

ORIGINAL ARTICLE

Dermatomycosis: A Comprehensive Clinicomycological Investigation

Manish Soni

Assistant Professor, Department of Dermatology, Index Medical College Hospital & Research Center, Indore, Madhya Pradesh, India

ABSTRACT:

Background: Dermatophyte infections, such as *Tinea corporis* (ringworm), *Tinea cruris* (jock itch), *Tinea faciei* (facial ringworm), and others, are becoming more prevalent in the general population. These infections are fungal in nature and typically affect the skin, often resulting in characteristic red, itchy, and sometimes ring-shaped rashes. They are generally spread through direct contact with an infected person or surface, and certain factors like warm and humid environments can contribute to their spread. If you suspect you have a dermatophyte infection, it's essential to seek medical advice for proper diagnosis and treatment. **Methods:** Out of a total of 260 cases with clinically probable Dermatophytosis, various samples, such as skin scrapings, nail clippings, hair, and hair stubs, were collected and subjected to both KOH mount and SDA culture analyses. **Results:** Out of the total cases, the majority of patients were male, comprising 152 individuals (58.46%), while 108 were female (41.53%). The age group most frequently affected was 20 to 30 years old. The most prevalent type of Dermatophytosis was *tinea corporis*, accounting for 132 cases (50.76%), followed by *tinea cruris* at 50 cases (19.23%), *tinea unguinum* at 36 cases (13.84%), and *tinea capitis* at 20 cases (7.69%). The most common fungal isolate was *Trichophyton rubrum*, responsible for 54 cases (38.57%). It was followed by *Trichophyton mentagrophytes* (16.85%), *Microsporum audoni* (15.42%), *Microsporum gypsum* (8.43%), *Trichophyton violaceum* (3.28%), and *Epidermophyton floccosum* (1.43%). **Conclusion:** Dermatophyte infections are prevalent in contemporary society, with a higher incidence among men, particularly those in the middle-age bracket. These infections are most commonly observed in individuals belonging to the lower-middle class, many of whom are engaged in manual labor. The most typical presentation is *tinea corporis et cruris*.

Keywords: Dermatophytosis, Dermatophytes, *Tinea*, *Trichophyton*, Lactophenol Cotton Blue (LPCB)

Corresponding author: Manish Soni, Assistant Professor, Department of Dermatology, Index Medical College Hospital & Research Center, Indore, Madhya Pradesh, India

This article may be cited as: Soni M. Dermatomycosis: A Comprehensive Clinicomycological Investigation. J Adv Med Dent Scie Res 2017;5(10):122-124.

INTRODUCTION

The most common type of skin ailment, affecting millions of people globally, is superficial fungal infections. These infections are primarily caused by dermatophytes, a group of closely related keratinophilic fungi¹. Dermatophytes have the ability to penetrate the outermost layer of the skin, known as the stratum corneum, as well as other keratinized tissues derived from the epidermis, such as hair and nails, by producing an enzyme called keratinase.

Dermatophytosis is the term used to describe an infection caused by dermatophytic fungi within the stratum corneum of the skin, hair, and nails. In most instances, dermatophytosis is colloquially referred to as 'tinea' or 'ringworm.' The word 'tinea' has its origins in Latin, where it means 'tiny insect larva.'²

Dermatophytosis is often given a colloquial name by adding a Latin word indicating the anatomical location where the infection appears. Different species of dermatophytes have distinct distribution patterns based on their primary natural habitats, which can vary significantly from one ecological niche to another³. Some dermatophyte species are sporadic and have a global distribution, while others are geographically restricted, existing exclusively in specific regions of the world. The occurrence of dermatophytosis is influenced by a combination of environmental factors, personal hygiene practices, and

individual susceptibility, all of which vary from one location to another.

MATERIALS AND METHODS

During our hospital's retrospective study, the outpatient departments specializing in dermatology and venereology encountered 260 cases of clinically suspected Dermatophytosis. A comprehensive patient history was gathered, including details on age, gender, occupation, lesion site, and any associated medical conditions. Additionally, patients underwent a clinical examination to ascertain the type and location of their skin condition. Before sample collection, patients were provided with a detailed explanation of the procedure^{4,5}. To prepare the area, a cotton swab saturated with standard saline solution was employed for cleansing. Sterile nail clippers, forceps for hair epilation, and sterilized scalpel blades were used to collect clinical specimens, including nail samples, infected hair, and skin scrapings. After allowing hair and skin samples to sit at room temperature for an hour, a 10% KOH mount was employed for analysis. Nail clippings were incubated at room temperature for 4-5 hours, and the samples were subsequently assessed using a 40% KOH mount. In all clinical specimens, the presence of retractile, hyaline fungal filaments was examined. Cycloheximide and chloramphenicol were employed to introduce the

clinical sample into two consecutive rounds of Sabouraud's dextrose agar (SDA). These inoculated agar slants underwent incubation, with one maintained at 37°C and the other at room temperature⁶. Following four weeks of observation, any observed growth that occurred was considered unfavorable and subsequently discarded. The identification of growth on SDA was carried out through slide culture and tease mount techniques.

RESULTS

Our study group consists of 260 participants, all of whom have received clinical diagnoses⁷. Among the patients, there was a majority of males, with 152 individuals (58.46%), while 108 were females (41.53%). The most frequently affected age group falls within the 20-30 years range, followed by those aged 30-40.⁸ The most common form of Dermatophytosis in our study was tinea corporis, accounting for 132 cases (50.76%) out of the total 260 clinically suspected cases. This was followed by tinea cruris (50 cases), tinea unguinum (36 cases), and tinea capitis (20 cases) at 7.69 percent.

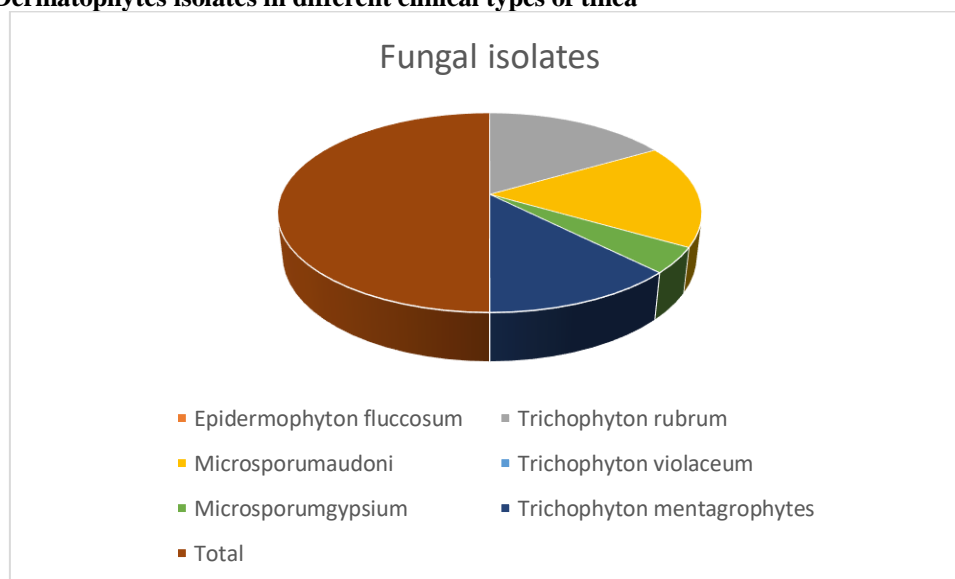
Out of the 260 clinically diagnosed cases, 196 individuals (75.38%) tested positive for KOH and/or culture. The remaining 64 patients (24.61%) had negative results for both KOH and culture⁹. In a small subset of cases, 08 (0.37%) were negative for KOH but displayed fungal growth, while 56 cases (21.53%) were positive for KOH but did not exhibit fungal growth in culture. In the majority of cases, which accounted for 132 instances (50.76%), fungal filaments were visible in KOH mounts and growth was also observed in culture. All three dermatophyte species—Trichophyton, Microsporum, and Epidermophyton—were successfully cultured.

As per Table 1, the most frequently isolated species was Trichophyton rubrum, found in 54 cases (38.57%). This was followed by Trichophyton mentagrophytes (32 cases, 22.85%), Microsporum audoni (30 cases, 21.42%), Microsporum gypsum (16 cases, 11.43%), Trichophyton violaceum (6 cases, 4.28%), and Epidermophyton fluccosum (2 cases, 1.43%).

Table1: Showing Dermatophytes isolates in different clinical types of tinea

Fungal isolates	Tinea unguinum	Tinea pedis	Tinea barbae	Tinea corporis	Tinea capitis	Tinea cruris	Total
Epidermophyton fluccosum	00	00	00	02	00	00	02
Trichophyton rubrum	08	00	02	26	02	16	54
Microsporum audoni	08	00	00	16	02	04	30
Trichophyton violaceum	00	00	00	02	02	02	06
Microsporum gypsum	02	02	00	10	00	02	16
Trichophyton mentagrophytes	06	02	00	14	02	08	32
Total	24	04	02	70	08	32	140

Figure1: Dermatophytes isolates in different clinical types of tinea



DISCUSSION

Infections caused by dermatophytes in both humans and animals can lead to various cutaneous diseases, including conditions commonly known as ringworm.

Clinically, these lesions often present as a circular, spreading infection with an active outer ring and a healing center.¹⁰ The epidemiology of superficial fungal infections has undergone significant changes

over the past century, influenced by shifts in lifestyles, migration patterns, and socioeconomic conditions. Environmental factors may play a crucial role in the increased prevalence of Dermatophytosis. Consistent with findings by Sumathi S et al. and our own research, dermatophytosis is most commonly observed in individuals aged 20 to 30 years. There is a higher incidence among males, accounting for 58.46 percent compared to 41.53 percent among females. This aligns with previous studies suggesting that men are more susceptible to the condition, possibly due to factors such as outdoor physical activity, trauma, hormonal variations, and increased perspiration. Our study also revealed that manual laborers were more frequently affected by dermatophytosis than individuals in other occupations. This may be attributed to the higher levels of physical activity associated with manual labor, consequently increasing their risk of exposure to the infection.

In this study, individuals with lower socioeconomic status experienced more pronounced adverse effects compared to others. This could be attributed to factors such as suboptimal living conditions, overcrowding, the sharing of linens and towels, or inadequate dietary practices. Out of the 260 clinical samples, 196 patients (75.38%) tested positive for KOH and/or culture. In contrast, 64 patients (24.61 percent) had negative results for both KOH and culture. Notably, 08 cases (0.37%) were negative for KOH but exhibited fungal growth, while 56 cases (21.53%) were positive for KOH but negative for culture. The remaining 132 cases, representing 50.76 percent of the total, were KOH positive and contributed to the overall count. These findings align with the results reported by Thongam Singh et al. *Trichophyton rubrum* stands out as the most common fungal isolate in this study, accounting for 54 cases, which represents 38.57 percent of the total isolates. It is followed by *Trichophyton mentagrophytes* with 32 cases (22.85 percent), *Microsporum audoni* with 30 cases (21.42 percent), *Microsporum gypsum* with 16 cases (11.43 percent), *Trichophyton violaceum* with 6 cases (4.28 percent), and *Epidermophyton floccosum* with 1.43 percent. These findings align with the results reported by several other researchers, including Thongam Singh et al and Santhosh Krishna H et al.

However, it's worth noting that in the research conducted by Grover Sanjiv et al ¹¹ *Trichophyton tonsurans* emerged as the most common fungal isolate. *Trichophyton rubrum*'s prevalence could be attributed to its superior adaptability, increased virulence, and its capacity to readily colonize hard keratin structures.

CONCLUSION

Dermatophytosis, though considered a minor illness, incurs high treatment costs and can cause significant psychological distress. The prevalence of dermatophyte infections is notably high in our country, primarily due to the hot and humid climate, unfavorable hygienic conditions, and various contributing factors. Among the clinical types of Dermatophytes, tinea corporis and tinea cruris were the most prevalent. Different regions of India exhibit variations in the species of dermatophytes isolated. However, across the majority of experiments, *Trichophyton* emerged as the predominant fungus. The primary species observed was *Trichophyton rubrum*, followed by *Trichophyton mentagrophyte* and *Microsporum audoni*. These fungal infections can be effectively prevented through the practice of good hygiene, proper sanitation, and regular washing.

REFERENCES

1. Rippon JW. Medical mycology- The pathogenic fungi and the pathogenic actinomycetes. 3rd edition. Philadelphia: WB Saunders company; 1988.
2. Chander J. Textbook of medical mycology 3rd edition. New Delhi: Mehta Publishers; 2009.
3. Singh TN, Zamzachin G, Singh NB. Dermatophytosis: Clinico- Mycological study on patients attending the department of dermatology RIMS Hospital, Imphal, Manipur. *Int.J.Curr.Microbiol.App.Sci* 2015;4(6):1066-1075.
4. Sumathi. S, Mariraj. J, Shafiyabi. S, Ramesh. R, Krishna. S: Clinicomycological study of dermatophytes. *International journal of pharmaceutical and biomedical research*. 2013. 4(2):132-134.
5. Ghosh Ray Reena, Ray Rathindranath, Ghosh Tamal Kanthi, Ghosh. Clinicomycological profile of Dermatophytosis in a tertiary care hospital in west Bengal- an Indian scenario. *International journal of current microbiology and applied sciences*. 2014;3(9):655-666.
6. K Sumit, Mallya PS, Pallavi K. Clinico-Mycological study of Dermatophytosis in a Tertiary care hospital. *International Journal of Scientific Study*. March 2014.1(6):27-32.
7. Malik Abida, Fatima Nazish, Anwar khan Parvez: *Virology and Mycology*. 2014.3(3):135-138.
8. Gupta S, Agrawal P, Rajawat R, Gupta S. Prevalence of dermatophytic infection and determining sensitivity of diagnostic procedures. *Int J Pharm Pharm Sci* 2014;6(3):35-8.
9. Santhosh Krishna H et al: Clinicomycological study of Dermatophytosis-our experience: *International journal of current microbiology and applied sciences*. 2015.4(7):695- 702.
10. Grover Sanjiv, Roy P: Clinicomycological profile of superficial mycosis in a Hospital in North-East India: *Medical journal armed forces India*. 2003;59:114-116.
11. Hitendra BK, Dhara MJ, Nidhi SK, Hetal SS: A study of superficial mycoses with clinical mycological profile in tertiary care hospital in Ahmadabad, Gujarat. *National Journal of Medical Research*. June 2012.2(2):160-164.