

ORIGINAL ARTICLE

A STUDY OF SUPERFICIAL MYCOSES WITH CLINICAL MYCOLOGICAL PROFILE IN TERTIARY CARE HOSPITAL IN AHMEDABAD, GUJARAT

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ABSTRACT

Aims & objectives: Superficial mycoses are commonly encountered fungal diseases prevalent in most parts of the world. It is a fungal disease infecting hair, skin & nails. In most of the cases, it does not produce any symptoms but in some cases it has cosmetic & systemic complications. The present study was carried out to know the prevalence of various superficial fungal pathogens in our institute.

Materials & Methods: In our study, a total of 377 samples from skin department were processed & all were examined by conventional direct KOH preparation & fungal culture methods. Identification of the species was done by Lactophenol Cotton Blue mount from colony smear.

Results: in present study, males are infected more than females with a ratio of 2.14:1. Tinea corporis was the commonest clinical type (52.78%). The positivity rate of KOH preparation is 68.16% & of culture is 20.15%. Trichophyton rubrum is the commonest fungal isolate (35.26%) followed by Trichophyton mentagrophytes. The maximum number of the cases was seen in the monsoon months.

Conclusion: Male have higher fungal infection rate than females. Trichophyton rubrum is the common isolate in our geographical area. KOH preparation has higher positivity rate than culture.

Key words: Superficial mycoses, Dermatophytes, Trichophyton rubrum, Tinea corporis

INTRODUCTION

Superficial mycoses refer to the diseases of the skin and its appendages caused by fungi. This group includes Dermatophytosis, Pityriasis versicolor and Candidiasis.¹ They possess the affinity for parasitizing keratin rich tissues like skin, hair & nails and produce dermal inflammatory response and intense itching in addition to a cosmetically poor appearance.¹ The causative fungi colonize only cornified layer of epidermis or suprapapillary portions of hair & do not penetrate into deeper anatomical sites.²

The dermatophytes are "among the commonest infectious agents of man".³ A dermatophytosis is a mycotic infection of the hair, skin or nails.³ On the basis of clinical, morphologic & microscopic characteristics three anamorphic genera are recognized as Dermatophyte: *Epidermophyton*, *Microsporum* & *Trichophyton*.³

The epidemiology of most of the clinically significant dermatophytosis has substantially changed over the last few years. Now, *Trichophyton rubrum* is predominantly

prevalent species throughout the world.² Though several reports on dermatophytosis are available from different parts of the country, there are only few reports on non dermatophytic fungi & yeast like fungi as causes of superficial mycoses along with dermatophytosis.⁴

Though there are many studies available from across India and world, there is very little data of superficial mycoses from our region. The present study was carried out to find out the clinical & mycological pattern of dermatophytosis & non dermatophytic fungi in tertiary care hospital, Ahmedabad, Gujarat, West India.

MATERIALS & METHODS

A retrospective study was done from January 2011 to December 2011 over a period of 12 months and total of 377 specimens were processed from clinically suspected cases of superficial mycoses attending the

outpatient department of Dermatology and Venereology of our hospital.

Detailed history of the patients regarding age, sex, site of lesion, occupation, and associated illness was taken and patients were examined clinically for the type & site of the lesion and classified accordingly. Before collection of the sample, patient was explained about the procedure & informed consent was taken. The sample collection site was cleaned with cotton soaked in normal saline. The Clinical specimens (like skin scrapping, infected hair taken by plucking, clipped nails) were collected in a small piece of sterile aluminium foil. Immediately after collection, 10 % KOH mount examination was done and samples were inoculated on saboraud's dextrose agar (SDA) with & without antibiotics. Nail clippings were dipped in 40% KOH solution overnight for study on the next morning .If KOH finding suggested of meatball and spaghetti appearance, then sample was inoculated on SDA with sterile olive oil overlay. Two bottles of SDA were incubated at different temperature, one at 25°C & another at 37°C for a period of 1 month before giving negative result.

If any growth was found on culture; then the isolate was identified by colonial morphology, pigment production and direct examination of smear from the colony by tease mount & cellophane tape mount using lactophenol cotton blue preparation.

RESULTS

In this study, out of total 377 patients, 257 were male (68.16%) & 120 were female (31.83%).

In general, it was noted that most common clinical presentation was T. corporis (199/377) with overall incidence of 52.78% followed by T. cruris (59/377)

15.64%. T. versicolor (47/377) occupied the third position 12.46%. Nineteen patients (5.04%) had infection at multiple sites.Among different age groups, maximum cases 287/377 (76.12%) were seen in the adult age group. (Figure 1)



Figure 1: Clinical Picture of T.Corporis

In all age groups, T. corporis is the commonest manifestation, except school age group (6-11 years) where T. capitis is the commonest(6/10 or 60%). Tinea versicolor shows commonest incidence in Adult followed by Adolescent group. Tinea versicolor, Tinea pedis & onychomycosis infections were not noted in Pre-school and School age group in our setup. Distribution of clinical types with age and sex is shown in table no1.

Table1: Distribution Of Clinical Types According To Age & Sex

Clinical manifestation	Age group					Total	Sex		
	Pre-school (0-5)	School age (6-11)	Adolscent (12-18)	Adult (19-59)	Elderly (≥60)		Male	Female	Total
T. corporis	4	2	20	151	22	199	139	60	199
T. versicolor	0	0	7	38	2	47	33	14	47
T. corporis + T. versicolor	0	0	0	1	0	1	1	0	1
T. cruris	0	2	4	47	6	59	43	16	59
T. corporis + T. cruris	0	0	2	11	1	14	8	6	14
T. capitis	1	6	0	3	0	10	6	4	10
T. mannum	0	1	2	7	1	11	7	4	11
T. facie	2	0	0	4	0	6	4	2	6
T. facie + T.corporis	0	0	1	3	0	4	1	3	4
T. pedis	0	0	1	8	0	9	6	3	9
Onychomycosis	0	0	2	14	1	17	9	8	17
Total (%)	7(1.85)	11(2.92)	39(10.34)	287(76.12)	33(8.75)	377(100)	257(68.16)	120(31.83)	377(100)

In our study, total positivity rate for fungal infection was 72.41% (273/377) by KOH examination and/or Culture examination.

Most of the clinically diagnosed cases were KOH positive. Out of total 377 samples, KOH was positive in 257 cases (68.16%). Among this, culture was positive

in only 60 cases showing low positivity rate of culture. In general, out of total 377 samples, culture was positive in 76 cases (20.15%). Among this, 16 cases were diagnosed negative in KOH preparation from direct specimens but showed fungal growth.Only 60 cases (15.91%) were positive in KOH preparation &

culture both. KOH and culture examination results are shown in table no. 2

Table 2: Results Of Culture & KOH Preparation

	Culture positive	Culture negative	Total (%)
KOH positive	60	197	257(68.16)
KOH negative	16	104	120 (31.83)
Total (%)	76(20.15)	301 (79.85)	377 (100)

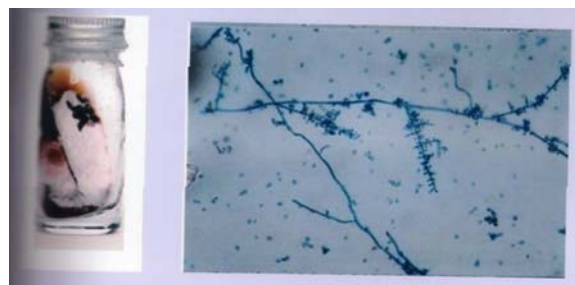
As is evident by table 3, in present study the most common isolate is *T. rubrum* (55.26%) mainly isolated from *T. corporis* & *T. cruris* cases.(Figure 2). The second common isolate is *T. mentagrophytes* (27.63%) which is also isolated most commonly from *T. corporis* followed by *T. cruris* & *Onychomycosis*.

Two isolates of *T. violaceum* were obtained, both from *T. capitis*.*T. rubrum* was main isolate in cases of onychomycosis(3/4). Out of two *T. scholeinae*, one was Isolated from *T. corporis*& another from *T. mannum*.

Only one species of *T. verrucosum* from *T. corporis* was isolated. Out of three *Epidermophyton* spp., two were

isolated from *T. corporis*& one from *T. cruris*. Three isolates of *Microsporum* spp. were grown from *T. corporis*& *T. crura*. Only one species of *Candida*&*Madurella* isolated, which was from *T. cruris* and *T. pedis* respectively. None of the dermatophytes could be cultured from *T. versicolor*.

Figure 2: Culture & Microscopic Picture Of T. Rubrum

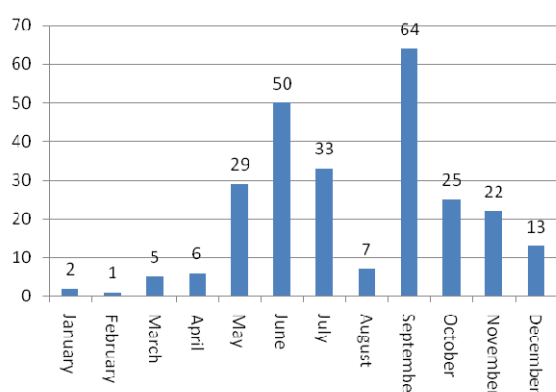


The highest incidence of superficial mycoses was found in the month of September (64 cases) and lowest incidence in February (1 case). (Figure 3)

Table 3: Clinico-Mycological Co-Relation of Dermatophytosis

Fungus	<i>T. corporis</i>	<i>T. versicolor</i>	<i>T. corporis</i> s + <i>T. versicolor</i>	<i>T. cruris</i>	<i>T. corporis</i> s + <i>T. cruris</i>	<i>T. capitis</i>	<i>T. mannum</i>	<i>T. facie</i>	<i>T. facie</i> + <i>T. corporis</i>	<i>T. pedis</i>	Onychomycosis	Total (%)
<i>T. rubrum</i>	22	0	1	10	1	0	1	1	1	2	3	42(55.26)
<i>T. mentagrophytes</i>	14	0	1	4	1	0	0	0	0	0	1	21(27.63)
<i>T. violaceum</i>	0	0	0	0	0	2	0	0	0	0	0	2 (2.63)
<i>T. scholeinae</i>	1	0	0	0	0	0	1	0	0	0	0	2 (2.63)
<i>T. verrucosum</i>	1	0	0	0	0	0	0	0	0	0	0	1 (1.31)
<i>Epidermophyton</i> spp.	2	0	0	1	0	0	0	0	0	0	0	3 (3.94)
<i>Microsporum</i> spp.	2	0	0	0	1	0	0	0	0	0	0	3 (3.94)
<i>Candida</i> spp.	0	0	0	1	0	0	0	0	0	0	0	1 (3.94)
<i>Madurella</i> spp.	0	0	0	0	0	0	0	0	0	1	0	1 (1.31)
Total	42	0	2	16	3	2	2	1	1	3	4	76 (100)

Figure 3: Monthly Positivity Rate of Superficial Mycoses



DISCUSSION

Superficial mycoses form a large group of patients attending the Dermatology OPD of our tertiary care

hospital in Ahmedabad, Gujarat. Hospital caters to the patients from most parts of North Gujarat as well as border areas of M.P and Rajasthan. The temperature in this area is very high most of the time. The higher temperature as well as body sweating facilitates fungal growth.^{5, 6, 7}

Observations of this study are compared with studies of other authors in table no.4.

In present study, males are more affected than females; with male to female ratio are 2.14:1. Other studies, done by Aruna Aggarwal (1.8:1)⁴, Nawal (1.8:1)⁷, Grover WCS (4.26:1)¹, Parul (1.79:1)⁶, V bindu (2.06:1)⁸ have similar observation.

In our study, adult age group (76.12%) is most commonly affected followed by adolescent 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, Nawal, Grover WCS, Parul, M Misra respectively.^{4,7,1,6,5}

Table 4: Comparison with Other Studies

	Present study	Aruna Aggarwal ⁴	Grover WCS ¹	Parul ⁷	Nawal ⁶	V Bindu ⁸	Misra ⁵	Sen ¹⁰
Male:Female ratio	2.14:1	1.8:1	4.26:1	1.75:1	1.8:1	2.06:1	-	-
Commonest age group affected	Adult 76.12% followed by adolescent, elderly	>20yrs (68%)	21-30 yrs (39.6%)	21-30 yrs (29.3%)	Adult (66.5%)	11-20 yrs (23.3%)	adult	-
Commonest clinical site involved	T.corporis (52.78%), T.cruris (15.64%), T.versicolor (12.46%)	T.corporis (36.1%), T.cruris (28.1%)	T. pedis (29.2%), T.cruris (26.2%), T.corporis (15.5%)	T.corporis (64%), T.capitis (11.11%)	T.corporis (40.8%), T.cruris (27.8%)	T.corporis (54.6%), T.cruris (38.6%)	T. versicolor (33.95%), T.corporis (24.55%), T.cruris (16.33%)	T.corporis (52.78%), T.cruris (15.64%)
Infection involving multiple sites	5.06%	-	17.3%	-	-	-	25%	-
Commonest species	T. rubrum (55.26%), T. mentagrophytes (27.63%)	T. rubrum (62.3%), T. mentagrophytes (23.4%)	T. tonsurans (20.5%), T. rubrum (8.7%), T. mentagrophytes (2.9%)	T. rubrum (54%), T. mentagrophytes (32%)	T. rubrum (67%), T. mentagrophytes (14.1%)	T. rubrum (66.2%), T. mentagrophytes (25%)	T. rubrum (76%)	T. rubrum (68.63%), T. mentagrophytes (25.53%)
KOH positivity rate	68.18%	59.20%	53.30%	62.12%	72.40%	64%	-	49%
Culture positivity rate	20.15%	50.40%	79.10%	29.29%	62.80%	45.30%	-	51%
KOH & culture both positive	15.91%	45.40%	-	26.77%	-	-	-	-
KOH negative but culture positive	4.20%	1.60%	28.5%	2.53%	7.70%	11.30%	-	4%

The commonest clinical type seen in our study is *T. corporis* (52.78%) followed by *T. cruris* (15.64%) which is also corroborated well with other studies i.e. Amritsar 36.1%⁴, Surat 64%⁶, Ahmedabad 40.8%⁷, Calicut 6%⁸. However study done in military recruits in North east India by Grover et al involving soldiers as a major group, showed *T. pedis* as the commonest manifestation¹ which could be well correlated to the profession of army personnel as they have to wear closed shoes for longer hours of the day. In sharp contrast is the study by M Mishra, where *T. versicolor* was major group.⁵

In our study, most common clinical manifestation among school age group patients is *T. capitis* (60%) showing that *T. capitis* is the disease of pre pubertal age group. This finding corroborates well with the various other studies i.e. Aruna Aggarwal⁴ (57.14%), Parul (45.45%)⁶, Nawal (78.5%)⁷, V bindu⁸. Post pubertal changes in hormones resulting in acidic sebaceous gland secretions are responsible for decrease in the incidence with age.

In the present study, *Tinea versicolor* infection was not found in Pre- school and School age group because of lipophilic nature of fungus as is also reported by Nawal et al.⁶

Onychomycosis was not observed in present study in the children which is on the lines of other studies by R.Kaur, Nawal & Parul (0%).^{9,7,6} This could be explained due to less exposure to fungus because of less time spent in the environment containing

pathogens, faster nail growth, smaller nail surface for invasion & lower prevalence of *T. pedis*.

Among various methods, the KOH preparation has shown good sensitivity in comparison with culture. In our study, KOH positivity rate is 68.16% & culture positivity rate is 20.15% The study is in lines with the other studies done across various parts of India , they had also shown KOH positivity rate as 59.20%⁴, 53.3%¹, 62.12%⁶, 72.4%⁷, 64%⁸, 49%¹⁰. However, high culture positivity rate are depicted in other studies i.e. 50.4%⁴, 79.1%¹, 29.29%⁶, 62.8%⁷, 45.3%⁸, 51%¹⁰, which is in sharp contrast to our study of 20.15%. There are 16 cases in which KOH is negative but culture is positive (1.6%). Similar finding is also noted by other investigators 1.6%⁴, 28.5%¹, 2.53%⁶, 7.7%⁷, 11.3%⁸, 4%¹⁰. This can be explained by drying out procedure.¹

The commonest isolated fungal species in present study is *T. rubrum* (35.26%) followed by *T. mentagrophytes* (27.63%). *T. rubrum* was also the commonest species in the studies done by Aruna Aggarwal (62.3%)⁴, Parul (54%)⁶, Nawal (67%)⁷, V bindu (66.2%)⁸, S sen (68.63%)¹⁰, M Misra (76%)⁵. However Grover et al had reported *T. tonsurans* (20.5%) as the commonest isolate. It could be explained on the basis of different climatic conditions and geographic distribution.¹

From onychomycoses, *T. rubrum* is the commonly isolated species. It is due to better adaptation, more virulence and easy colonization on hard keratin. Other researchers have also reported the same.^{6, 11, 12}

T.violaceum is the most commonly isolated species from *T. capitis*. On the similar lines is the finding on Kannan et al.¹³ The higher incidence of superficial mycoses is seen in month of September due to rainy season & humid atmosphere which is also correlating well with other studies.⁴

In conclusion, the present study of 377 cases at our tertiary care hospital, Ahmedabad shows that males are predominantly affected with preponderance of cases in the monsoon months. KOH examination is shown to be more sensitive than culture. Majority of the cases were from *T. corporis* and most common etiological agent is *T. rubrum*. Although the findings of this study matches with many studies done across India, it differs significantly with some studies suggesting the role of geographical variation in clinical and mycological pattern.

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