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Original Article

Clino-mycological studies of dermatophytosis at tertiary care centre, West India.

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ABSTRACT

Background: Dermatophytoses refers to superficial fungal infection of keratinized tissues such as epidermis, hair and nails caused by dermatophytes. Worldwide incidence of dermatophytoses is increased and it continues to spread and persist. It has become significant health problem in tropical countries due to heat and humidity. The present study was undertaken to find out clinical patterns of dermatophytoses and species prevalent in this region. Materials and methods: The study included 525 clinically diagnosed dermatophytoses cases over a period from July 2011 to April 2014. All clinical samples were subjected to direct microscopy (potassium hydroxide-KOH) examination and culture isolation; causative agents were identified macroscopically and microscopically. Results: Out of 525 cases; T.corporis found in 307 cases(58.48%) the commonest clinical type followed by T.ungium 117 cases(22.28%) and T.cruris 51 cases (9.71%). 19 cases (3.62%) having both T.corporis and T.cruris. On examination 456 (86.86%) samples were KOH positive and 244 (46.48%) were culture positive. Among culture isolates T.rubrum is the commonest isolate (), followed by T.mentagrophytes(). Commonly affected age group was 20-50 years , with males preponderance(51.42%) . Conclusion: The study reveals that T.corporis is the commonest clinical type and Tricophyton rubrum is predominant etiological agent. Adults are affected more and showing male preponderance. These infections though trivial, have lot of psychological effect and require effective treatment which is very costly. Knowledge about epidemiological and myocological characteristics is an important tool for control of this infection.

1. Introduction

Although fungi are worldwide, only few of them are considered pathogenic. Most of the agents cause infection of superficial layers of integument and only very few give rise to systemic involvement. Recently there has been an increase in the incidence of dermatophytoses as well as other fungal infection. This may be a result of frequent usage of antibiotics, immunosuppressive drugs and various conditions like oragn transplantation, lymphoma, leukemia and HIV infection.[1] Due to increase in such cases at an unprecedented rate, the management of dermatophytoses would be a definitive challenge to mankind[2]. Nature of dermatophtyses may change with time, living population, evolution of preventive measures and hygiene conditions in the society.[3]

Skin infection due to dermatophytes has become a significant health problem affecting children, adolescents and adults. The dermatophytes constitute a group of superficial fungus infections of keratinized tissues viz the epidermis, hair, nails- caused by a closely related group of filamentous fungi the dermatophytes. There are three genera of dermatophytes- Trichophyton, Microsporum and Epidermophyton.4 Dermatophytosis is a common disease in tropical countries due to factors like heat and humidity. The high humidity and temperature provide a fertile ground for abundant growth of dermatophytes. Dermatophytosis has been reported from different parts of India. 5-7 but there are not many reports from our region. The present study was therefore undertaken to assess the clinicoepidemiological profile of dermatophytic infection, to identify species of fungi and to compare the clinical diagnosis with KOH smear positivity and culture positivity.

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Materials and methods:

This study was undertaken over a period from July 2011 to April 2014 at Mycology section, Department of Microbiology, PDU Govt Medical college and Hospital, Rajkot. Clinically suspected 525 cases of Dermatophytosis attending skin outpatient department were subjected to mycological work up. The specimens included skin scrapings, nail clippings and infected hair.

Microscopic examination:

Direct microscopic examination was undertaken in 10% KOH wet mount for skin scrapings while 40% KOH was employed for hair and nail specimens.[4]

Culture study:

All cases were subjected to culture study, scraping site was cleaned aseptically with 70% alcohol and the scales were collected in a sterile slide with the help of sterile scalpel. The culture was performed in two different sets of antibiotic incorporated Sabouraud's Dextrose agar(SDA) media one with chloramphenicol 50mg/L and the other with cycloheximide 500mg/L in addition to chloramphenicol.[4]

The culture plates were incubated at 30°C and culture growth was observed. The tubes were declared negative only after observing for four weeks for absence of growth. The mycological identification was based on macroscopic and microscopic examination of culture isolates. The macroscopic examination of dermatophytes was characterized by duration of growth, surface morphology and pigment production on the reverse. Cornmeal agar (CMA) was used to differentiate Trichophyton rubrum from Trichophyton mentagrophytes. Dermatophyte test medium was used to isolate dermatophyte from contaminated or mixed growth with other fungus and bacteria. It selectively inhibit bacteria and other contaminant fungi while encouraging growth of dermatophytes.

The microscopic examination of fungal growth was observed with lactophenol cotton stain. Nature of mycelium and conidia formation (macro and micro conidia) helped to differentiate between species and genera. Special tests like hair perforation test, urease production were performed whenever necessary by standard technique.

Result

Table - 1

CLINICAL TYPES	No. Of Cases	%
T. corporis	307	58.48
T. unguim	117	22.28
T. cruris	51	9.71
T. corporis+ T.cruris	19	3.62
T. capitis	12	2.28
T. faciei	09	1.71
T. pedis	05	0.95
T. mannum	04	0.76
T. mannum + T. ungium	01	0.19
TOTAL	**525**	**100**

Among 525 clinically diagnosed dermatophytosis; T.corporis were 307 cases (58.48%) the most common clinical type followed by T.ungium 117 cases (22.28%) and T.cruris 51 cases (9.71%). 19 cases (3.62%) were presented with combined T.corporis and T.cruris. [Table 1]

Table - 2

SITE	NO. OF CASES	KOH & CULTURE BOTH +VE	KOH+VE CULTURE -VE	CULTURE +VE KOH-VE	KOH & CULTURE BOTH –VE
SKIN	395(75.23%)	207	99	17	72
NAIL	118(22.48%)	11	67	00	40
HAIR	12(2.28%)	08	04	00	00
TOTAL	**525**	**226**	**170**	**17**	**112**

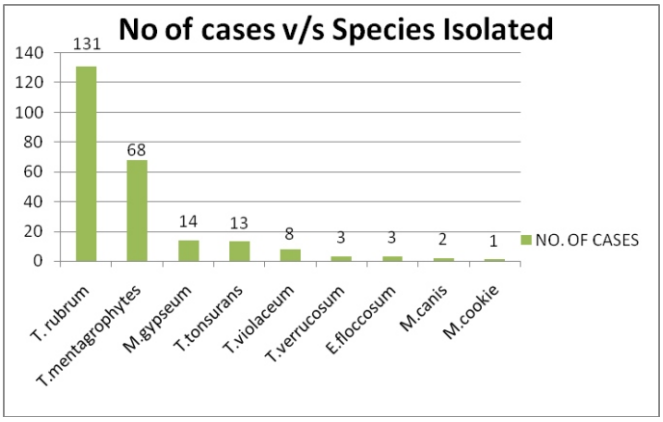
Out of 525 clinical samples processed 395 (75.23%) were skin scrapings, 118(22.48%) were nail clippings and 12(2.28%) were hair stubs. [Table 2]

Table - 3

	KOH +VE	KOH–VE	TOTAL
CULTURE +VE	226 (43.04%)	17 (3.23%)	243 (46.28%)
CULTURE –VE	170 (32.38%)	112 (21.33%)	282 (53.71%)
TOTAL	**396 (75.42%)**	**129 (24.57%)**	**525**

Out of 525 clinical samples processed 396 cases (75.42%) were positive by direct microscopy (KOH) and 243 cases (46.28%) were culture positive.170 samples were found KOH positive but culture negative while 17 KOH negative samples were culture positive. 112 (21.33%) were negative by both KOH and culture. [Table 3/Chart 3]

Chart No: 1



Among 243 culture positive isolates T. rubrum cases 131 (53.19%) were the commonest isolates followed by T.mentagrophytes 68 cases (27.98%), M.gypseum 14 cases (5.76%), T.tonsurans 13 cases (5.35%), T.violaceum eight cases (3.29%), T.verrucosum three cases (1.23%), E.floccosum three cases (1.23%) , M.canis two cases (0.82%) and M.cookie one case (0.41%). Overall Trichophyton species were 223 cases (91.76%), Microsporum species 17 cases (6.99%) and Epidermophyton species (1.23%). [Chart 1]

Table No: 5

CLINICAL TYPES	CULTURE +VE	T. rubrum	T.mentagrophytes	M.gypseum	T.tonsurans	T.violaceum	T.verrucosum	M.canis	M.cookie	E.flocosum
T. corporis	184 (75.72%)	100	52	09	11	04	02	02	01	03
T. cruris	26 (10.69%)	15	06	01	01	03	00	00	00	00
T. unguim	11 (4.53%)	06	04	00	01	00	00	00	00	00
T. corporis+ T.cruris	09 (3.7%)	05	02	02	00	00	00	00	00	00
T. capitis	08 (3.29%)	02	02	02	00	01	01	00	00	00
T. faciei	04 (1.64%)	02	02	00	00	00	00	00	00	00
T. pedis	00	00	00	00	00	00	00	00	00	00
T. Mannum	01 (0.42%)	01	00	00	00	00	00	00	00	00
T. Mannum + T. unguim	00	00	00	00	00	00	00	00	00	00
TOTAL	243	131	68	14	13	08	03	02	01	03

Out of 243 culture positive cases; commonest clinical type was T.corporis 184 cases (75.72%) followed by T.cruris 26 cases (10.69%), T.ungium 11 cases (4.53%), Combined T.corporis and T.ungium nine cases (3.7%), T.capitis eight cases (3.29%), T.faciei four cases (1.64%), T.mannum one case (0.42%). [Table 5]

Table No: 6 Age Distribution

CLINICAL TYPES	AGE – GROUP							TOTAL CASES	
	0-10	11-20	21-30	31-40	41-50	51-60	>60	NO.	%
T. corporis	04	50	69	70	72	27	15	307	58.48
T. unguim	03	06	36	23	24	14	11	117	22.28
T. cruris	00	09	13	08	16	04	01	51	9.71
T. corporis+ T. cruris	00	03	05	04	03	03	01	19	3.62
T. capitis	04	03	01	01	01	01	01	12	2.28
T. faciei	02	01	05	01	00	00	00	09	1.71
T. pedis	00	00	03	00	02	00	00	05	0.95
T. Mannum	00	00	00	01	03	00	00	04	0.76
T. Mannum + T. unguim	01	00	00	00	00	00	00	01	0.19
Total	14 (2.67 %)	72 (13.71%)	132 (25.14 %)	108 (20.57%)	121 (23.04%)	49 (9.33%)	29 (5.52 %)	525	100

Table No: 7 Sex Distribution

CLINICAL TYPES	MALE		FEMALE		TOTAL	
	NO.	%	NO.	%	NO.	%
T. corporis	159	51.79	148	48.21	307	58.48
T. unguim	56	47.86	61	52.14	117	22.28
T. cruris	28	54.9	23	45.1	51	9.71
T. corporis+ T.cruris	13	68.42	06	31.58	19	3.62
T. capitis	05	41.67	07	58.33	12	2.28
T. faciei	02	22.22	07	77.77	09	1.71
T. pedis	04	80	01	20	05	0.95
T. Mannum	02	50	02	50	04	0.76
T. Mannum + T. unguim	01	100	00	00	01	0.19
TOTAL	**270**	**51.43**	**255**	**48.57**	**525**	**100**

Out of 525 cases of dermatophytosis; the commonly affected age group was 21-30 years followed by 31-50 years. Males were more in number 270 (51.43%) than females 255(48.57%).[Table 6, Table 7]

Discussion:

Clinical type:

The commonest clinical types of dermatophytosis that presented to us were tinea corporis (58.48%) which concurs with reports from other parts of India[13]. It was followed by tinea ungium (22.28%). The incidence of tinea capitis was 2.28% in our study.

Sumit Kumar et al 2014 10 reported Tinea corporis as the commonest clinical presentation encountered in 119/250 cases (47.6%) and T.capitis was reported in 4.4% cases.

Bindu V et al 2002 12 reported Tinea corporis (54.6%) as the commonest clinical type.

Seema Bhaduria et al in 2001 found T.Corporis most common clinical types in 60% cases. 14

V. Sumana et al in 2004 found T.corporis to be the most common clinical presentation about 60% cases. [15]

Tinea capitis is less common in India than in other countries, 16,17,18 Tinea capitis and tinea corporis were the predominant dermatophytosis in children in our study. This may be attributable to the use of hair oils (particularly mustard oil) which are customarily used by Indians and have been shown to have an inhibitory effect on dermatophytes in vitro.[19,20]

KOH and Culture positivity comparison:

In the present study 396 cases (75.42%) were positive in direct microscopic examination (KOH). 243 cases (46.28%) were culture positive. The present study was supported by other studies. We found an isolation rate of 46.28% with culture, compared to rates varying from 7% to 49% in other studies.[8, 9]

	Our study	S. Singh et al 2003[11]	Bindu V. et al 2002[12]
KOH positivity	75.42%	60.38%	64%
Culture positivity	46.28%	44.6%	45.3%

Culture isolates:

	T.rubrum	T.mentagrophtye	T.violaceum
Our study	53.19%	27.98%	3.29%
Sumit Kumar et al 2014 [10]	65.09%	17.92%	3.78%
V Bindu e al 2002[12]	66.2%	25%	-
Sumana V et al[15]	60%	-	-
Gupta BK[21] et al in 1993	42.42%	-	-
Mohanthy JC[7] et al	68.34%	17.10%	-
Peerapur[22] B V et al	43.7%	-	4.7%

T. rubrum was the predominant isolate in the present study in 131 cases (53.19%). Other workers who reported, T.rubrum as predominant isolate in their studies were, .Mohanthy JC7 et al in 1998 – 68.34%, Bindu V et al12 in 2002-66.2%,Sumana15 V et al in 2004 – 60%, Peerapur22 B V et al in 2004 – 43.7%,21 Gupta BK21 et al in 1993 -42.42%.

In the present study T.mentagrophytes was the second commonest isolate in 68 cases (27.98%). This correlated with the results of Bindu V et al 12 in 2002– 25% and Peerapur22 BV et al in 2004-28.1% and Mohanty JC7 in 1998 who also reported 17.10% T.mentagrophytes in his study.

Trichophyton species were more commonly isolated than Epidermophyton and Microsporum. T. rubrum is the main dermatophyte reported from India and other countries.[14]

In the present study T. Violaceum was isolated in 3.29% cases. Sumit Kumar et al 201410 reported T. Violaceum 3.78% cases, S. Singh et al 11 in 2003 also reported 1.72%, Peerpur 22 BV et al in 2004 reported 4.7% .

Dermatophytes isolated according to clinical types:
T.corporis:

In the present study commonest isolate 113(53.19%) were Trichophyton rubrum from all clinical isolates. In T.corporis,100 isolates (54.34%), in T. cruris 15 isolates (57.69%). In T. unguium 6 isolates (54.54%) were Trichophyton rubrum. In T. manuum only T. rubrum was isolated.

In our study the isolates from T.corporis are in following order:

T.rubrum (54.34%), T.mentagrophte (28.26%), T.tonsurans(5.98%), M.gypseum(4.89%).

Sumit Kumar et al 2014 10 reported the following order from T.corporis:

T.rubrum (61.82%), T.mentagrophte (21.82%), E. floccosum(9.69%).

Singh S et al 2003 11 reported the following order from T.corporis:

T.rubrum (61.82%), T.mentagrophte (21.82%), E. floccosum(9.69%).

V Bindu e al 200212 in all clinical types:

T rubrum (66.2%), Tmentagrophytes (25%), T tonsurans (5.9%) and E. floccosum (2.9%)

T.Cruris:

T.Cruris was the third commonest in 9.71% cases in the present study.

Nita Patwardha et al in 1999 reported T.cruris in (22.2%) cases the second commonest.4

SS Sen, ES Rasul in 2006 reported T. cruris in (19%) cases the second commonest.12

T.ungium:

T.ungium was the second commonest in 24% cases in the present study.

Sumit Kumar et al 2014 10 reported Tinea, unguium was in (9.6%) cases.

SS Sen, ES Rasul in 2006 also reported tinea unguium in (11%) cases in their study.[12]

Age distribution:

Dermatophyte infection is more common in 21-30 years followed by 31-50 years.

Sumit Kumar et al 201410 reported the maximum incidence of dermatophytosis was in the age group 21-30 yrs.

Nita Patwar Dhan, Rashmika Dave et al in 1999 also reported maximum number of cases of dermatophytoses belonged to the age group 21-30 yrs.[3]

N Sumuna, V. Rajagopal in 2002 reported most of the cases were from age group 11-20 yr and 21-30 yr (51.4%).[15]

Singh S et al 2003 11 reported 16-30 years as the most affected age group. The higher incidence of dermatophyte in young age may be due to more physical activity and increased opportunity for exposure.

Sex distribution:

In the present study dermatophytic infection was slightly more common in male (51.43%) and less common in female (48.57%). Male to female ratio was 1.06:1. The higher incidence in young males could be due to greater physical activity and increased sweating.

Sumit Kumar et al 2014 10 reported 67.2% of cases in males.Singh S et al 2003 11 reported 61.15% of cases in males.

Conclusion:

The present study has given us a clear insight into the clino-mycological aspects of dermatophytoses in our region. The study reveals that skin infections are more than hair and nail infections in dermatophytoses cases. Common clinical types are T.corporis , T.ungium and T.cruris. Study highlightened that among culture positive isolates Trichophyton species were the most common than Microsporum and Epidermophyton. Among trichophyton species we found T.rubrum was the predominant isolate followed by T.mentagrophte. Predominant age group affected was 21-50 years and males were affected more.

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