

A Clinico-Epidemiological Study Of Superficial Mycoses In A Tertiary Care Hospital

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Abstract:

Background: Superficial mycoses are a kind of fungal infection that affects keratinized tissues, most often the stratum corneum of the skin and its appendages, such as the nails and hair. These infections can be caused by dermatophytes, non dermatophytic-moulds, or candida species in rare cases. Skin lesions are usually in an irregular ring form, itchy with central clearing. However, the precise levels of the magnitude of the problems is not known. Hence the current study was undertaken.

Objectives:

1. To know the clinic-epidemiological profile of superficial mycoses infection.
2. To study the risk factors of superficial mycoses.
3. To distinguish the types of fungi.

Materials and Methods: 200 patients with superficial mycoses were included. This cross-sectional study was done in the Department of Dermatology at Fathima Insititute of Medical Sciences, Kadapa, Andhra Pradesh, India. Male and female patients showing the clinical features suggestive of superficial fungal infections of all age groups were included.

Results: Most of the patients were males. Most of the patients were aged 21 to 30 years. 81% of cases showed positive culture in Sabourauds Dextrose Agar. 48% of the cases had the habit of sharing towels. Trichophyton mentagrophytes was the most common isolated dermatophytes species. 3% of the cases in study bathed once in 2 days, 97% of the cases had daily bath. 6% of the cases had diabetes mellitus (DM), 4% of cases had hypertension (HTN), 4% of cases had both, 1% of the cases had polyarthritis, 1% of the cases had psoriasis, 84% of subjects did not have any co-morbid illnesses.

Conclusion: Along with dermatophytes, non-dermatophytic fungi are also emerging as important causes of superficial mycoses. Both directmicroscopy and culture are vital diagnostic methods for determining the presence of fungi

Keywords: Superficial mycoses, Keratinized tissues, Ringworm, Dermatophytosis, Clinico-epidemiological profile

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I. Introduction

Superficial mycoses are a kind of fungal infection that affects keratinized tissues, most often the stratum corneum of the skin and its appendages, such as the nails and hair. These infections can be caused by dermatophytes, non- dermatophytic-moulds, or candida species in rare cases. In tropical nations like India, where the temperature and humidity are high, climatic conditions like these are favorable for the growth of fungi on the skin and its appendages.¹ Poverty, overcrowding and lack of attention to personal cleanliness are only a few of the socio-demographic issues that are widespread in India. Tinea is the term that is most used to refer to dermatophytosis. Tinea, which literally translates to "ringworm," is a Latin term. In accordance with the genera that they belong to, dermatophytes can be categorized into the following three groups: Trichophyton, Epidermophyton, and Microsporum. Trichophyton is accountable for diseases of skin, hair, and nails. Epidermophyton is responsible for diseases of the skin and nails (which causes diseases on skin and hair). People can become infected in one of two ways: either by direct transmission of these organisms from the contact of infected individuals or animals, or by indirect transmission via contact with infected resources including exfoliated skin, hair, clothing, furniture, bed linen, towels, and so on.² These lesions are usually in the irregular ring form, itchy with central clearing. However, the precise levels of the magnitude of the problems are not known. Hence the current study was undertaken.

Objectives:

4. To know the clinic-epidemiological profile of superficial mycoses infection.
5. To study the risk factors of superficial mycoses.
6. To distinguish the types of fungi and to compare the clinical findings and findings of KOH preparation.

II. Material And Methods

Study site: Department of Dermatology, Fathima Institute of Medical Sciences, Kadapa, Andhra Pradesh, India

Study duration: Eighteen months: January 2021 to August 2022

Sample size: 200

Type of study: Cross-sectional study

Ethical considerations:

Institutional ethical committee approval was obtained before conducting the study. Informed consent was taken from every patient who participated in the study.

Inclusion criteria:

Male and female patients showing the clinical features suggestive of superficial fungal infections of all age groups were included.

Exclusion criteria:

1. Patients on prolonged immunosuppression and antibiotic therapy.
2. Patient on topical or systemic antifungal therapy recently (within a duration of 7 days).

Methodology:

Direct Examination: The collected sample was placed on a glass slide that contains 10% potassium hydroxide (KOH). Proteins, lipids, and most of the remaining epithelium debris will be broken down by the alkaline clearing solution (KOH). Due to their chitinous wall, the fungal filaments are resistant to this treatment.

Culture: On synthetic media with an organic source of nitrogen, dermatophytes were grown. Dextrose, peptone, and agar are all ingredients in Sabouraud's dextrose agar. Emmon altered this medium, known as Neutral Sabouraud's dextrose agar, by raising the PH from 5.6 to 6.8–7.0 and lowering the proportion of dextrose from 4 to 2. This medium is selective for the isolation of dermatophytes with the addition of chloramphenicol (500 mg) in one litre.

Identification of species is aided by culture.

Ingredients for the standard formula are as follows:

1. Mycological peptone - 10 grams per litre
2. Dextrose - 40 grams per litre
3. Agar - 15 grams per litre

A lactophenol cotton blue (LCB) mount of the growth is studied when there is sporulation and pigment production.

Collection of Specimen: After cleaning the lesion with 70% isopropanol, scrapings were obtained from the ringworm lesion's edge using a scalpel blade's blunt edge. On a blank piece of paper, the samples were gathered. It was packed and folded.

1. If there is very little scaling on the skin to be scraped, the material was directly collected on the glass microscope slide pressed up against the skin. The first slide was then covered by the second, which was held together by a paper fold.
2. If lesions were comparatively dry, forceful scraping was required.
3. In the case of dermatophytes like *Microsporum audouinii*, a wood lamp was used to detect affected hair.

Identification of Dermatophytes:

Dermatophytes were distinguished from other mycelia under a microscope by their translucent, non-pigmented septate structure or by their arthrospore-like appearance. Budding oval yeast may appear as pseudo hyphae when there is candidiasis.

Statistical analysis: Data were analyzed using SPSS 23.3 software. Mean, SD, percentages, and frequencies were used.

III. Results

Age distribution:

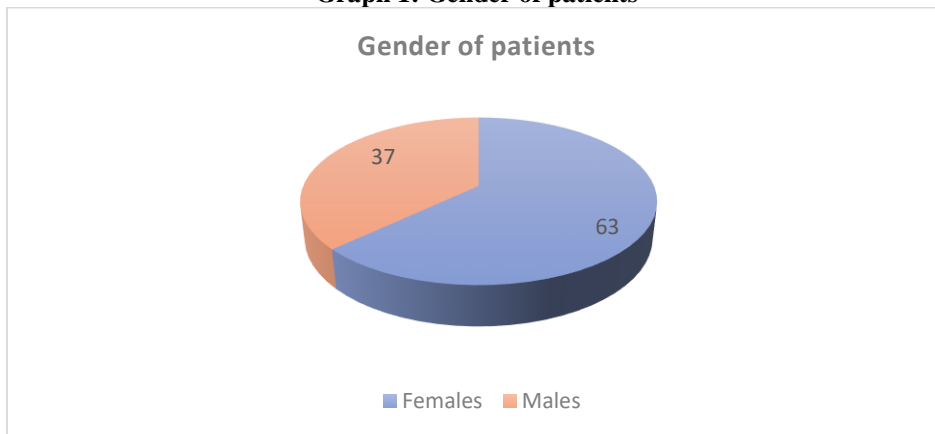
24% of patients were aged 11-20 years, 25% (most of the patients) were aged 21-30 years, 25% were aged 31-40 years, and 15% of the subjects were aged 41-50 years. The mean age of participants was 32.64 ± 13.93 years.

Table 1: Age distribution of patients

Age (in years)	Frequency	Percentage
11 – 20	48	24%
21 – 30	50	25%
31 – 40	50	25%
41 – 50	30	15%
51 – 60	14	7%
61 – 70	6	3%
71 – 80	2	1%
Total	200	100%
Mean ± SD	32.64 ± 13.93	

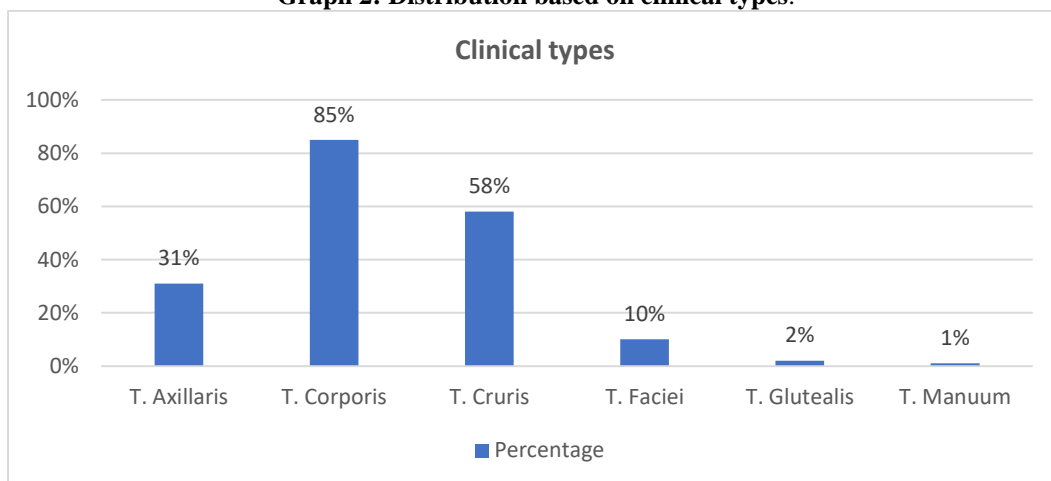
Gender: 63% of cases were females.

Graph 1: Gender of patients



Distribution based on clinical types: T. Axillaris was seen among 31% of the cases, 85% of subjects were of T. Corporis, 58% of participants were of T. Cruris, 10% of participants were of T. Faciei, 2% of subjects were of T. Glutealis, 1% of subjects were of T. Manuum.

Graph 2: Distribution based on clinical types.



Personal habits:

48% of the cases had the habit of sharing towels, 61% of the cases had the habit of using synthetic garments, 40% of cases were not having a habit of wiping after bath and 19% of cases were having the habit of using waist/ ankle band.

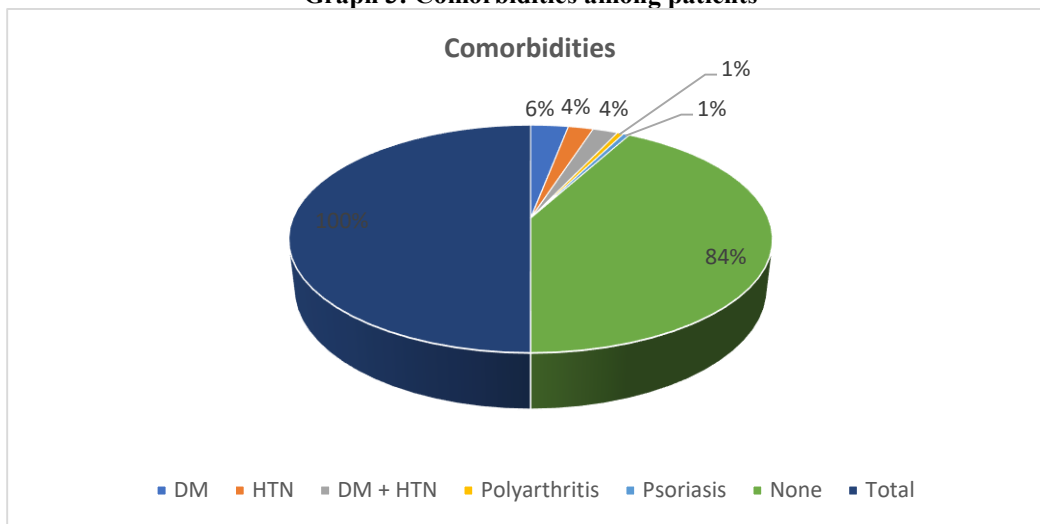
Table 2: Distribution based on Personal Habits

Personal habits	Frequency	Percentage
Sharing towel	96	48%
Usage of synthetic garments	122	61%
Not wiping after bath	80	40%
Using Waist / Ankle band	38	19%

Daily bathing: 3% of the cases in study bathed once in 2 days, 97% of the cases had daily bath.

Comorbidities: 6% of the cases had diabetes mellitus (DM), 4% of cases had hypertension (HTN), 4% of cases had both, 1% of the cases had polyarthritis, 1% of the cases had psoriasis, 84% of subjects did not have any comorbid illnesses.

Graph 3: Comorbidities among patients



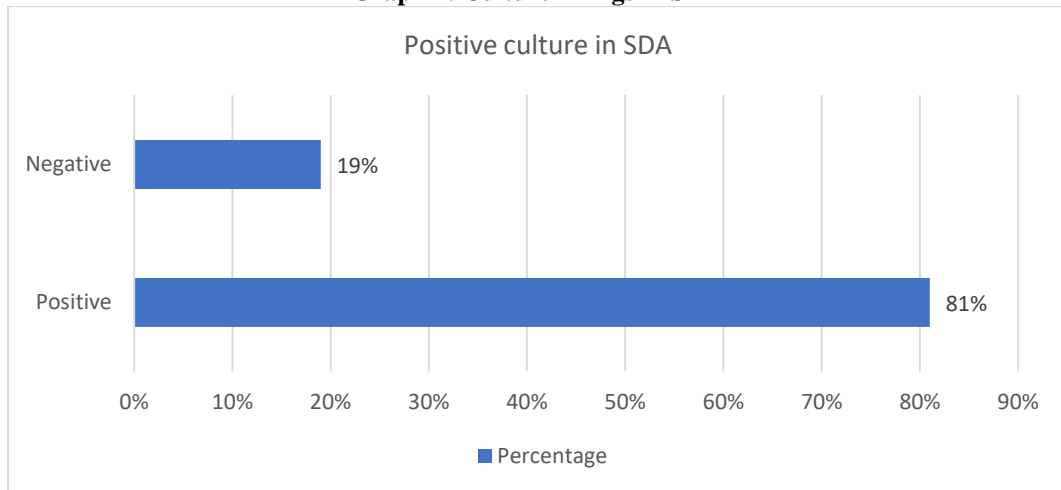
Isolation of dermatophyte species: Among 69% of the cases Trichophyton mentagrophytes was isolated, among 25% of the cases it was Trichophyton Rubrum, 4.8% of subjects were of Trichophyton tonsurans, 1.2% of subjects were of Trichophyton verrucosum.

Table 4: Isolation of dermatophyte species:

Type of dermatophyte species	Frequency	Percentage
Trichophyton mentagrophytes	116	69.0%
Trichophyton Rubrum	42	25.0%
Trichophyton tonsurans	8	4.8%
Trichophyton verrucosum	2	1.2%
Total	168	100%

Distribution based on Culture in Sabourauds Dextrose Agar (SDA): 81% of cases showed positive culture in Sabourauds Dextrose Agar

Graph 4: Culture findings in SDA



Antifungal treatment given:

25% of participants were treated using Griseofulvin, 25% of participants were treated by Fluconazole, 25% of cases had Itraconazole, 25% of the cases had Terbinafine.

Graph 5: Type of antifungal given

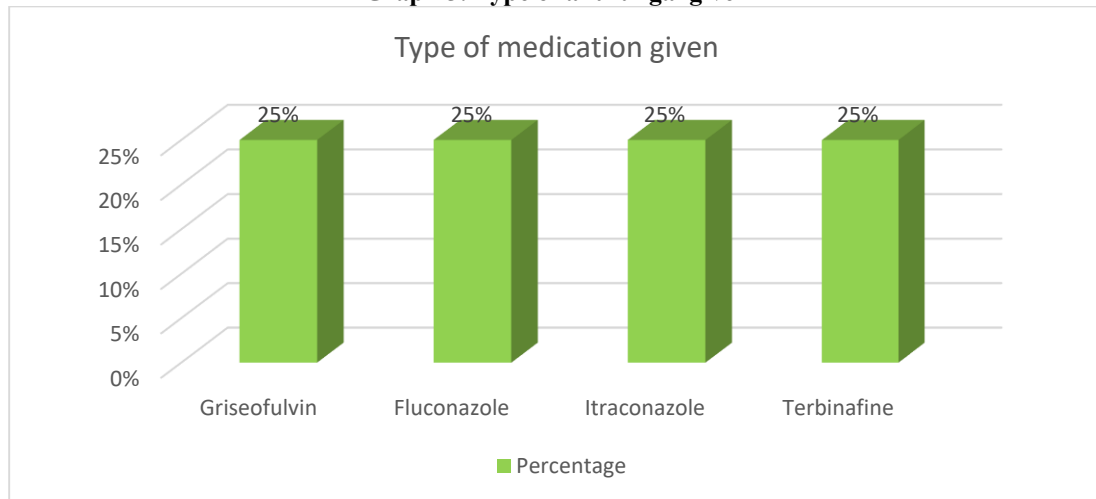


Fig 1: Pityriasis Versicolor seen in one case



Figure 2: Candida intertrigo seen in one case



Figure 3: Tinea corporis seen in one case



Figure 4: Tinea manuum

V. DISCUSSION

In the current study, 200 patients were studied. Most of the patients were males. Most of the patients were aged 21 to 30 years. 81% of cases showed positive culture in Sabourauds Dextrose Agar. 48% of the cases had the habit of sharing towels. Trichophyton mentagrophytes was the most common isolated dermatophytes species. 3% of the cases in study bathed once in 2 days, 97% of the cases had daily bath. 6% of the cases had diabetes mellitus (DM), 4% of cases had hypertension (HTN), 4% of cases had both, 1% of the cases had polyarthritis, 1% of the cases had psoriasis, 84% of subjects did not have any co-morbid illnesses.

Bhatia VK et al.³ observed that 85.1% were male and 14.9% were female and majority were aged between 20-50 years and this finding was in consonance without study.

Nawal P et al.⁴ observed commonest age involved was between 19-59 years and among them 64.2% were male, 35.8% of the cases were female.

Hazarika D et al.⁵ observed the superficial mycoses was found to be more prevalent among male and this was in consonance with the present study.

Prevalence of superficial mycoses was more in males (77.5%) than females (22.5%) in similar research conducted by **Grover et al.** in 2003.⁶

Research conducted by **Hitendra et al.**⁷ was also in support of the present study. Philpot suggests males may be more vulnerable to infection than females due to their higher exposure to infection in schools and public baths and sports activities.⁸

Fungal infections are prevalent in the tropics causing serious and fatal infections that range from superficial skin infections to internal organ invasion and may extend to other individuals also. They influence the

patient's quality of life and sometimes may even be life-threatening. These infections are easily diagnosed and treated.

In the study of **Bhatia VK et al.**,³ *Tinea Corporis* was found among 39.1% of the cases and this was found to be the most common species in this study, and this was in consonance with the most prevalent presentation seen in our research as well. Whereas in this study *Tinea Cruris* was seen among 27% of the subjects, *Tinea Gladiatorum* was seen among 1.35% of the subjects.

In a study done by **Misra et al**⁹ found even higher rates of such involvement comprising 25% of cases.

A correlation between the current study and the results of **Pakshir et al.**¹⁰ showed *T. mentagrophyte* was the most widespread isolate. However, **Aggarwal A et al.**,¹¹ **Patel P et al.**,¹² and **Nawal P et al**⁴ reported *T. rubrum* is the most frequent isolate. This may be due to variations in environmental conditions and geographical distribution.

In the study done by **Noronha TM et al.**,¹³ it was observed that 8% of patients had diabetes, 6.7% of patients had HIV infection and 3.3% of patients had asthma.

In the study by **Bindu et al.**,¹⁴ diabetes mellitus was seen in 10.6%, atopic diathesis in 10%, and HIV infection in 2% of patients. This variation can be due to regional differences in the incidence of various diseases.

Sharath et al.¹⁵ observed that all were positive for KOH (100%). but culture positivity was shown only in 72.9% of cases.

VI. CONCLUSION

Dermatophytosis was the commonest clinical presentation, followed by *P. versicolor* and Candidiasis. The most common dermatophytosis was *Tinea corporis*. The most common dermatophyte isolated was *Trichophyton mentagrophytes*. The KOH positivity rate was 100% and the total culture positivity rate was 81%. Along with dermatophytes, non-dermatophytic fungi are also emerging as important causes of superficial mycoses. Both direct microscopy and culture are vital diagnostic methods for determining the presence of fungi. The study is self-sponsored.

There were no conflicts of interest.

REFERENCES

- [1]. Weitzman I, Summerbell RC. The Dermatophytes. Clin Microbiol Rev. 1995;240-259.
- [2]. Winn WC. Koneman's color atlas and textbook of diagnostic microbiology. Lippincott Williams & Wilkins; 2006.
- [3]. Bhatia VK, Sharma PC. Epidemiological studies on dermatophytosis in human patients in Himachal Pradesh, India. Springerplus. 2014 Dec;3(1):1-7.
- [4]. P. Nawal, S. Patel, M. Patel, S. Soni, and N. Khandelwal. A study of superficial mycosis in tertiary care hospital. National Journal of Integrated Research in Medicine. 2012; 3(1):95-99.
- [5]. Hazarika D, Jahan N, Sharma A. Changing trend of superficial mycoses with increasing nondermatophyte mold infection: a clinic mycological study at a tertiary referral center in Assam. Indian journal of dermatology. 2019 Jul;64(4):261.
- [6]. S. Grover and P. Roy. Clinico-mycological profile of superficial mycosis in a hospital in North-East India. Medical Journal Armed Forces India. 2003; 59 (2). 114-116.
- [7]. K. B. Hitendra, J. M. Dhara, K. S. Nidhi, and S. S. Hetal. A study of superficial mycoses with clinical mycological profile in tertiary care hospital in Ahmedabad, Gujarat. National Journal of Medical Research. 2012; 2(2). 160-164.
- [8]. C. M. Philpot. Some aspects of the epidemiology of tinea. Mycopathologia, 1977; 62(1). 3-13.
- [9]. Misra R, Misra A, Kamamma N, Vikram NK, Gupta S, Sharma S, et al. Difference in prevalence of diabetes, obesity, metabolic syndrome and associated cardiovascular risk factors in a rural area of Tamil Nadu and an urban area of Delhi. Int J Diabetes Dev Ctries. 2011;31(2):82-90.
- [10]. K. Pakshir, L. Bahaedinie, Z. Rezaei, M. Sodaifi, and K. Zomorodian. In vitro activity of six antifungal drugs against clinically important dermatophytes. Jundishapur Journal of Microbiology. 2009; 2 (4) 158-163.
- [11]. A. Aggarwal, U. Arora, and S. Khanna. Clinical and mycological study of superficial mycoses in Amritsar. Indian Journal of Dermatology. 2002; 47 (4): 218-220.
- [12]. P. Patel, S. Mulla, D. Patel, and G. A. Shrimali. Study of superficial mycosis in the south Gujarat region. National Journal of Community Medicine. 2010; 1(2) 85-88.
- [13]. Noronha TM, Tophakhane RS, Nadiger S. Clinico-microbiological study of dermatophytosis in a tertiary-care hospital in North Karnataka. Indian Dermatology online journal. 2016 Jul;7(4):264.