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## A Prospective Study On Prevalence of Superficial Fungal Infections In Dermatology Department In A Tertiary Care Teaching Hospital In Telangana State

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### ABSTRACT

A prospective observational study was conducted in a tertiary care teaching Hospital, to study the prevalence of superficial fungal infection and related risk factors through clinical diagnosis and to monitor the management of observed superficial fungal infections. Patients diagnosed with superficial fungal infections were selected for the study. Being familiar with the local epidemiology of fungal infections and knowledge of risk factors involved can guide use of antifungal drugs. Appropriate antifungal therapy improves outcomes. Tracking epidemiology helps to detect outbreaks and new risks. Data was collected from case sheets of the patients in a specially designed patient data collection form which include information on demographic characteristics viz. age, sex, clinical signs and symptoms, chief complaints of the patients, drugs used previously if any, drugs given etc. Data was analyzed to find out prevalence and risk factors. 100 patients were included with age above 18 years, of which 46.6% were females and 53.4% were males. The most affected age group with superficial fungal infections was from 26-30 years in both males and females. Among all the causative organisms of superficial fungal infections, majority were caused by *Tinea corporis* (29%) followed by *Tinea capitis* (28%) and *Tinea cruris* (25%). Skin was the most affected site of superficial fungal infections followed by scalp, itching being the major symptom followed by redness at the site. In our study, farmers were the most affected socioeconomic group as the exposure of them to the causative organisms is greater.

**Keywords:** Superficial fungal infection, prevalence, risk factors, *Tinea corporis*, *Tinea capitis*, *Tinea cruris*.

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## INTRODUCTION

More than 100 species of fungi are generally recognized as a pathogen for man found in soil. Diseases caused by fungi, or Mycoses, can be clinically classified as superficial, deep, or systemic. Dermatophytes are the most important microorganisms, which cause superficial mycosis, and the lesions are characterized by circular disposition, desquamation, alopecia and erythema of the edges. The dermatophytes have the capacity to invade keratinized tissue (skin, hair and nails) of humans and other animals to produce an infection, dermatophytosis, commonly referred to as ringworm. Dermatophytes are mycelial and keratinophilic fungi of the mould group, originally saprobial, but have adapted themselves to animal and human parasitism through evolution<sup>1</sup>.

India is a large subcontinent with remarkably varied topography, situated within the tropical and subtropical belts of the world. Its climate is conducive to the acquisition and maintenance of mycotic infections<sup>2</sup>.

Fungi are parasites or saprophytes and live off living or dead organic matter. Mycologists identify and classify fungi according to their appearance by microscopy and in culture, and by the method of reproduction, which may be sexual or asexual. Growing fungi have branched filaments called hyphae, which make up the mycelium (like branches are part of a tree). Some fungi are compartmented by cross-walls (called septae). Arthrospores are made up of fragments of the hyphae, breaking off at the septae. Asexual spores (conidia) form on conidiophores. The sexual reproductive phase of many fungi is unknown; these are 'fungi imperfecta' and include those which infect humans. Yeasts form a subtype of fungus characterized by clusters of round or oval cells. These bud out similar cells from their surface to divide and propagate. In some circumstances, they form a chain of cells called a pseudo mycelium<sup>3</sup>.

Superficial Fungal Infections are the infections of the skin caused by dermatophytes or yeasts. They rarely cause serious illness, but fungal infections are often recurrent or chronic in otherwise healthy people. Most diagnoses of fungal infections of the skin can be made by physical examination, assisted by the use of a Wood's lamp, skin scrapings for microscopic examination, and fungal cultures. Dermatophyte infections are common at all ages, in both sexes, and they have a worldwide distribution. These infections include tinea capitis, tinea cruris, tinea pedis, tinea corporis, tinea manuum and tinea barbae. Tinea versicolor, caused by *Malassezia furfur*, and candida infections are also common. Treatment modalities include oral and topical agents. These affect the outer layers of the skin, the nails and hair. The main groups of fungi causing superficial fungal infections are: Dermatophytes (tinea), Yeasts: *Candida*, Moulds. The superficial mycoses are the most well-known since they can be readily observed. They commonly occur on the hair,

nails and skin of infected individuals. They have been recorded in various compilations of medical literature for well over a thousand years as ring worm, athlete's foot, jock itch and Piedra. Fungal infections of the skin, hair, and nails are common worldwide, and their incidence continues to increase. The principal causative agents are dermatophytes, and their geographic distribution is variable. This is reflected in the differing patterns of dermatophytosis seen in different parts of the world. The epidemiology of dermatophyte infection has changed as a result of migration, lifestyle, drug therapy, and socioeconomic conditions. This contribution discusses global patterns of dermatophyte infection and the changing epidemiology of the causative agents <sup>4</sup>.

Factors such as living conditions, socio-economic status, climate, poverty, sanitary conditions are social determinants of health that influence the presence of superficial fungal infections observed in this study <sup>5</sup>.

Superficial fungal infections are the most common fungal infections. According to World Health Organization (WHO), the prevalence rate of superficial mycotic infection worldwide has been found to be 20-25% <sup>6</sup>.

Azoles are used as first line treatment of drugs for fungal infections. Clotrimazole is used to treat vaginal yeast infections, oral thrush, diaper rash, pityriasis versicolor, and ringworm infections. It can be taken by mouth or applied as a cream to the skin or in the vagina. Fluconazole is used for a number of fungal infections. This includes candidiasis, coccidioidomycosis, cryptococcosis, and dermatophytosis. It is also used to prevent candidiasis in those who are at high risk such as following organ transplantation. Itraconazole is used to treat a number of fungal infections. This includes aspergillosis, blastomycosis, coccidioidomycosis and Para coccidioidomycosis. Ketoconazole should be used only when other antifungal medications cannot be used as it can cause serious harm to liver. Terbinafine fights infections caused by fungus *Trichophyton* species, *Microsporum canis*, *Epidermophyton floccosum*, and *Tinea* species. Terbinafine hydrochloride also treats yeast infections of the skin caused by *Candida* species and *Malassezia furfur*. Terbinafine tablets are used to treat infections caused by fungus that affect the finger nails or toe nails <sup>7</sup>.

Understanding the local epidemiology of fungal infections can guide use of antifungal drugs. Tracking the epidemiology can also help detect outbreaks and new risks. In Asia-pacific region, the epidemiology of fungal infections is not well described and data regarding incidence is scant <sup>3</sup>.

The study was aimed at finding the prevalence of superficial fungal infection and related risk factors through clinical diagnosis and monitoring of the management of observed superficial fungal infections in a subpopulation of Telangana state.

## MATERIALS AND METHOD

This is a six month Prospective observational study. 100 patients with clinical features of Superficial fungal infections attending Dermatology Out Patient Department in Osmania General Hospital, a tertiary care teaching hospital in Hyderabad, Telangana State were enrolled in the study.

### Selection Criteria

#### INCLUSION CRITERIA

- Patients of either sex
- All out patients attending Dermatology OPD department
- Patients of more than 18 years of age group were included in the study.
- Out patients already diagnosed of fungal infections and on treatment.

#### EXCLUSION CRITERIA:

- Any other type of infections
- Refusal to be a part of the study
- Patients whose collection of specimens would be necessary for Culture Sensitivity Test

Data was collected from case sheets of the patients in a specially designed patient data collection form which include information on demographic characteristics viz. age, sex, clinical signs and symptoms, chief complaints of the patients, drugs used previously if any, drugs given etc. Data was analyzed by descriptive statistical analysis method. All the relevant and necessary data was collected from Patient's previous medical history, Prescription prescribed by the physician, and by interviewing patient or patients care taker (s) and health care professionals.

## RESULTS AND DISCUSSION

Out of 100 patients enrolled in our study, 58 were males and 42 were females. The most affected age group with superficial fungal infections was from 26-30 years (32%), followed by 31-35 years (18%), 21-25 years (16%) and >40 years (15%) shown in Table 1.

**Table 1: Age & Sex Distribution of Superficial Fungal Infections**

Age	Male	Female
15-20	9	5
21-25	10	6
26-30	12	11
31-35	10	8
36-40	9	5
>40	8	7
Total	58	42

Table 2 represents Frequency of Clinical Presentation among Superficial Fungal Infections, the causative organisms of majority of superficial fungal infections are caused by *Tinea corporis* (29%) followed by *Tinea capitis* (28%) and *Tinea cruris* (25%).

**Table 2 Frequency of Clinical Presentation among Superficial Fungal Infections**

Infections	Total No. of Patients	Male		Female		Overall Percentage
		No. of Patients	Percentage	No. of Patients	Percentage	
T. corporis	15	10	17.2	5	11.9	29%
T. capitis	14	8	13.7	6	14.2	28%
T. cruris	13	9	15.5	4	9.52	25%
T. pedis	11	6	10.3	5	11.9	22.2%
T. faciei	10	5	8.62	5	11.9	20.52%
T. unguium	10	5	8.62	5	11.9	20.52%
T. manuum	9	3	5.17	6	14.2	19.37%
T. versicolor	7	3	5.17	4	9.52	14.69%
T. barbae	7	7	12.06	0	0	12.06%
Psoriatic erythroderma	2	1	1.72	1	2.38	4.1%
Lymphenditis	2	1	1.72	1	2.38	4.1%
Total	100	58		42		

Table 3 shows the prominent Sites of Superficial Fungal Infections. Common clinical symptoms at these sites include itching, redness, rashes, pain and burning sensation and itching was found to be present as a major symptom in patients(43%) with superficial fungal infections.

**Table 3 Prominent Sites of Superficial Fungal Infections**

	Total	Males	Females
Body	15	10	5
Scalp	14	8	6
Groin	13	9	4
Foot	11	6	5
Nails	10	7	3
Face	10	5	5
Hand	9	3	6
Shoulders	7	3	4

**Table 4 Clinical Presentation on Basis of Socio-economic status**

Occupation	T.capitis	T.cruris	T.corporis	T.barbae	T.versicolor	T.ungium	T.manuum	T.faeciei	T.pedis
Student	2	4	3	1	-	-	1	-	3
Engineer	2	2	1	1	-	-	-	1	-
Technician	2	1	2	1	1	-	1	1	-
Farmer	4	3	4	2	2	3	3	3	3
Labour	1	1	3	2	2	4	2	3	4
Housewife	3	2	2	-	2	3	2	2	1

Table 4 indicates farmers (27%) were found to be the most presented patients followed by labourers (22%), housewives (17%), students (14%), technician (9%) and engineer (7%) with superficial fungal infections.

In the present study, 100 clinically suspected superficial fungal infection cases were studied. Among 100 patients who were diagnosed with superficial fungal infection, the females were 46.6% which is marginally lower than the percentage of males 53.4%. The reason for increased percentage of males may be due to the fact of increased outdoor exposure and more physical work that results in increased sweating and less cosmetic consciousness compared to females. Earlier studies have confirmed that infection with superficial fungal infection was more frequent in males compared to females. In another study conducted by *Ramaraj V et al., 2016*<sup>8</sup> also there is prevalence of infection in males, which is in accordance with our study.

In our study maximum number of patients were in the age group of 26-30 years (32%), followed by 31-35 years (18%), 21-25 years (16%) and >40 years (15%) which is in par with the values shown in the study by *Sweta R. Prabhu et al., 2013*<sup>9</sup> which showed maximum prevalence of superficial fungal infections in third decade (21-30 year age group).

Among all the causative organisms of superficial fungal infections, majority were caused by *T. corporis* (29%) followed by *T. capitis* (28%) and *T. cruris* (25%). In the present work, *Tinea corporis* is the most common clinical type and the next most common is *Tinea capitis* which is in par with the values shown in the study by *N Jain et al., 2014*<sup>10</sup> which reported 34.48% incidence of *Tinea corporis*, followed by 31.37% *Tinea cruris* and 17.58% *Tinea capitis*.

Body organ such as skin was the most affected site of superficial fungal infections followed by scalp. Itching was found to be present as a major symptom in patients with superficial fungal infections followed by redness.

The higher rate of the prevalence of *Tinea corporis* could be attributed to the fact that certain body parts are exposed more frequently than others like the hands and once it gets in contact with other body parts, it helps in the spread of the infection. The degree of inflammation is influenced both by the patient's immune status and by the organism involved.

Results on the basis of socioeconomic status showed that farmers (27%) were found to be the most presented patients followed by labourers (22%), housewives (17%), students (14%), technician (9%) and engineer (7%) with superficial fungal infections. After them labourers showed the most presented cases of superficial fungal infection due to their extreme work conditions. Housewives also showed majority of the cases since their exposure to household work etc.

In a study conducted by *Kamothi, M. N. et al., 2010<sup>2</sup>* out of 200 cases *Tenia capitis* and *Tenia corporis* were the most predominant causative organism causing infections. And males were the most affected when compared to females due to their socioeconomic work and environmental factors which also co-relates this study.

To treat these conditions clotrimazole ointments was given along with ketoconazole and Itraconazole as oral medication. Non-pharmacological treatment includes use of hot water with regular maintenance of hygiene and proper cleansing of the affected area etc, which was instructed to the patients.

Age, sex, occupation and socioeconomic status are important risk factors for superficial fungal infections as they are more prevalent in males than females, in young age group, and farmers being most affected community.

The reason behind the spreading of these superficial fungal infections may be living condition, large family size and close contact, either directly or by sharing facilities, including combs and towels is common between family members in low socioeconomic people. These factors have been considered as risk factors for the superficial fungal infection.

## CONCLUSION

In this study, prevalence of superficial fungal infections was studied with risk factors involved in a subpopulation of Hyderabad. It has been concluded that the males are more susceptible to fungal infections when compared to females. Hence gender is one of the risk factors in this population. The most affected age group with superficial fungal infections was from 26-30 years (32%), in both males and females. Among all the causative organisms of superficial fungal infections, majority were caused by *T. corporis* (29%) followed by *T. capitis* (28%) and *T. cruris* (25%). Itching was found to be present as a major symptom in patients with superficial fungal infections followed by redness.

The socioeconomic status of the person can also be a risk factor for superficial fungal infections as seen in our study, farmers (27%) were found to be the most presented patients. Pharmacologically clotrimazole ointment was prescribed with ketoconazole and itraconazole as oral medications. The

risk factors for the superficial fungal infection were age, sex, illiteracy, poor hygiene, socioeconomic status.

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#### ETHICS STATEMENT:

The study do not involve any invasive procedures on humans. It is an observational study and do not include any other ethical conflicts

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