

The menace of tinea incognito: clinico-epidemiological study with microbiological correlation from South India

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Abstract

Objective To study and document the epidemiological data, various morphological expressions, and causative medications for tinea incognito, to identify the causative agent, and also to evaluate the laboratory methods' efficacy in substantiating the diagnosis clinically.

Methods It was conducted over a period of two years with a sample size of hundred cases of tinea incognito who had used topical or systemic steroids, topical immunosuppressants, and other indigenous preparations for a period of at least four weeks. Skin scrapings from the patients were examined for fungal elements under KOH mount, and fungal cultures were performed for species identification, and the derived results were analyzed. Patients at the end of three weeks and six weeks were re-assessed.

Results In our study, clinical presentation mimicked various dermatoses, of which eczematous like was the most common type, followed by psoriasiform. KOH was positive among 69% of the patients, and positivity for fungal culture was seen in 48%, out of which Trichophyton mentagrophytes constituted 56.25% of the cases, followed by Trichophyton rubrum (25%).

Conclusion Although this entity has been known for years, it still causes perplexity in diagnosis and treatment. Health education in order to create public awareness about dermatophytosis is indeed the need of the hour.

Key words

Tinea incognito; Steroids; Dermatophytosis.

Introduction

Dermatophytosis is a superficial fungal infection of the keratinized tissue, commonly designated as tinea.¹ In dermatologic clinics, dermatophytosis is the most prevalent cause of superficial fungal infections worldwide.² At present, there are 48 species of dermatophytes, which are classified into three genera, namely: trichophyton,

microsporum, and epidermophyton.³

Tinea incognito is an infection modified by topical or systemic corticosteroids⁴ or other immunosuppressants, which makes it difficult to diagnose. Although there are some studies on the different tinea incognito patterns and manifestations, it nevertheless raises diagnostic questions and therapeutic concerns.

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Methods

An open-label prospective study was conducted in the department of dermatology over a period

of 2 years with a sample size of 100 cases of tinea incognito after obtaining the institutional ethics committee's clearance.

All the cases of clinically suspected tinea incognito of all ages and sexes who have used topical or systemic steroids, immunosuppressants, and other indigenous preparations for at least a period of 4 weeks were included after obtaining informed consent. Severe life-threatening systemic diseases and non-cooperative patients were excluded from our study.

A detailed patient history, including physical and cutaneous examination, has been taken. Samples (skin scrapings) from the patients were examined for fungal elements under KOH mount, and fungal cultures were done for species identification, and the derived results were analyzed. Patients at the end of three weeks and six weeks were re-assessed. The KOH negative clinically suspected cases were treated with topical antifungals and included in the study based on the response to treatment.

Results

In our study, 62% of 100 cases were males and 38% were females. Males outnumbered females by a ratio of 1.63:1. Of all the patients, the minimum and maximum age recorded were nine years and 64 years, respectively, with a mean age of 31.47 years. In a combined comparison of age and gender, the maximum number of cases was observed in the age group of 21–30 years among males, i.e., about 33.87% (21) and among females, it was observed in the age group of 31–40 years, i.e., about 28.94% (11).

In the current study, out of 100 cases, 38% belonged to the urban population, whereas 62% belonged to the rural population. The maximum number of cases in our study were observed

among agricultural workers (36%), followed by housewives (29%), students (28%), and others (7%).

In our study, 44% gave a history of similar complaints in one of the family members. Comorbidities were present in 22% of patients, of which diabetes mellitus constituted a major part (54.54%), followed by hypertension (4%) and hypothyroidism (4%).

Out of 100 patients, 32% had the disease for 2–4 months, followed by 27% for 4–6 months, 15% for 6–8 months, 10% for 1–2 years, 8% for less than two months, and 4% each for 8–12 months and more than two years, respectively.

The most commonly used agents were a combination of topical and systemic steroids by 48% of the patients, followed by topical steroids by 27% of the patients, and multiple formulations were used by 9% of the patients. In this study, local quacks were the main offenders, responsible for 52% of the patients. 30% of the patients used medications given by pharmacists, while 7% of the patients were treated by physicians. Only 1% of patients used the formulations on their own.

In the current study, out of 100 cases, the most common clinical picture was eczema-like presentation (26%), which mimicked non-specific eczema, irritant contact dermatitis (**Figure 1**), seborrheic dermatitis, airborne contact dermatitis, and atopic eczema, followed by psoriasiform lesions (19%), large annular plaques (13%), and pseudo imbricata (10%) (**Figure 2**). The remaining 32% of the cases resembled various skin disorders like maculopapular rash, granuloma annulare, ichthyosis, folliculitis, furunculosis, prurigo, etc. (**Table 1**).

The eczematous lesions were common among



Figure 1 Irritant contact dermatitis- Tinea lesions masquerading as irritant contact dermatitis due to application of indigenous preparations like Zalim lotion.



Figure 2 Pseudo imbricate- Multiple concentric rings similar to Tinea imbricata, mainly occurring due to partial immune response caused by steroid application.



Figure 3 Colony of Trichophyton mentagrophyte.



Figure 4 Growth of Trichophyton rubrum on Fungibiotic Agar.

the age group of 21–30 years (8%). Psoriasiform lesions and large annular plaques were also common in the age group of 21–30 years. The other atypical forms were common among the age group of 31–40 years, constituting about 11%.

Out of 100 patients, 52% had involvement in more than two sites. 24% had involvement of the glabrous skin of the trunk, followed by 13% in the flexures. KOH examination and fungal culture were positive in 69% and 48% of patients, respectively. The most common species identified in culture was Trichophyton mentagrophyte (56.25%) (**Figure 3**), followed by Trichophyton rubrum [25%] (**Figure 4**). At the end of 6 weeks, 97% of patients showed a complete response to the treatment.

Discussion

In India, among superficial fungal infections, dermatophytosis is largely prevalent. A complicated mixture of host factors, agent variables, and social factors has recently led to an increase in its incidence and a wide range of unusual clinical manifestations.⁵ Iatrogenically sustained steroid recast dermatophytosis has

surfaced as a troublesome condition with a changed morphology and progression.⁶ Corticosteroid misuse, usually topical, is the crucial contributing factor to this epidemic-like situation.⁷

Commonly available over the counter medications topically for "itchy skin rash" embrace fixed dose combination (FDC) formulations containing steroids, antifungals, and antibiotics.⁵ These formulations may provide immediate symptomatic relief to patients due to their anti-inflammatory nature. Still, in the community they turn out for fungal infections as a crucial explanation for the cause of the spread and perseverance.⁵ Application of steroids topically may change the appearance of the dermatophytosis, leading to various atypical presentations.⁸ Tinea incognito on the face, may resemble lupus erythematosus, contact dermatitis, rosacea, etc.⁹⁻¹² It may sometimes also mimic other dermatoses, which include erythema multiforme, seborrheic dermatitis, dermatitis herpetiformis, psoriasis, impetigo, and polymorphous light eruption.¹³

In our study, males outnumbered females, and the results were similar to those of Chaudhary *et al*,¹⁴

Table 1 Distribution of various morphological types of Tinea incognito with site and culture characteristics in the present study (T-Trichophyton, M-Microsporium).

Clinical presentation	n	Site of involvement	KOH mount	Fungal culture (numbers)
Psoriasiform	19	Body (4), Flexures (2), Palms (1), Mixed (12)	15	T.rubrum (3), T.mentagrophytes (6), M.gypseum(2)
Pseudoimbricata	10	Body (1), Flexures(1), Face(1), Mixed (7)	8	T.rubrum (2), T.mentagrophytes (3), M.gypseum(1)
Irritant contact dermatitis like	6	Mixed (4), Facei (2)	4	T. rubrum (2), T.Mentagrophytes (1)
Maculopapular rash	5	Mixed (3), Body (2)	3	
Seborrheic dermatitis	8	Mixed (5), Scalp (1), Face (2)	8	T. rubrum (1), Mentagrophytes (3), M. gypseum (1), T. Tonsurans (1)
Echymosis like	2	Mixed (1), Body (1)	2	T.rubrum (1)
Large annular plaques	13	Mixed (3), Scalp (2), Body (4), Flexures (4)	8	T.rubrum (2), T.mentagrophytes (4), M.gypseum (1)
Eczematous	7	Mixed (1), Body (2), soles (2), Flexures (2)	4	T.mentagrophytes (2), M.gypseum (1)
Ichthyosis like	4	Mixed (2), Body (2)	2	T.mentagrophytes (1)
Granuloma annular like	5	Mixed (1), Body (3), Palm (1)	4	T.mentagrophytes (3)
Air borne contact dermatitis like	3	Mixed(2), Flexures (1)	3	T.mentagrophytes (1)
Folliculitis like	3	Body (1), Flexures(2)	0	
Majocchis granuloma	1	Mixed (1)	0	
Atopic eczema-like	2	Mixed (1), Flexures(1)	1	T.mentagrophytes (1)
Atrophic	2	Mixed (2)	1	T.mentagrophytes (1)
Pustular	3	Mixed(3)	2	M.gypseum (1)
Prurigo like	1	Mixed (1)	1	T.rubrum (1)
Id reaction	1	Mixed (1)	0	
Photosensitive rash	2	Mixed (1), Body (1)	0	
Hansen’s disease like	2	Mixed (1), Body (1)	2	T.mentagrophytes (1)
Furuncle like	1	Body (1)	1	T.tonsurans (1)
Total	100	100	69	48

and Dutta *et al.*,² who also recorded male preponderance. The male preponderance observed may be due to increased subjectivity risk to infections and type of work nature. Furthermore, in females, lower occurrence in females might be due to under-reporting as a result of prevailing social stigma.

Out of 100 patients considered for the study, 21-30 years outnumbered the other age groups, and the least number recorded was below ten years and above 60 years. The mean age group of all the patients was 31.47 years, similar to the study done by Dutta *et al.*;² where the mean age group was 28.47 years, and the study done by Arun *et al.*;¹⁵ which reported the mean age group as 32.4 years. The rate of infection was observed to be

low in extreme age groups in our study, which was comparable to the study done by Arun *et al.*;¹⁵

Most of the patients in our study belonged to a rural background and low socioeconomic status. Among low socioeconomic groups, factors like overcrowding, poor hygienic conditions, improper nutrition, and inappropriate sanitation education might contribute to dermatophytosis growth. A maximum number of cases were observed among agricultural workers (36%), for which the probable reasons could be increased sweating due to outdoor activities, constant contact with soil and plants, and associated unhygienic conditions.

In the present study, 22% of the patients were associated with comorbidities, of which diabetes mellitus constituted a major part (54.54%), followed by hypertension (4%), hypothyroidism (4%), and HIV (2%). These comorbidities may cause immunodysregulation, resulting in decreased clearance of dermatophytes. Dysregulation in immunity with asymmetrical response in the direction of Th2 cytokines, with raised levels of antibodies like IgE and IgG4, might also contribute clinically to a few of these unusual, chronic and atypical forms.¹³

Most of the patients had the disease for 2-4 months. The maximum duration of the disease was ten years. In a similar study done by Chaudhary *et al*;¹⁴ the maximum number of patients had disease duration of fewer than 12 months (88.7%), which was comparable to our study (86%).

The duration of the drug abuse varied from a few days to several years. In the present study, 58% of patients were using these formulations for a duration of 2 months or more (up to 12 months), and history recorded that only 9% of patients were using them for years. Rajkumaran *et al*.¹⁶ in their study recorded 55% of the patients applying formulations for duration of 1 month or more and 2.5% of the patients with a history of application for years.

The most commonly used agents were a combination of topical and systemic steroids by 48% of the patients. In a similar study done by Chaudhary *et al*;¹⁴ the majority of patients were using topical steroids (56%). One of the main reasons for the widespread misuse of steroids is their easy accessibility over-the-counter without a prescription. Erroneous usage of steroids in prescriptions by medical officers without keeping in view the etiology of fungus as differential diagnosis in primary health centers may result in the usage of steroids indecorously.

The prescription was not a criterion for the usage of medications. Local quacks were the main culprits responsible for 52% of the patients, which was similar to studies done by Arun *et al*;¹⁵ and Chaudhary *et al*;¹⁴ where 85% and 50% were treated by local quacks, respectively. Rajkumaran *et al*;¹⁶ stated that pharmacists were responsible for the majority of the cases (50.4%). Dutta *et al*;² also reported that most of the patients used medications prescribed by pharmacists in their study, which constituted about 78%.

The clinical presentation mimicked various inflammatory, eczematous dermatoses, and exanthematous conditions. In the current study, out of 100 cases, the most common clinical presentation was eczema-like presentation (26%), which included non-specific eczema, irritant contact dermatitis, seborrheic dermatitis, airborne contact dermatitis, and atopic eczema. Dutta *et al*;² found that eczema-like presentations were the most common (37%). Arun *et al*;¹⁵ stated that 80% of the tinea incognito cases had an eczema-like presentation. A similar study on Tinea incognito in Italy, by Kim J W *et al*;¹⁷ observed 82% of the lesions to be eczema-like presentations.

Out of 100 patients, 52% had involvement in more than two sites. Twenty-four percent had involvement of the trunk, followed by 13% in flexures. Dutta *et al*;² and Chaudhary *et al*;¹⁴ also observed similar results in their studies. Kim J W *et al*;¹⁷ observed that the trunk was the most common site of disseminated involvement in only 13.8% of the patients.

In the present study, KOH was reported positive in 69% of the cases, and fungal culture was positive in 48% of the cases. Arun *et al*;¹⁵ reported that KOH positivity was 78.4% and that culture positivity was 55.2%. In a study done by Dutta *et al*;² 85% of the cases were KOH

positive and 63% were culture positive, which was close to our study.¹⁴ reported that 76% and 72% of the cases in his study were KOH and culture-positive, respectively. Kim JW *et al*;¹⁷ observed that 91.1% and 23.7% were KOH and culture positive. Another study conducted by Gerceker Turk *et al*;¹⁸ reported 80.95% KOH positivity and 90% culture positivity.

Fungal culture was performed on Fungi biotic Agar. The culture bottle of Trichophyton mentagrophytes colony showed white colony growth, which was positive in 56.25% of the cases. Culture bottle of Trichophyton rubrum colony showed white, cottony growth with colony reverse showing red pigment, was positive in 25% cases. Microsporum gypseum and Trichophyton tonsurans were positive in 14.58% and 4.16% of cases, respectively. A study done by Arun *et al*;¹⁵ observed Trichophyton rubrum in 32% of the cases and Trichophyton mentagrophytes in 26% of the cases. Similarly, Dutta *et al*.² observed Trichophyton rubrum in 35% of the cases and Trichophyton mentagrophytes in 22% of the cases. In a study by Chaudhary *et al*;¹⁴ Trichophyton rubrum was observed in 24.6% of the cases, and Trichophyton mentagrophytes was observed in 29.8% of the cases. Kim J W *et al*.¹⁷ observed 73% and 9%, respectively, of Trichophyton rubrum and Trichophyton mentagrophytes, which was close to our study.

Studies in the past have mentioned that Trichophyton rubrum was the most common causative species for Tinea incognito. However, recent studies have stated that Trichophyton mentagrophyte is the most common species responsible for Tinea incognito. There have been reports suggesting Trichophyton mentagrophytes as a leading causative agent in many studies from India,¹⁹ which are in support of our study, stating that there has been a major epidemiological shift.

All the cases were reassessed at the end of three and six weeks, which showed complete clinical clearance in 97% of the cases by the end of six weeks, whereas 3% of the cases showed a 75–100% response by the end of six weeks. In a similar study done by Dutta *et al*;² all cases showed complete resolution of lesions at six weeks' follow up.

Conclusion

Dermatophytic infections are dealt with regularly in our day-to-day practice. Although this entity has been known for years, it is still a cause of diagnostic dilemmas and therapeutic concerns. The increased incidence of tinea incognito is mainly due to a lack of awareness among the population, improper diagnosis, as well as a lack of strict regulations for local chemists for dispensing drugs without a prescription. The incidence found in the present study is just the tip of the iceberg, and there are many more cases of tinea incognito that go unnoticed due to the social stigma prevailing in society.

Health education to create public awareness (even among chemists, quacks, and general practitioners) about the irrational usage of drugs and their adverse effects is indeed the need of the hour. An initiative at state and central levels is to be taken to spread awareness regarding the potential side effects of these drugs, and attempts have to be made to eliminate the people's social stigma.

References

1. Kanwar AJ, De D. Superficial Fungal Infections. In: Valia RG, Valia AR, editors. IADVL Textbook of Dermatology. Volume 1, 3rd ed. Mumbai: Bhalani Publishing House; 2008. p.252-97.
2. Dutta B Rasul ES, Boro B. Clinico-epidemiological study of tinea incognito

- with microbiological correlation. *Indian J Dermatol Venereol Leprol* 2017; 83: 326-31.
3. Mahajan S, Tilak R, Kaushal SK, Mishra RN, Pandey SS. Clinico-mycological study of dermatophytic infections and their sensitivity to antifungal drugs in a tertiary care centre. *Indian J Dermatol Venereol Leprol* 2017;83:436-40
 4. Hay RJ, Ashbee HR. Mycology. In: Burns T, Breathnach S, Cox N, Griffiths C, editors. *Rook's Textbook of Dermatology*, 8th ed. West Sussex: Wiley Blackwell; 2010. p. 36.1-36.93.
 5. Dabas R, Janney MS, Subramaniyan R, Arora S, Lal V S, Donaparthi N. Use of over-the-counter topical medications in dermatophytosis: A cross-sectional, single-centre, pilot study from a tertiary care hospital. *Indian J Drugs Dermatol* 2018; 4:13-7.
 6. Verma S.B., Das A. (2018) Steroid-Modified Dermatophytosis: A Potential Epidemic in Developing Countries. In: Orfanos C., Zouboulis C., Assaf C. (eds) *Pigmented Ethnic Skin and Imported Dermatoses*.
 7. Thakur R. Epidemiology of cortico-steroid-modified Tinea: The study of 100 cases in the rural tertiary care teaching hospital of Western Uttar Pradesh, India. *Journal of Dermatology & Cosmetology*. 2018;2(5).
 8. Alshehri, Sumayah & Al Muawad, Nouf & Gaafar, Rwan & Alsadi, Khlood & Alhajaji, Maather & Alwafi *et al.* (2017). Tinea Incognito: Case Report. *Dermatol Open J*. 2. 7-9.
 9. Aboud, Khalid & Hawsawi, Khalid & Alfadley, Abdullah. (2003). Tinea Incognito on the Hand Causing a Facial Dermatophytid Reaction. *Acta dermatovenereologica*. 83. 59.
 10. Crawford, Kevin & Bostrom, Paul & Russ, Brian & Boyd, Jason. (2004). Pimecrolimus- Induced Tinea Incognito. *Skinmed*. 3. 352-3.
 11. Siddaiah N, Erickson Q, Miller G, Elston DM. Tacrolimus-induced tinea incognito. *Cutis*. 2004 Apr;73(4):237-8.
 12. Pustisek N, Skerlev M, Basta-Juzbasić A, Lipozencić J, Marinović B, Bukvić-Mokos Z. Tinea incognito caused by trichophyton mentagrophytes - a case report. *Acta Dermatovenereol Croat*. 2001 Dec;9(4):283-6.
 13. Dogra S, Narang T. Emerging atypical and unusual presentations of dermatophytosis in India *Clin Dermatol Rev* 2017;1, Suppl S1:12-8
 14. Chaudhary, Savita & Shukla, Priyanka & Gupta, Khushboo & Paliwal, Gaurav. (2018). Incidence of steroid modified Tinea in tertiary care centre Lucknow. *International Journal of Research in Dermatology*. 4. 579.
 15. Arun B, Remya V S, Sheeba P M, Pratyusha Kokkayil. Mycological study on the incidence of Tinea incognito in a tertiary hospital. *MedPulse – International Medical Journal* October 2015; 2(10): 649-651.
 16. Kothiwalla R, Kumar R, Bohara D, Rawat L, Meherda A, Chawla L. Hot Trends of steroid modified Tinea at Tertiary care hospital in India. *International Multispeciality Journal of Health*. 2017; Vol 3(Issue No. 7).
 17. Kim WJ, Kim TW, Mun JH, Song M, Kim HS, Ko HC, Kim BS *et al.* Tinea incognito in Korea and its risk factors: a nine-year multicenter survey. *J Korean Med Sci*. 2013 Jan;28(1):145-51.
 18. Turk B.G, Taskin B, Karaca N, Sezgin A.O, & Aytimur D (2013). Clinical and mycological analysis of twenty-one cases of Tinea incognito in the Aegean region of Turkey: A retrospective study. *Acta dermatovenereologica Croatica: ADC*, 21: 2, 93-8
 19. Shenoy MM, Jayaraman J. Epidemic of difficult-to-treat tinea in India: Current scenario, culprits, and curbing strategies. *Arch Med Health Sci* 2019; 7:112-7.