

A study on clinical profile of patients with dermatophytes

¹Dr. Gopee Makwana, ²Dr. Manish Mathur

¹Associate Professor, Department of Microbiology, PDU Medical College, Rajkot, Gujarat, India

²Resident, Department of Medicine, Govt Medical College, Bhavnagar, Gujarat, India

Corresponding Author:

Dr. Gopee Makwana

Abstract

The Dermatophytes causing superficial infection differ from place to place.¹ Environmental conditions, economical factors like poverty, overcrowding, personal hygiene & individual's susceptibility governs their prevalence. There are evidences that the predominance of species not only differs from region to region but also may change from time to time. Patients diagnosed clinically suffering from ringworm infection and not having any significant medical history were selected for present study from the Skin & Venereal Disease Out Patient Department and examined in Mycology section of the Microbiology department. A complete history including age, sex, site, type & duration of lesion along with any predisposing factor like occupational exposure to animal source [farmers, veterinary personals, pet keepers] or family contact were noted. Clinical type more common in male were *T. corporis*, *T. cruris*, *T. capitis*, *T. barbae*. Clinical type more common in female were *T. pedis*, *T. manuum*, *T. unguium* and Non-dermatophyte onychomycosis.

Keywords: Dermatophytes, skin infection, superficial infection

Introduction

Fungal infections of the skin & its appendages are very common & assuming greater significance in India & both developed & developing countries. The common cause of skin infections are dermatophytes and opportunistic fungi. Although fungi are worldwide, only few of them are considered pathogenic. The pathogenic fungi may give rise to infections in animals and human beings. Most of the agents cause infection of the superficial layers of the integument and only very few give rise to systemic involvement. Recently there has been an increase in the incidence of fungal infections. This increase may be a result of frequent usage of antibiotics, immunosuppressive drugs and various conditions like organ transplantations, lymphomas, leukemia and human immunodeficiency virus (HIV) infections^[1].

Dermatophytes means "Skin-Plant", they are group of keratinophilic fungi, causative agents of "Dermatophytosis" are also called Tinea or Ringworm, clinically characterized by involvement of keratinized tissue of the skin & its appendages i.e. hair & nails^[1-5]. Ring worm produces circular lesion equal in all center & becomes active and scaly at the periphery. The Dermatophytes causing superficial infection differ from place to place^[1]. Environmental conditions, economical factors like poverty, overcrowding, personal hygiene & individual's susceptibility governs their prevalence. There are evidences that the predominance of species not only differs from region to region but also may change from time to time. Skin infection due to dermatophytes has become a significant health problem

affecting children, adolescents and adults.

Dermatophytosis remained a public health problem ^[1]. The isolation of different species of Dermatophytes also varies markedly from one ecological niche to another depending on their primary natural habitat ^[6]. Many studies have been conducted in India & in foreign for this region to find out the prevalence of different Dermatophytes.

Methodology

Patients diagnosed clinically suffering from ringworm infection and not having any significant medical history were selected for present study from the Skin & Venereal Disease Out Patient Department and examined in Mycology section of the Microbiology department. A complete history including age, sex, site, type & duration of lesion along with any predisposing factor like occupational exposure to animal source [farmers, veterinary personals, pet keepers] or family contact were noted. Patients were examined & classified in different clinical types depending upon the site of involvement e.g. T. cruris, T. capitis etc.

Sample collection

Sample was collected depending upon the site of lesion as follows.

Skin: The lesion of the ringworm was first examined & the extending erythematous edge along with the normal skin outside the lesion was selected for sampling. The area was first clean with 70% alcohol swab to remove the contaminating dirt & bacteria. The area was allowed to dry. Skin scrapping & scales were collected in a sterile paper, with the help of sterile scalpel blade no.21. It was folded, labeled & brought to the laboratory.

Nail: Fungus in the nail is deep seated particularly at the lateral margin & nail bed. Thus, after cleaning the nail with 70% alcohol, nail was clipped with sterile scalpel blade where the nail is thickened, also collected by scrapings from beneath the nail. Initial clippings were discarded & deeper portion collected in sterile paper, folded, labeled & brought to the laboratory for processing.

Hair: Hair was epilated with the help of sterile forceps, taking care to pluck hair with root after swabbing the area with 70% alcohol in case of T. capitis & T. barbae. Scales were also collected from scalp.

Transporting the specimen

Ringworm specimens are transported in paper packages rather screw-capped container to reduce humidity & multiplication of bacteria as spores of ring worm being resistant to unfavourable conditions can remain viable for several weeks when stored.

Results

Table 1: Results of Direct Microscopy & Culture in Relation to Clinical Types

Clinical Types	Cases	Koh & Culture Both + VE	Koh & Culture Both-VE	Koh + VE Culture-VE	Culture + VE Koh-VE	Total Culture + VE	Total Koh + VE
T. Corporis	110	62	12	33	03	65	95
T. Cruris	35	25	1	07	02	27	32
T. Capitis	20	12	-	06	02	14	18

T. Pedis	07	03	1	02	01	04	05
T. Manuum	04	02	-	02	-	02	04
T. Unguium	09	07	-	02	-	07	09
T. Barbae	01	01	-	-	-	01	01
Non-Dermatophyte Onychomycosis	14	07	01	06	-	07	08
Total	200	119	15	58	08	127	177

Table 2: Sex Distribution in Relation to Clinical Types

Clinical Types	Male		Female		Total	
	No.	%	No.	%	No.	%
Tinea Corporis	69	56.55	41	52	110	55
Tinea Cruris	26	21.3	09	11.53	35	17.5
Tinea Capitis	13	10.65	07	8.97	20	10
Tinea Pedis	04	3.27	03	3.84	07	3.5
Tinea Manuum	02	1.63	02	2.56	04	2
Tinea Unguium	03	2.45	06	7.69	09	4.5
Tinea Barbae	01	0.81	00	0	01	0.5
Non-Dermatophyte Onychomycosis	04	3.27	10	12.82	14	7
Total	122		78		200	

Table 2 shows the incidence of Dermatophytes in relation to sex of the patient & it can be seen that the majority is male with 122(61%) while female with 78(39%). The male: female ratio was 1.56: 1.

Clinical type more common in male were T. corporis, T. cruris, T. capitis, T. barbae. Clinical type more common in female were T. pedis, T. manuum, T. unguium and Non-dermatophyte onychomycosis.

Table 3: Incidence of Different Species of Dermatophytes

Species	No. of Cases	%
T. rubrum	64	50.39
T. mentagrophytes	18	14.17
T. tonsurans	10	7.87
M. canis	05	3.93
M. gypseum	07	5.51
E. floccosum	16	12.59
Candida albicans	04	3.14
Fusarium	03	2.36
Total	127	

Table 3 indicates isolation rates of Dermatophytes in processed samples. The isolation rate of the Dermatophytes is 63.5% (127). Following species of Dermatophytes were isolated i.e. *T. rubrum*, *T. mentagrophytes*, *T. tonsurans*, *M. canis*, *M. gypseum*, & *E. floccosum*. Non dermatophytic onychomycosis showed presence of *Candida albicans* & *Fusarium*. Maximum no. of dermatophytes isolated were *Trichophyton rubrum* 64(50.39%).

Discussion

KOH has been used as a clearing agent for direct demonstration of fungi in skin, hair & nail scrapings [1] but addition of DMSO as described by Rebell *et al.* [7] in 1971 was found to be a better preparation over plain KOH. Addition of DMSO permits rapid clearing of keratin &

almost immediate examination of sample without warming of slide. It also prevents rapid drying of the fluid & thus is a better option. KOH preparation tends to absorb CO₂ from air & form carbonate crystals thus reducing the effective hydroxide. Also, hydroxide preparation tends to saponify when gently heated thus forming fat globules in the slide & reducing effective visualization of fungal hyphae.

Dermatophytic infections were predominantly seen in March to October (163 cases, 81.5%) and less commonly seen during November to February (37 cases, 18.5%) as also reported by some others similar to our findings. Others have found maximum numbers of cases in March to July & low in December to February.

Here we classified the incoming patients into four groups according to their income/month. We found out that the dermatophytes were more prevalent in the very lower income group (Group-1) with 46.45% & least in the upper middle-income group (group-4) with 9.44%. It may be due to poor hygienic condition of the patient. Ranganathan S^[8] has found that 35% of infected cases from very low-income group (group-1), 34.2% from low-income group (Group-2), 23.3% from middle income group (group-3) & 1.8% from moderately rich group (group-4), while Bindu V.^[9] has found that majority of the patients belong to middle income group.

Considering the occupation of the patients, most of them were agricultural workers who get exposure to crop fields, cattle & poultry to about 56.69% while others were 31.49% labourers, 9.44% housewives & 2.36% has history of family contact similarly as reported by V. Sumana^[10] about 65% in agricultural workers & 26% in higher socioeconomical status.

Conclusion

- 88.5% cases were found to be positive by direct microscopy & 63.5% cases were found to be positive by culture.
- The most common genus isolated is Trichophyton. *T. rubrum* is found to be the most common species with 50.39%. *T. mentagrophytes* 14.17%, *E. floccosum* 12.59%, *T. tonsurans* 7.87%, *M. gypseum* 5.51%, *M. canis* 3.93%, *Candida* 3.14 & *Fusarium* 2.36%.

References

1. Hay RJ. Chronic Dermatophyte Infection, clinical & Mycological features. *British Journal of Dermatology*. 1982;106:1-7.
2. Pushpa Talwar, Baldev Singh, Hunjan BS, Surrinder Kaur, Bhusan Kumar. Study of Human Dermatophytosis. *Ind J Medical Research*, 1979 Aug, 187-194.
3. Davel G, Perrotta D, Canteros C, Cordoba S, Rodero L. Multicenter study of superficial Mycoses in Argentina, EMMS group. *Review of Argentina Microbiology*. 1999 Oct-Dec;31(4):173-181.
4. Costa TR, Costa MR, De Silva MV. The etiology & Epidemiology of Dermatophytes in Golanias, Brazil. 1999 July-Aug;32(4):367-371.
5. Merlin K, Kilkenny M, Plunkett A. The prevalence of common skin condition in Australian School Students, *British J Dermatol*. 1999 May;140(5):897-901.
6. Becerril-Chihu G, Bazan-Mora E, Lopez-Martinez R. Pediatric dermatology. 1999 March-April;16(2):87-89.
7. Taplin D, Zaias N, Rebell G. Improved preparation for the mycological disease. *Archives of Dermatology*. 1966;93:608-609.
8. Ranganathan S, Menon Thangeam. Effect of socio-economic status on the prevalence of Dermatophytosis in Madras. *Ind J Dermatol, Venereol & Leprol*. 1995;61(1):16-18.
9. Boukachabine K, Aqoumi A. Onychomycosis in Morocco: experience of the parasitology and medical mycology laboratory from Rabat children hospital. (1982-2003). *Ann Biol. Clin*. 2005;63:639-10442.

10. Baran R, Tosti A, Piraccini BM. Uncommon clinical patterns of Fusarium nail infection: report of three cases. *Br J Dermatol.* 1997;136:424-427.