Original article

Pattern of dermatophytes among skin, hair, and nail specimens in a tertiary care hospital of Lahore

Majid Rauf Ahmad[1], Iffat Javed[2], Sohaila Mushtaq[3], Muhammad Saeed Anwar[4], Kanwal Hassan Cheema[5]

[1]Assistant Professor, Microbiology, Pathology Department, Avicenna Medical College, Lahore, [2]Professor, Microbiology, Pathology Department, Amina Inayat Medical College, Lahore, [3]Professor, Microbiology, Pathology Department, Azra Naheed Medical College, Lahore, [4]Professor, Microbiology, Pathology Department, CMH Lahore Medical College & IOD (NUMS), [5]Assistant Professor, Microbiology, Pathology Department, CMH Lahore Medical College & IOD (NUMS)

Correspondence to: Majid Rauf Ahmad, Email: majidrauf177@yahoo.com

ABSTRACT

Background: Dermatophytes are considered to be the most common cause fungal of infections globally. The geographical distribution of these fungi varies from region to region. The aim of this study was to isolate and determine the frequency and variety of various dermatophytes from clinically suspected cases of dermatophytoses.

Patients and methods: This was a descriptive study carried out at the Department of Microbiology, Post graduate Medical Institute, Lahore over a period of nine months from July 2013 till March 2014. Nonprobability convenient sampling was used. One hundred clinically suspected cases of dermatophytosis were selected for this study. Specimen of skin, hair and nail were taken from patients and were evaluated by both microscopic examination and culture. Dermatophytes were identified based on the colony morphology as well as microscopic arrangement of macroconidia and microconidia. Data was collected and entered in Statistical Package for the Social Sciences (SPSS) version 20.0.

Results: Out of a total of 100 patients, 48 were male and 52 were female. The majority of cases were from the age group of 31-40 (25%) followed by less than 10 years (18%). Out of hundred patients, 59 (59%) were positive on direct microscopy with KOH wet mount. Fungal culture was positive in 56 (56%) cases. Out of these 56 positive cultures, twenty-three were identified as dermatophyte species. *Trichophyton rubrum* was the commonest isolate. Other dermatophyte species isolated were *Trichophyton mentagrophytes*, *Trichophyton verrocosum*, *Microsporum canis*, *Trichophyton tonsurans*, and *Microsporum audonii*.

Conclusion: Studying the pattern of dermatophyte species is necessary as it helps in the early diagnosis and treatment of dermatomycoses. This study identified Trichophyton rubrum as the commonest etiological agent of dermatophytoses.

Keywords:

Dermatophytes, KOH mount, Fungal culture, *Trichophyton rubrum*

INTRODUCTION

Dermatophytes are a group of related fungi requiring keratin for their growth and remain the main causative agents of superficial mycoses. Dermatophytosis are recognized as the most common fungal infection worldwide, estimated to affect between 20-25% of the world population.[1] They infect skin, hair, and nails.[2] They are mostly found in humid parts of skin, on the surfaces of ground and on household items such as towels, bedsheets, and clothing.[3] Factors like age, gender, personal hygiene, socioeconomic conditions have also contributed to the emergence of these infections.[4] Skin infections due to dermatophytes have become a significant public health issue affecting children, teenagers, and adults especially in the tropical and subtropical countries, where moisture contributes to a major role in their pathogenesis.[5] Dermatophytosis is mainly caused by one of the three genera of fungi known as Epidermophyton, Microsporum, and Trichophyton.[6] Despite the availability of many oral and topical antifungal drugs, resistance to them is on the rise and leads to anxiety and stress in affected patients.[7] Although dermatophytic infections are distributed worldwide, the endemic and most prevalent species of dermatophytosis vary considerably from one location to another.[8] The present study was done to isolate and identify various dermatophytes from clinically suspected cases of dermatophytes in a tertiary care hospital in Lahore, Pakistan.

PATIENTS AND METHODS

After taking informed consent, specimens of skin, hair and nail were collected from 100 patients attending the dermatology outpatient department of a tertiary care hospital, Lahore. This study included patients with clinical presentation of dermatophyte symptoms.

Conflict of interest: The authors declared no conflict of interest exists.

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Patients already taking antifungal treatment were excluded. The data from patients was entered in a proforma which included the name of the patient, age, gender, address, presenting complaint and duration of illness. Specimens of skin scrapings and nail were collected after thoroughly cleaning the site with 70% alcohol. Skin scraping was collected from the inflamed margins of the lesion with the help of a scalpel blade. Infected nail clippings were taken by sterile scissors. In some cases, a dental drill was also used to collect proximal nail sample in the form of powder. Hair samples were plucked from the site of scaling with the help of epilating forceps. The specimens were collected in a piece of sterile black paper which was then neatly folded, labelled and sent to laboratory. Samples were processed microscopically for the presence of fungal elements by placing them on a clean glass slide and adding potassium hydroxide/dimethyl sulphoxide (20% KOH in 40% DMSO). Each slide was examined carefully for the presence of hyaline, septate hyphae. All specimens were simultaneously inoculated on Sabouraud Dextrose agar with supplemented with antibiotics including chloramphenicol (0.05g/liter), gentamicin (5ml/liter), and cyclohexamide (0.5g/liter). The culture plates were incubated at 28-30° C for a period of four weeks. They were checked twice weekly to observe any growth.

Dermatophyte species were recognized by the color of the colony, surface texture and rate of growth. They were confirmed microscopically by preparing transparency tape preparation using Lactophenol cotton blue. The arrangement of microconidia and macroconidia were used as a basis of dermatophyte species recognition. Data was entered and analyzed using SPSS 20.0 software. Descriptive analysis of age, sex, the number of dermatophyte species was performed, and results are presented as frequencies and percentages.

The study was approved by the Ethical Review Committee of Post Graduate Medical Institute/LGH, Lahore.

RESULTS

In the current study, out of a total 100 specimens, 48 were from male patients and 52 were from female patients. The patients were divided in seven categories according to age. In the present study, the highest number of dermatophytosis were from the age group of 31-40 (25%) followed by less than 10 years (18%). Table 1 shows the distribution of clinical types of dermatophytes according to age groups of patients.

Table 1. Distribution of clinically suspected cases of dermatophytoses according to age group of patients (n=100)

Age groups (years)	Number of patients	Percentage
≤10	18	18%
11-20	15	15%
21-30	17	17%
31-40	25	25%
41-50	9	9%
51-60	7	7%
≥60	9	9%

Table 2. Frequency of various species of dermatophytes isolated

Species	Number isolated	Percentage
T. mentagrophytes	5	22%
T. rubrum	6	26%
T. tonsurans	2	9%
T. verrocosum	5	22%
Microsporum canis	4	17%
Microsporum audonii	1	4%

In the present study, out of hundred patients, 59 were positive on direct microscopy with potassium hydroxide (KOH) wet mount. Fungal culture was positive in fifty-six cases. Out of fifty-six cultures, twenty-three were of dermatophytes species whereas the rest were non-dermatophyte species. Among the dermatophyte species isolated on culture, 26% were of *Trichophyton rubrum*, 22% were of *Trichophyton mentagrophytes* and *Trichophyton verrocosum*, 17% *Microsporum canis*, 9% *Trichophyton tonsurans*, and 4% *Microsporum audonii.* A breakup of the dermatophyte species according to their genus is shown in Table 2.

A relationship of the dermatophyte species isolated with clinical type of dermatophytoses is shown in Table 3. *Trichophyton mentagrophytes* was the most common species isolated from tinea corporis whereas *Trichophyton rubrum*, *Trichophyton verrocosum* and *Microsporum canis* were among the other pathogens isolated in most of the patients.

DISCUSSION

Dermatophytes are a group of fungi that infect the skin, hair and nails of humans and animals producing a variety of cutaneous infections known as ringworm infections.[9] Factors like humidity, poor socioeconomic status, poor maintenance of personal hygiene are among some of the causes of dermatophyte infections.[5] The current study showed maximum number of patients in the age group of 31-40 years (25%) followed by less than 10 years (18%). These results are similar to a study conducted in Nepal in which dermatophytes were more common in the age group of 21-40 years.[3] However, in another study, dermatophytes were present largely in the age group of 11-30 years.[10] Majority of cases of dermatophytoses in the present study were seen

Table 3. Relationship of dermatophyte species with clinical types of dermatophytosis (n=23)

Clinical Diagnosis	*T. mentagrophytes*	*T. rubrum*	*T. verrocosum*	*T. tonsurans*	*M. canis*	*M. audonii*	Total
Tinea Corporis	3	2	2	1	2	0	10
Tinea Capitis	1	1	1	0	0	0	3
Tinea Cruris	0	0	2	0	1	0	3
Tinea Pedis	0	2	0	0	0	1	3
Tinea Unguium	0	0	0	0	0	0	0
Tinea Mannum	1	0	0	0	0	0	1
Tinea Faciei	0	1	0	1	1	0	3

in females (52%) as compared to that of males (48%). These results are similar to a previous study from Iran which reported that infection rate in females was 55.7% as compared to males which was 44.3%.[11] However, in a study from India, 75% of patients were males as compared to females (25%).[8] Most commonly isolated species in the current study was *Trichophyton rubrum* followed by *Trichophyton mentagrophytes* and *Trichophyton verrocosum*. These results are similar to a study done in Kerala, India in which out of 74 isolates, Trichophyton rubrum 40 (54.05%) was the most common species followed by *Trichophyton mentagrophytes* 29 (39.19%).[12] However, in another study, out of 60 cases, the most common isolate was *Trichophyton mentagrophytes* with 29 cases (48.3%) followed by *Trichophyton rubrum* with 23 cases (38.3%), *Trichophyton verrocosum* with 5 cases (8.3%) and *Trichophyton violaceum* with 3 cases (5%).[13] This highlights the fact that the distribution and frequency of dermatophytosis vary geographically. This study also observed the relationship of the dermatophyte species isolated with clinical type of dermatophytoses. *Trichophyton mentagrophytes* was the most common species isolated from tinea corporis whereas *Trichophyton rubrum*, trichophyton verrocosum and *Microsporum canis* were among the other pathogens isolated in most of the patients. These results are similar to another study done in India where *Trichophyton mentagrophytes* were the main cause of Tinea corporis and Tinea cruris.[5] The pattern of dermatophyte infections and their various clinical presentation vary in different geographical regions. Studying the pattern helps in the early diagnosis and treatment of dermatomycoses. This is recommended that further nationwide epidemiological research highlighting the socioeconomic factors attributed to the prevalence of dermatophytosis be done to find out in more details the species that are responsible for such infections.

CONCLUSION

The study signifies the importance of mycological examination in the diagnosis of various dermatophytoses. The etiological agents of superficial dermatophytoses found in this study would help contribute to the literature in terms of epidemiological data.

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