

## Original Research Article

# Incidence of steroid modified tinea in tertiary care centre Lucknow

Savita Chaudhary<sup>1</sup>, Priyanka Shukla<sup>2\*</sup>, Khushboo Gupta<sup>3</sup>, Gaurav Paliwal<sup>1</sup>

<sup>1</sup>Department of Dermatology, <sup>2</sup>Department of Microbiology, Era's Lucknow Medical College and Hospital, Lucknow, Uttar Pradesh, India

<sup>3</sup>Department of Dermatology, Saraswati Medical College, Lucknow, Uttar Pradesh, India

**Received:** 26 July 2018

**Revised:** 30 August 2018

**Accepted:** 31 August 2018

### \*Correspondence:

Dr. Priyanka Shukla,

E-mail: [dr.priyanka.microbio@gmail.com](mailto:dr.priyanka.microbio@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** Rampant use and abuse of topical steroids has led to increase in number of cases of superficial dermatophytosis of skin, nail and hair. In most of the cases they are resistant to topical as well as oral antifungals even after prolonged course of treatment. Our study aims to analyse epidemiological and microbiological profile of steroid modified tinea (SMT).

**Methods:** Clinically diagnosed tinea patients with history of usage of topical steroids were included in our study. Detailed history was taken and clinical examination along with KOH mount and culture was done.

**Results:** 980 patients were screened of which 550 patients with history of using topical steroids were included in our study. Most common age group was 20 to 29 years with male: female of ratio approximately 3:1 and disseminated form was the most common variety. KOH mount was positive in 76% cases and culture was positive in 72% cases. Most common species came out to be *T. Mentagrophytes* followed by *T. rubrum*. Among non-dermatophyte group, *Candida* was the commonest.

**Conclusions:** There is rise in incidence of dermatophytosis, especially steroid modified one and cases of disseminated tinea are rising.

**Keywords:** Steroid modified tinea, Dermatophytosis, Topical steroid, tinea, Superficial mycosis, *T. mentagrophytes*, Sabourauds dextrose agar

## INTRODUCTION

The dermatophytoses are a group of superficial fungal infections of keratinized tissues like the epidermis, hair and nails.<sup>1</sup> Depending on their genera, dermatophytes can be classified into three groups: trichophyton, epidermophyton, and microsporum.<sup>2</sup> As per World Health Organization (WHO), the prevalence of superficial fungal infection worldwide has been found to be 20-25% and its more prevalent in tropical and subtropical countries like India where the heat and humidity is high throughout the year.<sup>3</sup> Recently there is a surge in menace of dermatophytosis because of over the

counter sale of topical steroids and self-medication. Steroid modified tinea is the variety of tinea, which occurs after the application of topical steroids. Previously "Tinea incognito" which literally means the variety of tinea which is not recognizable and atypical Tinea were used interchangeably. The term tinea incognito was originally described in 1968 by Ive and Marks, for the atypical clinical presentation of dermatophytic infections caused by prior use of topical or systemic steroids.<sup>4</sup> In a recently published article, Verma has compared "tinea incognito" and "steroid modified tinea" and concluded that topical steroids do modify the morphology of tinea to varying extent but do not necessarily make the disease

difficult to recognize. Therefore, a majority of them are better described as “steroid-modified tinea” rather than “tinea incognita”.<sup>5</sup> As there is rapid increase in use of topical steroids and over the counter creams, incidence of such cases is increasing day by day. This study aims to find the incidence of SMT, common clinical patterns, causative pathogens and commonly used topical agents by the patients.

## METHODS

Prospective cross-sectional study was conducted after ethical clearance, in outpatient department of Dermatology in collaboration with Department of Microbiology, Era’s Lucknow Medical College and Hospital (ELMCH) between March 2018 to May 2018. All patients attending Dermatology OPD of ELMCH during study duration were screened and clinically diagnosed tinea patients were asked about the application of topical steroids. Patients with history of usage of topical steroids were included in the study. Detailed predesigned proforma was filled which included, name, age, family history, type of topical medications applied, prescription details, duration of illness and history of oral medications. KOH smear and culture was done. Patients not willing to participate in the study were excluded from the study.

### *Specimen collection*<sup>6-12</sup>

Skin, hair or nail specimens were collected as per standard techniques in the department of Microbiology in Era’s Lucknow Medical College and Hospital, Lucknow. This was performed only after an informed written consent from each patient/guardian and he/she was assured that the information would be kept strictly confidential. The affected part was first cleaned with 70% alcohol (and left to dry) to remove contaminants. As the site of invasion and localization of infection differ in the different types of superficial mycoses the following collection techniques were followed.

#### *Skin scrapings*

Scrapings were collected from the border of skin lesions with a sterile scalpel blade. The specimen was collected in a piece of stiff black paper 10 × 10 cm and fastened with a paper clip after folding. Each specimen was labeled with name, age, sex of patient, site of lesion and identification number and was kept at room temperature till further processing.

#### *Hair*

Affected site was disinfected with alcohol before collecting specimen. Basal root portion of hair was taken by plucking, scraping scales and excavating hair for direct examination and culture.

#### *Nails*

The nails were clipped short with the nail clippers and debris was discarded. Scrapping was collected (a) from nail bed (b) from the underside of nail plate (if nail plate was affected).

#### *Processing of specimens*

Skin scraping, hairs stubs and nails were examined by direct microscopy and culture using following techniques:

a) *Microscopic examination*: Two methods of direct microscopy were used.

- Potassium hydroxide (10% KOH) preparation.
- Potassium hydroxide (10%) with dimethyl sulfoxide (40%) (KOH/DMSO) preparation.

b) *Culture and isolation of causative fungi*: Specimen was cultured for the isolation of dermatophytes, non-dermatophytes as well as Yeast.

- Sabouraud’s Dextrose Agar (SDA); chloramphenicol (0.05 g/l) was added to the culture media to inhibit bacterial growth.
- SDA with Chloramphenicol (0.05 g/l) and cycloheximide (0.5 g/l) to inhibit the growth of contaminated fungi.
- Dermatophyte test medium (DTM) (Hi Media India) with chloramphenicol (0.05 g/l).

#### *Procedure*

The specimens were inoculated on the surface of the medium (two sets of tubes containing SDA with chloramphenicol with/without cycloheximide and DTM with sterile forceps or loop (L shape) breaking the surface of medium without becoming completely embedded. The use of cycloheximide free media allows other potentially pathogenic fungi to grow and is usually added to culture media to inhibit bacterial overgrowth.<sup>13</sup>

#### *Identification of fungal isolates*

Fungal isolates were identified by procedures detailed in standard mycology textbooks by Rippon and Larone.<sup>8,10,11</sup>

#### *A. Identification of moulds:*

##### *Colonial morphologic features*

- *Colony obverse*: Colour (e.g. white, pearl, ivory and black), consistency (e.g. cottony, fluffy, suede like, wiry), and topography (e.g. flat, folded, plicate, rugose) were noted.
- *Colony reverse*: Extent and color of pigmentation was noted, colony color and morphology including folds and rugosities on reverse were also noted.

**Microscopic morphologic features:** Definitive identification was made by micro-slide culture method.

**Slide culture technique:** It was carried out to observe intact microscopic morphology of the fungus, particularly the position of the macroconidia, micro conidia and chlamydoconidia in relation to each other and the mycelia.

The growth was examined under microscope with high power (40X) magnification for appearance of morphological features.

**Statistics**

Sample size with basis for exemption for calculation.

Sample size was calculated on the basis of incidence of steroid modified tinea among the OPD patients using the formula

$$N = Z^2_{\alpha}pq/L^2$$

Where p= 32%, the expected incidence is based on pilot study

$$q = 100 - p$$

Type 1 error  $\alpha = 5\%$

Allowable error l=10% of p for detecting results with 90% power of the study.

Data loss = 10%

The sample size of n = 900 was calculated.

Whole of the data was entered in Microsoft Excel Sheets and analysed.

**RESULTS**

980 patients were clinically diagnosed as cases of tinea. Out of 980 patients, 550(56%) gave history of application of topical steroids. Male preponderance was noted (Table 1). Most common age group involved was 3<sup>rd</sup> decade. No age group was spared as 6-month old infant was also brought with usage of topical steroids while the maximum age noted was 78 years (Table 2). Disseminated form of tinea was most common variety followed by tinea corporis, tinea cruris Figure 1a, 1b,1c) tinea capitis and tinea capitis with secondary infection (Figure 2a and b) (Table 3). The morphology of lesions was not typical, mainly seen as tinea pseudoimbricata (Figure 1b and c) that is with multiple rings. Itching was very common symptom. Family history was positive in 289(52.5%) patients out of 550 (Table 4). Duration of treatment varied from few days to 20 months. Most of the patients were using topical steroids for less than 12 months (Table 5). Most commonly used topical steroids were betamethasone, clobetasol, mometasone etc. These

were being used by 216 (39.3%) subjects (Table 6). Use of multiple drug combinations was very common which included antifungals, antibacterials and steroid combinations. Very few subjects were using oral medications. 0.4% subjects were on oral fluconazole, 0.4% subjects were on oral itraconazole and 0.2% were on oral terbinafine as shown in (Table 7).

**Table 1: Sex wise distribution.**

Sex	Frequency	Percentage (%)
Male	359	65.3
Female	191	34.7
Total	550	100



Figure 1 (a)



Figure 1 (b)



Figure 1 (c)

**Figure 1: (A) T. Cruris, (B) tinea cruris and corporis and (C) tinea corporis showing multiple rings.**

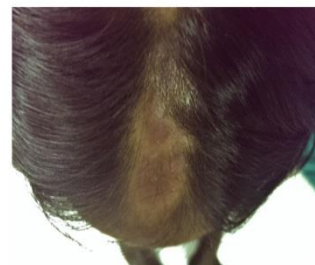


Figure 2(a)



Figure 2(b)

**Figure 2: (A) Tinea capitis with scarring; (B) Tinea capitis with secondary infection.**

**Table 2: Age wise distribution.**

Age (in years)	Frequency	Percentage (%)
0-9	13	2.4
10-19	113	20.5
20-29	189	34.4
30-39	114	20.7
40-49	70	12.7
50-59	27	4.9
60-69	22	4.0
>70	02	0.4
Total	550	100

**Table 3: Distribution of tinea.**

Type of tinea	Frequency	Percentage (%)
Disseminated tinea	328	59.7
Tinea capitis	01	0.1
Tinea corporis	98	17.9
Tinea cruris	80	14.5
Tinea faciei	30	5.4
Tinea mannum	10	1.9
Tinea pedis	03	0.5
Total	550	100

**Table 4: Family history.**

Family history	Frequency	Percentage (%)
Positive	289	52.5
Negative	261	47.5
Total	550	100

**Table 5: Duration of infection.**

Duration (in months)	Frequency	Percentage (%)
0-12	488	88.7
13-24	43	7.8
25-36	16	2.9
37-48	1	0.2
49-60	2	0.4
Total	550	100

**Table 6: Topical medication used.**

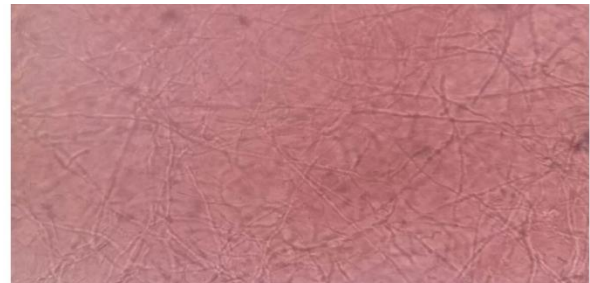
Composition	Frequency	%
Ayurvedic preparations	05	0.9
Betamethasone	78	14.2
Clobetasol	24	4.4
Mometasone	06	1.1
Betamethasone, clioquinol, gentamicin, tolnafate	30	5.5
Betamethasone, gentamycin, miconazole	18	3.3
Clobetasol propionate, miconazole, neomycin	43	7.8
Clobetasol, gentamicin, clotrimazole, clioquinol, tolnafate	22	4.0
Clobetasol, ofloxacin, ornidazole, terbinafine	56	10.2
Homeopathic	01	0.2
Multiple topical steroids	216	39.3
Antifungal	08	1.5
None	43	7.8
Total	550	100

**Table 7: Oral treatment table.**

Oral medication	Frequency	Percentage (%)
Fluconazole	2	0.4
Itraconazole	2	0.4
Terbinafine	1	0.2
Total	550	100

**Table 8: Source of medication.**

Source	Frequency	Percentage (%)
Chemist	165	30
Lmp	277	50.3
Relatives	21	3.9
Self	53	9.7
Not told	34	6.1
Total	550	100



**Figure 3: KOH SMEAR showing branched network of fungal hyphae under 40 X.**

**Table 9: KOH table and culture table.**

	KOH examination		Culture examination (SDA)	
	No.	%	No.	%
Positive	418	76	396	72
Negative	132	24	154	28
Total	550	100	550	100

**Table 10: Types of dermatophytic and nondermatophytic species isolated from dermatophytic infections.**

	Number	Percentage (%)
<b>Dermatophytic species</b>		
<i>T.Mentagrophytes</i>	130	32.82
<i>T.Rubrum</i>	79	19.94
<i>T.Verrucosum</i>	23	5.80
<i>T.Tonsurans</i>	17	4.29
<i>Microsporum Sp.</i>	9	2.27
<b>Non dermatophytic moulds</b>		
<i>Aspergillus Sp.</i>	43	10.85
<i>Acremonium Sp.</i>	19	4.79
<i>Fusarium Sp.</i>	11	2.77
<i>Candida Sp.</i>	65	16.41



Figure 4(a)



Figure 4(b)



Figure 4(c)



Figure 4(d)



Figure 4(e)

**Figure 4: (A) Uninoculated sabouraud dextrose agar fungal culture media; (B) culture bottle of *T. Mentagrophytes* colony obverse showing white cottony growth; (C) culture bottle showing *T. Rubrum* colony obverse showing white cottony growth; (D) culture bottle *Candida* species colony obverse showing moist pasty cream growth; (E) culture bottle showing *Aspergillus* species colony obverse showing blackish growth.**

After specimen collection, KOH was done and it was positive (Table 9) in approximately 76% of cases, (Figure 3) showing KOH wet mount-branched network of fungal hyphae under low power 40X.

Fungal culture was done on Sabouraud's Dextrose Agar (SDA) (Figure 4 a) showing Sabouraud's Dextrose Agar uninoculated fungal culture media. Fungal Culture (Table 9) was positive in 396(72%) patients. Culture bottle (Figure 4b) of *T. Mentagrophytes* colony obverse showing white colony growth was positive in 130 cases that is 29.84%. Culture bottle (Figure 4c) of *T. rubrum* colony obverse showing white, cottony growth. Colony reverse shows red pigment, this was positive in 79 cases that are 24.60%. *T. verrucosum* was positive in 23 cases (5.2%) and *T. tonsurans* in 17 cases (3.8%). Among non-dermatophyte group *Candida* was the most common causative fungus which contributes 65 cases, culture bottle (Figure 4d) of *Candida* species colony obverse showing moist pasty cream colored growth and *Aspergillus* 43 cases, culture bottle (Figure 4e) of *Aspergillus* species colony obverse showing blackish growth, followed by *Acremonium* species in 19 and *Fusarium* in 11 cases.

## DISCUSSION

This study analyzed the use of topical steroids in fungal infections. Due to easy availability and ineffective regulations on sale of topical steroids, the incidence of steroid modified Tinea is increasing. Tropical climate in most parts of our country favours fungal infections. Most of the patients prefer self-treatment and present to Dermatologist at late stages. In our study, 56% of subjects were using topical steroids with male preponderance (Table 1). Philpot suggested that males

may be more vulnerable to infection due to the higher exposures in the army, school and sporting activities and due to the types of shoes and socks used.<sup>15</sup> Similar observation was made by Kothiwalla, Poudyal et al. Dutta et al noted female preponderance in their study.<sup>16-18</sup> All age groups were involved in usage of topical steroids and infants were also not spared while the maximum age noted was 78 years. Most common age group involved was 3<sup>rd</sup> decade (Table 2). Similar scenario was mentioned in other studies also. Disseminated form of tinea was most common variety followed by tinea corporis, tinea cruris, tinea faciei, pedis and capitis (Table 4). As this infection is highly communicable, direct transmission explains the conjugal cases, while transmission in family members might be due to fomites or *de novo* infection.<sup>19</sup> Poor adherence to treatment and wrong treatment also may be a cause for prolonged course of disease. Various types of topical medications were being used by the subjects. Easy availability of topical steroids, dispensing of steroids without prescription and feeling of instant relief on applying topical steroids are the main factors in promoting the use of topical steroids. Use of multiple drug combinations was also common which included antifungal, antibacterial and steroid combinations. Prescription was not a criterion for applying medications. 50.3% of topical steroids users were advised by local medical practitioners/quacks. 30% of the subjects were using topical steroids on advice of chemists while 3.9% were influenced by friends and relatives. Self-treatment group included 9.7% of subjects as shown in (Table 8).

In our study KOH mount was positive in approximately 76% of cases, (Table 9), similar to observation made in other studies.<sup>20-25</sup> Fungal culture (Table 9) was positive in 396 (72%). In other studies, culture positivity varied from 24- 87%.<sup>20,26-29</sup> *T. mentagrophytes* species was found in

130 (29.84%) cases, which correlates with previous studies.<sup>20,30</sup> Previous studies mention *T. Rubrum* as the most common species identified.<sup>16</sup> The type of predominant fungal species may vary from region to region. In our study, the second most common isolated species was *T. rubrum* (24.60% cases) followed by *T. verrucosum* (5.2% of cases) and *T. tonsurans* in 17 cases (3.8%). The Trichophyton group was the most frequently isolated genera in almost all studies, except for one, in which *Microsporum canis* was the most common fungus isolated.<sup>31</sup>

Among non-dermatophyte group (Table 10) *Candida* was the most common causative fungus which contributed to 65 cases, (culture bottle (Figure 10)) followed by *Aspergillus* (43 cases). This was followed by *Acremonium* species in 19 and *Fusarium* in 11 cases.

## CONCLUSION

This was an institution based and time bound study were the drawbacks of this study and the incidence we found may be an iceberg's phenomenon. As KOH mount and fungal culture is not routinely done at all the centers, the real intensity of this problem still eludes. Most of the patients visiting us were already using some medications. Our study highlights the menace with unsupervised use of topical steroids. This not only prolongs the duration of illness but also makes the disease more resistant to treatment. This study emphasizes the need to spread awareness regarding the drawbacks of self-medication, especially with topical steroids. Doctors, chemists, public and government authorities need to work in conjunction to fight with this menace of unregulated topical steroid usage.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the institutional ethics committee*

## REFERENCES

- 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.
- Sahoo AK, Mahajan R. Management of tinea corporis, tinea cruris, and tinea pedis: A comprehensive review. *Indian Dermatol Online J.* 2016;7(2):77-86.
- Lakshmanan A, Ganeshkumar P, Mohan SR, Hemamalini M, Madhavan R. Epidemiological and clinical pattern of dermatomycoses in rural India. *Indian J Med Microbiol.* 2015;33 Suppl S1:134-6.
- Ive FA, Marks R. Tinea incognito. *Br Med J.* 1968;3:149-52.
- Verma SB. A closer look at the term 'tinea incognito' – A factual as well as grammatical inaccuracy. *Indian J Dermatol.* 2017;62:219–20.
- Jagdish C. Superficial cutaneous Mycosis in Text book of Medical Mycology 2nd edition, Jaypee Brothers medical publishers, New Delhi; 2002: 69-86.
- Evans EGV, Richardson MD. Medical Mycology A practical approach. IRL Press at OUP Oxford; 1989.
- Lorone DH, Medically important fungi-a guidance to identification, 2nd edition (141-183) 1993, American Society of Microbiology, Washington.
- Mackie & McCartney. Practical Medical Microbiology. 14th Ed., Collee JG, Fraser AG, Marmion BP, Simmons A, eds. Churchill Livingstone, Elsevier; 2007.
- Rippon JW. Medical Mycology, 3rd Edition, W.B. Saunders Co. Philadelphia, USA; 1988.
- Rippon JW. The changing epidemiology and emerging patterns of dermatophyte species. *Curr Top Med Mycol.* 1985;1:208-34.
- Topley and Wilson's Microbiology and Microbial Infections. Padhya AA, Weitzman I, eds. The Dermatophytes, Vol. 4, 10th Ed, Medical Mycology, Arnold, London; 2005.
- Weitzman I, Summerbell RC. The dermatophytes. *Clin Microbiol Rev.* 1995;8:240-259.
- Stoughton RB, Frisch W. The influence of dimethyl sulfoxide on human percutaneous absorption. *Arch Dermatol.* 1964;90:512-17.
- Philpot CM. Some aspects on epidemiology of tinea. *Mycopathologia.* 1997;3:62
- Dutta B, Rasul ES, Boro B. Clinico-epidemiological study of tinea incognito with microbiological correlation. *Indian J Dermatol Venereol Leprol.* 2017;83:326-31
- Poudyal Y, Joshi SD. Medication practice of patients with dermatophytosis. *J Nepal Med Assoc.* 2016;55(203):7-10.
- Kothiwal R, Kumar R, Bohara DS, Rawat L, Meherda A, Chawla L, et al. Hot Trends of steroid modified tinea at tertiary care hospital in India. *Int Multispecialty J Health.* 2017;3(7):263-7.
- Lyngdoh CJ, Lyngdoh WV, Chohury B, Sangma KA, Bora I, Khyriem AB. Clinico-mycological profile of dermatophytosis in Meghalaya. *Int J Med Public Health.* 2013;3:254-6.
- Gupta AK, Mohan A, Singh SK, Pandey AK. Studying the clinic mycological pattern of the dermatophytic infection attending OPD in tertiary care hospital in eastern Uttar Pradesh and Bihar. *Int J Res Dermatol.* 2018;4(2):118-25.
- Bhagra S, Ganju SA, Kanga A, Sharma NL, Guleria RC. Mycological pattern of dermatophytosis in and around shimla hills. *Indian J Dermatol.* 2014;59:268-70.
- Sarma S, Borthakur AK. A clinico-epidemiological study of dermatophytoses in Northeast India. *Indian J Dermatol Venereol Leprol.* 2007;73:427-8.
- Gupta S, Gupta BL. Evaluation of the incidences of dermatophilic infection in Rajasthan: Case studies

- from Rajasthan, India. *Int J Med Med Sci*. 2013;5:229-32.
24. Surekha A, Ramesh Kumar G, Sridevi K, Murty DS, Usha G, Bharathi G. Superficial dermatomycoses: A prospective clinicomycological study. *J Clin Sci Res*. 2015;4:7-15.
  25. Jain N, Sharma M, Saxena VN. Clinico-mycological profile of dermatophytosis in Jaipur, Rajasthan. *Indian J Dermatol Venereol Leprol*. 2008;74:274-5.
  26. Aggarwal A, Arora U, Khanna S. Clinical and mycological study of superficial mycoses in Amritsar. *Indian J Dermatol*. 2002;47:218-20.
  27. Malik A, Fatima N, Khan PA. A clinico-mycological study of superficial mycoses from a tertiary care hospital of a North Indian town. *Virol Mycol*. 2014;3:135.
  28. Sen SS, Rasul ES. Dermatophytosis in Assam. *Indian J Med Microbiol* 2006;24:77-8.
  29. Sumana MN, Rajagopal V. A study of dermatophytes and their in-vitro antifungal sensitivity. *Indian J Pathol Microbiol*. 2002;45:169-72.
  30. Bhatia VK, Sharma PC. Epidemiological studies on Dermatophytosis in human patients in Himachal Pradesh, India. *Springerplus*. 2014;3:134.
  31. Atzori L, Pau M, Aste N, Aste N. Dermatophyte infections mimicking other skin diseases: A 154-person case survey of tinea atypica in the district of Cagliari (Italy). *Int J Dermatol*. 2012;51:410-5.

**Cite this article as:** Chaudhary S, Shukla P, Gupta K, Paliwal G. Incidence of steroid modified tinea in tertiary care centre Lucknow. *Int J Res Dermatol* 2018;4:579-85.