

Original Research Article

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Isolation and Identification of Dermatophytes from Clinically Suspected Cases of Dermatophytosis in Patients Attending a Tertiary Care Center Hyderabad

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ABSTRACT

The dermatophytes are a group of closely related fungi that have the capacity to invade keratinized tissue (skin, hair, and nails) of humans and other animals to produce an infection. The clinical importance of identifying species of dermatophytes is to find out problem source of infection. Moreover, there are some prognostic considerations as well. The study was conducted at the Upgraded department of Microbiology, Osmania general hospital, Hyderabad. About 75 specimens were collected aseptically and were examined under low power and high power objectives of a light Microscope and cultured. Identification is done by tease mount and biochemical reactions. Of the 75, 46 (61.33%) were positive for both KOH and culture. *Trichophyton tonsurans* was the commonest isolate 28/53 (culture positives) (52.9%). Dermatophytic infections are of concern because of their character of chronicity of the disease. The study highlighted the various types of Dermatophytic infections in and around the places of Hyderabad.

Keywords

Dermatophytes,
Keratinized tissue,
*Trichophyton
tonsurans*, KOH

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Introduction

The dermatophytes are a group of closely related fungi that have the capacity to invade keratinized tissue. The etiologic agents of the Dermatophytosis are classified in three anamorphic (asexual or imperfect) genera, *Epidermophyton*, *Microsporum*, and *Trichophyton*, of anamorphic class Hyphomycetes of the Deuteromycota (Fungi Imperfecti). They infect tissue (skin, hair, and

nails) of humans and other animals to produce an infection Irene Weitzman *et al.*, 1995. The clinical importance of identifying species of dermatophytes is to find out source of infection. Moreover, there are some prognostic considerations as well.

The present study is aimed at isolation and identification of dermatophyte species. The study was approved by the Institutional ethical committee.

Materials and Methods

Study site: Upgraded department of Microbiology, Osmania General Hospital

Study population: 75 clinically suspected cases of Dermatophytosis of all ages and both sexes

Study period: Six Months
Study design: Prospective Study

Collection of skin scrapings

The scrapings were collected from the edges of the lesions by using sterile blunt scalpel blade after swabbing the lesion with 70% alcohol. Care was taken not to cause any bleeding from the lesions while collecting the specimens. Scrapings were collected on black photographic paper for better visualization

Collection of nail clippings

The affected nails were swabbed with 70% alcohol and Scraped up to the affected region and also nail clippings were also collected.

Collection of hair plucking

The affected hairs were epilated using sterile forceps and also scales from the surrounding area were collected after swabbing with 70% alcohol. Care was taken to include the basal portion of the hair [Hair stub].

Processing

Small portion of the specimen were transferred aseptically onto a sterile microscopic slide to which a drop of 10% KOH (potassium hydroxide) was added and covered with a cover slip. Nail clippings were transferred to a sterile penicillin bottle containing a few drops of 40%KOH and kept overnight before examination. Specimens

were also examined with a mixture of KOH and DMSO (dimethyl sulphoxide) as DMSO is a better clearing agent.

All direct positive and negative samples were inoculated on Sabourauds dextrose agar (SDA) containing chloramphenicol and cycloheximide - Himedia and incubated in BOD at 37°C and at room temperature. Slants were observed at regular intervals for a period of 6 weeks and absence of growth after the time period was discarded. Any visible growth on the slant was examined for, Colony morphology; a. Topography, b. Texture, c. Surface pigmentation, d. Pigmentation on reverse.

Microscopic morphology was studied by 1. Lacto phenol Cotton Blue tease mount preparation. 2. Slide culture. Urea hydrolysis done to differentiate *T.mentagrophytes*.

Results and Discussion

Clinical types of dermatophytosis

The study group included 75 clinically suspected cases of Dermatophytosis. The commonest clinical type of Dermatophytosis was Tinea corporis with 33/75(43.6%) followed by Tinea capitis 17/75 (23.5%) (Table 1).

Dermatophytosis in relation to age and sex

Out of 75 cases there were 48 males (63.56%) and 27 (36.44%). The predominant age group in both males and females was 21-30yrs. (Chart 1)

Results obtained after direct examination and culture

Out of the total 75 dermatophytosis cases 54 (71.56%) were direct KOH wet mount examination positive and 21(28.4%) were wet

mount negative. 46(61.33%) were positive for both KOH and culture. 8(10.67%) were KOH wet mount positive and culture negative. In 7 (9.2%) cases culture was positive but KOH wet mount negative. 14 (18.26%) were KOH wet mount as well as culture negative (Table 2).

Incidence of various species of dermatophytes in clinical isolates

Out of the total 75 cases of dermatophytosis 53 were positive for culture. *Trichophyton tonsurans* 28/53 (52.9%). was the commonest isolate followed by *Trichophyton rubrum* 11/53 (21.57%) (Table 3).

Sites involved

Out of 75 clinical specimens from the confirmed cases 45 (60.03%) were skin scrapings, 11(14.61%) were nail clippings and 19 (25.33%) were hair plucking with hair stub (Chart 2). Dermatophytosis is the commonest group of superficial fungal infections seen in

the tropics where hot and humid climate is conducive for the growth of the fungi (Siddappa, *et al.*, 1982; Suman Singh, *et al.*, 2003).

This study shown maximum number of cases in the age group of 21-30 years (32%), followed by 31-40 years (18.22%), which is in line with Kumar *et al.*, (1990), Banerjee *et al.*, (1987), Amin *et al.*, (1971), Rao *et al.*, (1973) and in contrast with Suman *et al.*, (2003) observed more cases in age group of 11-20 years

The higher incidence in adults aged 20-40 years could be due to greater physical activity with increased sweating and increased opportunity for exposure.

Dermatophytic infection was more common in males 48 (63.56%) than in females 27 (36.44%). KM Achary, RK Thakur *et al.*, in 1995(1) reported dermatophytic infection more in men (65%) than in women (35%).

Table.1 Clinical types of Dermatophytosis

Clinical types	Number of cases			
	Cases(n)= 75			Percentage
		M	F	
<i>Tinea corporis</i>	33	21	12	43.5%
<i>Tinea capitis</i>	17	12	5	23.52%
<i>Tinea cruris</i>	6	5	1	7.56%
<i>Tinea pedis</i>	6	2	4	7.56%
<i>Tinea unguinum</i>	5	4	1	6.67%
<i>Tinea manuum</i>	4	1	3	5.33%
<i>Tinea barbae</i>	2	2	0	2.67%
<i>Tinea faciei</i>	1	1	2	2.67%

Table.2 KOH and culture positivity

	KOH POSITIVE	KOH NEGATIVE	TOTAL(n=75)
Culture Positive	46(61.3%)	7(9.2%)	53(70.6%)
Culture Negative	8(10.6%)	14(18.6%)	22(29.4%)
TOTAL (n=75)	54	21	75

Table.3 Various species of dermatophytes in clinical isolate

Species	Dermatophyte isolated	
	No of isolates	Percentage
<i>Trichophyton tonsurans</i>	28	52.9%
<i>Trichophyton rubrum</i>	11	21.57%
<i>Trichophyton violaceum</i>	8	14.7%
<i>Trichophyton mentagrophyte</i>	4	6.86%
<i>Trichophyton verrucosum</i>	2	2.94%

Table.4 Comparison of age and sex ratio of dermatophytosis in different studies

	Male: Female ratio	Commonest age group affected
Aruna Aggarwal(3)	1.8:1	>20yrs (60%)
Grover WCS(6)	4.26:1	20-30yrs (39%)
Parul(11)	1.75:1	21-30 yrs. (29.3%)
Nawal(9)	1.8:1	Adult (66.5%)
V Bindu(5)	2.06:1	11-20 yrs. (23.3%)
Present study	1.7:1	21-30 yrs.(32%)

Table.5 Comparison of KOH positivity and culture rate

	KOH positivity rate	Culture positivity rate	KOH& culture both positive	KOH negative but culture positive
Aruna Aggarwal <i>et al.</i> , 2002(3)	59.20%	50.40%	45.40%	1.60%
Grover WCS <i>et al.</i> , 2003(6)	53.30%	79.10%	-	28.5%
Parul <i>et al.</i> , 2010(11)	62.12%	29.29%	26.77%	2.53%
Nawal <i>et al.</i> , 2012(9)	72.40%	62.80%	-	7.70%
V Bindu <i>et al.</i> , 2002(5)	64%	45.30%	-	11.30%
Present study	68.18%	20.15%	15.91%	4.20%

Table.6 Comparison of isolated species

	Infection involving multiple sites	Commonest species
Aruna Agarwal ³	5.06%	<i>T. rubrum</i> (62.3%)
Grover WCS ⁶	-	<i>T. tonsurans</i> (20.5%),
Parul ¹¹	17.3%	<i>T. rubrum</i> (54%),
Nawal ⁹	-	<i>T. rubrum</i> (67%),
V Bindu ⁵	-	<i>T. rubrum</i> (66.2%)
Sen ¹³	-	<i>T. rubrum</i> (68.63%)
Present study	-	<i>T. tonsurans</i> (52.9%)

Chart.1 Dermatophytosis in relation to age and sex

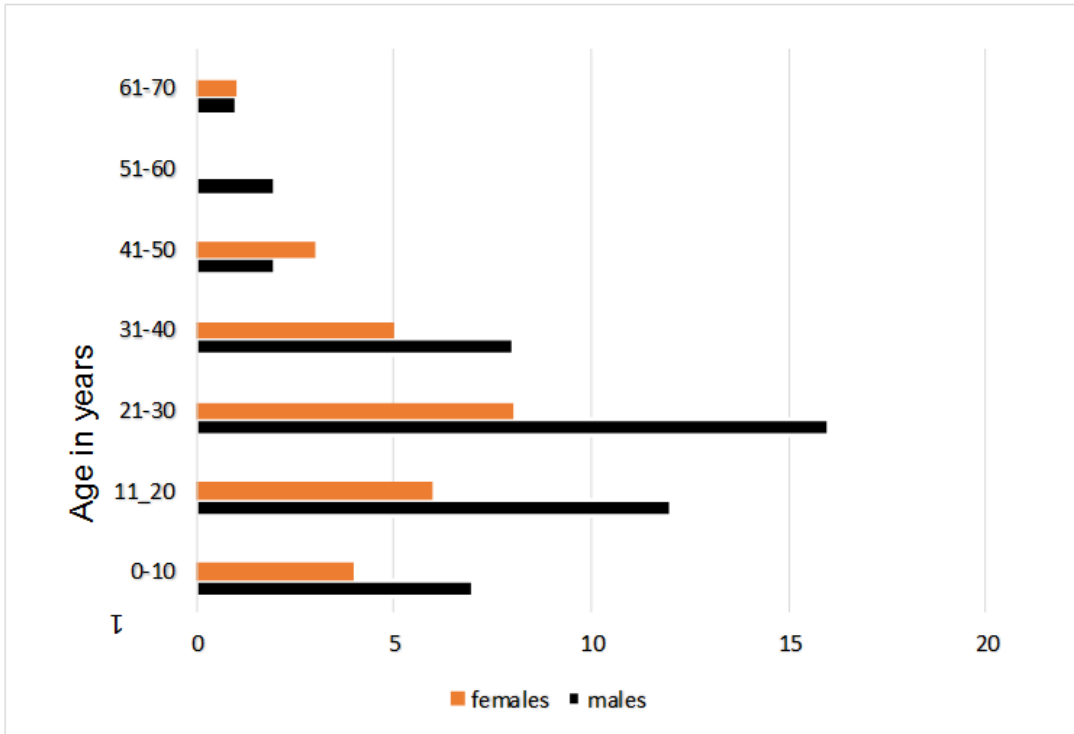
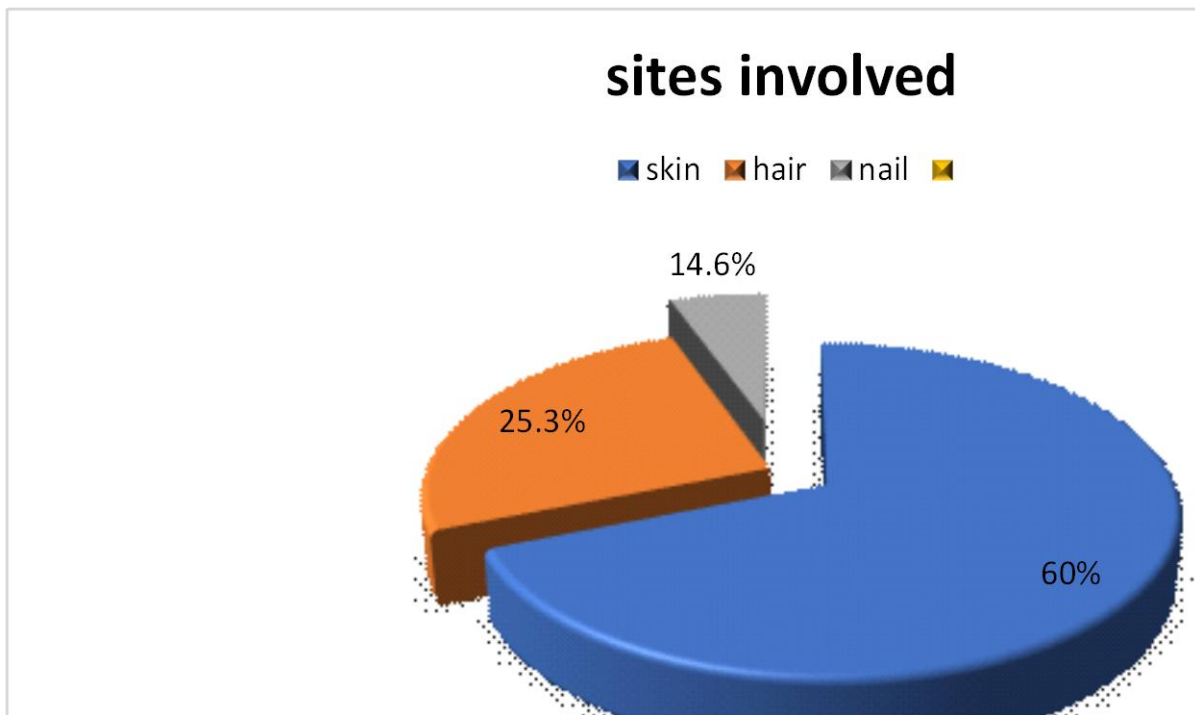


Chart.2 Different sites involved



Male predominance of dermatophytosis was observed due to increase outdoor activities and increased opportunity for exposure to the fungi than female. It may also be correlated with the occupational hazards related to their nature of work, the frequent interaction with different people of the society, environmental conditions such as hot and humid weather, poor personal hygiene and illiteracy are other major factors that influence dermatophytosis (Table 4).

The commonest clinical type seen in our study is *T. corporis* (43.5%) followed by *T. capitis* (23.5%) which is also corroborated well with other studies i.e., Suman Sing *et al.*, 2003 64%, Nawal P *et al.*, 2012 40.8% (9), Patel P 2010 6%.

Out of the total 75 Dermatophytosis cases 54 (71.56%) were direct KOH wet mount examination positive and 21(28.4%) were negative. 46 (61.33%) were positive for both KOH and culture. 8 (10.67%) were KOH wet mount positive and culture negative.

In 7 (9.2%) cases culture was positive but KOH wet mount negative. 14 (18.26%) were KOH wet mount as well as culture negative (Table 5).

This shows that KOH mount with culture is more accurate than KOH mount alone

In this study 53/75 cases were culture positive, *Trichophyton* species have been isolated with increasing frequency as compared to *Microsporum* and *Epidermophyton* species

Among them *T. tonsurans* (52.9%) was the predominant isolate followed by *T rubrum* (21.5%) which is in accordance with Grover *et al.*,(6), and is in contrast to the commonly reported prevalence of dermatophytic fungi in various Indian studies (Table 6).

The findings of this study showed that 3rd decade is most common age group affected with varied duration of symptoms. *Tinea corporis* was the commonest lesion. Species of *Trichophyton* namely *T. Tonsurans* was the predominant isolate. Addition of DMSO to KOH gave better and faster results when compared to plain KOH

Dermatophytosis is a major public health problem and intricately linked with socioeconomic standard of the population. Health education among the population at risk and awareness of preventive measures by following better standards of personal hygiene will help in reducing the prevalence of this disease among the community.

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