

Study of Dermatophytosis in Tinea Cruris Patients Attending OPD of Dermatology & V.D. Department at Integral Institute of Medical Sciences and Research Hospital Lucknow, Integral University-Uttar Pradesh

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Abstract: Introduction: Dermatophytosis are a superficial zymosis, observed as ringworm, spread easily by direct contact from infected humans or through fomites are common and located world-wide with higher prevalence in tropical countries. Tinea cruris include infection of the (Groin area) genital, pubic, and perianal area, more common in men (due to scrotum) than in women. Complain of burning and pruritus frequently seen in patients with this infection. Objective: To isolate the dermatophytes responsible for causing tinea cruris in inpatients and outpatients attending IIMS&R. Also study the demographic profile of patients with Tinea Cruris at IIMS & R Lucknow. Methods:-Skin scraping was mounted in fresh 10% KOH and observed under 40x for fungal elements. All samples were cultured in Sabouraud Dextrose Agar with cycloheximide and chloramphenicol, incubated at both 25^oC and 37^oC for 21 days. Isolated fungus were mounted with LPCB and observed under high power; the isolates that the morphology won't clear in LPCB, subjected to slide culture technique. Results: A total of 86 cases of clinically diagnosed Tinea cruris (74M & 12 F) were included during this study, 63 were found KOH Positive and 34 were found culture positive. Out of 34 culture positive patients, 24 were having dermatophytosis (20M & 4F), 10 were non-dermatophytic molds. The most number of patients of dermatophytosis affected between 15-34 years (58.3%), followed by age group 35-55 years (33.3%), and rest in 1-14 year (8.2%). Conclusion: Previously *T. rubrum* was the foremost prevalent organism whereas, during this current epidemic, *T. mentagrophyte* is isolated because the most typical species. This could be a possible reason for recurrent and recalcitrant dermatophytosis. Study data shows that age group 15-34yr is most vulnerable for Dermatophyte infection.

Keywords: Dermatophyte, Tinea Cruris

1. Introduction

Dermatophytosis are a superficial zymosis, habitually observed as ringworm (looks of the lesion) caused by a gaggle of fungi mentioned as dermatophytes, comprise of three major genera; *Trichophyton*, *Microsporum*, and *Epidermophyton*, from the category *hyphomycetes* and division *deuteromycota* (Kaufman G et al 2005). Based on Emmon's morphological classification, which relies on conidial morphology (Rippon J 1988), can even be divided into anthropophilic, zoophilic, and geophilic (Ajello L. 1962), and colonize keratinized non-living tissues like skin, hair, and nail in humans and animals (Kaufman G et al 2005). Infections spread easily by direct contact from infected humans and animals or through fomites (Nweze EI 2010), are common and located world-wide with higher prevalence in tropical countries (Ranganathan S et al 1995). The severity build upon the situation of infection, sensitivity of the host, and a specific strain of the infecting dermatophyte (Richardson M et al 2012). More prevalent in India due to favorable atmospheric conditions, influenced by economic factors like poverty, poor hygiene, and social conditions like overcrowding (Nita P et al 1999). Exchanging

of garments, foot-wears, and barbershop materials are potential risk factors for the proliferation of the Disease (E. G. V. Evans et al 1985 & J. N. Moto et al 2015).

Approximately, 20–25% of the global human population is infected minimum of once per lifetime (Havlickova B et al 2008 & Gnat S 2019). Tinea cruris include infection of the (Groin area) genital, pubic, perineal, and perianal areas (Margaret S et al 2008); more common in men than in women because males perspire over females, greater areas of occlusive skin where the scrotum is up-to-date with the thigh and clothing difference (Kanwar AJ et al 2001). Environmental factors like warm and humid climate cause an increased outbreak of ringworm infection in monsoon months in India (Kanwar AJ et al 2001). Occlusion from wet or tight-fitting clothing provides an optimal environment for infections mainly affects the proximal medial thighs and may extend to the buttocks and abdomen. Complain of burning and pruritus frequently seen in patients with this infection. At the active fringe of the infected area, Pustules and vesicles, maceration, are present on a background of red, scaling lesions with raised borders (Zuber TJ et al 2001 &

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Goldstein AO et al 2000). Jock itch (*T. cruris*) most typically affects adolescent and young adult males and involves the portion of the upper thigh opposite the scrotum. The scrotum itself is sometimes spared in ringworm (**Kelly BP 2012**).

2. Review of Literature

The real founding father of dermatomycology was David Gruby, Raimond Sabouraud began his scientific studies of the dermatophytes around 1890. Sabouraud's contributions included his studies on the taxonomy, morphology, and methods of culturing the dermatophytes (**Sabouraud, R. 1910**). Dermatophytes are classified into three anamorphic genera (*Trichophyton*, *Microsporum*, and *Epidermophyton*), in line with Emmon's morphological classification, which relies on conidial morphology, hyaline septate molds added 100 species. About 40 you look after dermatophyte infections associated to human disease (**Rippon J 1988**). Based on their prime habitat, dermatophytes can also be divided into anthropophilic, zoophilic, and geophilic (**Ajello L. 1962**). The Dermatophytes closely related antigenically, physiologically, and morphologically and are commonly called ringworm fungi (**Rabell G et al 1974**). Dermatophytosis is that the foremost typical contagious infection (**E. G. V. Evans et al 1985**).

WHO (World Health Organization) reported up to 19.7% prevalence of dermatomycosis within the overall population of developing countries (**Dogra et al. 2019**). Ajello, in 1960, said "species not only differ from region to region but can change with time (**Ajello L 1960**). At the tip of the 20th century, fungi were reported to be developing drug resistance (**Lenhart K 1969**). The dermatophytes, yeast, and non-dermatophyte molds are primarily causative agents of superficial fungal infections (**Nenoff P et al 2014 & Cai W et al 2016**), commonly mentioned as 'tinea' within the practice (**Nenoff P et al 2014, Cai W et al 2016 & Weitzman I et al 1995**). Few Dermatophyte species are found worldwide, whereas some show geographic clustering (**Ameen M. 2010**). Patients are presenting with widespread, atypical, extremely symptomatic lesions of ringworm, facei, cruris, capitis, and pedis which require a protected duration of therapy or treatment. (**Sahoo AK et al 2016 & Dogra S et al 2016**).

3. Material and Methods

Inclusion Criteria: Skin smears of suspected Tinea (*cruris*) patients, Attended dermatology & VD department of IIMS&R.

Exclusion Criteria: Dermatophyte causing Tinea infection apart from tinea cruris.

Sample Collection: Skin scraping was taken from centre to fringe of the infected area (lesion) and hair with basal root portion was plucked using sterile tweezers. Each specimen was labeled with name, age, sex of the patient, site of lesion and Patient identification number, and put up at temperature

(room temperature) till further processing (**Jagdish C. Book 2002, Evans EGV 1989, Lorone DH 1993, Mackie & McCartney 2007, Rippon JW 1988, Rippon JW 1985, and Topley & Wilson's 2005**).

Direct Microscopy: Scraping and hair are mounted in fresh 10% KOH and observe under high power for fungal elements.

Culture: Sabouraud Dextrose Agar with cycloheximide and chloramphenicol was used and incubated at both 25°C and 37°C for 21 days. Isolated fungus are mounted with LPCB and observed under high power; the isolates that the morphology won't clear in LPCB, that was subjected to slide culture technique.

Slide Culture: Done to test the undisturbed morphological details of fungi. 9cm diameter petridish with two layers of filter paper, keep a V or U shaped glass rod at the underside and sterilize. Putted 1cm cube square block using a flamed dissecting needle or a scalpel into a sterile microscopic slide. Inoculated four sides of the agar block with spores or mycelium fragments of fungi to be studied. Placed a sterile cover slip on the agar block, putted the slide in moist chamber that's already prepared, Few drops of sterile distilled water were added to remain moist chamber humid, incubated at room temperature 25°C. After sporulation has occurred 2 slides were prepared for microscopic examination from each slide culture.

- 1) Removed the cover-slip from the agar block and applied a drop of 95% alcohol to the centre of cover-slip, when it nearly to dry, added a drop of lactophenol cotton blue and mounted the cover slip get into a clean microscopic slide.
- 2) Removed the agar block from the slide and added a drop of 95% alcohol, when it nearly to dry, add a drop of lactophenol cotton blue mount employing a clear cover-slip, warm gently to rid of air bubbles.

Species identification of Dermatophytes-done on the bases of examination of the colony (pigmentation of the surface and reverse sides, topography, texture, and rate of growth) and microscopic morphology (size and body of macroconidia and microconidia, spirals, nodular organs, as well as pectinate branches). (**Kwon-Chung et al 1992 & Weitzman et al 1995**).



Figure 1: Lesion area



Figure 2: Lesion area

4. Results

A total of 86 cases of clinically diagnosed Tinea cruris out of 87 were included in this study, only one Female patient denied for giving a sample, and maximum no of patients belongs to 15-34years that is 55.81%, followed by 35-55years 29.07% and minimum no of patients belongs to 1-14years 15.12%. There were 74male (86.05%) and 12female (13.95%) included in our study, and male-female ratio was 6.1:1, all 86 clinically diagnosed Tinea cruris Patients, first screened for the fungal element (KOH mount), and 63were found KOH Positive and 34were found culture positive. Out of 34culture positive patients, 24 were having dermatophytosis among them 4were female and rests of 20 were males, 10 were nondermatophytic molds. According to the age group, we found that the maximum number of patients of dermatophytosis affected between 15-34 years (58.3%), followed by age group 35-55 years (33.3%), and rest in 1-14 year (8.2%). Non dermatophytic molds include candida species and aspergillus.

Table 1

Residence	Dermatophyte		Non dermatophyte		Total
	M	F	M	F	
Rural	13	02	05	02	22
Urban	07	02	01	02	12
Total	20	04	06	04	34

In our study, we found that maximum no of the dermatophytosis cases occurs in lower-class 12 (50%), and minimum no in upper class 4 (16.7%) and the rest of 8 (33.3%) from the middle class.

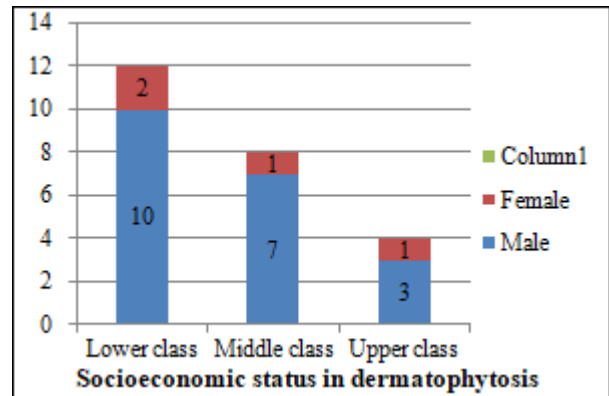


Figure 3: Showing socioeconomic status in dermatophytosis in our study

In our study, 20 male and 4 female patients are positive for dermatophyte and all patients have complained of many types of sign and symptoms such as – itching, burning sensation, redness, ring-shaped rash, peeling, cracking of the skin, dry scales, scaly patches, sharply marginated, unilateral, bilateral, etc.

The culture positive 34 grown isolates according to the Dermatophyte group and Non-dermatophyte group shown in table 2.

Table 2

Age group	Dermatophyte Isolates		Non-Dermatophyte Isolates	
	Male	Female	Male	Female
1-14year	02	0	01	0
15-34year	11	03	03	03
35-55year	07	01	02	01
Total	20	04	06	04

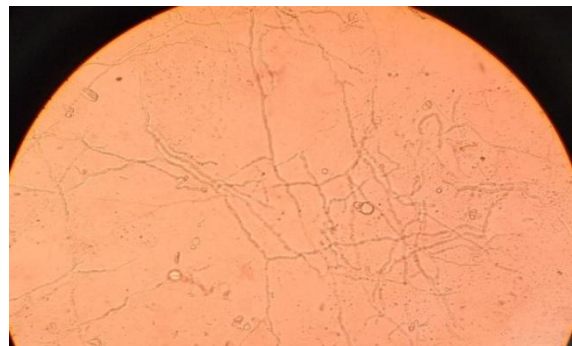


Figure 4: KOH Positive

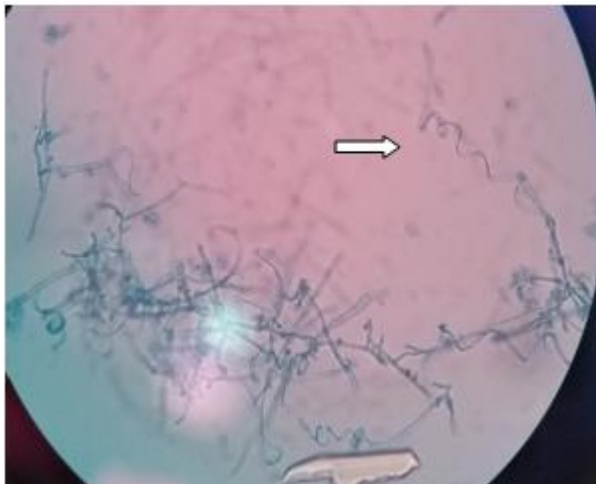
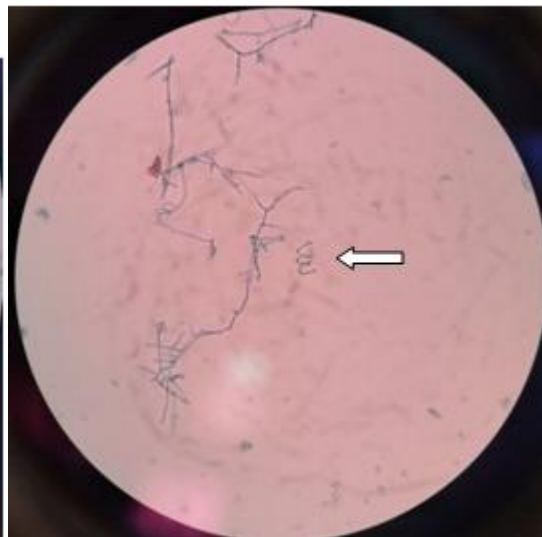
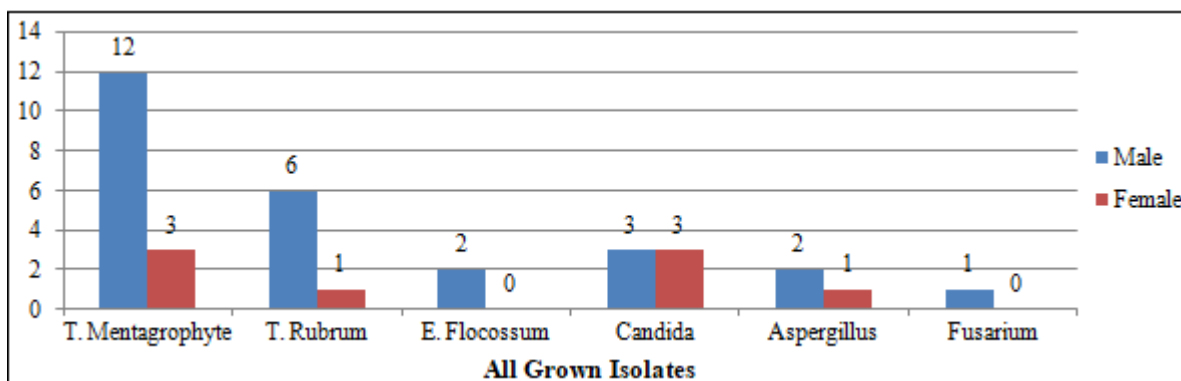
Figure 5: *T. Mentagrophyte*Figure 6: *T. Mentagrophyte*

Figure 7: Showing distribution of 34 isolates

5. Discussion

In our study, 86 clinically diagnosed Tinea Cruris patients were taken for the detection of dermatophyte infection within which we found 20 males and 4 females were positive for Dermatophytosis. In our study prevalence of dermatophytosis in tinea cruris is 27.9%, among 86 samples, KOH mount was positive in 73.2% near result previously observed by **Manjunath et al. 2016 - 75.38%**, Other authors have observed variable results of KOH positivity like **Sharma et al. 2017- 55.21%**, **Mahajan et al. 2017-79.6%**. The culture was positive in 39.53% cases in our study and results near previously obtained by **Tonita M. Noronha et al 2016**. In our study, *T. Mentagrophyte* was the most frequent isolate in (44.12%) the second prevalent isolated species was *T. rubrum* (20.59%) followed by *E. flocossum* (5.88%) as dermatophyte species all told grown cultures, among non-dermatophyte group Candida was the foremost common causative fungus isolated in (17.65%) followed by Aspergillus (8.82%) and Fusarium (2.94%) from all the grown cultures (out of 34) compared to review **Savita Chaudhary et al 2018**. Previous studies mention *T. Rubrum* because the most typical species identified (**Dutta B et al 2017**). The kind of predominant fungal species may vary from region to region. Positive case (family) history was observed by us in 50% cases (including

37.5% in male and 12.5% in female) closer results observation by **Ghosh et al. 2014 (48%)** previously. The study showed that 70.5% of patients had a positive culture for dermatophyte species. Out of 63 KOH positive cases, 34 (39.53%) patients yielded positive results for fungal culture together with dermatophyte and non-dermatophytic mold. Among the grown 24 dermatophytes the foremost common isolate in the dermatophyte group obtained from culture was *T. mentagrophytes* (62.5%) followed by *T. rubrum* (29.1%) in our study. comparable results were observed by **Agarwal et al. 2014**, **Vikesh Kumar Bhatia et al 2014** and **Mahajan et al. 2017**, in our study 2 species of *E. flocossum* (8.3%) also isolated, As discussed *T. mentagrophytes*, a zoophilic fungus has emerged to be replacing *T. rubrum* in most parts of India **Aziz M et al 2001**.

In our study, among 86 Tinea (cruris) cases studied, *Trichophyton* was found to be the predominant etiological agent with 22 isolates out of 24 dermatophyte isolates. Such findings are previously obtained by **Kannan P et al 2006**. There was a change within the dermatophyte pattern in India noticed during the last 5 years with a rising prevalence of *T. mentagrophytes* in many studies. In 2014, one study from Himachal Pradesh showed *T. mentagrophytes* causing about two-thirds of the infections **Bhatia VK et al 2014**, Data from

north Karnataka showed *T. mentagrophytes* to be the principal organism causing nearly 1/2 the infections **Noronha TM et al 2016**. A Study by **Ramaraj V et al 2017 & Agarwal US et al 2014** shows an equal prevalence of *T. mentagrophytes* & *T. rubrum*. Family history was positive in 50% of cases & the majority of patients (45.83%) presented with <1-month duration, closer results previously Observed (42.76%) by **Bhabani S. T. P. Singh et al 2019**. Another study was done by **Janardhan B et al 2017**, observed 17% of patients with <1-month disease duration, in contrast to the study by **Agarwal et al 2014** and **Kumar et al 2014** highest number of patients presented after 3 months of disease. All patients included that are clinically diagnosed jock itch together with some mixed infection of tinea cruris with tinea corporis. Most of the patients (70.83%) including 15 male with 2 female presented with multiple site involvement common clinical variants observed tinea corporis with tinea cruris (15 cases), followed by jock itch (tinea cruris) with tinea manuum and tinea pedis 1 case of every, The remainder of (29.17%) have only jock itch (tinea cruris). A Previous study was done by **Mahajan et al 2017** also found the highest mixed infection of tinea cruris with tinea corporis. The male cases were mostly laborers and field workers working in sunlight most of the time resulting in profuse sweating which produces a hot, humid, environment within the body, favoring the expansion of Dermatophytes. The causes for the shift of causative organisms aren't known but are postulated to multiple factors, including steroid abuse, indiscriminate use of oral and topical antifungals, changing agent and host factors, and environmental changes. One recent multicenter study in India has mentioned *T. mentagrophytes* as causing an awesome majority of infections (92.6%) **Nenoff P et al 2019**.

6. Conclusion

There is often a geographical variation within the distribution of species of dermatophytes among patients as evident from studies from different regions of India. Our study showed the most isolated *T. mentagrophytes* because of the predominant organism to causes dermatophytosis. An epidemiological shift of variety of fungus has been observed by many authors within the epidemic era of dermatophytosis.

Previously *T. rubrum* was the most prevalent organism whereas, during this current epidemic, *T. mentagrophytes* is isolated because of the most typical species. This might be a possible reason for recurrent and recalcitrant dermatophytosis. Study data shows that age group 15-34yr is most vulnerable for Dermatophyte infection.

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