

International Journal for Pharmaceutical Research Scholars (IJPRS)



ISSN No: 2277 - 7873

RESEARCH ARTICLE

A Clinico-Mycological Study of Superficial Dermatophytes Dutta AK^{*1}, Maharana J¹, Sinha H²

¹Department of Biotechnology & Microbiology, St. Thomas College, Bhilai (CG) – 490006, India. ²Kalyan PG College, Bhilai Nagar, Bhilai (CG) – 490006, India. Manuscript No: IJPRS/V3/I1/00039, Received On: 23/01/2014, Accepted On: 01/02/2014

ABSTRACT

Dermatophytes commonly cause superficial dematoses, especially in children. Superficial tinea infections can vary widely in appearance, ranging from a single, small circular lesion with mild erythema and a scaling active border to multiple large areas of marked inflammation. Despite the variety in the morphological feature, the most common lesion of dermatophytes is an annular, ring like scaly patch; hence the name ring worm is given. Therefore, laboratory tests, particularly the potassium hydroxide slide preparation, are often necessary to establish the diagnosis. The culture becomes particularly important if the smear is negative but a superficial dermatosis is strongly suspected. Tinea capitis is frequently diagnosed only by culture. This work was planned to study the dermatophytes in patients those who are coming from this middle part of the country especially in Chhattisgarh state.

KEYWORDS

Infection, Samples, Culture, Laboratory Test, Diagnosis

INTRODUCTION

Dermatophytes are kerationophilic fungi whose activity are confined to the skin (Stratum corneum), hair and nails. Dermatophytes grow only within keratin layers and not penetrate into deeper tissues because of the immune factors in the host. Interaction with dermatophytes commonly known as "Ringworm" is one of the most widely prevalent mycotic infections in human beings.¹ In immune-compromised hosts, even non-pathogenic fungi may cause infection. Many of the letters will be superficial types of diseases that are more of a cosmetic than a health problem. Thus, there are relatively few species of fungi that are pathogenic to human that can be fatal. Dermatophytes occur worldwide. Although not life threatening,

*Address for Correspondence: Dr. Amit Kumar Dutta Lecturer, Department of Biotechnology & Microbiology, St. Thomas College, Risali, Bhilai (CG)- 490006, India. E-Mail Id: adjnchrc@yahoo.com they may produce significant symptoms which interfere with the quality of life. They are particularly widespread in tropical countries because of warm and humid climate, crowded living conditions and other socio-economic factors.² The present study was planned to study the superficial fungal infections in patients attending the skin OPD of Pandit Jawaharlal Nehru Medical College, Raipur and Dr. Bhim Rao Ambedkar Memorial Hospital, Raipur to study the effects of socio- economic factors on prevalence of fungal infection by clinical studies and also to find out the various causative fungi in superficial fungal infections by clinical studies.

Because of the aging population, increase in the number of therapeutic agents, which suppress the immune system (chemotherapy and corticosteroids) and newer diseases such as acquired immune deficiency syndrome, fungi infections are more common. Thus, present research is aimed at determining how fungi cause diseases, improving diagnostic technique for detecting fungal diseases and developing improved anti-fungal new and drugs. Dermatophytes spread by direct contact from (Anthropophilic other people organisms: Trichophyton rubrum), animals (Zoophilic organisms: T. mentagrophytes and Microsporum canis) and soil (Geophilic organisms: M. gypseum), as well as indirectly from fomities. Anthropophilic dermatophytes may also spread through fallen hair, desquamated epithelium from combs, caps barbers instrument bedding, clothing, furniture, floors, diving boards, etc. Zoophilic Dermatophytes may spread by handling animals like cats, dogs, cattle horses and pigs. Geophilic Dermatophytes though spreading from soil, commonly pass through a vector like infected animals and seldom directly. from soil.³

MATERIALS AND METHOD

A total no 115 patients who attended the Out Patient Department of dermatology section of Pandit Jawaharlal Nehru Medical College, Raipur and Dr. Bhim Rao Ambedkar Memorial Hospital, Raipur formed the study material for this study. The period of the work was 1st June, 2013 to 30th November, 2013. Only the first 50 consecutive culture positive patients were included for the final conclusion of the study.



Graph Showing the Distribution of Patients according to different age groups of male & female

A detail history of age, sex, occupation, duration of disease, any predisposing factors, sites, associated disease, family and personal history, etc. were recorded in all cases. The patients were thoroughly examined clinically and sites & morphology of the lesions were noted. Baseline investigation was carried out in all cases. The skin, nail and hair samples were obtained from the patients.

Collection of Material

The lesion was cleaned with medicated spirit; the material from the affected site was scraped with blunt edge of a sterile scalpel blade from the surface and active edge of the lesion. Affected hair stubs and loosely attached hair were plucked with forceps. Thickened nail plate was scraped from the under surface.

Direct Examination

The material was placed then on a glass slide in 2- 3 drops of 20% KOH solution and covered with a cover slip. It is allowed to remain for about 15- 20mins, in which time the keratin is dissolved. Nails were kept in KOH for about 40-45mins. Warming the slide help this process. The slide was then viewed under low and high power of magnifying microscope to look for the presence of spores.

Culturing

The selective material was collected in sterile petri dish and cultured on Sabouraud's Dextrose Agar Media in the test tube. The specimen taken as well as collected from the patients were incubated for 48 hours and then examined for their cultural characteristics.

RESULTS AND DISCUSSIONS

The observations were made among the 50 culture positive patients, out of which 9 were positive. The age of the patients ranged from 3yrs to 75 years. The mean age of the patients was 37.5 yrs. There were 29 males and 21 females.

Disease Distribution of the Patients

The clinical diagnoses among the study group are shown in Table 1 & Photographs no 1- 4 respectively.



Figure 1 a, b: Photograph showing erythromatous circular ring & *T. facie* involving right cheek in the Patient

Table & Graph 1: Showing the Distribution of patients according to clinical diagnosis

S.N	Name of Disease	No of Patients		% of Clinical
		Male	Female	Diagnosis
1	Mixed Infection	15	06	42
2	T. captis	01	00	02
3	T. corporis	09	07	32
4	T. cruris	02	00	04
5	T. versicolor	01	05	12
6	T. pedis	01	02	06
7	Onychomyc osis	00	01	02
	Total no of Patients	29	21	100



Microorganism's Culture among the Patients

The different organisms cultured in the patients with dermatophytic infection are shown in Table

no-2. Trichophyton was the most commonly cultured organism cultured in 56% of cases, followed by *Candida albicans* in 22% cases.



Figure 2 a, b: Photograph showing *T. corporis* lesions over the lower trunk and *T. cruris* lesions over the buttocks and posterior thigh

 Table & Graph 2: Showing the Microorganisms

 culture among the Patients

S. N	Name of Organism	No of Patients		% of
		Male	Female	organism
1	Mala <mark>ssez</mark> ia fu <mark>rfur</mark>	01	03	08
2	Trichophyt on sp.	17	11	56
3	Microspor um sp.	01	00	02
4	Mixed Organism	03	03	12
5	Candida albicans	07	04	22



The present study of 50 culture positive superficial fungal infection of the patients attending the skin OPD of dermatology section of Pandit Jawaharlal Nehru Medical College, Raipur and Dr. Bhim Rao Ambedkar Memorial Hospital, Raipur where studies for their clinic epidemiological and salient features were observed. Out of 50 patients, there were 29 males and 21 females. The male and female ratio was 4.1: 3. The age of patient ranges from 2.5 years to 75 years. The mean age of the patient was 37.49 years and the duration of the clinical diseases ranges from m 7 days to 4 years. The mean duration of the disease was 3.45 months. 24% of the patients were from urban areas while only 76% belonged to rural areas. Majority (48%) of the patients belonged to lower socio-economic group with earning <Rs.25000/Annum.



Figure 3 a, b: Photograph showing positive dermatophytic culture & multiple colonies of *Candida albicans* on Sabouraud's Medium

T. corporis was the most commonly seen disease followed by T. cruis. Trichophyton sp. was the most prevalent (56%) culture organism among the superficial mycosis patients followed by Candida albicans (22%).As culture of the organism was negative in all the patients of T. barbae and T. facie these patients were not included in the study. The culture of the organism (Trichophyton) was positive in only one female patient with Onychomycosis. Hence the above study demonstrated that Trichophyton & Candida organism are quite prevalent in causing superficial dermatophytes in this area although culture of the causative organism is difficult in patient with T. ungium, T. barbae and *T. facie*.



Figure 4 a, b: Micro-photograph showing the multiple hyphae in KOH & spores of patient with *T. versicolor*

CONCLUSION

Superficial fungal infections are among the most common skin diseases affecting millions of people worldwide. India is a large subcontinent with remarkably varied topography, situated within the tropical and subtropical belts of the world. Its climate is conducive to the acquisition and maintenance of Mycotic infection. Since dermatophytes occur most frequently during the monsoon, the present study was planned during this period. The Maximum number of patients was found in the age group of 21- 40 years(42%), followed by 41- 60 years(34%) age group. There were 29 men (58%) and 21 women (42%), the male to female ratio being 1.57: 1 (29: 21).

A higher incidence of dermatophytes in males than in females has been reported both in India and abroad. Differences in the incidence of other clinical types were also observed in the present study, e.g. Tinea corporis and mixed infection were more common in males while Tinea pedis, T. versicolor, T. corporis and mixed infection were more common in females also. The disease is uncommon in children as compared to adults in his large series study of superficial mycosis found 95% of his patients were adults and Only 5% children. In the present study, the percentage of children affected was 2%. The incidence of T. capitis was 2% in our study which is comparable with reports from other workers reports of 0.57% to 10%. It is less common in common in India than in other countries. This may be attributable to the use of hair oils (particularly mustard oil) which are customarily used by Indian and have been shown to have an inhibitory effect on dermatophytes *in vitro*.⁴⁻⁶

The reported incidence of T. pedis varies from 26.4% to 0.4%. We found it to be 2% in our study. The predominance of Tinea pedis in western countries could be because of the regular use of shoes and socks, predisposing to perspiration and maceration. Tinea capitis was present in one child (2%) in this study. As universally reported, Tinea capitis is an infection of children. The post-pubertal changes in hormones, resulting in acidic sebaceous gland secretions, are responsible for the decrease in incidence with age.^{5,7} Out of 110 patients, 08 (7.27%) tested positive by direct microscopy and 50 (45.45%) by culture. 42 patients were negative for Dermatophytes by direct microscopy but yielded growth on culture; 60 cases were negative by both techniques. Being the most common clinical type, *Tinea corporis* contributed the highest number of culture positive cases (16/50). We found an isolation rate of 44% with culture, compared to rates varying from 7% to 49% in other studies. Out of 50 specimens positive by culture, only 08 (16%) were positive by direct microscopy alone, highlighting the importance of both direct microscopy and culture in the definite diagnosis of Dermatophytes.

Tinea rubrum is the main Dermatophytes reported from India and other countries. *Rubrum* has been found to be the main causative agent of Tinea corporis, whereas Tinea cruris is mainly caused by *E. floccosum* and *Tinea capitis* by *T. violaceum.*⁸ In our present study, Species identification could not be done due to lack of facilities. Further study required for this to give the species name at the concludary section.

ACKNOWLEDGEMENT

With the name of Almighty GOD we would like to acknowledge all those people, without whom, this work would not have been possible. We express our deep sense of gratitude to Dr. S. Mukherjee, Dean, Pandit Jawaharlal Nehru Medical College, Raipur and Dr. Bhim Rao Ambedkar Memorial Hospital, Raipur, for permitting us to work in their esteemed Medical College. We are also thankful to Dr. A. Neral of same Medical College, for his support during our research, experiment and data analysis. We are highly grateful towards the Management of St. Thomas College, Bhilai & Kalyan PG College, Bhilai for their supportive nature and all time response to carry on this work.

REFERENCES

- 1. Aly, R. (1994). Ecology and epidemiology of dermatophyte infections. *Journal of the American Academy of Dermatology*, *31*(3), S21-S25.
- Anand, L. C., Singh, U. K., & Rathore, B. S. (1980). Fungal flora in the armed forces: clinical and mycological studies. *Indian Journal of Medical Research*, *71*, 365-371.
- 3. Bergus, G. R., & Johnson, J. S. (1993). Superficial tinea infections. *American family physician*, 48(2), 259.
- 4. Kaur, I. S. (1970). Incidence of dermatophytosis in Chandigarh and surrounding areas. *Indian J Dermatol Venereal Leprol*, *36*, 143-46.
- 5. Cohn M. S. (1992). Superficial fungal infections: Tropical and oral treatment of common types. *Postgrad Med*, *91*, 239-44.
- 6. Gupta, R. N., & Shome, S. K. (1959). Dermatomycoses in Uttar Pradesh: an analysis of 620 cases. *Journal of the Indian Medical Association*, *33*, 39.
- 7. Hajini G.H., Kandhari K.C., & Mohapatra L.N. (1970). Effect of hair oils and fatty acids on the growth of Dermatophytes and their in vitro penetration of human scalp hair Sabouradia. *Indian Journal Med Assoc, 8*, 174-6.
- Haneke, E. (1991). Fungal infections of the nail. In *Seminars in dermatology* (Vol. 10, No. 1, pp. 41-53).