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A STUDY ON IDENTIFICATION AND ISOLATION OF DERMATOPHYTE INFECTION IN PATIENTS ATTENDING IN THE DERMATOLOGY OPD IN A TERTIARY CARE HOSPITAL

Microbiology

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ABSTRACT

INTRODUCTION Fungal infections are very common in human beings, especially cutaneous fungal infections in which superficial keratinized tissue of the stratum corneum of the skin, hair and nail are involved by a group of specialized fungi known as Dermatophytes and the condition is known as Dermatophytosis. These dermatophytes use keratin as a nitrogen source. Dermatophytes produce only superficial infections of the skin and its appendages without involving the deeper tissue or the internal organs. **AIM OF PROPOSED RESEARCH** General objectives This study is to determine the proportion and distribution pattern of the etiological agents of dermatophytosis among the clinically suspected cases, attending the dermatology OPD of Calcutta National Medical College and Hospital with specific dermatological complaints, taking into account, the different parameters like age, sex, occupation of the patient, associated relevant co-morbidity if any, socio- economic condition and nature of the dermatological condition. **MATERIAL AND METHODS Study design:** Observational, Cross sectional, Hospital based study. Study setting and time lines: Submission of thesis synopsis - within 30th November 2017. Data collection: After approval by the ethical committee, data was collected for the next 1year. Data analysis and submission is done in following 6 months. Place of study: Department of Microbiology and department of Dermatology at Calcutta National Medical College and Hospital Kolkata (WB) **Period of study:** One year from March 2018 to March 2019 Study population: Clinically suspected cases with specific dermatological complaints attending the dermatology OPD of Calcutta National Medical College and Hospital.Sample Size/Design Sample Size: Altogether 200 samples (approximately) including nail, skin scrapings and hair samples.**RESULTS AND ANALYSIS** Our study showed that out of 200 clinically suspected cases, 112 were male and 88 were female, 153 were KOH positive and 47 were KOH negative, and 125 found to be suggestive for dermatophyte of different species, on cultivation. Remaining 75 were either contaminant, fungi of other than dermatophytes like aspergillus yeast cells malasagia furfur etc or did not show any positive reports on KOH mount preparation and growth on culture media. **CONCLUSIONS** The most common clinical type was tinea corporis followed by tinea cruris and tinea pedis and overall predominance in the study was female with 16-55 being most affected age group. T. verrucosum forms the commonest etiological agent of dermatophytosis, which were mostly isolated from Tinea corporis, Tinea cruris Tinea unguinum,and Tinea manuum. Possible cause of dermatophytic infection in lower socioeconomic groups were due to more exposed to the infections and because of their lack of awareness as well as poorer knowledge on hygiene on fungal infection and its preventive measures.

KEYWORDS

ISOLATION OF DERMATOPHYTE AND DERMATOLOGY OPD

INTRODUCTION

Fungal infections are very common in human beings, especially cutaneous fungal infections in which superficial keratinized tissue of the stratum corneum of the skin, hair and nail are involved by a group of specialized fungi known as Dermatophytes and the condition is known as Dermatophytosis. These dermatophytes use keratin as a nitrogen source. Dermatophytes produce only superficial infections of the skin and its appendages without involving the deeper tissue or the internal organs.[1]

Traditionally, infections caused by dermatophytes have been named according to the anatomical locations involved, by appending the Latin term designating the body site after the word "Tinea" [2]. Proposed division of dermatophytes into three genera on the basis of clinical, morphological and microscopic characteristics – Epidermophyton (involving skin and nail)Microsporum (involving skin and hair) ,Trichophyton (involving skin, hair and nail).

Based on their ecological characteristic, dermatophytes are divided into geophilic, zoophilic and anthrophilic species.[3]

In Tropical countries including India, the dermatophytosis is more prevalent, especially because of hot and humid conditions, low socio-economic status, poor hygiene, overcrowding and lack of affordable treatment. The first case of dermatophytosis was recorded in India from Assam (Powell, 1900). In recent decades, the indiscriminate use of broad spectrum antibiotics, corticosteroids and other immunosuppressants have caused an alarming increase of fungal infections besides the expanding number of immunocompromised patients. The clinical forms are based on the site of involvement. A single species is able to cause more than one type of clinical infections. Conversely, a single clinical form such as tinea corporis may be caused by more than one dermatophyte species. Dermatophytosis lesion is also called ring worm lesion because it mostly takes a ring shape with inflammatory edges and clear centre of normal skin. Fungal elements are always found in active state in the edge of lesion and that's why it is preferred to take scraping sample for microscopically diagnosis from the lesion edges and not from the clear zone. Ring shape of dermatophytosis can be useful to differentiate it from other skin diseases, such as psoriasis or lichen planus in which the inflammatory responses tend to be uniform over the lesion.[4]

Another name of dermatophytosis in addition to ring worm is tinea. In humans, type of tinea depends on the area of the body involved, e.g. Tinea capitis where dermatophytes infect hair and scalp. Tinea corporis occurs on the trunk, extremities and other glabrous skin. Tinea cruris that represents acute and chronic infection of groin and adjacent area including penis and Scrotum, [5] Tinea pedis (athletes' food) is an infection of the foot etc. The infection of nail by dermatophytes is called onychomycosis which include toe and fingernails. Other groups of fungi can be associated with dermatophytes to cause nail infection and that what we should be careful about when we try to diagnose the causes of onychomycosis.

Infection can, however, spread from one area to another, for example, tinea faciei in children may result from tinea capitis infection that has spread to the face. However, the peak incidence of infection is after puberty, although patients may present in the pre-adolescent period. There is no sexual predilection. In tropical and subtropical countries like India [6] the distribution of dermatophyte infections and their causative agents varies with geographical region and is influenced by a wide range of factors, such as type of population, climatic factors, lifestyle, migration of people, cultural practices and socioeconomic conditions, incidence of peculiar co morbidities and drug therapy. In general, due to the hot and humid environmental conditions, dermatophytosis is common.

AIM OF PROPOSED RESEARCH

General objectives

This study is to determine the proportion and distribution pattern of the etiological agents of dermatophytosis among the clinically suspected cases, attending the dermatology OPD of Calcutta National Medical College and Hospital with specific dermatological complaints, taking into account, the different parameters like age, sex, occupation of the patient, associated relevant co-morbidity if any, socio- economic

condition and nature of the dermatological condition.

Specific Objectives

1. To identify and isolate dermatophytes in clinically suspected cases of dermatophytosis attending the dermatology OPD of Calcutta National Medical College and Hospital by microscopic examination.
2. To identify species of dermatophytes isolated from the different clinical samples such as skin, nail and hair collected from the suspected cases.
3 To assess the distribution pattern of different dermatophytes in the clinical samples from the study subjects.
4. To find out the demographical, socio economic and clinical profiles of the patients, coming with specific complaints of dermatophytosis in the Dermatology OPD of Calcutta National Medical College and hospital.

MATERIAL AND METHODS

Study design: Observational, Cross sectional, Hospital based study.

Study setting and time lines: Submission of thesis synopsis - within 30th November 2017.

Data collection: After approval by the ethical committee, data was collected for the next 1year. Data analysis and submission is done in following 6 months.

Place of study: Department of Microbiology and department of Dermatology at Calcutta National Medical College and Hospital Kolkata (WB)

Period of study: One year from March 2018 to March 2019

Study population: Clinically suspected cases with specific dermatological complaints attending the dermatology OPD of Calcutta National Medical College and Hospital.

Sample Size/Design Sample Size: Altogether 200 samples (approximately) including nail, skin scrapings and hair samples.

Sample design: Cases, as per inclusion and exclusion criteria, were selected by simple random sampling method from the Dermatology OPD of the hospital.

Case control required or not: Case Controls are not required.

Inclusion Criteria:

Clinically suspected cases of dermatophytosis attending the dermatology OPD of Calcutta National Medical College and Hospital with specific dermatological complaints.

Exclusion Criteria:

Patients undergoing any types of antifungal therapy for any cause currently was excluded from the study. Patients having simultaneous bacterial co-infections in the affected sites were also excluded from the study.

Independent variables:

Age, sex, per capita income, occupation, no of members in the family, history of prolonged drug use, history of any chronic illness.

Dependent variables:

Presence of dermatophytes in the samples, species of the dermatophytes identified by microscopy, culture and biochemical tests.

RESULTS AND ANALYSIS

Our study showed that out of 200 clinically suspected cases, 112 were male and 88 were female, 153 were KOH positive and 47 were KOH negative, and 125 found to be suggestive for dermatophyte of different species, on cultivation. Remaining 75 were either contaminant, fungi of other than dermatophytes like aspergillus yeast cells malasagia furfur etc or did not show any positive reports on KOH mount preparation and growth on culture media.

In the present study, Trichophyton verrucosum was the predominant dermatophyte (40%) involved followed by Trichophyton rubrum (24%). Trichophyton mentagrophyte (12.8%) ,Epidermophyton flocusum (8.8), Microsporum canis (6.4) Microsporum gypseum and Microsporum tonsurans was involved only in 3.2% cases.

DISCUSSION

The present study highlights the clinical pattern and prevalence of different dermatophyte species implicated in different tinea/ringworm infections in park circus area of Kolkata. In general, hot and humid environment of the tropical and sub-tropical regions are best suited for the dermatophytic infections which have been reported from different parts of India. Besides the climatic conditions favourable for the growth of dermatophytes, other factors such as the migration of labourer, workers, overcrowding, unhygienic life style of the community with lower socioeconomic background might contribute to the development of dermatophytosis in this region of the state. Of the total 200 cases of superficial lesion of skin,nail,hair infections examined, only 125 (62.5%) were found positive in culture. Of the positive cases, 56% were females and 44% were males. This may be due to the differences in occupational exposure of both the sexes as females are household workers wearing burka"s and other garments which cover all over the body and males are constructional workers and labourer with low socioeconomically status causes more sweating in humid and hot atmosphere and more chances of superficial fungal skin infection(dermatophytosis). Similarly, most of the positive cases had the sharing habit of dress material. Many of the people in our society has the habit of sharing same towel, combs, cloth and other dress material with the family member resulting high risk of infection among them. Especially people living in below poverty line (BPL), the students who live in hostel they are basically share everything with the family members and friends that results into the sharing of diseases too. In the present study, I found that there was a significant difference between the sharing habit of dress materials and positive cases. Further, although patients of all ages were susceptible to dermatophytosis but most (87.8%) belonged to the age group of 16–55 years. Almost similar observations have been made by others. They have reported highest prevalence in the age group of 21–30 years [7].

The probable reason for higher prevalence in this group could be that the individuals in this group are often most active because of their involvement in the outdoor activities such as sports, jobs etc. Tinea corporis was the most common clinical condition observed in which various exposed parts of the body are affected followed by tinea cruris in which groin and surrounding areas are affected. Similar observations have been made by other researchers [6]. In addition, the tight fittings and synthetic clothing particularly in females provide damp, sweaty and warm skin conditions. All these factors favour the growth of dermatophytes [8]. In the present study, Trichophyton verrucosum was the predominant dermatophyte (40%) involved followed by Trichophyton rubrum (24%). Trichophyton mentagrophyte(12.8%), Epidermophyton flocusum (8.8),Microsporum canis(6.4) Microsporum gypseum and Microsporum tonsurans was involved only in 3.2% cases. The lower socioeconomic groups are more exposed to the infections due to their lack of awareness as well as poorer knowledge on hygiene. Generally without proper treatment, dermatophytosis becomes a chronic disease and more difficult to treat. Hence if the surveillance of infections and the awareness level in the common population is increased, the burden of this type of disease can be reduced to much lower level. The most common clinical type was tinea corporis. This is in accordance with the studies of Sharma et al [9] and Kumar et al. (2007) [10].Tinea corporis was more in females. In my study, tinea infection was more in case of female then male because of excessive sweating due to excessive physical activity, and among female tinea corporis was maximum, tinea cruris was more common in males. This finding is supported by studies conducted by Singh and Beena [8] and Peerapur et al [11].

SUMMARY

Dermatophyte infection also known as tinea, are the most common fungal infections of superficial layer of the skin, hair, and nails. The term "dermatophyte" refers to fungal species that infect keratinized tissue, and includes members of the genera Trichophyton, Microsporum, and Epidermophyton . Dermatophyte infection are clinically identified as tinea infection. Tinea are classified based on their location (e.g., tinea pedis occurs on the feet and tinea capitis on the scalp,tinea corporis on trunk and back, tinea unguium over groin area etc). Children and immunocompromised individuals are more affected by tinea infections, especially tinea capitis. However, people of all ages may suffer from tinea pedis or tinea unguium. The clinical features of dermatophyte infection include purities, scaling, and erythema. The best initial test for the diagnosis of dermatophyte infection is potassium hydroxide (KOH) preparation, which allows segmented hyphae to be seen on microscopy. KOH positive sample are grown in SDCCA and DTM media for further species level identification of dermatophye. Generally, the treatment for dermatophyte infections is topical antifungals. Oral antifungals (e.g.,

terbinafine, griseofulvin) are always used in tinea capitis and are also used for severe, refractory cases of other kinds of tinea. Concomitant tinea infections in household members or pets should be treated as well.

CONCLUSIONS

Dermatophytoses are distributed worldwide with 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. In the present study I have attempted to understand the epidemiological status of the dermatophytes in a tertiary care centre in Park circus area of Kolkata, India. Commonest Dermatophytosis was Trichophyton verrucosum which was the predominant dermatophyte involved followed by Trichophyton rubrum . Trichophyton mentagrophyte ,Epidermophyton flocusum ,Microsporum canis Microsporum gypseum and Microsporum tonsurans. The lower socioeconomic condition associated with overcrowding wearing of ethnic cloths (like Burka"s),hot humid atmospheric condition are more exposed to the infections due to their lack of awareness as well as poorer knowledge on hygiene.. Hence if the surveillance of infections and the awareness level in the common population is increased, the burden of this type of disease can be reduced to much lower level. The most common clinical type was tinea corporis followed by tinea cruris and tinea pedis and overall predominance in the study was female with 16-55 being most affected age group. T. verrucosum forms the commonest etiological agent of dermatophytosis, which were mostly isolated from Tinea corporis, Tinea cruris Tinea unguinum,and Tinea manuum. Possible cause of dermatophytic infection in lower socioeconomic groups were due to more exposed to the infections and because of their lack of awareness as well as poorer knowledge on hygiene on fungal infection and its preventive measures.

Table:1 Distribution of Sample, T2DM and Dermatophyte

		Frequency	Percent
Sample	Skin	162	81.0
	Nail	33	16.5
	Hair	5	2.5
	Total	200	100.0
T2DM	Non-diabetic	181	90.5
	Diabetic	19	9.5
	Total	200	100.0
Dermatophyte	T.verucossum	50	40.0
	T.rubrum	30	24.0
	T.mentagrophyte	16	12.8
	T.tonsurans	4	3.2
	Microsporum canis	8	6.4
	Microsporum gypsium	4	3.2
	Microsporum audinii	2	1.6
	Epidermophyton sp	11	8.8
	Total	125	100.0

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