



## Research Article

### DERMATOPHYTOSIS IN A TERTIARY CARE HOSPITAL: A CLINICO-MYCOLOGICAL STUDY

Dr. Vijender Kumar

Assistant Professor, Department of Skin and VD, F.H. Medical College

#### ABSTRACT

#### BACKGROUND

A fungal infection of the skin, hair, and nails is called dermatophytosis. It has been a major issue for national public health during the last few years. Studies from various geographical areas have produced diverse patterns of the disease's etiological distribution. Fungi called dermatophytes attack the skin, hair, and nails. There have been described more than a hundred species of these hyaline septate molds. Only 42 of them are accepted as legitimate, and fewer than half of them are linked to human diseases. Infections caused by this, known as dermatophytoses, are widespread in humid tropical and subtropical regions of the country. A fairly frequent superficial fungal infection found in tropical and subtropical regions is dermatophytosis. Its chronicity is caused by patient noncompliance and decreased medication responsiveness. Mycological research and antifungal sensitivity testing are essential given the rise in antifungal resistance and occurrence.

**AIM:** The aim of this study was to evaluate the host-related factors of chronic dermatophytosis and to identify the common fungal isolates.

#### MATERIAL AND METHOD:

This was an observational study carried out in a tertiary care hospital's dermatology department. Dermatophytosis was identified clinically. All patients were required to sign written informed consent forms. The study involved 50 dermatophytic infection patients who were seen in the dermatology outpatient department of a tertiary hospital. A thorough history was taken, followed by a clinical examination. A thorough history of the patients' age, sex, occupation, site of the lesion, and related illnesses was obtained, and patients underwent clinical examinations to determine the nature and location of the lesion. The patient was informed of the technique before the sample was taken. The patient underwent a thorough general, physical, systemic, and cutaneous examination.

#### RESULTS:

50 clinically confirmed cases of dermatophytosis served as the basis for the current study's isolation, identification, and clinicomycological analysis of dermatophytes. These 50 samples included 34 (68%) skin scrapings, 9 (18%) nail clippings, and 7 (14%) hair stubs. Males made up 40% (20 cases) of the 50 clinically confirmed instances of dermatophytoses, while females made up 60% (30 cases). The age range of 11 to 20 years had the highest number of instances. 50 cases of dermatophytoses were examined, and 36 (72%) of those cases had positive direct microscopy results whereas 14 (28%) did not. Only 23 of the 36 wet mount positive cases had cultures that grew; the remaining 13 did not. Three samples produced dermatophyte isolates from among the 14 wet mount negative cases.

#### CONCLUSION:

Dermatophytosis is a minor illness with expensive treatment costs and psychological side effects. Infections with dermatophytes are particularly prevalent in our nation, where the hot, humid weather combined with unfavorable hygienic conditions encourages the growth of these fungus.

Tinea corporis and tinea cruris were the two clinical types of Dermatophytes that were most prevalent. In different regions of India, distinct species are more or less isolated from one another. But in the majority of the experiments, Trichophyton was the main fungus. These fungi infections can be prevented with the use of good hygiene, sanitation, and washing.

**KEYWORDS:** Dermatophytosis, Dermatophytes, Tinea, Trichophyton, Lactophenol Cotton Blue, Tinea and Antifungal

### INTRODUCTION:

The term "dermatophytosis" describes a superficial keratinized tissue fungal infection brought on by dermatophytes. Hyaline septate molds, often known as dermatophytes, are the harmful agents. According to their physical traits, these are grouped into three primary genera: Trichophyton, Epidermophyton, and Microsporum.<sup>1</sup> Dermatophytes do not infiltrate deeper anatomical places; instead, they only colonize the cornified layer of the epidermis or the supra-follicular parts of hair. Dermatophytosis causes a cutaneous inflammatory reaction that causes excruciating itching and is also very important cosmetically.<sup>1,2</sup>

The dermatophytes are a family of fungus that can penetrate keratinized tissue and cause an infection called dermatophytosis. Three anamorphic (asexual) genera, Epidermophyton, Microsporum, and Trichophyton, are the causative agents of dermatophytosis.<sup>3</sup> Filamentous fungi called dermatophytes attack the keratinized layers of skin, hair, and nails. In tropical and subtropical regions, they are more abundant. The three primary anamorphic genera that these fungi belong to are Epidermophyton, Microsporum, and Trichophyton. Dermatophytosis, the illness brought on by these fungus, is marked by a strong itching and skin inflammatory reaction. It is also referred to as "tinea" or a "ringworm" infection. The name "ringworm" refers to the lesions' worm-like appearance and their irrational inflammatory borders. "Ringworm" is referred to as tinea in Latin. Following the word tinea, infections are given names based on the body place.<sup>4</sup> In various geographic regions of

the nation, distinct dermatophyte species are more or less common.<sup>5,6</sup>

Other regions of the world, particularly the tropics, have also recorded cases of this dermatophytosis pattern. Despite the lack of a universally accepted description, chronic dermatophytosis is used to describe cases of the condition that persist despite treatment for longer than six to twelve months, with or without recurrence.<sup>7,8</sup>

Dermatophytosis is frequently referred to as "Tinea," a Latin word that means "ringworm." It affects both humans and animals and is spread from host to host. Dermatophytosis is not life-threatening or disabling, although it can be chronic and bothersome and is frequently mistaken for other skin conditions. Therefore, laboratory tests are crucial for accurate diagnosis, management, and cost reduction.<sup>1,9</sup> Remak presented the initial scientific evidence for dermatophytosis in 1845. Since then, numerous people have investigated and isolated the dermatophytes in other nations.<sup>10,11</sup> In 1900, Dr. Powell became the first person to document a case of dermatophytosis from Upper Assam. Recalcitrant dermatophytosis is a term used to describe relapse, reinfection, persistence, or chronic infections, as well as potential microbiological resistance.<sup>12</sup> The goal of the study was to determine the clinicomycological pattern of dermatophytic infections in our area and the susceptibility of isolated dermatophytes to five antifungals (fluconazole, itraconazole, amphotericin B, ketoconazole, and clotrimazole).

India, a tropical nation, has a higher prevalence of these skin illnesses due to favourable climate factors including warmth and humidity.

Dermatophytosis is negatively impacted in India by a number of causes, including deprivation, bad cleanliness, and overcrowding. Species distribution and prevalence are influenced by environmental factors, personal hygiene, and individual vulnerability, which vary with geography and over time. Over the past few years, most clinically relevant dermatophytes' epidemiology has undergone a major alteration.<sup>13</sup>

### **MATERIAL AND METHODS**

This was an observational study carried out in a tertiary care hospital's dermatology department. Dermatophytosis was identified clinically. All patients were required to sign written informed consent forms. The study involved 50 dermatophytic infection patients who were seen in the dermatology outpatient department of a tertiary hospital. A thorough history was taken, followed by a clinical examination. A thorough history of the patients' age, sex, occupation, site of the lesion, and related illnesses was obtained, and patients underwent clinical examinations to determine the nature and location of the lesion. The patient was informed of the technique before the sample was taken. The patient underwent a thorough general, physical, systemic, and cutaneous examination. The place of involvement and the proportion of body surface involvement were considered while evaluating the dermatophytosis lesions.

#### **Inclusion Criteria**

- Included were clinically diagnosed cases of dermatophytosis with the duration of the disease of at least six months, with or without recurrence.

#### **Exclusion Criteria**

- Patients suffering from dermatophytosis for less than six months.
- Patients suffering from onychomycosis without lesions of tinea on other body sites.
- Pregnant and lactating women.

#### **Specimen Collection**

70% alcohol was used to clean the lesions, getting rid of any contaminants like dirt and

bacteria. Skin lesions were scraped with the blunt end of a sterile scalpel when the active border of the lesion was chosen. Clippings and subungual debris were gathered with a nail cutter from the affected nails. To preserve the integrity of the roots, hairs were pulled out with forceps. No particular transport medium was used; samples were simply collected on sterile paper, folded, labeled, and brought to the microbiological lab at room temperature. The mycology division handled additional processing. Materials were split into two sections: one for culture and the other for wet mount inspection (10% KOH for skin lesions and 40% KOH for nail and hair). Mounting wet (KOH): The fungi showed up as septate branching hyphal components that were highly refractile within the epidermal scales in a positive preparation.

#### **Direct microscopy:**

After an hour at room temperature, the hair and skin samples were analyzed with 10% KOH mount. After incubating the nail clippings at room temperature for 4-5 hours, 40% KOH mount was used to analyze them. Retractable, hyaline fungal filaments were looked for on all clinical samples.

#### **Isolation of dermatophyte on culture**

Following the inoculation of the material onto two sets of SDA (Sabouraud dextrose agar) slope, tubes were incubated in a biological oxygen demand incubator at 25°C with one set containing chloramphenicol and cycloheximide and the other containing simply chloramphenicol. Before being classified as negative, they had a growing period of 4-6 weeks of observation.

#### **Species identification**

Growth rate, colony shape, and lactophenol cotton blue mount were used to separate the species. When there was an uncertainty about morphological identification, slide culture and a biochemical test like the urease test were conducted.

#### **STATISTICAL ANALYSIS**

For the purpose of describing the patterns of distribution of distinct clinical forms of

dermatophytosis and diverse species of dermatophytes, the analyzed findings were reported as percentages. Also investigated was the relationship between the species isolated and the clinical forms of dermatophytosis. The qualitative distribution was examined using the chi-square distribution.

**RESULT: -**

50 clinically confirmed cases of dermatophytosis served as the basis for the

current study's isolation, identification, and clinicomycological analysis of dermatophytes. 50 samples were collected, of which 34 (68%) were skin scrapings, 9 (18%) were nail clippings, and 7 (14%), hair stubs. Males made up 40% (20 instances) of the 50 clinically confirmed cases of dermatophytoses, while females made up 60% (30 cases). The age range of 11 to 20 years had the highest number of instances.

**Table 1. Predisposing Factors of Dermatophytoses**

Predisposing Factors	Number	%
No exposure	22	44
Occlusive dressings	10	20
Frequent baths in stagnant waters – (Ponds & dams)	7	14
Affected family members	4	8
Contact with dog/cat	3	6
Cattle rearing in house	2	4
<b>Total</b>	<b>50</b>	<b>100</b>

Out of the 50 patients in total, 22 instances (or 44%) had no exposure to risk factors. Ten (20%) of the patients had a history of using occlusive dressings, seven (14%) had a history of bathing in ponds or dams, four (8%) had contact with infected family members, three (6%) had interaction with pets, and two (4%) had cattle being raised in the home.

**Table 2. Clinical Types of Dermatophytoses**

Sl. No.	Clinical Types	No. of Cases	Percentage (%)
1	Tinea corporis	20	40
2	Tinea corporis+ Tinea cruris	9	18
3	Tinea cruris	8	16
4	Tinea unguium	4	8
5	Tinea pedis	3	6
6	Tinea faciei	3	6
7	Tinea capitis	2	4
8	Tinea manuum	1	2

Tinea corporis was found to be the commonest clinical type with 20 cases (40%) followed by mixed type (Tinea corporis + tinea cruris) 9 (18%), tinea cruris 8 (16%), tinea unguium 4 (8%), tinea pedis 3 (6%), tinea faciei 3 (6%), tinea capitis 2 (4%) and tinea manuum 1 (2%).

Out of 50 cases of dermatophytoses, 36 (72%) cases were positive by direct microscopy, and 14 (28%) were negative. Among the 36 wet mount positive cases only 23 were culture positives, the remaining 13 did not grow in culture. Of the 14 wet mount negative cases 3 samples yielded dermatophyte isolates.

**Table 3. Species of Dermatophytes Isolated**

Species	Number of isolates	Percentage (%)
T. rubrum	15	30
T. verrucosum	9	18
T. mentagrophytes	5	10
T. tonsurans	3	6
T. soudanense	2	4
M. gypseum	2	4

Of the total 50 cases, 36 (72%) were culture positive as mentioned above. Trichophyton rubrum was the commonest isolate 15 (30%). Other isolates were Trichophyton verrucosum 9 (18%), Trichophyton mentagrophyte 5(10%), Trichophyton tonsurans 3 (6%), Trichophyton soudanense 2 (4%) and Microsporum gypseum 2 (4%).

#### DISCUSSION

Due to the global rise in mycotic infections, studies on dermatophytoses in India have attracted a lot of attention recently. At any age, dermatophytoses can develop. Dermatophytosis cases with chronic recalcitrant illness, atypical presentations, recurrent relapses, and treatment failures are currently on the rise in India.<sup>14</sup>

When lesions from dermatophytosis return after 4 weeks of receiving effective systemic medication, the condition is said to be recurrent.<sup>15</sup> Relapse is defined as the development of dermatophytosis (lesions) in a patient who has been clinically healed after a longer interval of infection-free time (6–8 weeks). When patients have had dermatophytosis for more than six months to a year, with or without recurrence, while receiving proper treatment, the condition is deemed chronic.<sup>16</sup>

**Vineetha M et al.2018<sup>17</sup>** reported the maximum number of cases of dermatophytoses in the age group of 10-20 years. But various other workers reported the maximum number of cases in the 20-30 years of age group. **Vineetha M et al.2018<sup>17</sup>** conducted a mycological study on dermatophytoses in Kottayam and found that

the incidence was more in females in the first episode with a male-female ratio of 1:1.1. But studies conducted by **KAK Surendran et al. 2011<sup>18</sup>** and **Hosthota A et al. 2018<sup>19</sup>** revealed male preponderance with the male-female ratio of 1.63:1 and 2.06:1 respectively.

**Aghamirian MR and Ghiasian S A ET al.2011<sup>20</sup>** conducted an epidemiological study of dermatophytes as a cause of epi-zoonoses in dairy cattle and humans in Iran during 2006-2007. It was discovered that 33.1% of the herdsmen had fungal lesions that were thought to be dermatophytoses. Upon closer inspection, KOH and culture isolated Trichophyton verrucosum in 62.8% of the cases, which was the same isolate found in the infected cattle (92.6%). Trichophyton mentagrophyte was the second most commonest isolate by **Surendran et al.2011<sup>18</sup>**(20%), **Kumar et al.2014<sup>21</sup>**(17.92%), and **Hosthota A et al.2018<sup>19</sup>** (20%).

There is a general lack of awareness regarding the use and side effects of topical steroids among various non-dermatologists and medical practitioners, as demonstrated in a study by **Abrol and Sharma 2020<sup>22</sup>**. A considerable number of patients (78.62%) in our study had been applying topical antifungals that contained corticosteroids. **Vineetha et al.2018<sup>23</sup>** also reported the use of topical steroid/antifungal creams by their patients, but the percentage was lower (63%).

**Dabas et al.2018<sup>24</sup>** observed 14.7% of cases were on preparations containing salicylic acid, lactic acid, dithranol, coal tar, and urea and 7.35% on topical antifungal therapy.

In the study done by **Sumit Kumar and Srikara Mallya in 2014**<sup>21</sup> commonest isolates was *Trichophyton rubrum* 69 (65.09%). *Trichophyton rubrum* was present in 34 isolates of tinea corporis (61.82%), 26 isolates of tinea cruris (74.28%), 3 isolates of tinea unguium (60%), 2 isolates of tinea pedis (100%), 1 isolate of tinea capitis (20%), and 1 isolate of tinea manuum (50%) infections.

The majority of the patients had a number of risk factors that may contribute to the chronic nature of dermatophytosis. This included poor hygiene, sharing of feminine products, wearing constricting synthetic clothing, being exposed to the sun for an extended period of time, having a larger body surface area affected, having atopic dermatitis, comorbid conditions, using topical steroids, and not adhering to treatment. In ordinary clinical practice, identifying and changing the modifiable risk factors may be beneficial. The most frequent clinical type of tinea corporis is that caused by *Trichophyton rubrum*, which is also the most frequent cause. In contrast to earlier studies, ours also included a sizable collection of *Trichophyton verrucosum* and *Trichophyton mentagrophyte* species. Along with other typical risk factors, this is likely caused by exposure to cattle producing areas and habits of bathing in ponds and dams in this area of Thrissur. The most effective medications for dermatophytosis are antifungal ones. However, the condition can be prevented to some extent by identifying the risk factors and avoiding them.

#### CONCLUSION:

Dermatophytosis is a minor illness with expensive treatment costs and psychological side effects. Infections with dermatophytes are particularly prevalent in our nation, where the hot, humid weather combined with unfavorable hygienic conditions encourages the growth of these fungus. Tinea corporis and tinea cruris were the two clinical types of Dermatophytes that were most prevalent. In different regions of India, distinct species are more or less isolated from one another. But in

the majority of the experiments, *Trichophyton* was the main fungus. These fungi infections can be prevented with the use of good hygiene, sanitation, and washing. When antifungal medicines are provided based on culture and antifungal susceptibility data, the disease's treatment will be more effective and meaningful. over a better conclusion, more patients must be studied over a longer period of time.

#### REFERENCES:

1. K Sumit, Mallya PS, Pallavi K. Clinico-Mycological study of Dermatophytosis in a Tertiary care hospital. *International Journal of Scientific Study*.2014.1(6):27-32.
2. Hitendra BK, Dhara MJ, Nidhi SK, Hetal SS: A study of superficial mycoses with a clinical mycological profile in tertiary care hospital in Ahmadabad, Gujarat. *National Journal of Medical Research*. 2012.2(2):160-164.
3. Weitzman I, Summerbell RC. The dermatophytes. *Clin Microbiol Rev*. 1995;8:240-59.
4. Rippon JW. *Medical mycology*. Philadelphia: WB Saunders Company, 1988;3:169-275.
5. Padhey AA, Summerbell RC. *Medical mycology - Topley and Wilson's Microbiology and microbial infections*. Oxford University, London: 1998;10:223-32.
6. Huda MM, Chakroborty N, Bordoloi JNS. A clinic-mycological study of superficial mycoses in Upper Assam. *Indian J Dermatol Venereol Leprol* 1995;61(6):329-32.
7. Dogra S, Uprety S. The menace of chronic and recurrent dermatophytosis in India: Is the problem deeper than we perceive? *Indian Dermatol Online J*. 2016;7:73-6.
8. Panda S, Verma S. The menace of dermatophytosis in India: The evidence that we need. *Indian J Dermatol Venereol Leprol*. 2017;83:281-4.
9. 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.
10. Sumana V, Singaracharya MA. Dermatophytoses in Khammam (Khammam District, Andhra Pradesh, India). *Indian J Pathol Microbiol* 2004;47(2):287-9.
  11. Agarwal US, Saran J, Agarwal P. Clinico-mycological study of dermatophytes in a tertiary care center in North West India. *Indian J Dermatol Venereol Leprol* 2014;80(2):194.
  12. Mahajan K, Sharma S, Sardana K, Gupta A. Superficial fungal infections. In: Sardana K, Mahajan K, Mrig PA, editors. *Fungal Infections: Diagnosis and Treatment*. 1st ed. New Delhi: CBS; 2017;1:52-178.
  13. V Lavanya, Solabannavar SS: Clinico-mycological study of Dermatophytosis in a tertiary care center in Bagalkot. *International journal of medical & health research*. 2015.1(2):63-66.
  14. Dogra S, Uprety S. The menace of chronic and recurrent dermatophytosis in India: Is the problem deeper than we perceive? *Indian Dermatol Online J*. 2016; 7:73.
  15. Sardana K. Overview of causes and treatment of Recalcitrant Dermatophytoses. In: Khurana A, editor. *IADVL Manual on Management of Dermatophytoses*, New Delhi: CBS Publishers; 2018;1:80-104.
  16. Rajagopalan M, Inamadar A, Mittal A, Miskeen AK, Srinivas CR, Sardana K, et al. Expert consensus on the management of dermatophytosis in India. *BMC Dermatol* 2018;18:6.
  17. Vineetha M, Sheeja S, Celine MI, et al. Profile of dermatophytes in a tertiary care center. *Indian Journal of Dermatology* 2018; 63 (6):490-5.
  18. Surendran KAK, Bhat RM, Bolor R, et al. A clinical and mycological study of dermatophytic infection. *Indian J Dermatol Venereol Leprol* 2014; 59 (3) :262-7.
  19. Hosthota A, Gowda T, Manikanda R. Clinical profile and risk factors of dermatophytoses: a hospital-based study. *International Journal of Research in Dermatology* 2018; 4 (4):508-13.
  20. Aghamirian MR, Ghiasian SA. Dermatophytoses as a cause of epizoonoses in dairy cattle and humans in Iran: epidemiological and clinical aspects. *Mycoses* 2011;54(4):52-6.
  21. Kumar S, Mallya PS, Kumari P. Clinicomycological study of dermatophytoses in a tertiary care hospital. *International Journal of Scientific Study* 2014; 1 (6):27- 32.
  22. Abrol S, Sharma R. Knowledge, attitude, and behavior in the prescription of topical steroid for dermatological disorders among medical practitioners. *Our Dermatol Online*. 2020;11:357-9.
  23. Vineetha M, Sheeja S, Celine MI, Sadeep MS, Palackal S, Shanimoole PE, et al. Profile of dermatophytosis in a tertiary care center. *Indian J Dermatol*. 2018;63:490-5.
  24. Dabas R, Janney MS, Subramaniyan R, Arora S, Lal VS, Donaparthi N. Use of over-the-counter topical medications in dermatophytosis: A cross-sectional, single-center, pilot study from a tertiary care hospital. *Indian J Drugs Dermatol* 2018;4:13-7.