



Original Research Article

Occurrence of dermatophytes and other fungal agents from clinically suspected cases of superficial mycoses

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ABSTRACT

Background: Dermatophytes are group of fungi that infect keratinized tissue. The group consist of three different genera i.e. *Epidermophyton*, *Microsporum* and *Trichophyton*, which are distributed around the world. Therefore, the infection of Tinea (dermatophytosis) are one of the most common superficial infections worldwide. Dermatophytes may lead to acute or chronic diseases with high morbidity but not mortality.

Aim & Objective: The main objective of this study was to determine the occurrence of dermatophytosis, isolate and identify the dermatophyte from samples of clinically suspected cases.

Materials and Methods: A total of 220 patients showing lesions typical of dermatophytes infection from outpatient Department of Dermatology were send to Mycology Unit , Department of Microbiology for the period of December 2018 to September 2019 were studied. Diagnosis was confirmed by conventional methods like microscopic, macroscopic examination and culture.

Result: Out of 220 KOH mount 61 (27.72%) were found positive. Culture on SDA there were SDA 61 (27.72%) culture positive, 59 (26.81%) DTM culture positive and isolated spp were *T. rubrum* 39 (17.72%) and *T. mentagrophytes* 20 (9.06%).

Conclusion : Dermatophytosis are distributed worldwide with the increased incidence especially in a tropical country like India. Several factors such as age, sex, illiteracy, poor hygiene, and social economy influence the dermatophyte infection. This study shows that the epidemiological status of the dermatophytes. Tinea corporis (48.65%) was predominant fungal infection in which dermatophytes were isolated. *T. rubrum* and *T. mentagrophytes* have been major etiological agents.

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1. Introduction

Dermatophytosis refers to superficial fungal infection of keratinized tissues caused by dermatophytes. The present study was undertaken to assess the clinicoepidemiological profile of dermatophytic infection, to identify the species of fungi and to compare the clinical diagnosis with KOH smear positivity and culture positivity.^{1,2} The degree of immunosuppression and the number of immunosuppressed patients are increasing at an unprecedented pace, the management of dermatophytosis would be a definite challenge to mankind in the years to come.³

Fungal infection of the skin and its appendages are more prevalent in India, due to favorable climatic conditions like temperature, humidity.⁴ In India which is a tropical country, the cause of dermatophytosis was adversely influenced by economic factors like poverty, poor hygiene and social conditions like overcrowding. Nature of dermatophytosis may change with passage of time, living population, evolution of preventive measures and hygienic conditions in society.⁵ Dermatophytosis are generally called tineas, tinea is a Latin word for “ring worm”. The second part of the name of the dermatophytosis identifies the part of the body infected.⁵

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1.1. Ethics approval

Ethics approval was obtained from TMMC Moradabad institutional Ethics Committee (TMMC-IEC) ref. no. TMMC & RC /IEC/18-19/083.

2. Materials and Methods

Total of 220 patients showing lesions typical of dermatophytes infection based on the clinicians preliminary diagnosis from outpatient Department of Dermatology from December 2018 to September 2019, were send to Mycology Unit, Department of Microbiology, TMMC & RC Moradabad, UP. Patients of all age groups and both sexes were included in this study.

Different tinea conditions such as tinea corporis, tinea capitis, tinea cruris, tinea unguium, tinea faciei and tinea manuum were observed in patients.

2.1. Specimen collection

2.1.1. From the skin

The affected area was first thoroughly swabbed with 70% alcohol to remove surface contaminants. After the alcohol dries, skin scrapings was collected from the border of the active lesions with a bard parker blade in a sterile black paper envelop.

2.1.2. From the scalp

Hair from the scalp was epilated with a flame sterile forceps and the active border area is scraped with a scalpel to collect epidermal scales on a sterile black paper envelop.⁵

2.1.3. From the nail

The affected nail was first cleaned with 70% alcohol. The upper portion of the affected nail was scraped away and the material was collected from the deeper part of the distal end of the nail on to the sterile black paper envelop.⁵

If KOH mount were positive. Then the culture on Sabouraud's dextrose agar (SDA) and dermatophyte testing media (DTM) media for identification, and other relevant tests like slide culture and LPCB. DTM medium which are indicator media of dermatophytes.⁶

Microscopic examination of culture is done using LPCB mount (Lacto-phenol cotton blue) preparation and the slide culture was done in case of morphology was not clear in LPCB preparation.²

2.2. Direct microscopic examination using of KOH mount

The scraped material was placed on a clean glass slide. A few drops of freshly prepare 10% KOH were added on the material and a cover slip placed. This slide were placed at room temperature for 10-15 min in case of scrapings. On microscopic examination, branching hyphae or arthrospores

was seen.^{7,8}

2.3. Culture examination

For the primary isolation of fungi, on sabouraud's dextrose agar with cycloheximide was used as semi selectivemedia, since cycloheximide reduces the growth of non-dermatophytic fungi and other bacterial contaminants Incubated at 25⁰C – 27⁰C & 37⁰C for four weeks.

Dermatophyte Test Media (DTM) was used as a selective media. One set was incubated at 37⁰C and another set at room temperature.

Growth was usually seen after incubation period. Growth identified based on macroscopic and microscopic features.^{7,8}

2.4. Lactophenol cotton blue (LPCB) preparation

The LPCB mount was prepared by the mixing of colony with LPCB covered with clean glass cover slip, heated gently and observed under 10 X and 40 X magnification.⁴

3. Results

Total 220 suspected cases of superficial mycoses were included in this study among which 61 (27.72%) samples were found positive for fungal element after performing microscopic examination of KOH mount.

All 220 suspected cases of superficial mycoses samples were processed for culture on SDA and DTM media in which culture positivity on SDA 61 (27.72%) and DTM 59 (26.81%).

Table 1: KOH positivity

Total number	KOH positive	KOH negative
220	61	159

Out of 220 cases 61 (27.72 %) positive for fungal element and 159 (72.28%) samples negative. All age group included in this study. Out of 220 clinically diagnosed dermatophytosis the highest incidence was seen in the age group 31-40 (26.38%) followed by 21-30 (22.28%).

Table 2: Gender wise distribution

Total sample	Male	Female
220	127	93

Out of 220 clinically diagnosed dermatophytosis. male 127 (57.72%) were more in number as compare to females 93 (42.27%).

After study of 220 samples, it was found that the most common clinical distribution of superficial mycoses was tinea corporis (48.65%) followed by Tinea unguium (25%).

Out of 61 positive cases on the culture we found that the *T. rubrum* (17.77%) is the most common etiological agents

for superficial mycoses followed by *T. mentagrophytes* (9.10%) and other fungal agents were isolated *Aspergillus spp* (1.81%) and *Candida spp* (3.18%).

Table 3: Dermatophytes and other fungal agents

Species	Number of isolates	Percentage
<i>T. rubrum</i>	39	17.72
<i>T. mentagrophytes</i>	20	9.09
<i>Candida</i>	7	3.18
<i>Aspergillus spp</i>	4	1.81

4. Discussion

This study conducted in the department of microbiology TMMC & RC Moradabad, UP.

Earlier studies have confirmed that infection with dermatophytes are more frequent in males as compared to females (Kumar et al., 2014;⁸ Doddamani et al.,2012,¹ Ramaraj et al.,2016,⁹ Anupama et al .,2017²).

Among 220 samples 127 (57.72%) were male patients and 93 (42.27%) were female patients sample. Male percentage marginally higher than females. The reason of increase percentage of males may be due to increased outdoor exposure and added physical work and may be one of the reason rural population which result increase sweating and less cosmetic consciousness compared to females. Singh S et al., 2003¹⁰ also reported in their studies dermatophytosis more common in male (61.15%) and less in female (38.84%). In their study also reported that male to female ratio was 1.57:1.

The study shows that the dermatophytes infection is predominant in the age group of 21-51 years (Islam et al., 2017¹¹). The reason for this may be due to increased level of physical activity in the particular age group leading to excessive sweating which favor the growth of dermatophytes. Socialization with different people is also high compared to other age groups which eventually helps in spreading of infection.

This present study shows that the most affected age group were 31-40 (26.38%) followed by 21-30 (22.28%) year. And most common clinical distribution were *Tenia corporis* 48.65% followed by *Tenia unguium* 25%.

T. rubrum was the predominant isolate in the present study in 39 cases (17.72%). *T. mentagrophytes* was the second commonest isolate (9.09 %). This correlated with the results of Bindu V et al ., 2002¹² 25%.

5. Conclusion

Dermatophytosis are distributed worldwide increased with the increase incidence especially in a tropical country like India. Several factors such as age, sex, illiteracy, poor hygiene, and social economy influence the dermatophyte infection. In this study male were more affected than female. This can be correlated with the occupation of the person

(Farmers). On the other hands, Social stigma present in rural population. This study indicates the epidemiological status of the dermatophytes. *Tinea corporis* (48.65%) was predominant clinical site from which dermatophytes were isolated. *T. rubrum* has a propensity to infect glabrous (hairless) skin and is exceptionally known from other sites. *Tinea corporis* was the predominant clinical sites fungal infection in this study. *T. rubrum* (17.72%) and *T. mentagrophytes* (9.06%) have been major etiological agents and *Aspergillus spp* (1.81%) and *Candida spp* (3.18%) fungal agents were found.

6. Source of Funding

None.

7. Conflict of Interest

None.

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