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ORIGINAL ARTICLE

Frequency, sociodemographic features and variations in clinical presentation of steroid induced dermatophytosis from a tertiary care hospital of Karachi.

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ABSTRACT… Objective: To evaluate the increase in frequency of tinea incognito along with its current presentation and etiologic features. **Study Design:** Cross-sectional study. **Setting:** Dermatology Outpatient Clinic, Dr. Ruth Pfau Civil Hospital Karachi, Dow University of Health Sciences. **Period:** July to November 2023. **Material & Methods:** It is a retrospective cross-sectional study done on subjects who were diagnosed with dermatophystosis from outpatient clinic of dermatology at Dr. Ruth Pfau Civil Hospital Karachi. The subjects were inquired about predisposing factors, drugs and family history, along with examination of the site of infection. The Statistical Program for Social Sciences (SPSS) version 21 was used for the analysis of data. **Results:** In this study, tinea corporis was determined to be the most frequent site of dermatophytoses (77.2%) with most of the participants being females (66.1%). Topical steroids were most commonly utilized (71.7%), whereas 44.9% of the population used steroid of moderate potency. Significant association of steroid use was found with itching ($p = 0.019$), pustules ($p = 0.019$) and erythroderma ($p = 0.012$) when compared with secondary signs and symptoms of dermatophytosis. **Conclusion:** This study concluded that wider prevalence, easy access and differentiable modes of application of steroids without proper consultation have worsened the clinical picture of dermatophytosis and increased the likelihood of recurrent infections.

Key words: Dermatophytosis, Frequency, Recurrence, Steroid, Tinea Incognito.

INTRODUCTION

Tinea, also known as dermatophytosis, are the most prevalent cause of human fungal infections that invade keratinized tissues such as hair, nails, and the corneal layer of the skin.[1,2] Dermatophytic infections of the skin can appear in a variety of anatomical locations of the body ranging from the head to the groins and are hence named accordingly.[3]

On the other hand, tinea incognito is a dermatophytic infection with a different clinical appearance due to prior therapy with steroids either topical or systemic, as well as certain topical immunomodulators.[4,5] Its proclivity to resemble other dermatological disorders makes it of utmost significance.[6,7]

Fungal skin infections affect 10–20% of the global population, among whom tinea incognito is responsible for roughly 40% of all tinea infections.[5] The probable risk factors implicated include those linked to dermatophytes exposure in communal facilities with wet settings that support fungus growth, such as tropical regions, overpopulation, urbanization, shared housing such as hostels, fitted clothing, communal baths, and joint sporting facilities like swimming pools and school gymnasiums.[8,9] It is to be noted that the causes could be even more varied, ranging from inappropriate use of antifungal medicines to topical steroid use, as well as the population's adverse socioeconomic status.[2]

Subcoastal regions like South Asia have a hot and humid climate that is ideal for the growth of

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dermatophytes.[9,10] In recent years, a rapid rise in dermatophyte infections has been detected.[2,3,11] It could be due to widespread inflammatory presentations, late diagnosis, incongruent treatment, and treatment resistance.[3,9] This has resulted in a remarkable rise in fungal infections and the emergence of resistant dermatophytosis in South Asian countries like India and Pakistan.[9,11]

The emergence of a range of powerful medicines has tremendously aided dermatology in recent years. While this has made it easier to manage diseases, it has also led to rise in iatrogenic disease. Corticosteroid ointments are frequently misapplied as a dermatological panacea, and their overuse is frequently the cause of induced skin illness.[3,12] It is a widespread practice in South Asian countries that pharmacists and local quacks frequently dispense drugs without a prescription as individuals seek care from them first, rather than professional dermatologists.[4,6,8,13] Due to the immunosuppressive nature of steroids, fungal growth flourishes rapidly and acquires a form entirely different from classical ringworm infection. These lesions are large, discoid, less scaly, pruritic, erythematous, and pustular, and they can look like other skin disorders such as psoriasis, eczema, and candidiasis.[4,14] As a result, the clinical diagnosis of tinea incognito is often overlooked or delayed, and the illness spreads slowly with few clinical and subclinical symptoms.[5]

As the data from extensive or multicentric research are limited on this recently observed epidemic-like scenario from Pakistan, this study was conducted to determine the factors of alarming increase of tinea incognito and its horrifying implications. The study's primary goals were to evaluate the frequency of dermatophytosis as well as the clinical and epidemiological parameters of steroid-induced tinea infections in the outpatient setting of a tertiary care hospital in Karachi.

MATERIAL & METHODS

This is a retrospective cross-sectional study, conducted on patients attending the outpatient setting of dermatology clinic of Dr. Ruth Pfau Civil Hospital Karachi affiliated with Dow University of Health Sciences. The sample size was calculated by Open Epi version 3.0, an open-source calculator, keeping 90% power at 95%. Data was collected from 129 subjects with clinically suspected tinea infections of all ages and all genders, after taking informed written consent. Patients who reported a history of tinea infections along with the use of steroids for a minimum of two weeks were included in the study, whereas subjects with bacterial, viral dermal infection or systemic disease with dermatologic manifestations were excluded from the study. Tinea infections of the nail and head were eliminated from the study because of their different presentation. The patients were first investigated regarding their general demographic details, comorbidities, and type of tinea infections. A detailed history was later taken about the duration and nature of topical or systemic medication usage, including antifungal drugs and steroids, either used alone or in combination. Episodes of relapses or remissions, if experienced, were also taken and recorded in proforma. Risk factors for recurrent dermatophytosis, such as a history of contact with pets, atopy, a family history of fungal infection, and sharing of household items, were also noted. This study is ethically registered at the institutional review board of the affiliated institute for ethical approval (IRB-2518/DUHS/Approval/2022/917) and the Helsinki's principle was followed. Confidentiality of study participants was maintained throughout the course of the study.

Data was analyzed using the software Statistical Package for the Social Sciences (SPSS) Version 21. Descriptive analysis was done using range and median whereas continuous variables were represented as mean with standard deviation. Frequency (n) and percentages (%) were used to show the distribution of qualitative variables. Statistical differences and bivariate analysis of subgroup comparisons in categorical data were assessed using the chi-square test. The significance level was chosen at $P < 0.05$, keeping the confidence interval at 95%.

RESULTS

A total of 129 patients were recruited from the

dermatology outpatient clinic of Dr. Ruth Pfau Civil Hospital, Karachi. Data from two subjects were excluded due to incomplete information, hence, the net result is developed from 127 subjects. The mean age of the affected participants was 31.65±14.9 years, with females having a preponderance, accounting for 66.1% (n=84). Approximately, 33.9% (n=43) of the subjects had an associated comorbidity, of which hypertension was the most prevalent (15%, n=19), followed by diabetes mellitus, which accounted for 9.7% (n=11) of the cases.

In majority of the patients, tinea corporis has been found as the most common dermatophytic infection with a prevalence of 77.2% (n=98) among the recruited population. The details of the frequency of different tinea infections among the subjects are described in Figure-1. Approximately 45.7% (n = 58) of subjects were at the initial stage of dermatophyte infections, while 29.1% (n=37) and 25.2% (n=32) reported histories of recurrent and relapsing infections, respectively.

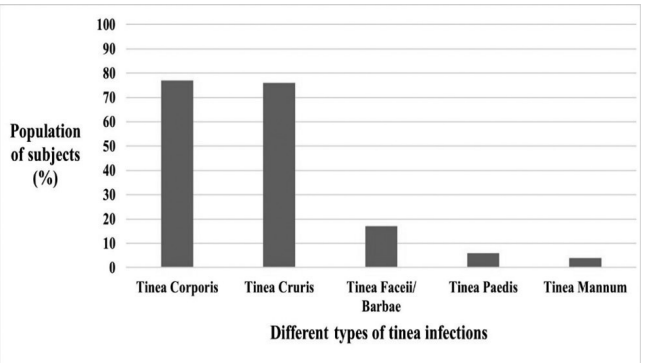

Figure-1. Different types of dermatophyte infections prevalent among targeted population

The mean duration of dermatophytic infection was 1.84 ± 1.1 years. Out of them, 71.6% (n=91) were diagnosed for less than a year, followed by 18.1% (n=23) who reported for more than one year but less than two years, and then 9.3% (n=13) who had been suffering from tinea infections for more than two years. A positive family history of dermatophytic infections was found in 72.4% (n=92) of the patients. Notably, 73.2% (n=93) of patients said they had shared at least one household item with family members. Towels were found to be the most shared item (65.4%, n=83). The details of sharing household items with family members among the subjects are depicted in Figure-2. Additionally, 18.1% (n=23) of the targets were pet owners.

Coming to the treatment sought by the targeted population, 45.7% (n = 58) of them used topical treatment, followed by 43.3% (n = 55) who used oral treatment, and those who used both oral and topical treatment were 11.0% (n = 14). Almost 99.2% (n=126) of complainants had a previous history of steroid use. Figure-3 represents the different durations of steroids used by the recruited subjects. Subjects who used steroids of moderate potency were 44.9% (n=57), followed by 36.2% (n=46) who used steroids of high potency. However, mild steroids were used by only 18.9% (n=24) of them. Topical steroids were most frequently used, i.e., 71.7% (n=91), whereas 10.2% (n=13) used injectables and 0.8% (n=1) used oral steroids. Drugs other than steroids used by patients were Fluconazole 34.6% (n=44), Terbinafine 25.2% (n=32) and Itraconazole 5.5% (n=7).

Table-I shows the prevalence of the different signs and symptoms observed after the implementation of steroids. The most frequent clinical manifestations were itching, followed by eczematization, inflammation, and scaling. Roughly 96.9% (n=123) experienced no Interface Dermatitis (ID) eruption secondary to steroid use, with only 1.6% (n=2) having complained of pompholyx and urticaria each. When the nature of steroids was compared to the signs and symptoms of dermatophytic infection secondary to steroid use, a significant association was found in subjects who used moderate and high potency steroids with gross inflammation ($\chi^2 = 6.317$, $p = 0.042$), itching ($\chi^2 = 3.241$, $p = 0.019$), pustules ($\chi^2 = 7.964$, $p = 0.019$) and erythroderma ($\chi^2 = 8.815$, $p = 0.012$).

DISCUSSION

Tinea incognito, a dermatophytosis with much generalized characteristics, lacks the conventional ringworm symptoms and is frequently caused by long-term steroid usage.[3-5,12] Our study showed a wider prevalence of tinea incognito, particularly among those individuals who had used steroids

of moderate to higher potency with symptoms of secondary inflammation, predominantly itching, pustules, and erythroderma.

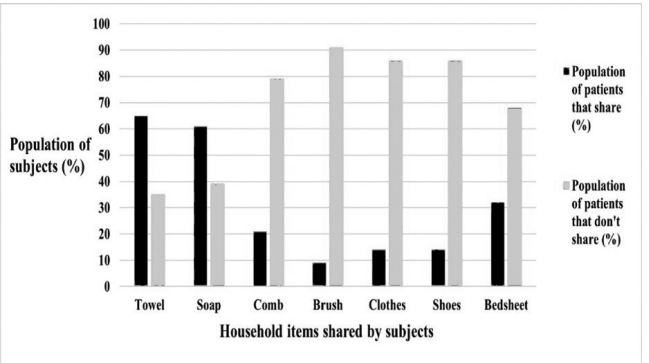

Figure-2. Details of sharing of household items among patients with dermatophyte infections.

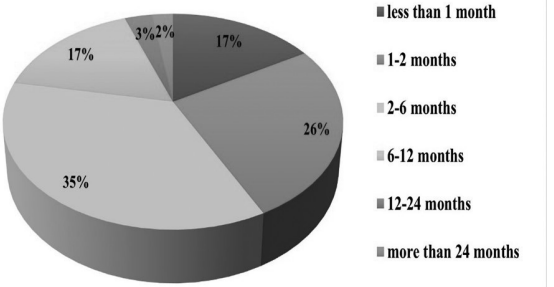

Fig. 3. Duration of use of steroid by targeted population.

S. No.	Characteristics	No. of Patients With Symptom N (%)	No. of Patients Without Symptom N (%)
1.	Inflammation	110 (86.4%)	17 (13.4%)
2.	Itching	120 (94.5%)	7 (5.5%)
3.	Scaling	95 (74.8%)	32 (25.2%)
4.	Pustules	73 (57.5%)	54 (42.5%)
5.	Erythroderma	41 (32.3%)	86 (67.7%)
6.	Eczematization	99 (78.0%)	28 (22.0%)
7.	Broken hairs	1 (0.8%)	126 (99.2%)
8.	Alopecia	1 (0.8%)	126 (99.2%)
9.	Scarring	1 (0.8%)	126 (99.2%)
10.	Crusting	2 (1.6%)	125 (98.4%)
11.	Onychomycosis	-	127 (100%)
12.	Yellow/ black discolouration	1 (0.8%)	126 (99.2%)
13.	Powdery white	-	127 (100%)

Table-I. Variations in clinical signs and symptoms of dermatophyte infections secondary to steroid use

In our study, majority were females, which is in concordance with a Pan-Indian survey also showing a female preponderance in the prevalence of dermatophyte infections.[15] The average age of usage found in our study was like findings from studies in India and Pakistan.[6,13,15]

Tinea corporis was found to be the most common site of dermatophytosis, which contrasts with studies in India that found the face to be the most afflicted.[16] The mean duration of diagnosis in our study was an extended period of more than one year, whereas in India this period was limited to less than six months, as reported by Dabas R and Kashyap P et al. in their respective studies.[15,17] This may have been due to patients frequently self-medicating and, lately approaching professional consultants.[18]

A quarter of our patients experienced recurring dermatophytosis, which backs up Pathania S's findings, underlining the high rate of relapse due to poor treatment adherence and personal hygiene.[8] Approximately three-fourths of our subjects showed a positive family history of infections, which is in accordance with a Polish study focusing on the genetic predisposition to the disease in humans.[2] As compared to studies from around the world, most of the participants reported sharing household items, highlighting the risk of fomite transmission at home.[8,9,19,20]

This study also focused on the adverse clinical outcomes observed after steroid usage, and as per the findings, itching was the most common complaint, correlating with an Indonesian study.[21] It could be due to heat and humidity common in local weather which leads to excessive sweating [18,.21] Topical steroids were used by nearly three-quarters of our participants, which compares with an Indian study showing a prevalence of self-medicated patients opting for over-the-counter topical steroids.[15]

Despite their grave side effects, these medications are manufactured and supplied in Pakistan without enough regulatory oversight. In a South Asian study, pharmacists were found to be responsible for almost four-fifth of tinea incognito cases, especially in areas where local health services are non-compliant.[4] Kim et al.'s study in

South Korea also revealed an increasing trend of self-medication and visiting quacks in contrast to professional consultants among subjects with tines incognito.[22] These results support our study where almost all the patients with secondary inflammation reported previous use of steroids.

Steroid misuse can make tinea difficult to distinguish from other common disorders such as eczema, thereby increasing the likelihood of misdiagnosis, mistreatment, and even morbidity.[13,23,24] Public awareness and training programs should be organized at primary and secondary healthcare facilities and for general practitioners to update their level of knowledge concerning common dermal infections. This will ultimately facilitate them in making the correct diagnosis and prevent the unnecessary prescription of steroids and other such drugs.

The main limitation of our study was that no microscopy was done to cross-check the pathogens responsible for these dermatophyte infections. However, as this study was done in an outpatient setting of a tertiary care hospital, we were able to analyze a wide variety of subjects. Moreover, we also studied the association between the nature of steroids used and the symptoms induced.
Our study highlights the interdependence of steroids and the intensity of symptoms observed in patients. This will be useful in further research and be beneficial in the field of dermatology so that the effects of steroid misuse can be studied further and eventually prevented. This will disburden the load of patients visiting tertiary care hospitals, especially in developing countries of South Asia where dermal problems are least focused on.

CONCLUSION

An increasing trend of positive family history, sharing of household items, and misuse of steroids were all common findings in this study. There is also a higher prevalence of tinea incognito among people who have used moderate or high potency steroids, along with secondary inflammatory symptoms such as itching, pustules, and erythroderma. The study revealed a strong message for updated training of primary health care workers regarding correct diagnosis and timely management of common dermal infections such as dermatophytosis and tinea incognito. It will ease the load on healthcare workers available at a tertiary care facility as well.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Anoosha Asma	Designed the methodology, data acquisition, wrote the resutls.	
3	Adeena Jamil	Prepared the first draft of manuscript.	
4	Durre Sameen Kamran	Wrote the discussion and proof read the article.	
5	Shahneela Parveen	Wrote the discussion and proof read the article.	
6	Arif Ali	Helped in data analysis.	