EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 4
Issue: 7
536-540
Year: 2017

PROFILE OF DERMATOMYCOSIS IN PATIENTS ATTENDING DERMATOLOGY OPD IN TERTIARY CARE HOSPITAL, INDIA

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Article Received on 11/05/2017 **Article Revised on 02/06/2017** **Article Accepted on 23/06/2017**

ABSTRACT

Introduction: Dermatophytosis constitutes a group of superficial fungal infections of the epidermis, hair and nails. Fungal infections of the skin and its appendages are more prevalent in India, due to favourable climatic conditions. **Aims & Objectives**: The present study was undertaken to assess the mycological profile of dermatomycosis infection and identify the species of fungi using standard techniques. **Materials and methods**: Study included 334 samples of nail clippings, infected hair stubs and skin scrappings, which were collected from clinically suspected cases of dermatomycoses attending the dermatology outpatient department of our hospital. All specimens were screened by direct microscopy using KOH DMSO preparation and confirmed by fungal culture. **Results:** In our study, total positivity rate for fungal infection was 36.22% (121/334) by KOH examination and 35.3% (118/334) by Culture examination. The rest 53% were culture negative. The culture positivity rate among hand nail, toe nail, hair and skin were 16.7% (56/334), 9.5% (32/334), 4.5% (15/334) and 4.5% (15/334) respectively. Out of total culture positive samples, 52/118(44%) were dermatophytes, non dermatophytic moulds 26/118(22%) and yeast 24/118(20%). Trichophyton rubrum was the most common species isolated. **Conclusion**: The present study, gives an insight about the etiological agents of dermatomycosis. This data provides an assessment of the prevalence and etiological profile which would help in the estimation of the problem and hence in the prevention of superficial dermatophytosis with adequate control measures.

KEYWORDS: Dermatophytosis constitutes Trichophyton rubrum dermatophytosis with adequate control measures.

INTRODUCTION

Dermatophytosis constitutes a group of superficial fungal infections of the epidermis, hair and nails. Fungal infections of the skin and its appendages are more prevalent in India, due to favourable climatic conditions. Dermatophytosis or tinea is the most common infection of keratinized tissue. Although it is globally prevalent, it is more common in tropical countries like India due to increased humidity, unhygienic and overcrowded living conditions. Malnutrition, humidity, overcrowding, poverty, poor personal hygiene, immunosuppressive conditions, such as, diabetes mellitus, human immunodeficiency virus (HIV) infection, cancer chemotherapy are considered to be factors that influence the prevalence and severity of superficial dermatomycoses.[1] The type and frequency of dermatomycoses may vary with time, due to changes in standards of living and attention to personal hygiene.[1] Though superficial fungal infections are usually diagnosed and treated clinically in routine practice, the identification of the fungal species is epidemiologically important since the source of infection can be traced and its transmission halted. The present study was conducted to know the mycological profile and any change of epidemiology of dermatophyte infections in a tertiary care hospital of central Delhi, India.[2,3]

MATERIALAND METHODS

The present study was conducted on symptomatic patients presenting to the outpatient service of the department of Dermatology, Lady Hardinge Medical College, New Delhi during the period from January 2015 to December 2015. Patients clinically suspected to be having superficial dermatomycoses were included in the study.

Appropriate specimens from skin, nail and hair were collected and sent for direct microscopy and culture for isolation of causative organism. The affected part (skin/nail) was cleaned with 70% ethyl alcohol and

allowed to evaporate. Skin scrapings were collected from active border of lesion with the help of sterile scalpel blade. Nail specimens were clipped from free edge including its full thickness. Hair specimens were epilated with sterile forceps. All the specimens were collected into a sterile paper envelope and subjected to 10% potassium hydroxide (KOH) wet mount. The specimen was placed in a few drops of freshly prepared 10% KOH on a clean glass slide, then the glass slide was gently heated over Bunsen burner flame and then left for 20 minutes. Nail clippings were placed in few drops of 20% KOH and left for 12-24 hours. Then the glass slides were examined under low power and high power of microscope respectively. Scrapings from dermatophytoses were inoculated into slopes of Sabouraud dextrose agar (SDA). Each sample was inoculated into a pair of SDA slants one incubated at room temperature and another at 37 oC. The cultures were examined twice a week and were declared negative if no growth was obtained till 4–6 weeks.

Growths were identified based on macroscopic and microscopic appearance of colonies. Macroscopic appearance of dermatophytic colonies was identified by color (white/pearly/ ivory) and consistency (cottony/fluffy/suede) on obverse side and by the presence or absence of pigment, diffusion of pigment and topography (flat/plicate/rugose) on reverse side for further classification of dermatophytes. Colonies of Candida were white to cream soft colonies. Microscopic appearance of dermatophytic colonies by tease mount/needle mount revealed the presence of hyphae, macroconidia and microconidia. Candida was identified by the presence of predominantly budding yeast cells Descriptive statistics regarding age, sex, KOH mount, culture positivity and causative organism were presented. Continuous variables with normal distribution were summarized as mean ± standard deviation. Categorical variables were presented as percentages. The statistical analysis was carried out using statistical software Package SPSS.

RESULTS

During the study period, 334 patients were included in the study. There were 171 (51.2%) males and 163(48.8%) females. Overall, majority of patients were in the age group of 18-50 years, followed by paediatric age group (<18 years).

Table 1: Age and Sex distribution of patients

Age group	Male	Female	Total
< 18 years	26	36	62
18-50 years	106	114	220
>50 years	39	13	52

Age wise distribution among different clinical samples is depicted in table 2. Majority of nail sample (both hand and toe) were from adult age group. Out of all the sample received, 169(50.1%) were hand nail, 87(26%) were toe nail, 32(9.5%) were skin scrappings and 45(13.5%) were hair clippings.

Table 2: Age wise distribution among different clinical samples

Age group	Hand nail	Toe nail	Skin scrapping	Hair Clipping	Total
< 18 years	33	14	3	12	62
18-50 years	106	62	28	24	220
>50 years	30	11	2	9	52

Table 3: Correlation between age, direct microscopy and culture findings

Age group	KOH+	KOH-	Culture+	Culture-
< 18 years	13	49	14	42
18-50 years	91	129	88	105
>50 years	17	35	16	30

In our study, total positivity rate for fungal infection was 36.22% (121/334) by KOH examination and 35.3% (118/334) by Culture examination. The rest 53% were culture negative. The culture positivity rate among hand nail, toe nail, hair and skin were 16.7% (56/334), 9.5% (32/334), 4.5%(15/334) and 4.5%(15/334) respectively. Out of total culture positive samples, 52/118(44%) were dermatophytes, non dermatophytic moulds 26/118(22%) and yeast 24/118 (20%). Overall rate of contamination was 11.6%.

Table 4: Correlation of fungal isolates with clinical samples

Isolate	Hand Nail	Toe Nail	Hair	Skin	Total(%)
Culture negative	97	36	29	15	177(53%)
Contaminants	14	19		6	39(11.6)
Candida albicans	10	2		2	14(4.2)
Candida tropicalis	2		4		6(1.8)

Candida krusei	2				2(0.6)
Candida parapsilosis	1		1		2(0.6)
Trichophyton rubrum	20		5	2	27(8.08)
Trichophyton violaceum	1	2	2	2	7(2.09)
Trichophyton verrucosum				2	2(0.6)
Trichophyton mentagraphite		2			2(0.6)
Trichophyton schonlenii	2				2(0.6)
Microsporum gypseum				3	3(0.9)
Microsporum canis			2		2(0.6)
Microsporum audonii			2		2(0.6)
Epidermophyton floccosum	2	3			5(1.5)
Aspergillus flavus	4	2		2	8(2.4)
Aspergillus niger	2				2(0.6)
Acremonium	2		1		3(0.9)
Fusarium		2			2(0.6)
Scopulariopsis	2			2	4(1.2)
Chetomium	4	3			7(2.09)
Paecilomyces	2				2(0.6)
Trichosporon		4			4(1.2)
Alternaria spp		2			2(0.6)
Total	167	87	44	36	334

As is evident by table 4, in present study the most common isolate is *T. rubrum* (8.08%) mainly isolated from hand nail (Figure 4). The second common isolate is *Candida albicans* (4.2%) which is also isolated most commonly from cases of Onychomycosis. Among dermatophytes *T rubrum* (8%) was most commonly isolated followed by *Trichophyton violaceum* (2%). Two isolates of *Trichophyton verrucosum*, *Trichophyton mentagraphite* and *Trichophyton schonlenii* from skin and nail. *Epidermophyton floccosum* was isolated from nail whereas *Microsporum spp* isolated from skin and hair.

Among different age groups, maximum cases 88/118(74.5%) were seen in the adult age group with T. rubrum being the most common isolate.(Figure 5).

Table 5: Correlation of fungal isolates with different age group

Isolate	**< 18 years**	**18-50 years**	**>50 years**
Culture negative	42	105	30
Contaminants	6	27	6
Candida albicans		11	3
Candida tropicalis	1	4	1
Candida krusei		2	
Candida parapsilosis		1	1
Trichophyton rubrum	3	29	5
Trichophyton violaceum	2	5	
Trichophyton verrucosum	2		
Trichophyton mentagraphite	2		
Trichophyton schonlenii		2	
Microsporum gypseum		3	
Microsporum canis	2		
Microsporum audonii			2
Epidermophyton floccosum	2	1	
Aspergillus flavus		8	
Aspergillus niger		2	
Acremonium		1	2
Fusarium			2
Scopulariopsis		4	
Chetomium		7	
Paecilomyces		2	
Trichosporon		4	
Alternaria		2	
Total	62	220	52

Table No.6

	Present study	Aruna Aggarwal[4]	Grover WCS[5]	Parul[6]	Nawal[7]	V Bindu[8]	Misra[9]	R Kaur[11]
Male Female Ratio	1.09:1	1.8:1	4.26:1	1.75:1	1.8:1	2.06:1	-	2:1
Commonest Age group	Adult	>18 years	21-30 years	21-30 years	Adults	11-20 years	Adult	21-30 years
Commonest Isolate	T rubrum	T rubrum	T tonsurans	T rubrum	T rubrum	T rubrum	T rubrum	Non dermatophytic moulds
KOH positivity rate	36.22	59.2	53.3	62.1	72.4	64		53.5
Culture positivity rate	35.3	50.4	79.1	29.3	62.8	45.3		61.2

DISCUSSION

Superficial mycoses form a large group of patients attending the Dermatology OPD of our tertiary care centre. The present study included patients from a tertiary care hospital from central Delhi where high temperature, humidity and sweating are the main factors favourable for fungal infection. Observations of this study are compared with studies of other authors in table no.6

In present study, males are slightly more affected than females; with male to female ratio of 1.09:1. Our finding corroborated with other studies done by Aruna Aggarwal (1.8:1), Nawal(1.8:1), Grover WCS(4.26:1), Parul (1.79:1), V bindu(2.06:1). However, in a study from Western Iran in 2013 there was more of female preponderance.

In our study, adult age group (74%) is most commonly affected followed by elderly and paediatric age group. It is explained by the higher incidence of physical activity & sweating in them. This finding is well correlated with studies done by *Aruna Aggarwal*[4], *Nawal*[7], *Grover WCS*[5], *Parul*[6], *M Misra*[9] respectively.

Dermatomycoses were seen in 35.3% of cases in our study (Table 2), while in a study in Tamil Nadu in India in 2015 the prevalence of dermatomycoses was 27.6%, which was less as compared to ours.[12] In contrast to our study, in a study by Veer et al. in Aurangabad, India, dermatomycoses of nail were seen in 48.86% of cases.[13] We found nail as the commonest site of superficial fungal infection followed by skin and hair. *Lakshmanan et al*. in 2015 had found skin as the commonest site of superficial infection, followed by nail and hair.[12]

In our study, KOH and Culture positivity were 36.22 and 35.3% respectively. Studies have shown that the KOH wet mount positivity rates range from 23.8% to as high as 91.2% which was true in our case. In a study in Kashmir, India, in 2013, KOH mount and culture showed positive results in 84 (56%) and 60 (40%) patients, respectively.[14] *Shenoy et al.* in their study in 2008 showed positive results in 53% and 35% of cases by microscopy and culture, respectively.[15] The skills involved in techniques of sampling and in examining the KOH mount might be different at different places, which might account for the difference in microscopic and culture findings, making it essential that all the KOH negative samples should be cultured.

The most common isolate in our study were dermatophytes (44%) followed by non dermatopytic moulds and yeasts. Our finding corroborated with other studies like Lone et al. in Kashmir, India, the most common organisms were dermatophytes (61.66%), followed by NDMs (31.66%) and yeasts (6.66%).[14] High prevalence of dermatophytes as the etiological agents was also seen in previous studies by Kaur et al. in 2007[16], Aghamirian and Ghiasian[17] in Iran and Sayed et al. in Lebanon[18], while yeasts were the most common agents in a Canadian study in 2000 by Gupta et al.[19] and in a Greek study in 2002 by Koussidou et al.[20]

Among dermatophyte, T. rubrum was the most common dermatophyte followed by T. violaceum. Our finding was in concordance with other studies by Lone et al. in Kashmir[14], Alvarez et al.[21] in 2004 in Colombia, and Veer et al.in 2007 in Aurangabad (India)[13] which found *T. rubrum* as the most common dermatophyte, suggesting that *T. rubrum* might have developed increased virulence and better adaptation to hard keratin of skin, hair, and nail leading to its increased prevalence. Among non dermatophytic moulds, Aspergillus flavus was most commonly isolated. Similarly, In another study in Iran by Mikaeili and Karimi in 2013[22], *A. flavus*, *A. niger* and *A. fumigatus* were the more frequent isolated species.

CONCLUSION

The present study, gives an insight about the etiological agents of dermatomycosis. This data provides an assessment of the prevalence and etiological profile which would help in the estimation of the problem and hence in the prevention of superficial dermatophytosis with adequate control measures.

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