



RESEARCH ARTICLE

A STUDY OF DERMATOMYCOSES

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Corresponding Author*Dulla Sarada****Abstract**

A total of 125 cases of clinically diagnosed dermatomycosis in patients attending the department of dermatology, Government General Hospital, Vijayawada were taken up for mycological study. Highest age incidence was in the age group of 31 - 40 years 33(26.4%). Females were more affected than males in a ratio of 1.1:1. The infection was more common in people belonging to low socio-economic status 92(73.6%). Among the clinically diagnosed dermatomycoses, Tinea corporis was more common in females followed by Tinea unguium and Tinea cruris in males. Among the males, Tinea capitis was more common in age group below 20, followed by Tinea faciei in females in the age group of 11 – 20 years. Direct microscopy was positive in 88(70.4%) and culture was positive in 72(57.6%). The commonest aetiological agent for Tinea corporis was Trichophyton rubrum followed by Trichophyton mentagrophytes. Out of 72 culture positive isolates, Trichophyton rubrum was 20(25%) followed by Trichophyton mentagrophytes 15(18.75%), Trichophyton schoenleinii 5(6.25%), Trichophyton tonsurans 4(5%), Trichophyton verrucosum 2(2.5%), Trichophyton ajelloi 1(1.25%), Epidermophyton floccosum 3(3.75%) and Microsporum gypseum 2(2.5%). Of the total 80 isolates, 55 are Dermatophytes (23.75%) and the Non dermatophyte fungi are 25, of which 3 were Candida (3.75%) and 3 were Malassezia (3.75%). Trichophyton species was the most commonest aetiological agent in Dermatomycosis, among fungal infection of the skin in tropical countries like India. Other factors contributing to the prevalence of dermatomycoses was people in low socioeconomic status, with low literacy and poor personal hygiene.

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INTRODUCTION

Fungal infections however, are extremely common and some of them are serious and even fatal. With the control of most bacterial infections in the developed countries, fungus infections have assumed greater importance. Most fungi are soil saprophytes and human infections are mainly opportunistic. Dermatomycosis is by far the most common fungal disease in human beings. Eventhough world-wide in distribution, they are mostly prevalent in Tropical and Sub-tropical countries like India. Hot and humid climate is supposed to aggravate the infection. BAER and SULZBURGERS work has established that fungal diseases occur only in certain susceptible persons and on certain susceptible areas. The fungi are only facultative pathogens. In the presence of adjuvant factors like Trauma, Maceration, Warmth, lack of fresh air and sunlight to a part, previous infection, sensitization and debility, these fungi are facilitated to develop pathogenic lesions. All races are affected. The clinical varieties and prevalence appear to depend mainly on environmental and socio-economic factors, which result in overcrowding, poor hygiene and malnutrition, together with individual susceptibility which undoubtedly play an important role. Invasive fungal infections are more prevalent than ever, due to an increasingly large populations of patients at high risk secondary to immuno-suppression. Underlying disease or chronic conditions such as cancer, bone marrow or solid-organ transplantation, HIV infection, and chronic corticosteroid administration make patients vulnerable to both superficial

and opportunistic fungal pathogens. In hospital complicated surgical procedures, widespread use of implanted devices and administration of broad-spectrum antibiotics have dramatically increased the incidence of nosocomial fungal infections. Cutaneous mycoses are caused by fungi that infect only the superficial keratinized tissue like the skin, hair and nails. Mycotic infections of the skin can be caused by dermatophytes, yeast and Non-dermatophyte moulds although dermatophytes are the most frequently encountered causative agents. In India, superficial fungal infections of the skin, nail and hair account for

8– 10% of all dermatology outpatient attendance which increases during Summer and Monsoon. Various studies conducted in different parts of the subcontinent has revealed a prevalence rate of about 22% to 85% of dermatomycoses of all the mycological infections.

As various aspects of dermatomycoses are likely to differ markedly in different regions of a country, the present study was undertaken to monitor the pattern of dermatomycoses and an attempt is made to isolate and identify the etiological agents prevalent in the clinically diagnosed /suspected cases in and around Vijayawada city.

MATERIALS AND METHODS :

From 125 clinically diagnosed cases of Dermatomycoses, skin scrapings, nail clippings and hair stubs were collected from the outpatient Department of Dermatology government general hospital and were processed in the Department of Microbiology, Siddhartha Medical College, Vijayawada. The samples were collected after cleaning the site of lesion thoroughly with 70% alcohol and drying, the scrapings and nail clippings and from the scalp, the hair stubs are epilated with the help of a forceps. The samples are collected in a sterile piece of paper. The collected samples were placed in a drop of freshly prepared aqueous solution of 10% Potassium Hydroxide on a glass slide. Allow the KOH preparation at room temperature for about 30 minutes when the material gets cleared. A coverslip is placed over the KOH mount and observed under the microscope. Nail clippings were placed in a drop of 20% KOH for mounting. The mount was first observed under low power and then under high power for hyphae which appear refractile, large, branches coursing in, around and through epidermal cells. Another preparation with lactophenol cotton-blue is done with samples after it has been cleared with 10% KOH and observed under low power and then under high power of the microscope for macroconidia or microconidia. The collected material is mixed thoroughly with 70% alcohol in a clean sterile petridish and dried. The material is then inoculated with sterile straight wire into modified Sabourauds dextrose agar medium slants, one containing actidione and an antibiotic Gentamycin and another slant containing only actidione without any added antibiotic and slants are incubated at room temperature or in a Biological oxygen demand(BOD) incubator. The growth in the modified SDA was examined from third day for colonial morphology and for the presence of any pigmentation. The cultures were examined microscopically by removing a portion of the aerial mycelium with a sterile straight wire, placed on a glass slide in a drop of Lactophenol cotton blue and a coverslip is placed by avoiding air bubbles. The wet mount was observed under low power and high power of the microscope and different morphologic types of fungi were identified depending on the hyphae hyaline or dematiaceous, septate or non septate, morphology and arrangement of macroconidia and microconidia.

Invitro Hair Perforation Test: A filter paper disk placed in a sterile petridish and 15ml of sterile water is added and into the water a lock of child's hair, sterilized in an autoclave is placed. A portion of the colony is inoculated directly onto the hair and incubated at 25°C for 10 to 14 days. The hair shafts are examined microscopically for the presence of conical perforations.

Inoculation on Cornmeal agar with 1% Dextrose : used to differentiate *Trichophyton mentagrophytes* from *Trichophyton rubrum* on the basis of production of the pigment. Production of a red pigment identifies the dermatophyte *T. rubrum* whereas in *Trichophyton mentagrophytes*, no pigment is produced. **Philpot's Urease Test:** Urea agar was inoculated with *Trichophyton* species of dermatophytes demonstrated urease activity usually within 7 days by changing the colour of the medium into pink. *T. rubrum* isolates do not change the colour of the medium. Grams staining method: This is done when the colony morphology shows creamy, opaque white or pale colour and microscopic examination of the emulsified colonies on lactophenol cotton blue preparation shows budding cells.

RESULTS

Clinical samples of skin scrapings, nail clippings and hair stubs were collected from 125 clinically diagnosed cases of dermatomycoses from outpatient department of Dermatology, GGH, Vijayawada. The age group of patients in the study ranged from 0 – 60 years. The most common age group was 31 – 40 years and the next common was 21 – 30 followed by 11 – 20 and 41 – 50 years (fig-1). Among the 125 studied, 53.6% were females and 46.4% were males (fig-2). Categorization of cases by Socio-economic status revealed that the incidence of ring worm infection was more common in people of low socio-economic status 92 (73.6%) followed by middle socio-economic status 29

(23.2%) and in high socio-economic status it was least common 4 (3.2%) (fig-3). *Tinea corporis* is more common in females (63.4%) and in age group 31 – 40 years. *Tinea unguium* is more common in males (62.5%) and in age group 21 – 30 years. *Tinea capitis* is more common in male children (55.5%) and age group 11 – 20 years. *Tinea cruris* is more common in males (85.7%) and in age group 11 – 20 years. *Tinea pedis* is more common in males (62.5%) and in age group 41 – 50 years. There are 5 cases of *Tinea faciei* in females in the age group 11 – 20 years. Out of 7 cases of mixed infection with *Tinea corporis* and *Tinea cruris*, 5 cases were males (71.4%) and 2 were females. The predominant age group is 31 – 40 and 11 – 20 years (table-1).

Out of 125 cases, direct microscopy was positive in 88(70.4%) cases and culture was positive in 72(57.6%) of cases. 58(46.4%) cases were both KOH and culture positive. 29(23.2%) cases were KOH positive but culture negative whereas 14(11.2%) cases were KOH negative but culture positive. 24(19.2%) cases were both KOH and culture negative (table-2). *Trichophyton rubrum* is the commonest pathogenic species isolated 20(25%) followed by *T. mentagrophytes* 15(18.7%) *T. schoenleinii* 5(6.25%), *T. tonsurans* 4(5%), *T. violaceum* 3(3.75%), *T. verrucosum* 2 (2.5%) and *T. ajelloi* 1(1.25%). *Epidermophyton floccosum* 3(3.75). *Microsporum gypseum* 2(2.5%) are the other dermatophytes. The Non dermatophyte fungi, *Fusarium* and *Alternaria* are isolated with an incidence of 6.25% with 5 isolates each followed by *Curvularia*, *Candida* and *Malassezia* 3(3.75%) each, *Penicillium* and *Mucor* 2(2.5%) each and *Cladosporium* and *Aspergillus* one each (1.25%) (table-3).

TABLE - 1: CORRELATION OF CLINICAL TYPES AGE WISE

Sl. No.	Clinical Types	AGE WISE					
		0 – 10 yrs	11 – 20	21 – 30	31 – 40	41 – 50	51 & above
1.	T corporis	3(4.7%)	5(7.9%)	16(25.3%)	19(30.1%)	16(25.3%)	4(6.3%)
2.	T unguium	-	1(6.67%)	7(46.6%)	4(20%)	2(13.3%)	2(13.3%)
3.	T capitis	3(33.3%)	4(44.4%)	-	1(11.1%)	1(11.1%)	-
4.	T cruris	1(14.2%)	3(42.8%)	1(14.2%)	1(14.2%)	-	1(14.2%)
5.	T pedis	-	2(25%)	-	-	3(37.5%)	2(25%)
6.	T faciei	1(16.6%)	5(83.3%)	-	-	-	-
7.	T manuum	-	1(33.3%)	-	1(33.3%)	1(33.3%)	-
8.	T versicolor	-	1(33.3%)	-	2(66.6%)	-	-
9.	Candidiasis	-	1(33.3%)	1(33.3%)	1(33.3%)	-	-
10.	Mixed T corporis & T cruris	-	2(37.5%)	1(14.2%)	3(42.8%)	1(14.2%)	-
11.	T manuum & T pedis	-	-	-	1(100%)	-	-
	Total	8	25	26	33	24	9

TABLE – 2 : IDENTIFICATION OF DERMATOMYCOSES BY MICROSCOPY AND CULTURE AMONG CLINICAL TYPES

Sl.No.	Clinical type	No.	Total KOH Positive	Total Culture Positive
1.	T corporis	63	48	35
2.	T unguium	16	11	7
3.	T capitis	9	6	7
4.	T cruris	7	6	4
5.	T pedis	7	4	3
6.	T faciei	6	5	4
7.	T manuum	3	-	1
8.	T versicolor	3	1	3
9.	Candidiasis	3	1	3
10.	Mixed T corporis & T cruris	7	5	4
11.	T manuum & T pedis	1	1	1
	Total	125	88	72

T : Tinea

TABLE – 3: INCIDENCE OF FUNGAL ISOLATES SPECIES WISE

Sl. No.	Fungal isolate	Number	Percentage
1.	T rubrum	20	25
2.	T mentagrophytes	15	18.75
3.	T schoenleinii	5	6.25
4.	T tonsurans	4	5
5.	T violaceum	3	3.75
6.	T verrucosum	2	2.5
7.	T ajelloi	1	1.25
8.	E floccosum	3	3.75
9.	M gypseum	2	2.5
10.	Fusarium	5	6.25
11.	Alternaria	5	6.25
12.	Curvularia	3	3.75
13.	Penicillium	2	2.5
14.	Mucor	2	2.5
15.	Cladosporium	1	1.25
16.	Aspergillus	1	1.25
17.	Candida	3	3.75
18.	Malassezia	3	3.75

T : Trichophyton; E : Epidermophyton; M : Microsporum

FIGURE : 1

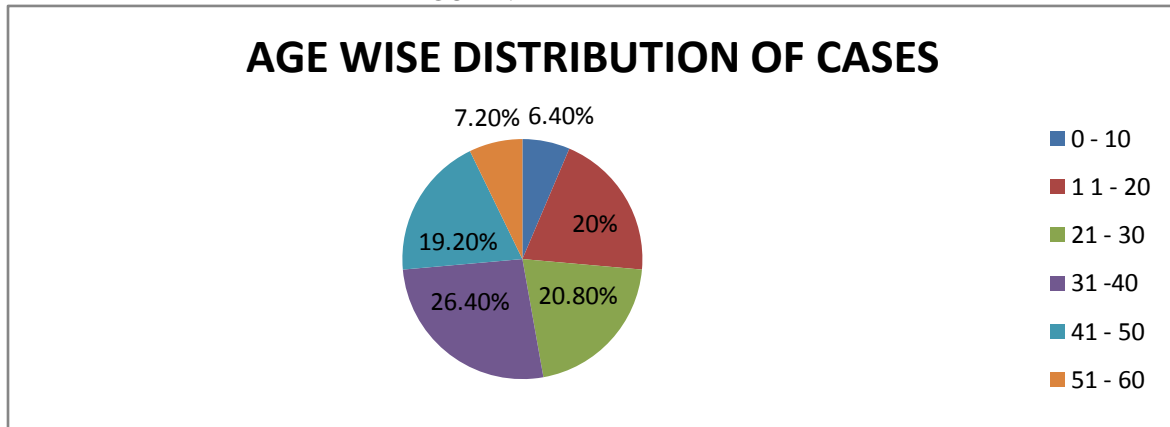


FIGURE - 2

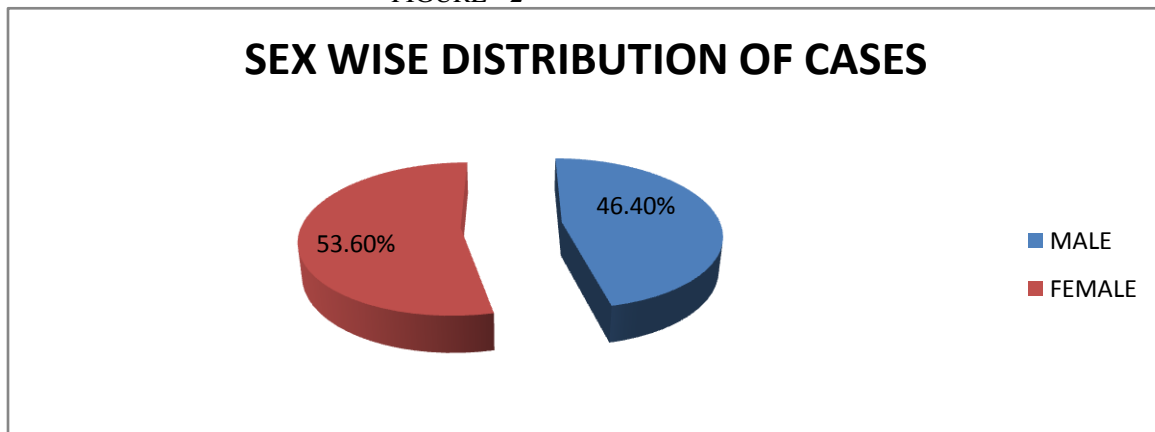


FIGURE – 3

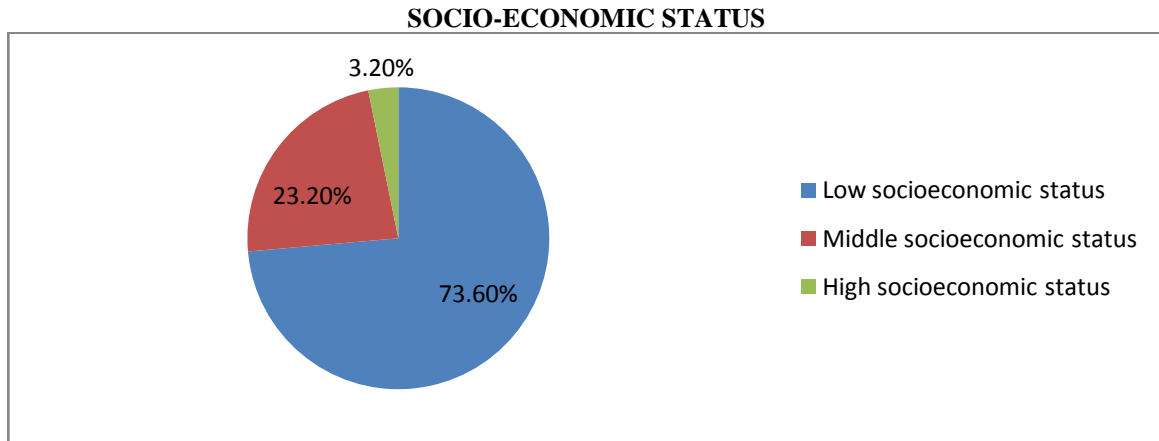


FIGURE : 4

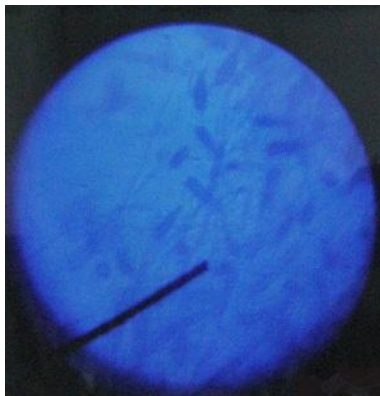
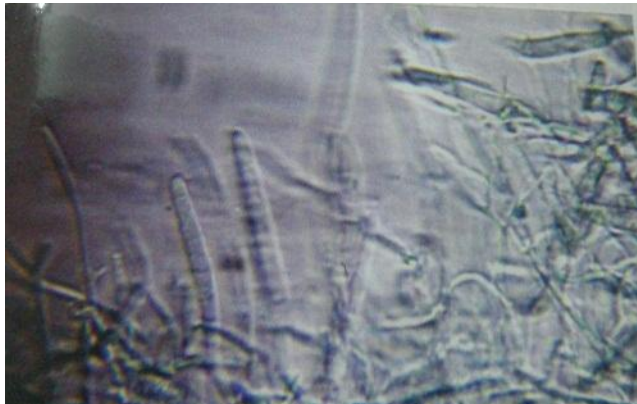
*Curvularia*

FIGURE : 5

*Trichophyton ajelloi*

DISCUSSION/CONCLUSION :

Of the 125 cases, 107 were skin scrapings, 16 nail clippings & 2 hair stubs were subjected to mycological study. Highest age incidence was seen in the age group of 31 – 40 years(26.4%), followed by 21-30 years which correlated with studies by K. Siddappa and O.A Mahipal (1982), Nita Patwardhan, Rashmika dave (1999), Wg Cdr Sanjeev Grover, Lt. Col P. Roy (2003) in the age group of 21 – 30 years. The maximum incidence in young adults is due to increased physical activity and an increased opportunity for exposure. In this study, females were affected more than males. Male predominance was noted in various studies. N.L. Sharma and Neelam Gupta,et, al. (1983) as described in their study, that in big cities, relatively large number of females are affected and this has been attributed to the increased participation of women in outdoor activities, use of footwear and higher degree of health awareness. In our

study M:F correlates with the ratio seen in big cities. Fungal infections of the skin are more common in people of low socio-economic status. S. Ranganathan, et, al. (1995) reported that dermatomycoses were most common in very low socio-economic group and less in moderately rich socio-economic group, the reason being poor hygienic practices.

Tinea corporis(63.4%) was more common in female population and *Tinea cruris* among males(38.3%). The commonest age group for *T. corporis* was 31-40yrs in both males and females. Usha Rani, et, al. (1983) reported that the most prevalent clinical type was *T. corporis* (52%) followed by *Tinea cruris* and *Tinea unguium*. B.K. Gupta et al (1993) reported *Tinea cruris* as the most prevalent clinical type. Bindu V. (2002) reported most common clinical type as *Tinea corporis* (54.6%) followed by *Tinea cruris* (38.6%). Correlation of Direct microscopy and culture positive was seen in 58(46.4%) of the cases. Direct microscopy was positive in 88 (70.4%) cases and culture was positive in 72(57.6%). Bindu V (2002) from Calicut reported 64% positivity by direct microscopy and 45.3% culture positivity. Nita Patwardhan and Rashmik dawe (1999) reported direct microscopy 37.71% and 40.9% cases were culture positive. In this study, *Trichophyton rubrum* 20(25%) was the commonest species followed by *Trichophyton mentagrophytes* 15(18.7%) . Nita Patwardhan, Rashmika dawe (1999) isolated *Trichophyton rubrum* in 28.12% followed by *Trichophyton mentagrophytes* (25%) of total isolates. B.V. Peerapur, et, al. (2002) reported *Trichophyton rubrum*(43.7%) as the most frequent isolate followed by *Trichophyton mentagrophytes* (28.1%). In the present study, *Tinea capitis* was most prevalent in people below 20 years and *Tinea corporis* in adults. *Trichophyton rubrum* is the most common species in *Tinea corporis* followed by *Trichophyton mentagrophytes*. *Trichophyton schoenleinii* was isolated in 3 cases followed by *Trichophyton tonsurans* in 2 and one each of *Trichophyton verrucosum*, *Trichophyton ajelloi* and *Epidermophyton floccosum*. The opportunistic Non dermatophyte fungi like *Fusarium* (1), *Alternaria* (2), *Curvularia* (2), one each of *Mucor* and *Penicillium* were also isolated in cases of *Tinea corporis*. One each of *Trichophyton mentagrophytes*, *Trichophyton schoenleinii* and *Microsporum gypseum* were isolated in *Tinea pedis*. Of the 9 cases of *Tinea capitis*, 7 were culture positive of which one each of *Trichophyton rubrum*, *Trichophyton mentagrophytes* & *Trichophyton violaceum* were isolated and the NDM fungi like *Fusarium* (2), *Curvularia* (1) and *Cladosporium*(1) were also isolated. Of the 16 cases of *Tinea unguium*, 7 were culture positive of which 4 dermatophyte molds and 4 non dermatophyte moulds have been isolated. One case showed mixed type of growth with *Trichophyton violaceum* and a NDM, *Alternaria*. Mohammed Azam Bokari, et, al. (1999) reported an isolation rate of *Fusarium* (4%) and *Alternaria* (1%) in addition to other opportunistic fungi.

Mixed infection i.e., more than one clinical type was noticed in 8 cases of which 5 were culture positive. Two isolates of *Trichophyton tonsurans*, one each of *Trichophyton mentagrophytes* and *Trichophyton schoenleinii* were isolated in cases of *Tinea corporis* with *Tinea cruris*. In a single mixed infection case of *Tinea manuum* and *Tinea pedis*, mixed growth with *Aspergillus fumigatus* and *Mucor* has been noted. In this study 3 cases of *Tinea versicolor* and 3 *Candidiasis* were seen with culture positivity (2.4%) each.

In our study, of the total 80 isolates, 55 were dermatophytes (68.7%), 19(23.75%) were non dermatophytes, 3(3.75%) were *Candida* and 3 were *Malassezia* (3.75%). Mohammed azam bokhari, et, al. (1999) in his study, reported 11% isolation of NDM in samples of Nail clippings which included *Fusarium* 4%, *Aspergillus* 2% and *Alternaria* 2%. Wg Cdr Sanjiv Grover and Lt Col P. Roy (2003) reported a high proportion of NDM (34%) in their study on different clinical types of dermatomycoses. The NDM though commonly considered contaminants, have been reported to colonize damaged tissue and cause secondary tissue destruction. These findings suggest that varied nature of Dermatmycosis with different clinical disease being reported by different authors at the same place. These differences may be due to the changes in the environment and more physical activity due to urbanization, occupation, change in dressing habits and use of immunosuppressant and antibiotics and chronic debilitating diseases.

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