

## To Determine the Prevalence and Etiological Profile of Dermatophytosis: An Observational Study

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### Abstract

**Aim:** To determine the prevalence and etiologic profile of dermatophytosis

**Materials and Methods:** For the purpose of the study, a total of 215 skin scraping, nail, and hair root specimens were collected. Direct microscopic examination was performed using 10-40% Potassium hydroxide mount (KOH). Additionally, the samples were inoculated onto Sabouraud dextrose agar (SDA) and dermatophyte test medium (DTM). Species identification was based on colony morphology, teased mount using LCB and urease test results.

**Results:** There was male predominance in the incidence of dermatophytosis with a male: female ratio of 2.7:1. In 163 samples out of a total of 215, direct microscopy with a KOH mount indicated the presence of fungal components. And, out of those 163, only 123 evolved in culture. The most common isolate was *T. mentagrophytes* followed by *T. rubrum* and *T. violaceum*.

**Conclusion:** In the current research area, dermatophytosis has been recorded throughout the year, with an increase in the predominance of particular species. Dermatophytic infections are prevalent all over the world, however superficial mycoses are more common in India, where heat and moisture play a big role.

**Keywords:** Dermatophyte, KOH, SDA.

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## Introduction:

Dermatophytosis is the most common superficial fungal infections, commonly known as Ringworm and is caused by dermatophytes, which are capable of invading the keratinized tissues such as skin, hair and nail in humans.[1] Dermatophytes are a distinct group of fungi that infect the keratinized tissues like skin, hair, and nails of humans and animals and can produce a variety of cutaneous infections. This group of fungi are closely related antigenically, morphologically and physiologically.[2, 3]

Superficial mycoses refer to the disease of the skin, nail and hair caused by fungal agents. Over the past decades, the prevalence of these infections has been on a rising trend; accordingly, they have affected 20-25% of the world's population. These diseases are more common in the tropical countries due to humidity, elevated temperature and sweating. The major examples of superficial mycoses include dermatophytosis, pityriasis versicolor, and candidiasis.[4]

The clinical lesions caused by the fungi closely resemble other skin diseases. Therefore, it is necessary to make a confirmed laboratory diagnosis of superficial skin infection.[5,6]

The severity of dermatophytic infections depends on a variety of factors, such as host reactions to the metabolic products of the fungi, virulence of pathogenic species or particular strain, anatomical site of the infection and local environmental risk factors.[7]

The dermatophytic infection spreads easily by direct contact with the infected humans and animals or through fomites. Although the infection is non-invasive and curable, its widespread nature and therapeutic costs are major public health problems, imposing a high economic burden on society, especially in the developing tropical countries like

India.[8] This study was taken up with the main objective to determine the prevalence of dermatophytosis and their etiological agents.

## Material and Methods:

The present observational study was conducted in the Department of Microbiology, Government Medical College, Bettiah, West Champaran, Bihar, India from July 2021 to November 2021. A total of 215 samples were gathered from hospital OPD.

## Methodology:

The patient underwent a thorough history and clinical examination, as well as a detailed inspection of his or her skin lesions. The study included all new cases of dermatophytosis from all age groups and both sexes who gave their consent. Patients who had recently been treated with an antifungal or topical steroid were excluded from the research.

The samples were taken based on the condition of the skin, such as scales, crusts, nail clippings, or hair plucking.

## Tests for identification of Dermatophytes

### (i) Direct microscopy:

KOH mount - A portion of the sample material was treated with KOH (10% for skin and hair, 40% for nail) and a wet mount is prepared using a cover slip. Then this mount is screened under 10X and 40X for the presence of fungal hyphae.

Similarly, Lacto phenol cotton blue teased mount can also be done after culture using LPCB stain to look for the specific morphology.

### (ii) Culture on:

Sabouraud's dextrose agar with and without antibiotics- Culture plates were incubated at 25°C and were examined every 24 hours for any growth upto 4 weeks. The culture plates

showing growth was processed further. Species identification was based on colony morphology on SDA, use of DTM, teased LCB mount and urease test results.[9]

### (iii) Dermatophyte Identification Media:

DTM was used to isolate and identify Dermatophytes. Dermatophytes gave red colour on this medium but other fungus didn't give any colour.

### Results:

A total of 215 samples were sent for fungal testing, with 152 being skin scrapings, 39

being hair samples, and 24 being nail clippings. In 163 samples, the KOH mount was positive for fungal element and in 123 samples, the culture was positive.

Dermatophytes were found in 123 of the culture-positive samples and they were isolated from 98 skin scrapings, 16 nail clippings and 9 hair samples.

T. mentagrophytes accounted for 61 out of the 123 dermatophytes isolated whereas T. rubrum accounted for 43 and T. violaceum for 19. Microsporium and Epidermophyton were not found.

**Table 1: Distribution of patients according to sex**

	Male	Female	Total
No. of cases	164	51	215
Percentage%	76.2	23.7	100

**Table 2: Distribution of sample on the basis of KOH mount and Culture**

Total no. of samples	KOH positive	Culture positive
215	163	123

**Table 3: Distribution of dermatophytic cases based on clinical samples**

Sample type	No. of samples
Skin	98
Hair	09
Nail	16
Total	123

**Table 4: No. of species isolated**

Organism isolated	No. of isolates
T. mentagrophytes	61
T. rubrum	43
T. violaceum	19

### Discussion:

Mycotic infections are found all throughout the world, with superficial mycoses being more common in tropical areas where heat and moisture play a key role in the growth of these organisms.[9]

Superficial skin infections caused by dermatophytes resulting in local inflammation are common in humans. In the present study, skin infection was found to be common clinical presentation (79.6%) followed by nail (13.0%) and hair (7.3%).[10]

Males (76.2 percent) were more afflicted than females (23.7 percent) which is consistent with earlier studies by Sarma and Borthakur, 2007.[11]

According to recent findings, males are more susceptible to dermatophytosis than females.

This could be linked to their line of employment, which causes excessive perspiration and requires them to contact with a wide range of people. The lower incidence in females may be also due to the non-reporting of the female patients to the hospitals due to the prevailing social stigma in the rural population in India.[12,13]

In our investigation, dermatophytosis cases were diagnosed using a combination of KOH mount demonstration under the microscope and SDA culture.

Direct KOH mount was determined to be a good screening test among them, with 90.5 percent of samples positive in KOH mount and 62.2 percent positive in culture, according to some research.[14] *T. Mentagrophyte* (49.5%) is the predominant dermatophyte isolated followed by *T. Rubrum* (34.9%) and *T. Violaceum* (15.4%). This result is in agreement with that found by Tan in 2005 [15]. Like other studies in our study, *Trichophyton* species were more commonly isolated than *Epidermophyton* and *Microsporum*. [16]

### Conclusion:

According to the findings of this study, dermatophytosis is frequent in this location, where the hot and humid temperature, combined with inadequate hygienic conditions, plays a key role in fungal growth.

The most prevalent etiological agent is *Trichophyton* species with *T. Mentagrophytes* being the most common isolation. Dermatophytosis is a public health problem because of its psychological

consequences and significant morbidity in terms of lost working days and treatment. It can be reduced by treating the inflicted people and their contacts and by educating the population at risk in this area about the precautionary measures.

### References:

1. Doddamani PV, Harshan KH, Kanta RS, Gangane R, Sunil KB. Isolation and identification of dermatophytes in a tertiary care hospital in Gulbarga People Journal of Scientific Research 2013; 6(2)10-13.
2. Kalita JM, Sharma A, Bhardwaj A, Nag VL. Dermatophytoses and spectrum of dermatophytes in patients attending a teaching hospital in Western Rajasthan, India. Journal of Family Medicine and Primary Care: 2019;8:(4).
3. Ajello L. A taxonomic review of the dermatophytes and related species. Sabouraudia 1968; 6: 147-59.
4. Santosh HK, Jithendra K, Rao AV, Buchineni M, Pathapati RM. Clinico-mycological study of dermatophytosis-our experience. Int J Curr Microbiol App Sci. 2015; 4(7):695-702.
5. Upadhyay V, Kumar A, Singh AK, Jayesh Pandey J. Epidemiological characterization of dermatophytes at a tertiary care hospital in Eastern Uttar Pradesh, India. Curr Med Mycol, 2019, 5(1): 1-6.
6. Janardhan B, Vani G. Clinico-mycological study of dermatophytosis. Int J Res Med Sci. 2017; 5(1):31-9.
7. Poluri LV, Indugula JP, Kondapaneni SL. Clinico-mycological study of dermatophytosis in South India. J Lab Physicians. 2015; 7(2):84-9.
8. Ramaraj V, Vijayaraman RS, Rangarajan S, Kindo AJ. Incidence and prevalence of dermatophytosis in and around Chennai,

- Tamilnadu, India. *Int J Res Med Sci.* 2016; 4(3): 695-700.
9. Vara A, Khan RA, Narayan LS. Prevalence of dermatophytes in patients attending a teaching hospital in Hyderabad, South India. *Indian Journal of Microbiology Research* 2021;8(2):132–134.
  10. Balamuruganvelu S, Reddy SV, Babu G. Age and gender wise seasonal distribution of dermatophytosis in a tertiary care hospital, Puducherry, India. *J Clin Diagn Res.* 2019;13(2):6–10.
  11. Sarma S., and Brothakur, A. (2007). A clinico-epidemiological study of dermatophytosis in northeast India. *Dermatology journal from India*, 73(6): 427-428.
  12. Noronha TM, Tophakhane RS, Nadiger S. Clinico-microbiological study of dermatophytosis in a tertiary-care hospital in North Karnataka. *Indian Dermatol Online J.* 2016; 7(4):264–71.
  13. Mundhe SS, Chaudhari KN. Prevalence of dermatophytes and other fungal agents from clinical specimens at a tertiary care hospital. *MedPulse Int J Microbiol.* 2017;2(1):5–9.
  14. Sudha M, Ramani CP, Anandan H. Prevalence of Dermatophytosis in patients in a Tertiary Care Centre. *Int J Contemp Med Res.* 2016;3 (8):2399–2401.
  15. Tan, H. H. (2005). Superficial fungal infections seen at the National Skin Centre, Singapore. *Nippon Ishinkin Gakkai Zasshi.*, 46(2):77-80.
  16. Singh S, Beena PM. Profile of dermatophyte infections in Baroda. *Indian J Dermatol Venereol Leprol.* 2003;69 : 281–3.