OPEN ACCESS
Saudi Journal of Pathology and Microbiology
Abbreviated Key Title: Saudi J Pathol Microbiol
ISSN 2518-3362 (Print) |ISSN 2518-3370 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com/sjpm

Original Research Article

Prevalence of Dermatophyte Infections in a Tertiary Care Medical College in Eastern India

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DOI: 10.36348/sjpm.2020.v05i05.015 | **Received:** 04.05.2020 | **Accepted:** 24.05.2020 | **Published:** 30.05.2020

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Abstract

Background: Superficial mycoses are the fungal infections of skin, nail, and hair. Superficial mycosis is most prevalent in tropical and subtropical countries. The clinical lesions caused by the fungi are highly variable and closely resemble other skin diseases. Therefore, it is necessary to make a definite laboratory diagnosis of superficial skin infections. Dermatophytes are hyaline septate moulds which include the genera *Epidermophyton, Microsporum,* and *Trichophyton* that cause superficial mycoses. ***Materials and methods:*** The study was conducted for a period of one year (January to December 2019) in a tertiary care hospital in Eastern India. The skin, hair and nail samples were collected from patients with suspected dermatophyte infections. The samples were examined by KOH preparation and cultured on Saboraud's dextrose agar (SDA) and cornmeal agar. The species identification was done by LPCB preparation and other tests. ***Results:*** A total of 68 samples were obtained of which 56 were skin scraping, 10 nail clipping and 2 hair samples. 60 (88.23%) were positive by KOH preparation where as 42 (61.76%) showed growth on SDA. The most common species was T.rubrum followed by T.mentagrophytes. There was a male preponderance and dermatophytic infections were most common among farmers. ***Conclusion:*** The most common dermatophyte infection was tinea corporis and T.rubrum was the commonest isolated organism. In the modern era of molecular diagnosis of infectious agents culture and microscopy still play an important role in the diagnosis of superficial mycoses.

Keywords: Tinea, Dermatophytosis, Superficial mycoses.

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INTRODUCTION

Superficial mycoses are the fungal infections of skin, nail, and hair. Superficial mycosis is most prevalent in tropical and subtropical countries including India. The clinical lesions caused by the fungi are highly variable and closely resemble other skin diseases. Therefore, it is necessary to make a confirmed laboratory diagnosis of superficial skin infection [1]. Superficial mycosis is reported to be one of the most prevalent diseases with 20–25% of the world's population affected. It is caused by a heterogeneous group of pathogens including dermatophytes, yeasts and moulds [2].

Dermatophytes are common causes of superficial mycosis. Severe itching and disabling lesions on the genital and other areas cause morbidity and embarrassment. The rising prevalence of dermatophytosis has been attributed to many factors including tropical climate, overcrowding, urbanization, shared accommodation such as living in hostels, the use of occlusive footwear, tight-fitting clothes, community showers and sports activity [3].

Although the dermatophytes including species of *Epidermophyton*, *Microsporum*, and *Trichophyton* are the major cause of superficial mycosis, an infection of skin and its appendage by non-dermatophyte moulds and yeasts have also been noted. Emergence of chronic diseases such as diabetes that resulted from an increase in the life expectancy of world population and suppression of host immune defense mechanisms by underlying diseases have made humans more susceptible not only to pathogenic fungi but also to all fungi that were once considered contaminants [4].

Dermatophytoses include a wide variety of diseases involving glabrous skin, nails and hair. In many cases, their diagnosis is not clinically obvious,

and mycological analysis is required. Direct microscopic examination of the samples using clearing agents provides a quick response to the clinician and is usually combined with cultures on specific media, which must be used to overcome the growth of contaminating moulds that may hamper the recovery of dermatophytes. Accurate identification of the causative agent (i.e. at the species level), currently based on morphological criteria, is necessary to initiate an appropriate treatment. Despite the recent availability of molecular methods allowing the detection of fungal DNA or both detection and direct identification of the main dermatophyte species, the diagnosis of dermatophytosis largely depends on both direct examination and cultures of appropriate clinical specimens [5].

This study was done to determine the prevalence and characterization of the dermatophytic infections in a tertiary care hospital and medical college in Eastern India.

MATERIALS AND METHODS

The study was conducted for a period of one year (January to December 2019) in a tertiary care hospital and medical college in Eastern India. After obtaining informed consent and clinical details, the skin, hair and nail samples were collected from patients with suspected dermatophytic infections. The samples were processed in the Department of Microbiology.

The samples were first examined by KOH preparation. 20% KOH was used for the skin scrapings and hair samples whereas 40% KOH was used for the nail clippings. The samples were observed by standard microbiological techniques for the presence of any fungal element under low and high power microscopy. The skin scrapings were seen after dissolving in KOH for 15-30 minutes while the nail samples were seen after overnight dissolution.

The samples were then cultured on Saboraud's dextrose agar (SDA) and cornmeal agar. Each sample was inoculated in two SDA tubes containing chloramphenicol and cycloheximide and incubated at 25^0C and 37^0C. All the cultures were examined twice weekly and kept for 4 weeks. The species identification was done by lactophenol cotton blue (LPCB) preparation and other tests like hair perforation test, urease test after observing the colony characteristic and pigment production on cornmeal agar.

RESULTS

In this study a total of 68 samples were obtained during the study period of one year (January to December 2019) in a tertiary care hospital and medical college in Eastern India. None of these were repetitive samples. Among these patients, there were 40 (58.62%) male and 28 (41.18%) female patients. 65 (95.58%) of these were from adult patients. The samples included 56 (82.35%) skin scrapings, 10 (14.7%) nail clipping and 2 (2.95%) hair samples. Farmers followed by labourers were most prone to the dermatophytic infections (Table-1).

Among the included population, 60 (88.23%) were positive by KOH preparation where as 42 (61.76%) showed growth on SDA (Table 2 and 3). The most common clinical types were tinea corporis and tinea cruris (Table-4). The most common species was *Trichophyton rubrum followed by Trichophyton mentagrophytes, Epidermophyton flocossum, Microsporum gypseum, Trichophyton tonsurans, Microsporum canis, Trichophyton violaceum* and two *Candida species* (Table-5). The two isolates of candida were from palm and soles (Table-6).

Table-1: Shows the occupation of the patients included

Occupation	Number of cases	Percentage
Farmer	36	52.94%
Labourer	14	20.58%
Housewife	12	17.64%
Service	3	4.42%
Student	3	4.42%

Table-2: Shows the correlation among KOH and culture of the samples

	KOH positive	KOH negative	Total
Culture positive	38	4	42
Culture negative	22	4	26
Total	60	8	68

Table-3: Shows the isolation of dermatophytes and candida from different clinical samples

Site	Total	KOH positive only	Culture positive only	Both positive	Negative
Skin	56	18	4	31	3
Nail	10	4	0	5	1
Hair	2	0	0	2	0
Total	68	22	4	38	4

Table-4: Shows clinical condition included in the study

Clinical features	Total	Percentage
T. corporis	46	67.64%
T. cruris	8	11.76%
T. capitis	2	2.94%
T. unguium	10	14.7%
T. mannum	1	1.47%
T. pedis	1	1.47%

Table-5: Shows the different species of dermatophytes and candida isolated

	Number	Percentage
Trichophyton rubrum	14	33.33%
Trichophyton mentagrophytes	11	26.19%
Trichophyton tonsurans	3	7.14%
Trichophyton violaceum	1	2.38%
Microsporum gypseum	4	9.52%
Microsporum canis	3	7.14%
Epidermophyton floccosum	4	9.52%
Candida sp.	2	4.76%
Total	42	

Table 6: Shows the clinical condition and the associated causative agent

	T.corporis	T. cruris	T.capitis	T.unguium	T.mannum	T.pedis	Total
T. rubrum	9	1	1	3	-	-	14
T. mentagrophytes	8	2	-	1	-	-	11
T. tonsurans	3	-	-	-	-	-	3
T. violaceum	1	-	-	-	-	-	1
M. gypseum	2	1	1	-	-	-	4
M. canis	1	2	-	-	-	-	3
E. floccosum	2	1	-	1	-	-	4
Candida	-	-	-	-	1	1	2
Culture negative	20	1	-	5	-	-	26
Total	46	8	2	10	1	1	68

DISCUSSION

During the study period of one year 68 patients with suspected dermatophytic infections were included in the study. Among these patients, there were 40 (58.62%) male patients and 52.94% were farmers. This is similar to the finding of Upadhyay and group who found that there were 125 male out of 220 patients of dermatophyte infections [1]. Yadav *et al* also states that among the patients of onychomycosis 87% were male patients and his the study population ranged from 21 to 75 years [6].

The most common clinical types were tinea corporis and tinea cruris. The most common clinical form is presence of one or more affected areas, of oval, round or irregular shape with a clear boundary, pale pink colour. In a study it was found that 51.3% patients of 195 had skin lesions on the scalp (tinea capitis), skin lesion of upper and lower limbs and groin (tinea cruris) were observed equally in 12.8% patients, combined skin lesion on torso, arms and legs were in 12 (6.2%) cases, isolated skin lesions on body (tinea corporis) were in 11 5.6% cases [7].

Among the included population, 60 (88.23%) were positive by KOH preparation where as 42 (61.76%) showed growth on SDA. In most studies it was found that more samples were positive by microscopy than by culture. This may be due to treatment taken by the patients elsewhere.

In this study the most common species was *Trichophyton rubrum* followed by *Trichophyton mentagrophytes, Epidermophyton flocossum, Microsporum gypseum, Trichophyton tonsurans, Microsporum canis, Trichophyton violaceum* and two *Candida species*. In a study in Jaipur by Jain *et al*, it was found that *T.rubrum* was the most common dermatophyte followed by *T.mentagrophytes*, *T. violaceum*, *T. tonsurans*, *T. simii*, and *Chrysosporium tropicum* [8]. In another study done by Sharma *et al*., in Sikkim, among the dermatophytes isolated, *T.mentagrophytes* was the most common species (40%), followed by *Trichophyton schoenleinii* (33.33%), and *Trichophyton tonsurans* (16.66%). *T. rubrum* (6.66%) was the least commonly isolated *Trichophyton* species. Two isolates of *Epidermophyton floccosum* (3.33%) and no *Microsporum* species were isolated [9]. Similar findings were shown by Poojary *et*

al., where *Trichophyton rubrum* (50%) and *Trichophyton mentagrophytes complex* (47.2%) were the two major species isolated [10]. In a study from 185 patients 23% were both KOH and culture positive, and 44 of these isolates were *Trichophyton mentagrophytes* and *Trichophyton rubrum* [11]. There were two isolates of candida from palm and soles. There has been reports of candida causing superficial infections even in immunocompetent individuals [12].

CONCLUSION

The most common dermatophyte infection was tinea corporis and *T.rubrum* followed by *T.mentagrophyes* was the commonest isolated organism. There were two isolates of candida from palm and sole. Identification of the causative agent of dematophytic and non dermatophytic superficial fungal infections are needed for management of these cases. In the modern era of molecular diagnosis of infectious agents, culture and microscopy still play an important role in the diagnosis of superficial mycoses.

Acknowledgement – None

Financial support - None

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