ORIGINAL ARTICLE ASIAN JOURNAL OF MEDICAL SCIENCES

Clinico mycological profile of Dermatophytosis in patients attending tertiary care hospital in Northern India

Aishiya Ishrat[1], Saba Choudhary[2], Masarat Jabeen[3]

[1]Lecturer, [2]Medical Officer, Department of Microbiology, [3]Lecturer, Department of Dermatology, Government Medical College, Jammu, India

Submission: 02-06-2022 Revision: 28-07-2022 Publication: 01-09-2022

ABSTRACT

Background: Dermatophytoses refers to superficial fungal infection of keratinized tissue caused by keratinophilic dermatophytes. It is most common superficial cutaneous infection of stratum corneum affecting hair, nail, and skin. **Aims and Objective:** The aim of this study was to study the clinico-mycological profile of dermatophytic infection that are prevalent in this region. **Materials and Methods:** Samples were collected from 104 patients which included skin, nail, and hair samples after the detail history and examination of patients. The samples were subjected to direct microscopy and culture. Further identification was done by microscopic and macroscopic characteristics of fungal pathogens. **Results:** A total of 104 cases were positive for dermatophytic infection. Among the dermatophytic infections, Tinea corporis (63.4%) was most common clinical type followed by Tinea cruris (18.3%). Males (66.3%) were affected more than females (33.6%) and the age group most affected was 31-45 yrs (46.2%) followed by 16-30 yrs (32.7%) in the current study. Of all the dermatophyte isolates *T.rubrum* was the most common (77.4%) cause of infection, followed by *T. mentagrophytes* (12.7%). **Conclusion:** The present study reveals the varying trend in the incidence of dermatophyte species which is important to implement treatment regimens and to recommend control measures.

Key words: Dermatophytosis; *Trichophyton rubrum*; Tinea corporis; KOH Positive; Fungal pathogens

Access this article online

Website: http://nepjol.info/index.php/AJMS

DOI: 10.3126/ajms.v13i9.45501

E-ISSN: 2091-0576

P-ISSN: 2467-9100

INTRODUCTION

Dermatophytes are aerobic fungi that produce proteases that digest keratin and allow colonization, invasion and infection of stratum corneum of the skin, the hair shaft, and the nail.[1] It is more prevalent in tropical and subtropical countries like India where the heat and humidity is high for most part of the year. Dermatophytic infection has become a significant health problem affecting children, adolescents and adults.[2] Although the disease hardly causes death, but it deleteriously affects the quality of life via social stigma and upsetting the day-to-day activities. Various factors like socioeconomic condition, climate, host factors, family history, and occupation attribute to the mounting rate of dermatophytic infection. Host factors include age, race, decreased rate of sebum production, immune status, any disruption in skin barrier and associated atopic dermatitis.[3] Large population size, low socioeconomic status, poor hygiene, overcrowding, improper sanitation, lack of health education and awareness, poor healthcare facilities, exchanging of foot-wears and clothes among people in developing nation have been recognized as potential risk factors for the proliferation of the disease.[4]

The current study was done to evaluate the pattern and clinico-epidimiological profile of dermatophytic infection.

Address for Correspondence:
Dr. Saba Choudhary, Medical Officer, Government Medical College, Bakshi Nagar, Jammu, India. **Mobile:** +91-9797594700.
E-mail: sabachoudhary.gmc@gmail.com

Aims and objective

The aim of this study was to study the clinico-mycological profile of dermatophytic infection that are prevalent in this region.

MATERIALS AND METHODS

The study was conducted on 104 clinically suspected cases of Dermatophytosis in the Department of Dermatology, SMGS Hospital over a period of one year. Prior to sample collection, written informed consent was completed and signed by the study subjects and this study was approved by institutional ethical committee**.** The patients with suspected dermatophytic infections were thoroughly examined with detailed clinical history including age, sex, occupation, daily activity, itching and field related work as contact with soil and animals was elicited and documented in all the cases.

Collection of samples

Before collection of specimens from suspected patients, preparation of patient was done by cleaning the infected area with 70% ethanol and ensured for dryness.

Skin samples were collected by scraping the surface of the margins of the lesion using sterile blunt scalpel.[5] Nail pieces were collected by taking snipping of infected part of nail using sterile scissors.[6] Hair were collected by removing dull broken hair from the margins of the lesion using sterile tweezers.[6] Samples were collected on a clean piece of paper which were subjected to direct microscopy in 10% potassium hydroxide (KOH) for skin and hair samples and 40% KOH for nail samples. The samples were cultured in Sabourauds dextrose agar tubes into two sets, one group with chloramphenicol and other with cycloheximide (to prevent growth with saprophytic fungi and bacteria); and incubated at 37 and 25°C; respectively. The cultures were examined for presence of growth, colony morphology and pigment production.

RESULTS

The study population included 104 clinically suspected cases of dermatophytosis, of which 69 (66.3%) were from males and 35 (33.6%) from females. The ages of the study subjects ranged from 1 year to 75 years with a mean age of 29 years. The details regarding the clinical manifestation and sex of study subjects are shown in Table 1. Tinea corporis was the predominant clinical manifestation accounting for 63.4% of the cases, of which 45 (68.1%) were males and 21 (31.8%) females. This was followed by Tinea cruris and Tinea pedis accounting for 18.3% and 12.5% of the cases, respectively.

Table 1: Frequency of clinical manifestations in relation to gender

Clinical Manifestation	Total Samples n(%)	Sex	
		Male n(%)	Female n(%)
Tinea corporis	66 (63.4%)	45 (68.1%)	21 (31.8%)
Tinea cruris	19 (18.3%)	12 (63.2%)	7 (36.8%)
Tinea pedis	13 (12.5%)	8 (61.5%)	5 (38.4%)
Tinea unguium	2 (1.9%)	0	2 (100%)
Tinea manuum	3 (2.8%)	3 (100%)	0
Tinea capitis	1 (.96%)	1 (100%)	0
Total	104 (100%)	69 (66.3%)	35 (33.6%)

According to clinical manifestations with respect to age, patients with age groups 31-45 (46.2%) were most commonly infected followed by patients with age group 16-30 years (32.7%). Out of 66 study subjects with Tinea corporis, 51.5% (34/66) were 31-45 years of age. Study subjects in the age group of 16-30 were the second most affected (Table 2).

Of the 104 suspected cases of dermatophytosis, 90(86.5%) were confirmed by KOH microscopic examination while 71(68.2%) were both KOH and culture positive. Identification of dermatophytic fungi showed the presence of *Trichophyton mentagrophytes*, *Trichophyton rubrum*, *Trichophyton tonsurans*, *Trichophyton verrucosum*, *Epidermophyton floccosum*, and *Microsporum gypseum*. Among all the dermatophyte isolates *T. rubrum* was the most common (77.4%) cause of infection followed by *T. mentagrophytes* (12.7%) whereas *T. tonsurans* (1.4%) and *T.verrucosum* (1.4%) were least common (Table 3).

DISCUSSION

Dermatophytic infections are more prevalent in the developing world and the infection is increasing in this part of the world. Dermatophytosis is a common disease in India due to factors like heat and humidity. The present study attempted to determine the dermatophyte infections in patients attending a tertiary care hospital. This study comprises of 104 clinically suspected cases of dermatophytic infection. In this study, males were 66.3% and females were 33.6%. High prevalence in males have been reported by other studies also.[7,8] This may be due to more occupational exposure of males in outside activities than females and outdoor work predisposes men to hot, humid, and sweaty conditions favourable to the growth of dermatophytes. In our study, about six different types of Tinea were noted among which Tinea corporis was the commonest clinical presentation accounting for 66 (63.4%) of the total study subjects which was followed by Tinea cruris 19 (18.3%) which concurs with the study.[7,9,10] This finding can be credited to the tropical climatic condition of India.[11] However, predominant clinical manifestations of dermatophytosis vary considerably in different studies

Table 2: Clinical manifestations in different age groups

Clinical Manifestation	Total samples	Age groups				
		1–15	16–30	31–45	46–60	>61
Tinea corporis	66	4	20	34	5	3
Tinea cruris	19	-	10	5	3	1
Tinea pedis	13	2	3	6	2	-
Tinea manuum	3	-	1	2	-	-
Tinea unguium	2	1	-	1	-	-
Tinea capitis	1	1	-	-	-	-
Total	104 (100%)	8 (7.7%)	34 (32.7%)	48 (46.2%)	10 (9.6%)	4 (3.8%)

Table 3: Distribution of dermatophytes among various clinical manifestations

Fungal Isolates*	Clinical Presentation						Total
	T corporis	T cruris	T pedis	T unguium	T mannum	T capitis	
TR	40	9	5	1	0	0	55 (77.4%)
TM	4	5	0	0	0	0	9 (12.7%)
TV	0	0	0	0	1	0	1 (1.4%)
TT	0	0	0	0	1	0	1 (1.4%)
MG	1	0	0	0	0	1	2 (2.8%)
EF	0	0	2	1	0	0	3 (2.8%)
Total	45 (63.4%)	14 (19.7%)	7 (9.8%)	2 (2.8%)	2 (2.8%)	1 (1.4%)	71 (100%)

*Fungal isolates-*Trichophyton rubrum (TR), Trichophyton mentagrophytes (TM), Trichophyton verrucosum (TV), Trichophyton tonsurans (TT), Microsporum gypseum (MG), Epidermophyton floccosum (EF)*

reported in literature. In the present study, persons of all age groups were susceptible to dermatophytosis but it appeared to be more common in adults of age group 16-30 (32.7%) and 31-45 (46.2%) years as they are physically active outdoors. Our finding in this regard was similar with the findings of others.[7,12,13] As reported by most of the studies, tinea capitis is an infection of childhood. In this study, out of 104 cases, Tinea capitis was seen in a single patient and that was again in age group of 1-14 yrs as reported by earlier studies.[14,15] The decrease in no of cases of Tinea capitis with age is due to the changing pattern of hormones after puberty and production of inadequate amounts of inhibitory fatty acids before puberty.[16,17] In the present study, *T. rubrum* was the commonest dermatophyte isolated from 55 clinical samples. Second most common dermatophyte isolated was *T. mentagrophyte* from 9 clinical samples. Similar results were observed in other researches where *T. rubrum* was commonest followed by *T. mentagrophyte*.[18,19] *E. floccosum* was the most common etiological agent of dermatophytosis in another study.[20] Overall in our study 90% of isolates were *Trichophyton* genera which was followed by *Epidermophyton* and *Microsporum* in agreement with other studies.[21]

Limitations of the study

Patients on antifungal drugs were not excluded from the study and this could result in decreased chance of growth on fungal culture. Also a more systematic study covering larger population over a longer period of time would give better insight into clinicomycological profile of dermatophytosis.

CONCLUSION

Dermatophytic infections remain prevalent in India. The current study highlights the prevalence and distribution pattern of dermatophytoses. This study depicted Tinea corporis as the commonest clinical presentation involving 63.4% of all the cases of dermatophytosis and *T. rubrum* as the commonest fungal pathogen. And study also suggest that the fungal cultures are mandatory to rule out false positivity of result and to improve the diagnosis of suspected dermatophytosis for the further effective treatment without interruption of medication and also to intend potential control measures. Because of the psychological effects and high morbidity in terms of loss of working days and treatment, dermatophytosis is a public health problem. Therefore, to obtain a true representation of the overall disease pattern of the country more such types of studies should be conducted.

ACKNOWLEDGMENT

We acknowledge all the staff members of the Department of Dermatology of SMGS hospital for their contribution in this study.

REFERENCES

1. Gorbach SL, Bartlett JL and Blacklow NR. Infectious disease. 3rd ed. Philadelphia: Lippincott Williams and Wilkins; 2004. p. 1162-1180.
2. M. Jeya and G. Kumaran. Clinico- mycological profile of

dermatophytic infections. Int J Pharm Bio Sci, 2014; 5 (2): (B) 1 - 5.

3. Grover C and Vohra S. Superficial fungal infections. In: Singal A, Grover C, editors. Comprehensive Approach to Infections in Dermatology. 1 st ed. New Delhi, India: Jaypee Brothers Medical Publishers; 2016. p. 85-115.
4. Oke OO, Onayemi O, Olasode OA, Omisore AG and Oninla OA. The prevalence and pattern of superficial fungal infections among school children in ile-ife, South-Western Nigeria. Dermatol Res Pract, 2014; 2014: 842917.
5. Cheesbrough M. District Laboratory Practice in Tropical Countries Part 2. 2006.
6. Jagadish Chander. Textbook of Medical Mycology: 4th Edition. 2018.
7. Bhatia VK and Sharma PC. Epidemiological studies on dermatophytosis in human patients in Himachal Pradesh, India. Springer Plus 2014; 3:134.
8. Mahajan S, Tilak R, Kaushal SK, Mishra RN and Pandey SS. Clinico-mycological study of dermatophytic infections and their sensitivity to antifungal drugs in a tertiary care center. Indian J Dermatol Venereol Leprol 2017; 83:436-440.
9. Kanwar AJ, Mamta and Chander J. Superficial fungal infections. In: Valia RG, Valia AR, editors. IADVL textbook and atlas of dermatology. 2nd ed. Mumbai: Bhalani Publishing House; 2001. p. 215-258.
10. Jha B, Bhattarai S, Sapkota J, Sharma M and Bhatt CP. Dermatophytes in skin, nail and hair among the patients attending outpatient department. J Nepal Health Res Counc 2019; 16:434-437.
11. Mandell RJ. Douglas and Bennett. Principle and practice of infectious diseases. Dermatophytosis and other superficial mycoses. 7th edn. Philadelphia: Churchill Livingstone Elsevier, 2010; 2:3346-3348.
12. Kumar S, Mallya PS and Kumari P. Clinico mycological study of dermatophytosis in a tertiary care hospital. International Journal of Scientific Study 2014;1(6):2731.
13. Gebreabiezgi Teklebirhan and Adane Bitew. Prevalence of Dermatophytic Infection and the Spectrum of Dermatophytes in Patients Attending a Tertiary Hospital in Addis Ababa, Ethiopia. International Journal of Microbiology 2015; 653419, 5.
14. M. C. Attapattu. A study of tinea capitis in Sri Lanka. Journal of Medical and Veterinary Mycology, 1989; Vol 27(1); 27–32: 1989.
15. H. A. Sheikh. Epidemiology of dermatophytes in the Eastern province of Saudi Arabia. Research Journal of Microbiology 2009; 4(6): 229–234.
16. J. A. A. Oliveira, J. A. Barros, A. C. A. Cortez and J. S. R. L. Oliveira. Superficial mycoses in the city of Manaus. Anais Brasileiros de Dermatologia 2006; 81: 238–243.
17. G. David, C. B. Richard, F. John and R. B. Michael. Medical Microbiology: A Guide to Microbial Infections: Pathogenesis Immunity, Laboratory Diagnosis and Control, Churchill Living stone, 16th edition, 2003.
18. Sharma M and Sharma. Profile of dermatophytic and other fungal infections in Jaipur. Indian J Microbiol;2012.
19. Singh S and Beena PM. Profile of dermatophyte infection in Baroda. Indian J Dermatol Venerol Leprol.2003;69:281-283.
20. Sumana MN and Rajagopal VA. Study of dermatophytes and their in vitro antifungal sensitivity. Indian J Pathol Microbiol. 2002;45(2):169-172.
21. Topley WT. Wilson's microbiology and microbial infections. 9th ed London: Hodder Arnold; 2005: 215-235.

Authors Contributions:
AI- Concept and Design of the study, Manuscript Preparation; **MJ-** Interpretation of results, Preparation and revision of manuscript; **SC-** Reviewed literature, Statistical analysis and revision of manuscript.

Work attributed to:
SMGS Hospital, Government Medical College, Bakshi Nagar, Jammu - 180 001, India.

ORCID ID:
Dr. Aishiya Ishrat- https://orcid.org/0000-0003-3361-8408
Dr. Masarat Jabeen- https://orcid.org/0000-0002-2849-436X
Dr. Saba Choudhary- https://orcid.org/0000-0001-7756-8372

Source of Funding: None, **Conflicts of Interest:** None.