

A Study of Superficial Mycoses in Tertiary Care Hospital

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Abstracts: Background & Objectives: Fungal infections are extremely common in the tropical regions and some of them are serious. Fungi produce diverse human infections ranging from superficial skin infections to systemic disease. The study of superficial mycosis is important due to the frequent occurrence in dermatology clinics. The present study was undertaken with a view to find out the clinical pattern of dermatophytic and non – dermatophytic fungi (superficial mycosis) and most common fungal pathogens in tertiary care hospital affiliated with medical college in Western India from August 2007 to July 2008. Methods: A clinical and mycological study of superficial mycosis was conducted on 215 cases (138 males and 77 females). Direct microscopy by KOH (potassium hydroxide) mount and culture was undertaken to isolate the fungal pathogen in each case. Results: Commonest age group involved was adults of 19-59 years age. Tinea corporis was the most common clinical presentation and *Trichopyton rubrum* was the most common fungal pathogen isolated. Dermatophytosis was the commonest superficial fungal infection and found in 147/215 cases (68.4%). Non dermatophytic fungus like *pityriasis versicolor* and yeast like *candida* species were isolated in 48/215 (22.3%) cases and 20/215 (9.3%) cases respectively. The KOH positivity rate was 72.4% and total culture positivity rate was 62.8%. Interpretation & conclusion: Along with dermatophytes, nondermatophytic fungi are also emerging as important causes of superficial mycosis. Direct microscopy and culture both are important tools for diagnosis of the fungal infections. [Nawal P et al NJIRM 2012; 3(1) : 90-93]

Key Words: Dermatophytes, Superficial mycosis, Tinea corporis, *Trichopyton rubrum*

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Introduction: Fungal infections are extremely common in the tropical regions and some of them are serious and even fatal. They produce diverse human infections ranging from superficial skin infections to internal organ invasion (systemic disease) ¹. Superficial mycosis refers to fungal infections of the outermost layer of skin and its appendages like hair and nails¹. They are among the most prevalent of human infectious diseases². These infections are divided into two groups: the “*Superficial mycoses*”, which includes Pityriasis versicolor, Piedra and Tinea nigra and the “*Cutaneous mycoses*” which includes Dermatophytoses and Candidiasis^{2, 3}.

The study of both types of mycoses is important due to the frequent occurrence in dermatology clinics. Although dermatophytosis does not cause mortality, it does cause morbidity and poses a major public health problem particularly in tropical countries like India due to favourable climatic conditions like high temperature and air humidity²

.Over the last decades, an increasing number of non – dermatophytic filamentous fungi have been recognized as agents of skin and nail infections in humans, producing lesions clinically similar to those caused by dermatophytes. Though several reports on dermatophytosis are available from different parts of the country, there are hardly any reports on non – dermatophytic fungi and yeast like fungi as causative agents of superficial mycoses along with dermatophytes⁴. The present study was undertaken with a view to find out the clinical pattern of dermatophytic and non – dermatophytic fungi (superficial mycosis) and most common fungal pathogens in tertiary care hospital affiliated with medical college in Western India.

Material and Methods: The study population comprised of clinically suspected 215 cases of superficial mycoses, attending Skin and VD outpatient department from August 2007 to July 2008 after obtaining due permission from ethical committee and consent from the guardians of patients or patients.

A detailed history was taken from all the patients. It included age, sex, education, occupation, socioeconomic status, site, type and duration of the lesion along with similar history in the past or in family, contact with animals and known case of diabetes, AIDS or immunocompromised status. Patients were examined and classified in different clinical types according to the site of involvement.

Clinical specimens like skin scrapping, infected hair (by hair plucking) and clipped nails were collected in small paper envelopes after cleaning the area with 70% alcohol. All specimens were subjected to direct microscopy for fungal elements in 10% KOH (20% for nail) and were cultured in Sabouraud's Dextrose Agar (SDA) with and without antibiotics and Dermatophyte Test Medium (DTM) with supplements. Tease mount, cellophane tape mount

and slide cultures were undertaken for microscopic morphology.

Malassezia is a normal skin commensal but it may sometimes be responsible for infection. So skin scrapings from clinically diagnosed cases of Pityriasis versicolor were subjected to KOH mount only and not cultured. The culture studies and identification were done by standard methods^{3, 5, 6}.

Result: A total of 215 patients were enrolled in the study. Out of which 138/215 were males (64.2%) and 77/215 were females (35.8%). Commonest age group involved was adults of 19-59 years in 143/215 (66.5%) cases followed by 12-18 years (adolescent) in 38/215 (17.7%) cases [Table 1].

Table 1: Distribution of clinical types according to Age and Sex.

MYCOSES	AGE GROUPS						SEX		
	Preschool (0-5)	School age (6-11)	Adolescent (12-18)	Adult (19-59)	Elderly (≥60)	Total	Male	Female	Total
T. corporis	1	1	8	44	6	60	37(61.6%)	23(39.4%)	60(40.8%)
T. cruris	0	0	8	27	6	41	30(73.1%)	11(26.9%)	41(27.8%)
T. capitis	3	8	3	0	0	14	10(71.4%)	4(28.6%)	14(9.5%)
T. pedis	0	0	0	6	0	6	3(50%)	3(50%)	6(4%)
T. manuum	0	0	1	5	0	6	5(83.3%)	1(16.7%)	6(4%)
T. faciei	0	0	1	3	1	5	3(60%)	2(40%)	5(3.4%)
Onychomycosis	0	0	2	10	3	15	8(53.3%)	7(46.7%)	15(10.2%)
P. versicolor	0	0	15	33	0	48	30(62.5%)	18(37.5%)	48(22.3%)
Candidiasis	0	4	0	15	1	20	12(60%)	8(40%)	20(9.3%)
Total	4 (1.9%)	13 (6%)	38 (17.7%)	143 (66.5%)	17 (7.9%)	215 (100%)	138(64.2%)	77(35.8%)	215(100%)

Dermatophytosis was the commonest superficial fungal infection in 147/215 cases (68.4%), followed by P. versicolor in 48/215 (22.3%) and Candidiasis in 20/215 (9.3%) cases. Commonest clinical presentation was T. corporis in 60/147 (40.8%), followed by T. cruris in 41/147 (27.8%) cases.

The commonest dermatophyte cultured was T. rubrum in 57/85 (67%) followed by T. mentagrophytes in 12/85 (14.1%) cases. [Table 2]

Non Dermatophytic Molds (NDM) were isolated in 7/85 (8.2%) cases. The commonest NDM isolated was Aspergillus spp in 3/7 (42.8%) followed by

Curvularia in 2/7 (28.6%), and Penicillium and Fusarium each in 1/7 (14.3%) case.

All 48 cases of P. versicolor were KOH positive. Out of 167 samples sent for culture, 105(85+20)/167 (62.8%) were culture positive, including 20 (12%) for yeasts; and 62/167 (37.2%) were culture negative. Out of 167 samples, 121 (72.4%) samples were KOH positive; 29 KOH positive samples were culture negative and 13 KOH negative samples were culture positive [Table 3].

Table 2: Clinico-mycological co-relation of dermatophytosis

Fungi	Tinea corporis	Tinea cruris	Tinea capitis	Tinea unguium	Tinea pedis	Tinea manuum	Tinea faciei	Total (%)
T. rubrum	28	19	0	3	2	3	2	57(67)
T. mentagrophytes	3	6	2	0	0	1	0	12(14.1)
T. violaceum	0	0	2	0	1	0	1	4(4.7)
M. gypseum	1	0	2	0	0	0	0	3(3.6)
T. tonsurans	0	0	0	2	0	0	0	2(2.4)
NDM*	2	1	0	4	0	0	0	7(8.2)
Total growth	34	26	6	9	3	4	3	85(57.9)
No growth	26	15	8	6	3	2	2	62(42.1)
Total	60	41	14	15	6	6	5	147
	(40.8%)	(27.8%)	(9.5%)	(10.2%)	(4%)	(4%)	(3.4%)	(100%)

Commonest clinical presentation in our study was patient having skin infection (130/167, 77.8%) followed by nail infection (23/167, 13.8%) and hair infection (14/167, 8.4%).

Table 3: Culture and KOH characteristics of clinical types

Clinical types	Culture +		Culture -	
	KOH +	KOH -	KOH +	KOH -
T. corporis	32	5	12	11
T. cruris	27	2	7	8
T. capitis	5	1	3	5
Onychomycosis	15	2	4	2
T. pedis	5	1	2	2
T. manuum	5	2	1	3
T. faciei	3	0	0	2
Total	92	13	29	33

Discussion: Most superficial and subcutaneous fungal infections are easily diagnosed and readily amenable to treatment. Superficial mycoses form a large fraction of ailments in patients attending the Skin Outpatient Department of our centre. There was a high prevalence among males in this study with male to female ratio being 1.8:1. High incidence of superficial mycoses in males has been reported by Grover and Roy⁷ (81%), Singh S et al⁸ (61.1%), Oliveira et al⁹ (64.45%), and Vasu et al¹⁰ (72.4%) Philpot suggested that males may be more vulnerable to infection than females probably due to higher exposure to infection in the army, in the schools, in the greater use of public bath and sporting activities; and the type of shoes and socks they use¹¹

Persons of all age groups are susceptible to superficial mycoses but it appears to be more common in adults of age group 19-59 years as they are physically active outdoors. Other workers have also reported similar results^{7,9}. As universally reported by most of the workers, T. capitis is an infection of childhood. Out of total 14 patients of T. capitis, 8 were in school age whereas 3 each in pre-school and adolescent age group. The changing pattern of hormones after puberty is held responsible for decrease in the incidence of T. capitis with age⁹. Children are less affected by onychomycoses due to faster growth rate of the nails, reduced superficial area for spore invasion and, reduced probability of trauma. On the other hand, onychomycoses are more frequent in the elderly population due to reduced growth rate of the unguis plate, an increase in trauma rates, poor peripheral circulation, diabetes and inability to maintain good foot care¹². Pityriasis versicolor is rare in children due to the lipophilic nature of the fungus⁹.

Most common superficial mycosis was dermatophytosis. Among dermatophytoses, T. corporis (40.8%) was the commonest clinical presentation. Reports available from other parts of India ranging from 1959 to 2003 show that T. corporis is the main clinical entity^{10, 13, 14}. T. cruris was the second most common dermatophytosis in our study (27.8%). Other studies have reported it be ranging from 17% to 48%^{13, 14}.

T. rubrum (64.8%) was the commonest dermatophyte isolated which correlates with other

studies e.g. Singh S et al⁸ and Oliveira et al⁹ which show 73.2% and 49.5% respectively.

Non dermatophytic molds (NDM) were isolated from 7/85 cases (8.2%) mainly from nail (5 cases) with *Aspergillus* spp as a major isolate. Though commonly considered as contaminants, they have been reported to colonize damaged tissues and cause secondary tissue destruction.

Cutaneous Candidiasis occurs commonly in the skin folds and regions that remain moist¹⁵. Sixty (60) % of our cases were isolated from the intertriginous areas of the hand, feet and groin; and 40% from the nails.

In various studies, KOH positivity rate varied from 35.6% to 88.6% and culture positivity rate varied from 36% to 53.6%¹⁶. In these studies, the proportion of KOH negative isolates turning positive on culture varied widely from 5.6% to 56.7%¹⁶. Though KOH positivity rate (72.4%) and KOH negative-culture positive fraction (7.7%) in the present study were well within the reported range, a comparatively high culture positive rate (62.8%) was achieved.

Conclusion: Dermatophytosis was the commonest clinical presentation, followed by *P. versicolor* and Candidiasis. The commonest dermatophytosis was *Tinea corporis* (40.8%). The commonest dermatophyte isolated was *Trichophyton rubrum* (67%). The KOH positivity rate was 72.4% and total culture positivity rate was 62.8%. Along with dermatophytes, nondermatophytic fungi are also emerging as important causes of superficial mycosis. Direct microscopy and culture both are important tools for diagnosis of the fungal infections.

References:

1. Chander J. Superficial Cutaneous Mycosis. In: Textbook of Medical Mycology, 2nd edition, Mehta Publisher, New Delhi, India; 2009: 92-147.
2. Collee JG, Fraser AG, Marmion BP, Simmons A. Fungi. In: Mackie McCartney Practical Medical Microbiology, 14th ed. Churchill Livingstone, UK; 1996: 695-717.

3. Tony Burns, Neil Cox et al, Rook's textbook of Dermatology, Vol. 2, 7th edition.
4. Aggarwal A, Arora U, Khanna S. Clinical and Mycological Study of Superficial Mycoses in Amritsar. Indian J dermatol 2002; 47:4: 218 – 20.
5. Koneman EW, Allen SD, Janda WM, Schreckenberger PC, Winn WC. Mycology. In: Color Atlas and Text book of Diagnostic Microbiology, 5th ed. Lippincott Williams and Wilkins, USA; 1997: 983 – 1069.
6. A.A. Padhye and I. Weitzman, The dermatophytes, Topley and Wilson's Microbiology and Microbial infections, 10th edition, London, 2005: 782-815.
7. Grover and Roy, Clinico-mycological profile of superficial mycosis in a hospital in North-East India, MJAFI, Vol. 59, page no. 2, 2003.
8. Singh S, Beena PM; Profile of dermatophyte infections in Baroda, IJDVL, Vol. 69, Page 281 – 283, 2003.
9. Oliveira JAA, Barros JA, Cortez ACA, Oliveira JSRL, Superficial mycoses in the city of Manaus/AM; An Bras Dermatol. 2006, 238-243.
10. D. R. B. H. Vasu, Incidence of dermatophytosis in Warangal, A.P. India. Indian Journal of Medical Research, May 1966, 54; 468 – 74.
11. Philpot C. M. Some aspects of the epidemiology of tinea. Mycopathologia 1997, 3, 62.
12. Kaur R, Kashyap B, Bhalla P; Onychomycosis – Epidemiology, diagnosis and management, IJMM, 2008, 26(2): 108 – 16.
13. R.N. Gupta and S.K. Shome; Dermatophytes in Uttar Pradesh - an analysis of 620 cases. Indian Journal of Medical Associates 1959; 22(2); 39 – 43.
14. S.L. Kalra, L.N. Mahapatra & H.C. Gugnani. Etiology of dermatophytosis in Delhi. Indian Journal of Medical Research June 1964; 52; 553 – 58.
15. Rosen T. Cutaneous Candidiasis. In: Bodey GP, Fainstein V. New York: Raven Press, 1985; 227 – 40.
16. Mohanty JC, Mohanty SK, Sahoo RC et al. Diagnosis of superficial mycoses by direct microscopy – a statistical evaluation. IJDV, 1999; 65: 72 – 4.