

## ORIGINAL RESEARCH

# Ringworms fondness towards steroid: A prospective study

<sup>1</sup>Dr. Anushi Hardaha, <sup>2</sup>Dr. Pranjal Nema, <sup>3</sup>Dr. Uppal Rashmi Kunkal, <sup>4</sup>Dr. Abhay S Tirkey, <sup>5</sup>Dr. Shoeb Akhtar Khan, <sup>6</sup>Dr. Amardeep Rai

<sup>1</sup>Junior Resident, <sup>2</sup>Senior Resident, Atal Bihari Medical College, Vidisha, M.P, India

<sup>3</sup>Demonstrator, <sup>4</sup>Professor, <sup>5</sup>Associate Professor, <sup>6</sup>Professor and Head, Bundelkhand Medical College, Sagar, M.P, India

### Corresponding author

Dr. Abhay S Tirkey

Professor, Bundelkhand Medical College, Sagar, M.P, India

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### ABSTRACT

**Background:** Dermatophyte is a group of saprophytic fungi(1). Several members of this distinct group of fungi have evolved to cause superficial mycoses. **Aim and Objective:** Mycological study on spectrum of tinea infection and immune status of patients attending tertiary care hospital, Bundelkhand Medical College Sagar. **Material and Methods:** Clinical samples viz. hairs, nails, and skins were collected from 179 patients. A portion of each sample was examined microscopically, and the remaining portion of each sample was cultured. Dermatophyte isolates were identified by studying macroscopic and microscopic characteristics of their colonies. **Result:** Out of 179 samples, dermatophytes were detected in 126 (70.3%) cases. The most common species of dermatophyte identified on culture was *Trichophyton rubrum* (42.9%), followed by others. *Tinea corporis* was the predominant clinical manifestation accounting for 25% of the cases. A total of 116 (65.1%) participants were using steroids for one or more reasons. **Conclusion:** Most cases of dermatophytosis were caused by *Trichophyton rubrum* and were associated with topical steroid use.

**Keywords:** Dermatophytes, KOH wet mount, Fungal culture, Sabouraud's Dextrose Agar, immune status

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### INTRODUCTION

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, physiologically, and morphologically and are commonly known as ringworm fungi.[1] Dermatophytes are classified into three anamorphic (asexual or imperfect) genera, Epidermophyton, Microsporum, and Trichophyton.[2] On the basis of their primary habitat, dermatophytes can also be divided into anthropophilic, zoophilic, and geophilic. Species of all the three groups can cause human infection.[3] However, among healthy immunocompetent individuals, dermatophytes cannot penetrate to the deeper tissues, hence, the infection is generally restricted to the dead cornified layers leading to these fungi being named derma (meaning skin), phyte- (meaning plant that grows in a specified habitat)(3,4). Dermatophytosis, also known as Tinea and commonly called as Ringworm infections, are prevalent around the globe, with a preponderance in the tropical region secondary to a significantly higher level of humidity, crowding, and poor sanitary

conditions(5,6).Several clinical types with distinct pathology are produced by a single species.Based on the anatomical site of infection and the causative organism, dermatophytes are classified into different varieties. The second word in the clinical classification of dermatophytosis indicates the specific part of the body infected by fungi, e.g., *Tinea corporis*, "corporis" means 'body'(5,6). Among human beings, *Tinea capitis* regarded as the most contagious/transmissible species and tinea (corporis, manuum, and cruris) being the least infectious one(5,6).

The mode of transmission of dermatophytosis is by contact with the infected person/pet animals, fomites, or autoinoculation from another body site(7,8). There are several risk factors for acquiring dermatophytosis. Including poverty, unhygienic personal habits, overcrowding, poor peripheral circulation, steroid use, immunosuppressive therapy, cancer chemotherapy and immunocompromised conditions(7,8). The prevalence of some risk factors has increased in recent times, and they are responsible for the increase in the prevalence of chronic dermatophytosis. In general, dermatophytosis occurs most frequently in post-

pubertal hosts, except for tinea capitis(7,8). Conventionally, men are more frequently affected than women because outdoor work predisposes men to hot, humid, and sweaty conditions conducive to the growth of dermatophytes(7,8).

### MATERIAL AND METHODS

This was a prospective cross-sectional study done during July 2021 to July 2022 in Department of Microbiology, Bundelkhand Medical College, and affiliated hospitals, a tertiary care institute in Sagar, Madhya Pradesh. Clinical samples viz. hairs, nails, and skins were collected from 179 patients. Skin lesions were sampled from the peripheral, erythematous, actively growing margin of the lesions. The affected area of the skin is decontaminated with 70%ethyl alcohol to eliminate surface bacterial contamination. the skin scales in the active growing edge of the lesion (15) were scrapped into the black paper kept inside the sterile petri dish by means of the blunt edge of a sterile scalpel. For nail sample. The affected nail was meticulously cleaned with 70% Ethyl alcohol and the nail was clipped or scrapped deeply enough to obtain recently invaded nail tissue by a flame sterilized tweezer. Nail clippings were taken from nail plate, nail bed and subungual region of the nails. In suspected tinea capitis, after cleaning the affected area with 70%Ethylalcohol, Lustreless hair and hair stubs are preferred and epilated along with root portion by a pair sterilized surgical forceps. Direct microscopy by 10% KOH mount for skin and hair specimen (stored for 15-20 minutes) and 20% - 40% KOH mount for nail specimen (stored for 24 hours) done to examine fungal hyphae with

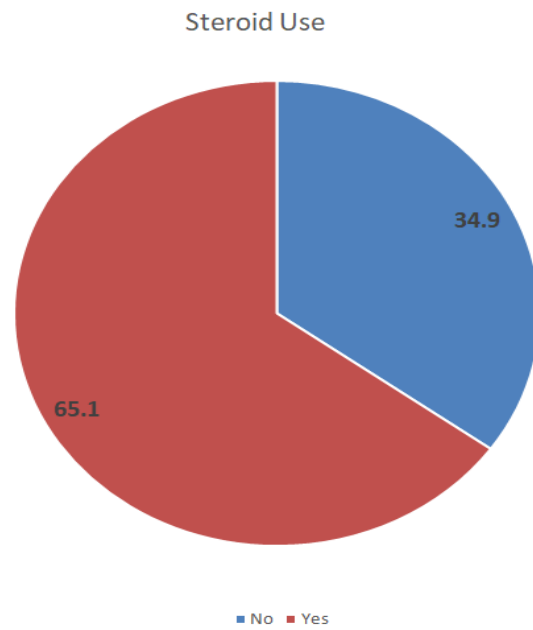
arthroconidia. Narrow, septate, branching hyphae with or without arthroconidia and other features were observed .A portion of each clinical specimen streaked on to suitable media like SDA and dermatophyte test media etc and incubated at 26-to-28-degree Celsius for 3-4 weeks. The collected specimen were inoculated on fungal culture media irrespective of the findings in direct KOH wet mount microscopic examination. Culture of dermatophytes requires media containing antibiotics .Sabouraud's Dextrose Agar with antibacterial agents such as chloramphenicol or gentamycin and cycloheximide to inhibit the growth of saprophytic fungi. The inoculated cultures were incubated at room temperature and 37°C . After incubation Macroscopic appearance of colonies and it's microscopic examination by LPCB mount was done to demonstrate hyphae and conidia and The immune status of participants was assessed using the medical history.

### RESULT

Of 179 samples, dermatophytes were detected in 126 (70.3%) cases. the use of steroids during the preceding 3 months among the participants. A total of 116 (65.1%) participants were using steroids for one or more reasons. Further, most patients (72%), were using topical steroids, mostly for a dermatological condition (some without a medical prescription). The distribution of patients having dermatophytosis based on their utilization of steroids was statistically significant. Moreover, the distribution of patients having dermatophytosis based on the utilization of topical steroids was statistically significant as well.

<b>Table : Steroid Therapy (n=179)</b>		
<b>Steroid</b>	<b>n</b>	<b>%</b>
<b>No</b>	63	34.9
<b>Yes</b>	116	65.1
<b>Total</b>	179	100.00
<b>Type of Steroid (n=116)</b>		
<b>Topical</b>	84	72.0
<b>Systemic</b>	32	28.0

**Figure: Use of Steroid**



Among the study participants, a majority of 57.14% of participants were categorized as ‘immunocompromised’ and the remaining 42.86% of participants were immune-competent. The distribution of patients having dermatophytosis based on their immunity status was statistically non-significant.

Status	n	%
Competent	77	42.86
Immunocompromised	102	57.14
<b>Total</b>	<b>179</b>	<b>100.00</b>

**Figure: Immune status of participants**  
 Immune Status of Participants

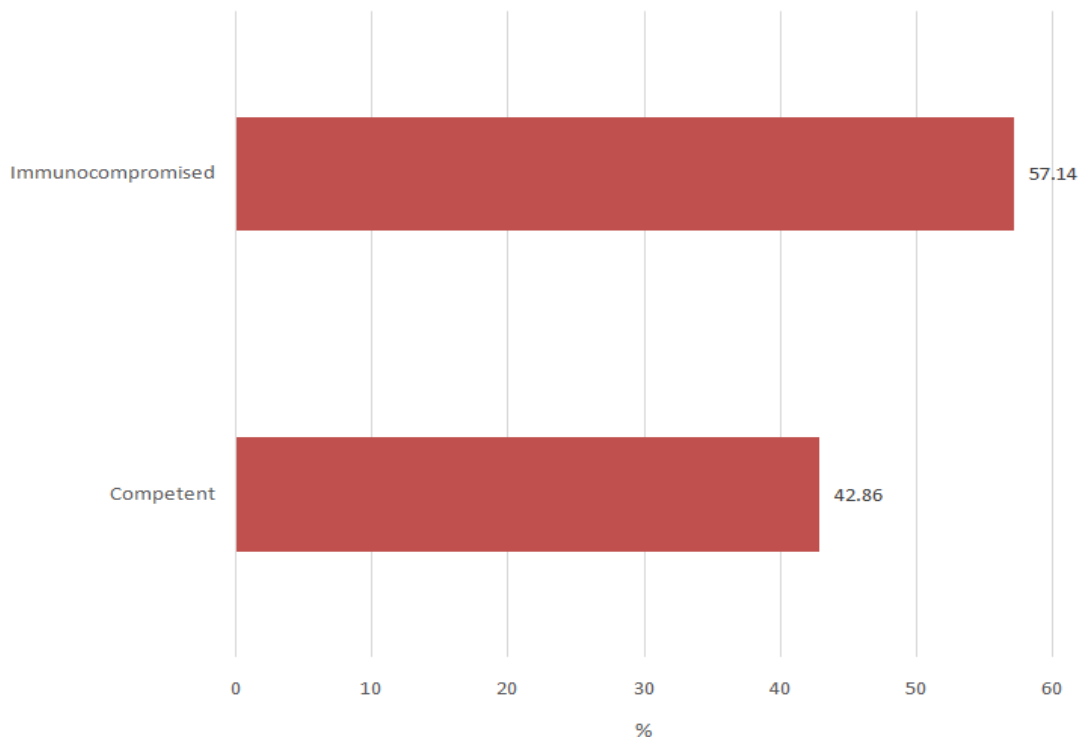


Table below illustrates the body part from which the pathological sample was collected. The most common site for collecting samples was the groin (39.7%) and the feet were the least common site (7.1%).

**Table : Body part from which sample was collected (n=179)**

Body Part	n	%
Groin	71	39.7
Chest	55	30.9
Buttocks	23	12.7
Hand	17	9.5
Feet	13	7.1
<b>Total</b>	<b>179</b>	<b>100.00</b>

Figure: Source of pathological sample

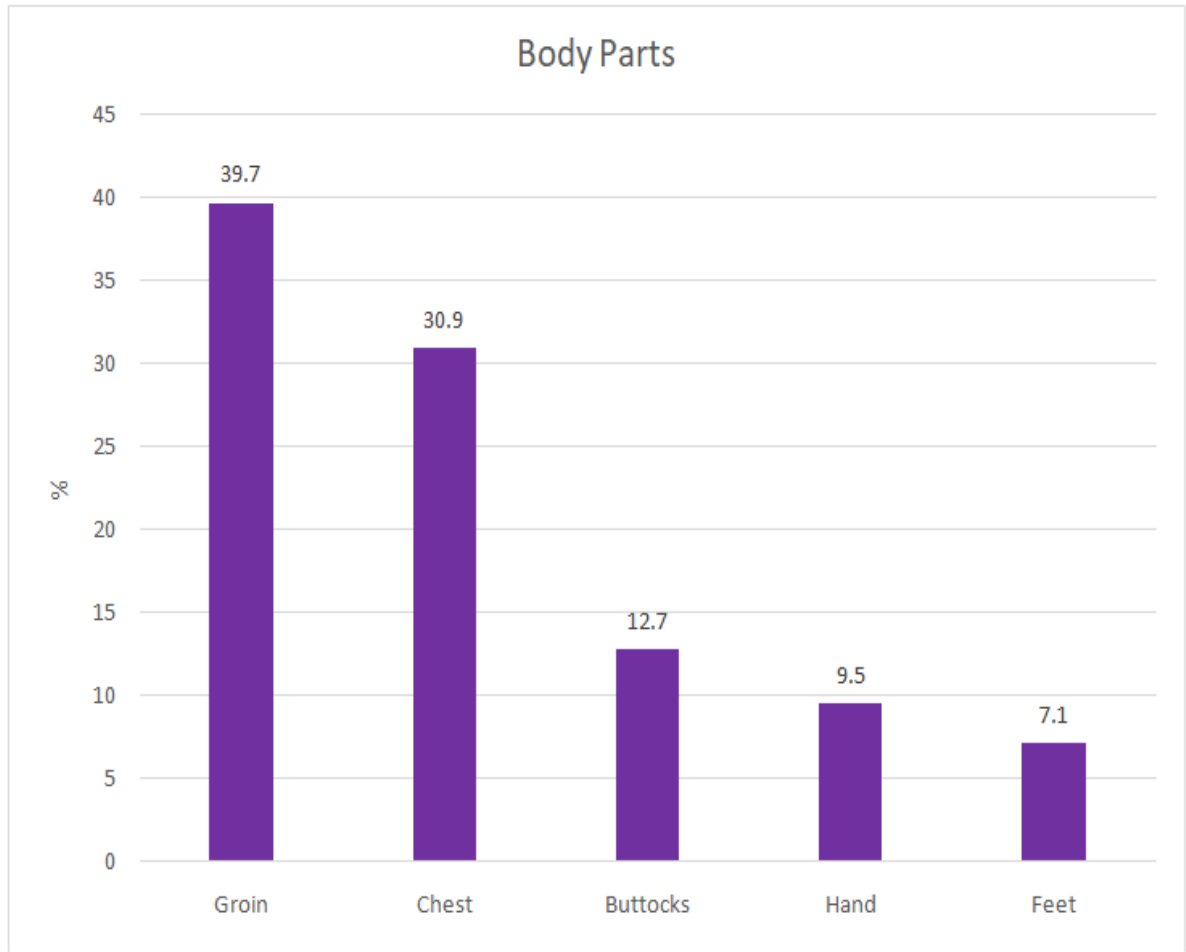
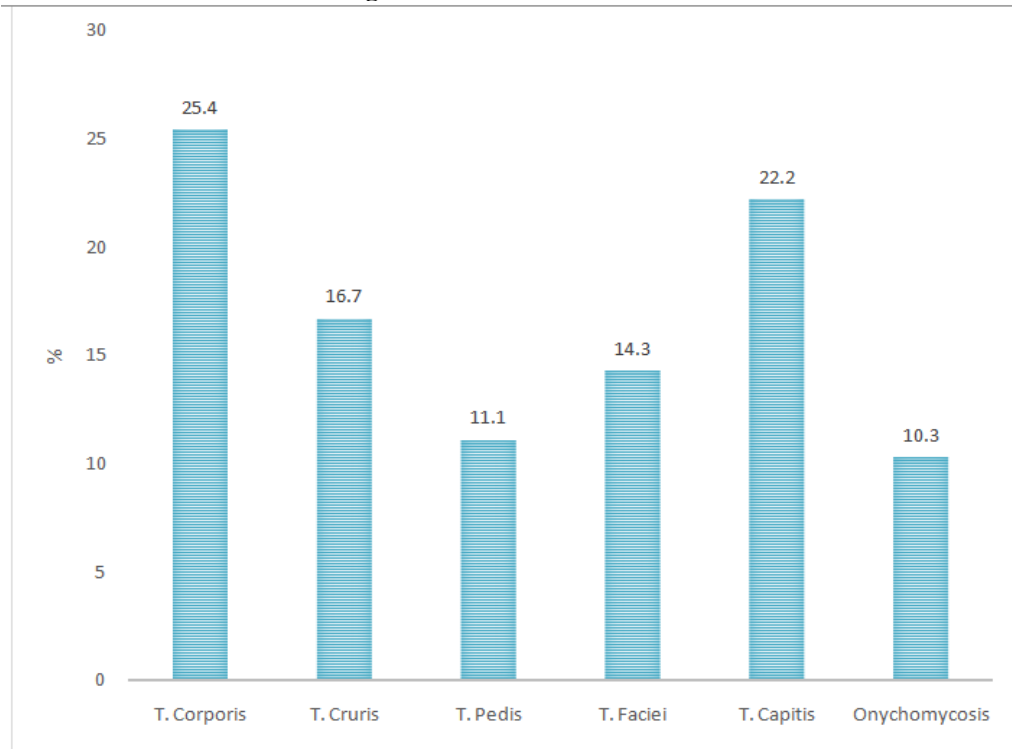


Table: Clinical classification of the participants (n=179)

Category	n	%
Tinea corporis	45	25.4
Tinea cruris	30	16.7
Tinea pedis	20	11.1
Tinea faciei	26	14.3
Tinea capitis	40	22.2
Onychomycosis	18	10.3
<b>Total</b>	<b>179</b>	<b>100.00</b>

**Figure: Clinical Classification**



**Tinea corporis**



**Tinea cruris**

## DISCUSSION

In recent years there has been a rise in the occurrence of dermatophytosis because of an increase in the number of people who have diabetes and a variety of other conditions that damage their immune systems. The purpose of this research was to evaluate the dermatophytosis among patients their immunological status, and anatomical site.

A total of 116 (65.1%) participants were using steroids for one or more reasons. Further, most patients (72%), were using topical steroids, mostly for a dermatological condition (some without a medical prescription). The statistical analysis of the empirical data collected for the present study indicated that the prevalence of dermatophytosis among those using steroids and topical steroids was statistically higher in comparison to non-users. Literature suggests that injudicious use of both broad-spectrum antibiotics and steroids alone or in combination are independent risk factors for fungal infection(9,10,11). Steroid ointment especially in combination with antibiotics damages the normal microbiological flora of the skin and diminishes the immune system. The fact that fungi are a normal component of the environment makes them challenging to avoid(9,10,11). Outside, fungi dwell in the soil, on plants, trees, and other types of vegetation. Additionally, they are on your skin and a lot of interior surfaces. Hence, fungal infections including dermatophytosis are commonly seen among patients using steroid cream for cosmetic reasons(9,10,11). **Goel RG et al., (2021)** reported that a total of 18.40% (n = 503) of patients having dermatophytosis were already using cream-containing topical steroid cream at the time of presentation. Moreover, almost half of the patients (48.90%) were using unprescribed topical steroids cream. **Priyanka NA** reported that Shows that the commonest source of referral of steroids cream among patients having dermatophytosis was over the counter (58.18%). **Tripathy S et al. (2016)** conducted a multi-centric study by screening 26,348 and found cutaneous fungal infections among 16,346 (62%) patients by a dermatologist: recurrent fungal infections (74%) and primary infection (26%)(54). They reported that patients with recurrent fungal infections had a history of steroid abuse.

As per clinical classification, most of the patients in the present study were diagnosed with Tinea Corporis (25%), followed by Tinea capitis (22%), and Onychomycosis (10%) was the least common diagnosis. **Agarwal US et al. (2014)** also reported that Tinea corporis was the most common clinical pattern in 37.3% of cases, followed by a mixed clinical pattern in 44 (14.7%), tinea cruris in 13.7% of cases, tinea capitis in 39 (13%), onychomycosis in 33 (11%), tinea pedis in 11 (3.7%), tinea faciei in 9 (3%), tinea manuum in 6 (2%) and tinea barbae in 5 (1.7%) cases(44). **Bitew A et al. (2018)** reported that Tinea capitis was the predominant clinical manifestation consisting of 48.1% of the cases(45). **Fatima SH et al. (2021)** reported that Tinea corporis was the most

common clinical type (50%) followed by Tinea Cruris (22.58%)(47). **Penmetcha U et al. (2016)** reported that Tinea capitis was more common in male children (80%)(48). Tinea corporis and T. unguium were more common in females. **Singh S and Beena PM. (2003)** reported that Tinea corporis was the most common clinical presentation followed by tinea cruris(51).

## CONCLUSION

Dermatophyte infections are very common in developing country like india where hot and humid climate along with poor hygienic conditions play an important role in the growth of fungi like dermatophytes. It was estimated that approximately two-thirds of the individuals were using steroids for one or more purposes. The usage of steroids was found to have a significant association with dermatophytosis in the present investigation. The most relevant finding was that patients who had been using topical steroids had a significantly higher incidence of dermatophytosis. Tinea corporis was the most prevalent type, followed by tinea capitis, while fungal infection of the nails was the least common type.

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