 320 cases male were 194 (60.6%) and female were 126(39.4), with a male-female ratio 1.54:1(Table-I).

Table I: Age and sex distribution of study population (n=320).

Age (Years)	Male	Female	Total
1-10	13	8	21(6.6%)
11-20	32	23	55(17.18%)
21-30	62	50	112(35.0%)
31-40	25	23	48(15.0%)
41-50	27	13	40(12.5%)
51-60	24	6	30(9.37%)
61-70	3	3	6(1.87%)
>70	8	0	8(2.5%)
	194 (60.6%)	126 (39.4%)	320 (100%)

T.unguium was the most common 144(45.0%) clinical type of

dermatophytosis followed by *T.corporis* 73(22.81%) (Table-II).

Table II: Distribution of clinical types of Dermatophytosis in relation to age and sex.

Sl. no	Clinical types	Age group (in years)								Sex		Total	%
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	>70	Male	Female		
1	<i>T.corporis</i>	7	18	20	8	8	8	2	2	44	29	73	22.81
2	<i>T.cruis</i>	0	7	11	5	2	3	0	1	25	4	29	9.1
3	<i>T.pedis</i>	3	12	20	10	8	3	0	2	35	23	58	18.12
4	<i>T.unguium</i>	4	15	58	24	22	15	3	3	81	63	144	45.0
5	<i>T.manuum</i>	5	0	3	0	0	1	1	0	3	7	10	3.1
6	<i>T.faciei</i>	0	1	0	1	0	0	0	0	2	0	2	0.6
7	<i>T.capitis</i>	2	2	0	0	0	0	0	0	4	0	4	1.3
	Total	21	55	112	48	40	30	6	8	194	126	320	100.0

Out of 320 clinically suspected cases of dermatophytosis, dermatopytes were demonstrated in 105 cases (32.8%) by direct microscopy and 97 cases (30.3%) were positive by culture. Eighty three (25.9%) cases were positive by both microscopy and culture. Fourteen cases were negative for dermatophytes by direct microscopy but yielded growth on culture; 22 cases were positive on direct microscopy but negative on culture. Two hundred and one cases were negative by both techniques [Table-III].

Table III: Results of skin scraping and nail shaving by Microscopy and Culture (n=320).

	Microscopy +ve N (%)	Microscopy -ve N (%)	Total N (%)	P-value
Culture +ve	83(25.9%)	14(4.45)	97(30.3%)	0.243 ^{ns}
Culture -ve	22 (6.9%)	201(62.8%)	223(69.68%)	
Total	105(32.8%)	215(67.18%)	320(100%)	

Though *T. unguium* was the most common clinical type, *T. cruris* contributed the highest positivity by microscopy and /or culture (51.72%) (Table-IV).

Table IV: Fungal positivity in different clinical lesions.

Clinical types	Total number among 320	Positive by Microscopy and/or Culture	Percentage
<i>T.cruis</i>	29	15	51.72
<i>T.corporis</i>	73	28	38.37
<i>T.unguium</i>	144	59	40.97
<i>T.pedis</i>	58	14	24.14
<i>T.manuum</i>	10	2	20.0
<i>T.faciei</i>	2	1	50.0
<i>T.capitis</i>	4	0	00.0
Total	320	119	37.19

The isolation rate of dermatophytes was 30.3% (97/320), with

three species of dermatophytes being isolated: *T. rubrum* (isolation rate 86.6%), *T. mentagrophytes* (8.2%), and *E. floccosum* (5.2%) (Table-V).

Table V: Isolated species of dermatophytes (n=97).

Species of dermatophytes	Number	Percentage (%)
<i>T.rubrum</i>	84	86.6
<i>T.mentagrophytes</i>	8	8.2
<i>E.floccosum</i>	5	5.2
Total	97	100

T-Tricophyton, E-Epidermophyton

Discussion

Dermatophytes are the major agents of cutaneous mycoses, commonly occurring in tropical countries and remain as a general public health problem. A study of dermatophytosis in a population is important as it may reflect the environmental variation, customs, hygienic and socio-economic status of people⁸.

Majority of the study subject was in the age group of 21-30 years (35%) which is consistent with study done by many other workers⁹⁻¹⁴. Increased participation in outdoor physical activity, increase sweating, increased exposure to wet work, shoe wearing habit among this age group and early marriage leading to new household responsibilities could be some of the contributing factors for the increased prevalence in the 21-30 years age group¹⁵. Whereas, Study in Brazil reported patient with age group of 40-59 years were more affected and justified this age group by repeated micro trauma, greater work activity and venous insufficiency in older age¹⁶. Dermatophyte positivity in culture was also predominant in 21-30 years with 39(40%) cases followed by 11-20 years with 22(22.68%) cases and was declining after 50 years of age which is similar with the study done in BSMMU¹⁷. The cause of declining after the age of 50 may be due to less physical activity and less sweating (hormonal change) in old age.

In the present study, out of 320 cases males 194 (60.6%) were more commonly affected than females 126 (39.4%). Male to female ratio was 1.54:1, which is comparable with other studies^{9, 13, 14, 18, 19}. The highest incidence in male may be due to increased outdoor physical activity, increase sweating and increased opportunity for exposure (army, school and sporting activities). In Brazil females were more commonly affected than males, with male to female ratio being 0.31:1. The author suggested that, the susceptibility of the female gender in Brazil may be explained by the work habits of female in some occupations, such as: cooks, laundresses, cleaners¹⁶.

Tinea unguium was the most common clinical type encountered (45%) followed by *Tinea corporis* (22.81%),

Tinea pedis (18.12%) and *Tinea cruris* (9.1%). Differences in the incidence of clinical types were observed in different studies. A study in Brazil reported the most affected site were feet (33.1%), nails (19.1%) and groin/buttocks (18.8%) [20] and in North East India, *Tinea pedis* as the most prevalent type of dermatophytosis (29.2%) followed by *T.cruris* (26.2%)²¹. An increased incidence of *Tinea unguium* in our study may be due to work associated constant trauma to the nails, use of occlusive footwear resulting in hyperhidrosis and poor hygienic condition.

Direct microscopy analysis was positive in 105(32.8%) which is comparable with the other studies^{13,17,22}. But this may be considered high when compare with 14.3%²³ and considered as low with 57%²⁴. We found an isolation rate of 30.3% with culture, compared to rates varying from 29% to 38.96% in other studies^{17,13}. Slight variation could be due to non-viability of fungal elements in some cases and /or other reasons may be co-existing microbes which may inhibit the growth of pathogenic fungi. Also the reduced rate of fungal positivity in present study may be due to improvement of life style as well as health facilities in our country.

In our study, all specimens were examined by direct microscopy and culture. The result showed that by doing only direct microscopy at least 6.6% of dermatophytic infection would have been missed. On the other hand by doing only culture 20.95% of positive result would have been missed. A different study in Bangladesh showed direct microscopy and culture would miss 12.1% and 6.7% positive cases respectively if done alone¹³. Hence, both tests are complementary to each other.

T. rubrum 84 (86.6%) was found to be the main etiological dermatophyte species responsible for dermatophytosis in the present study followed by *T. mentagrophytes* 8 (8.2%), and *E. floccosum* 5 (5.2%), which is comparable with other studies^{7,8}. However, in a laboratory based mycological study *T.mentagrophyte* was found as the commonest species 69.4% causing fungal infection in Bangladeshi population²⁵. Author mentioned domestic animals of Bangladesh may be a source of this species. A dissimilar results *T.violaceum* (55.7%) as the commonest dermatophyte causing skin and nail infection of the people of Rajasthan, India was also identified²⁶. According to this present study, *T. rubrum* was the most frequently isolated dermatophyte in almost all anatomical sites and recently numerous authors reported similar findings^{24,27,28}.

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