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TINEA PEDIS AND TINEA MANNUM- A CLINICOMYCOLOGICAL STUDY AT IIMS & R. LUCKNOW

Microbiology

Shaista Mobin PG Student, Dept. of Microbiology, Integral Institute of Medical Sciences & Research Hospital, Lucknow.
Praveen Kumar Lecturer, Bora Institute of Allied Health Sciences Lucknow.
Neeraj Yadav Lecturer, Bora Institute of Allied Health Sciences Lucknow.

ABSTRACT

Background- The dermatophytes are the group of keratinophillic fungi thriving on the keratin substrates that have ability to invade keratinized tissues (skin, hair, nail) of humans & other animals& generate an infection commonly reffered as ringworm. T.pedis is a common superficial dermatophyte infection of the feet. T. mannum is a fungal infection of the hand. **Objectives-** To study the correlation between T.pedis &T.mannum. To evaluate the epidemiology of foot and hand mycosis. **Material & Method-** A Hospital based cross-sectional study. All skin scraping samples of T.pedis &T.mannum was obtained by 30 patients. The samples were directly subjected to 10-30% of Pottasium hydroxide & LPCB under the microscope and cultured on Sabouraud's dextrose agar plates. **Result-**Out of 30 samples of T. pedis &T. mannum 9 samples were both KOH & culture positive and 21 sample were KOH & culture negative. Most commonly isolated dermatophytes is Trichophyton rubrum (16.6%) while other dermatophytes was Tricophyton mentagrophyte (10%) followed by Epidermophyton flocossum (3.3%). **Conclusion-** Prevalance of T.pedis & T.mannum was more common among males than females.

KEYWORDS

Tinea pedis, Tinea mannum, Lactophenol cotton blue (LPCB), Trichophyton rubrum, Tricophyton mentagrophyte, Epidermophyton flocossum.

INTRODUCTION

The dermatophytes are the group of keratinophilic fungi thriving on the keratin substrates that have ability to invade keratinized tissues (skin, hair & nail) of humans and other animals and generate an infection,commonly reffered to as ringworm(Weitzman et.al.1995). there are three genera of dermatophytes-Trichophyton, Microsporum, Epidermophyton (Pakshir et.al.2006). Dermatophytosis is a common disease in tropical countries due to factors like heat and humidity. Based upon the affected site dermatophytes have been classified clinically into- Tinea capitis(head), Tinea faciei (face), Tinea barbae(beard), Tinea mannum(hand), Tinea cruris (groin), Tinea pedis (foot), and Tinea ungium(nail).(Drake LA et.al. 1996).

Tinea pedis is a common superficial dermatophyte infection of the feet. It may present in several clinical varieties such as intertriginous, hyperkeratotic, vesiculobullous, ulcerative or a combination of these.

It is often to as “Athlete's Foot”. Tinea pedis may be accompanied by dermatophyte infection of other parts of the body including groin, hands,or nails.(Burzykowski T et.al.2003).

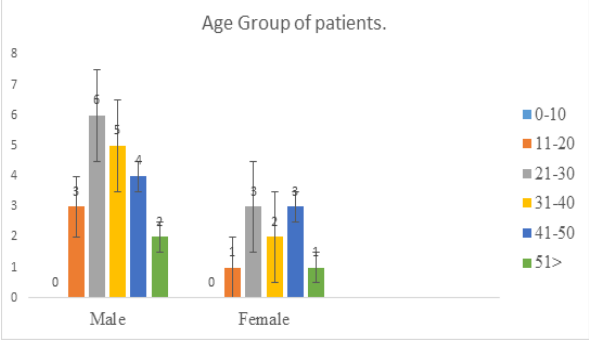
Tinea mannum is a fungal infection of the hand. Itching, burning,cracking,& scaling are observable and may be transmitted sexually or otherwise, whether or not symptoms are present. In the west, Tinea pedis is estimated to be present in about 40% of all pateints who attend clinics for any medical concern. (Burzykowski T et.al. 2003). Because of the prolonged period of treatment and recurrence of infections,foot mycosis are still considered as a major public health problem affecting the standard of life.(B.E.Elweski 1997).Tinea pedis affect about 15% of the population at large, being more common in closed communities such as army barracks & boarding schools , in warm weather, among regularly using swimming pools, and using nonporous tight fitting shoes. In an increasingly ageing population and with the increasing numbers of immune compromised patients, tinea pedis is emerging as an important and significant prevalent infection. (Maruyama R et. Al. 2003).

MATERIALAND METHOD:

Study population- This is a hospital-based cross-sectional study, carried out in patient attending Dermatology department of Integral Institute of Medical Sciences& Research Hospital ,Lucknow between May 2019 to April 2020.A total 30 samples of Tinea pedis &Tinea mannum were collected from Dermatology dept. Skin scraping was taken under aseptic procedures. Specimen was sent to Microbiology lab for further identification skin scraping were suspended in 10-30% of KOH through the direct microscopy method and evaluate the sample as positive and negative by the presence of hyphae or mycelium. After that the sample were inoculated on culture plate on to Sabourard's dextrose agar (SDA) and Dermatophyte test medium (DTM) and incubated at 25 and 37 upto period of 4 weeks before discarding as negative. The identification and speciation of the causative agent made according to the morphological, microscopic and specific test characters of growing colonies.

RESULT-

Out of 30 patients in this study, 18(60%) were males & 12(40%) were females. It was seen that male were more affected than female. The age distribution of patients affected by ***Tinea pedis*** and ***Tinea manuum,*** revealing that the majority of cases occur within the 21-30 age group, accounting for 30% of the total population (6 males and 3 females). The 31-40 and 41-50 age groups each contribute 23.3%, with a slightly higher number of male patients. The 11-20 age group comprises 13.3% of cases, while the lowest representation is observed in patients aged 51 and above, accounting for only 10%. Notably, no cases were reported in the 0-10 age group. These findings suggest that ***Tinea pedis*** and ***Tinea manuum*** predominantly affect individuals in their most active years, potentially due to occupational exposure, lifestyle factors, or increased susceptibility to fungal infections in this age range (Graph-1).



Graph-1The age distribution of patients affected by ***Tinea pedis*** and ***Tinea manuum.***

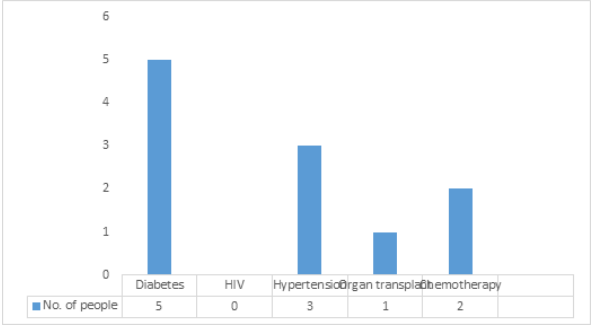
Distribution of Tinea mannum & Tinea pedis among patients.

The distribution of diseases among the patients reveals that ***Tinea pedis*** is the most prevalent condition, accounting for **53.3%** of the total cases, with **16** reported instances. ***Tinea manuum*** follows closely, comprising **46.6%** of cases, with **14** affected individuals. The near-equal distribution suggests that both fungal infections are commonly observed, likely influenced by similar risk factors such as environmental exposure, hygiene practices, and occupational hazards. However, ***Tinea pedis*** appears to be slightly more frequent, which may be attributed to the increased susceptibility of feet to moisture and fungal proliferation (table-1).

Table- 1 *Tinea mannum & Tinea pedis among patients*

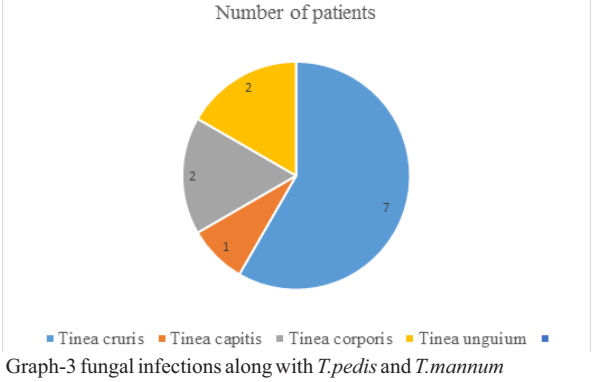
Disease	Total no. of cases	Percentage
Tinea pedis	16	53.3%
Tinea mannum	14	46.6%

Predisposing factors associated with T.pedis &T. mannum.
Among the **30 patients** who presented to the **skin OPD** with ***Tinea pedis*** and ***Tinea manuum***, several predisposing factors were identified. **Diabetes** was the most common underlying condition, affecting **5 patients (16.6%),** highlighting the role of impaired immunity and poor circulation in fungal infections. **Hypertension** was observed in **3 patients (10%),** which, although not a direct cause, may indicate an association with other health conditions that compromise skin integrity. Additionally, **2 patients had a history of chemotherapy**, suggesting that immunosuppression plays a significant role in susceptibility to fungal infections. **One patient had undergone an organ transplant,** further emphasizing the risk associated with immunosuppressive therapy. Notably, no cases were reported in individuals with **HIV**, though immunosuppression remains a recognized risk factor for fungal infections. These findings indicate that individuals with compromised immune systems or chronic illnesses are at a higher risk of developing ***Tinea pedis*** and ***Tinea manuum*** **(Graph-2).**



Graph-2 factors associated with *T.pedis &T. mannum*

Clinical presentation along with T.pedis and T.mannum.
Among the **30 patients** diagnosed with ***Tinea pedis*** and ***Tinea manuum***, several also presented with additional fungal infections, indicating a tendency for dermatophytes to affect multiple body sites. The most common coexisting condition was ***Tinea cruris***, observed in **7 patients (23.3%),** highlighting the frequent association of groin infections with foot and hand involvement. ***Tinea corporis***, affecting the trunk and other areas of the body, was reported in **2 patients (6.6%),** while ***Tinea unguium*** (onychomycosis), a fungal infection of the nails, was also seen in **2 cases (6.6%).** ***Tinea capitis***, a scalp infection, was the least frequent, occurring in only **1 patient (3.3%).** These findings suggest that individuals affected by ***Tinea pedis*** and ***Tinea manuum*** are often susceptible to additional fungal infections, emphasizing the need for a comprehensive treatment approach to prevent further spread and recurrence (Graph-3).



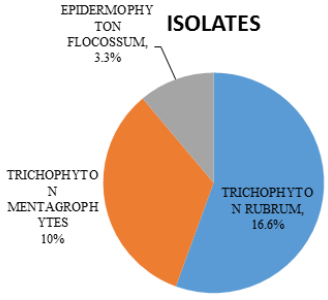
Graph-3 fungal infections along with *T.pedis* and *T.mannum*

Correlation of results between KOH and Culture Examination
Among the **30 patients** tested for ***Tinea pedis*** and ***Tinea manuum***, laboratory investigations using **KOH (potassium hydroxide) preparation and fungal culture** revealed significant findings. A total of **15 patients (50%)** tested **KOH positive**, indicating the presence of fungal elements under microscopic examination, while **12 patients (40%) were KOH negative. Fungal culture**, which provides definitive confirmation of infection, was positive **in 9 patients (30%),** all of whom were also **KOH positive**, demonstrating a strong correlation between direct microscopy and culture results. However, **21 patients (70%)** had negative fungal cultures, including **6 KOH-positive cases**, suggesting the possibility of non-viable fungal elements or limitations in culture sensitivity. The **15 patients with both KOH and culture negativity** indicate that clinical suspicion alone may not always be confirmed through laboratory testing. These findings emphasize the importance of combining **KOH microscopy** and **fungal culture** for accurate diagnosis and effective management of ***Tinea pedis*** and ***Tinea manuum*** **(table-2).**

Table-2 Laboratory investigations using KOH

	KOH positive	KOH negative	Total
Culture positive	9	0	9
Culture negative	6	15	21
Total	15	12	30

Isolated Dermatophytes
Among the **30 patients** diagnosed with ***Tinea pedis*** and ***Tinea manuum***, fungal culture identified specific dermatophytes responsible for the infections. The most frequently isolated species was ***Trichophyton rubrum***, found in **5 cases (16.6%),** which aligns with its known prevalence as a leading cause of dermatophytosis, particularly in foot and hand infections. ***Trichophyton mentagrophytes*** was detected in **3 cases (10%),** demonstrating its role as another common etiological agent of tinea infections. Additionally, ***Epidermophyton floccosum*** was isolated in **1 patient (3.3%),** highlighting its relatively lower occurrence. These findings reinforce that ***Trichophyton*** **species**, particularly ***T. rubrum***, are the predominant pathogens in dermatophyte infections, emphasizing the need for targeted antifungal therapy based on species identification (Graph-4).



Graph-4 Different type dermatophytes

DISCUSSION

In this study 30 cases were taken in which 18 were males and 12 were females. In accordance with the previous study by the other workers such as (Bindu et. al. 2002) and other studies done on T.pedis and T.mannum by (Singh et. al. 2003) showed the male predominance. Maximum no. of patients were seen at the age group of 21-30 (30%) including both male and female. Previous studies by other workers such as (Patwardhan N & Dave et. al. 1999) shows the similar finding. Among 30 patients in this study 5 patients were diabetics (16.6%) . Diabetes is one of the most important predisposing factor for foot & hand mycosis including T.pedis & T.mannum in elderly age group patients . Recurrence & chronicity were seen to be more frequent in Tinea cruris , similar findings was seen by the other researchers such as(Ranganathan S et. al. 1995). In this study culture positive & KOH positive samples was 9(30%) . Trichophyton rubrum was the most common isolate in this study. Other researchers such as(Singh et.al. 2003) also recorded Trichophyton rubrum to be the most common isolate . Trichophyton mentagrophyte was less commonly isolated in this study 3(10%) and also Epidermophyton flocossum was 1(3.3%).

CONCLUSION

Prevalence of Tinea pedis and Tinea mannum was more common among males than females. 21-30 year of age group was more affected by Tinea infection of foot and hand. Any patients diagnosed with Tinea infection of foot and hand should be screened for diabetes as implied as the outcome of the study. Among other dermatophyte infection noted in patients Tinea cruris was the most common dermatophyte isolated. Culture &KOH positive samples were 9(30%). Trichophyton rubrum is the most common dermatophyte isolated in the samples i.e.5(16.6%) . While Trichophyton mentagrophytes was 3(10%) and Epidermophyton flocossum was 1(3.3%) isolated dermatophyte from

Tinea pedis and Tinea mannum.

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