

EPIDEMIOLOGY OF DERMATOMYCOSIS IN THE SUB-HIMALAYAN REGION OF WEST BENGAL, INDIA

Nibedita Haldar¹, Niladri Haldar², Mani Kumar Sharma³, Goutam Dutta⁴, Nihar Ranjan Haldar⁵

¹Professor, Department of Microbiology, MGM Medical College & LSK Hospital, Kishanganj, Bihar.

²RMO, "The Microbes Pathological Lab", Siliguri Dist., Darjeeling.

³Consultant Dermatologist, Sharma Skin Foundation, Siliguri Dist., Darjeeling.

⁴Senior Technician, "The Microbe Pathological Lab", Siliguri Dist., Darjeeling.

⁵Professor, Department of General Medicine, Nobel Medical College & Teaching Hospital Pvt Ltd., Biratnagar, Nepal.

ABSTRACT: Dermatomycosis is the superficial infection of the keratinised tissues of the skin, hair and nail caused by various fungi including dermatophytes. This infection though trivial, has lot of psychological effect and requires effective treatment which is often costly. Numerous studies on clinico-mycological aspects of dermatomycosis have been conducted in different parts of India, but till now no reports are available on epidemiology of dermatomycosis from the Sub-Himalayan region of West Bengal. Over a period of two years (January 2013–December 2014) skin and nail samples were collected from 502 patients with signs and symptoms of dermatomycosis attending Sharma's skin foundation at Siliguri. Majority of the patients 301(60%) were in the age group of 22-40 years. Males were more commonly affected than the females. The overall male to female ratio was 3: 1. Tinea corporis was the commonest presentation no: 321(64%). Direct microscopy of KOH mount, culture on Sabouraud dextrose agar (SDA) and identification of colony using Lactophenol cotton blue mount (LCB) has been done with all the specimens. Total no of skin and nail samples processed were 462(92%) and 40(8%) respectively. KOH mount was positive in 402(80%) of the total cases. In 80(16%) cases no fungal growth was found. Out of 422 culture positive cases Trichophyton (T) rubrum was the commonest fungi isolated 130(48.5%) followed by T mentagrophytes 54(20.1%). Other fungi isolated were Microsporum (M) gypseum 21(7.8%) T verrucosum 23(8.6%), T tonsurans 10(3.7%), T violaceum 18(6.7%), T schenlenii 4(1.5%), Epidermophyton floccosum 6(2.2%), Hortaea werneckii 1, M persicolor 1(0.4%), T terrestre 1(0.4%), Chrysosporium keratinophilum 1, Aspergillus 64, Candida 56, Penicillium 24, Mucor 7, Fusarium 1. Clinical response rate to oral Fluconazole was very less 53(20%), whereas the response rate to oral Terbinafine was high 214 (80%). Most of the patients responded very well to oral Itraconazole 254(95%).

KEYWORDS: Sabouraud Dextrose Agar, Trichophyton, Microsporum, Lactophenol Cotton Blue.

HOW TO CITE THIS ARTICLE: Nibedita Haldar, Niladri Haldar, Mani Kumar Sharma, Goutam Dutta, Nihar Ranjan Haldar. "Epidemiology of Dermatomycosis in the Sub-Himalayan Region of West Bengal, India". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 91, November 12; Page: 15619-15623, DOI: 10.14260/jemds/2015/2245.

INTRODUCTION: Dermatomycosis are the superficial infections of the keratinised tissues of the skin, hair and nail caused by various fungi, most important and commonest agents being dermatophytes. Dermatophytosis manifest itself in various clinical forms, notably Tinea corporis, Tinea cruris, Tinea capitis, Tinea incognito, onychomycosis to name a few.

The infecting fungi are distributed variedly in different geographical regions of the world.^(1,2) This distributions are not static and the range of species in some areas may change dramatically and quickly. Relevant clinicoepidemiological data of such cases are vary scanty from North Eastern part of India.⁽³⁾ There is a lot of uniqueness in clinical presentation of dermatophytes and dramatic shift in range of infecting fungi, for example Tinea capitis in this area used to be mostly of non-inflammatory type earlier is now mostly seen to be of inflammatory type infected by zoophilic species.

The higher incidence of Tinea incognito in this region is associated with the use of topical potent steroids as cosmetic

for years together by the population at large. Tinea unguium is also very common and mostly found to be caused by T mentagrophyte and usually of DLSO (Distal and lateral sub ungual onychomycosis) clinical type. So the knowledge of the geographical distribution in clinico epidemiology goes a long way in planning preventive and treatment strategies in such cases on a regional basis.

Over the past decades, non-dermatophytes, as agents of superficial fungal infections in humans, produce lesions that are clinically similar to those caused by dermatophytic infections. These infections, though trivial, have lots of psychological effects and require effective treatment which is often costly. Therefore the present study was undertaken with a view to find out the prevalence of dermatophytes and non-dermatophytes and to identify the commonest pathogens of superficial fungal infections in Siliguri – a Sub-Himalayan region of West Bengal, India.

MATERIALS AND METHODS: A clinico-microbiological study was conducted from January 2013 upto December 2014 between Sharma's Skin Foundation and The Microbes Pathological lab at Siliguri, North Bengal. Skin and nail samples were collected from 502 patients of all age groups and both the sexes attending sharma's skin foundation at Siliguri with signs and symptoms of Dermatomycosis. These patients had not been treated earlier for the fungal infections.

Dermatomycosis was suspected when a lesion had central clearing with advancing, red, scaly, elevated border, which might result in vesicles on the border of the affected area. A nail infection was suspected when there was distal

Financial or Other, Competing Interest: None.
Submission 13-10-2015, Peer Review 14-10-2015,
Acceptance 30-10-2015, Published 10-11-2015.

Corresponding Author:

Dr. Nibedita Haldar,

Ramakrishna Road,

1st by Lane (II JK Dutta Sarani),

Ashrampara, Siliguri-734001, Darjeeling.

E-mail: nibeditaslg@yahoo.com

DOI:10.14260/jemds/2015/2245.

hyperkeratosis, when chalky and dull yellow debris was found under the nail if it was separated from its bed, and the nail was brittle.

The skin scrapping were collected from the active edges of the lesion with a blunt scalpel after cleaning it thoroughly with 70% alcohol. The infected nails were clipped and processed as per standard mycological techniques.

A detailed history of the selected patients was taken regarding duration of illness, involvement of other sites, and history of similar episodes in the family members and immunocompromised condition.

Samples processing and further laboratory diagnosis done at "The Microbes" pathological lab, Siliguri. All the samples were subjected to direct microscopy in 10% potassium hydroxide (KOH) for skin samples and 40% KOH for nail samples. The samples were cultured in SDA bottle into two sets, one group with chloramphenicol and other with cycloheximide (To prevent growth with saprophytic fungi and bacteria) along with chloramphenicol and incubated at 37°C and 25°C; respectively. The cultures were examined for presence of growth, colony morphology, and pigment production. LCB mount was done for the identification of the colony by microscopy. Slide cultures were also prepared for identification of specific fungal species.

RESULTS: A total number of 502(100%) samples were screened during the study period of two years (January 2013 –December 2014) of which total number of skin samples and total number of nail samples processed were 462(92%) and 4(8%) respectively. Of the 502(100%) samples, 402(80%) were confirmed by KOH microscopic examination and 422(84%) were culture positive. Total number of Dermatophytes isolated were 268(63.5%) and those of non-dermatophytes isolated were 154(36.5%). Total number of patients in the age group of 1-22 years were 100(20%), in the age group of 22-40 Years were 301(60%) and in the age group of 40-70 years were 101(20%). Overall male to female ratio were 3:1. Commonest clinical presentation were Tinea corporis: 321(64%). Clinical response rate of the Dermatophytes to oral Fluconazole was 53(20%) whereas clinical response rate to oral Terbenafine was quite high: 214(80%). Most of the patients responded very well to oral Itraconazole: 254(95%)

DISCUSSION: The prevalence of dermatophytosis is governed by environmental conditions, personal hygiene and individual's susceptibility from place to place. The isolation of different species of dermatophytes also varies markedly from one ecological niche to another depending on their primary natural habitat. Few studies have investigated the etiology of superficial fungal infections in the developing world, and consequently, there is less knowledge of changes in their epidemiology.

It is difficult to ascertain the reliability of the overall incidence and prevalence of various skin diseases caused by superficial mycoses in different parts of the world because incidence and prevalence figures may only be the representative of the population sampled, which may have associated risk factors for infection.⁽⁴⁾

In the present study skin was found to be the commonest site of Dermatophytosis followed by nail. Overall *T. rubrum* was the chief isolate followed by *T. menta-*

grophytes from various parts of the skin & nail as has been observed in other studies.^(5,6,7) However it is noteworthy that two uncommon species of the genus *Trichophyton* namely *T. schoenleinii* and *T. terrestris* were also identified in this study. In the present study among the different species of the genus *Microsporum* *M. gypseum* was found as the most common isolate (7.8%) followed by *M. persicolor* (0.4%). Isolation of *M. gypseum* could be accounted to patient's interaction with soil and domestic animals.⁽⁸⁾

Among the genus *Epidermophyton* *Epidermophyton floccosum* (2.2%) was the only species isolated. The commonest age group of the patients were 22- 40 yrs. (60%) which is in contrast to others studies.^(2,5) The overall male to female ratio was 3:1. Higher incidence in males may be because they are exposed to outdoor with greater physical activity and more prone to trauma.⁽⁹⁾ The percentage of non-dermatophytic mould isolated was 36.5%. The commonest non-dermatophyte isolated was *Aspergillus* in contrast to some other Indian studies showing *Candida* as the commonest non-dermatophytic mould.⁽⁷⁾

All the samples showing *Aspergillus* species in culture were also positive by direct KOH smear preparation. To rule out contamination telephonic conversation was also done with those patients whose samples showed growth of *Aspergillus* species and they were asked to come to the clinic for repeat sampling.

In about 75% of the cases repeat culture could be done which showed *Aspergillus* and in 25% of the cases patients did not come for repeat testing. A good no of patients 351(70%) gave history of household contact with cases 201(40%), contact with animals 100(20%) and history of trauma to nails 50(10%). This confirms that these infections can be transmitted from person to person by sharing routine usable articles or fomites.^(10,11)

People of lower socio-economic status with poor hygiene and overcrowding, some clinical conditions like Diabetes mellitus, Asthma etc. were the common pre-requisite conditions. Most of the patients (62%) came from rural areas with agriculture as their main occupation. 23% people were urban dweller working in factories, shops or garages. Only 15% of the people belonged to higher socio-economics status with jobs in offices, Schools and colleges. Cases were scattered throughout the year with highest incidence in rainy season (50%) and summer (20%).

Before starting the treatment for dermatomycosis, it is essential to establish the diagnosis of the disease so that specific therapeutic modalities can be adopted and monitored during the course of treatment. The clinician can now have trust that dermatophytic as well as non-dermatophytic pathogens can be eradicated effectively if timely and proper diagnosis is made.

In the recent years, introduction of two new antifungal agents, itraconazole and terbinafine, have represented major advance in therapy for dermatomycosis. Both drugs are highly effective and have in large parts replaced use of griseofulvin in the treatment of onychomycosis mainly because of relatively low efficacy of griseofulvin. Itraconazole and terbinafine may be given as pulse therapy in patients of dermatophytosis for better results. The 'Clinical cure' is defined as disappearance of all lesions on each nail or residual disease of no more than 10% of original disease surface and 'mycological cure' is defined as negative culture and negative microscopy.

Non-dermatophytic molds are difficult to eradicate. Itraconazole has recently been reported to be effective in nail infections caused by *Aspergillus*, *Fusarium* and *Scopulariopsis brevicaulis* with mycological and clinical cure rate upto about 88%. The resistance to infection may be acquired after primary infection. It varies in duration and degree depending on host, site and species of fungus causing infection. In the present study clinical response rate of the dermatophytes to oral Fluconazole was only 20%, but response rate to oral Terbinafine and oral Itraconazole was 80% and 95% respectively. Though antifungal drugs should ideally be given on the basis of in vitro sensitivity of the isolate but it is cumbersome, still to be standardized for routine use and is possible only in very big institutes with all the modern facilities.

So identification of fungal species is vital to curtail the drug resistance among the fungi. Therefore direct microscopy along with culture and LCB mount of the fungal growth still remains as the methods of choice for the laboratory diagnosis of dermatomycosis in the periphery where molecular diagnosis are not available.⁽¹²⁾

REFERENCES:

- Balakumar Srinivasan, Rajan Suyambu, Thirunalasundari Thiagarajan, Jeeva Solomon. Epidemiology of dermatophytosis in and around Tiruchirappally, Tamilnadu, India. *Asian Pacific J Tropical Dis* 2012; 2(4): 286- 289.
- Madhavi S, Rama Rao MV, Jyothsna K. Mycological study of dermatophytosis in rural population. *Annals of Biological Research* 2011; 2(3): 88-93.
- Sarma Smita, Borthakur AK. A clinico-epidemiological study of dermatophytosis in Northeast India. *Indian J Dermatol Venereol Leprol* 2007; 73(6): 427.
- Chander Jagdish. Text book of Medical Mycology; 2009 (3rd edition): 123 -124.
- Singla Bhavna, Malhotra Rubina, Walia Geeta. Mycological study of dermatophytosis in 100 clinical samples of skin hair and nail. *International J of Pharmacy and Pharmaceutical sciences* 2013; 5(4) 763- 765.
- Prasad PVS, Priya K, Kaviarasan PK, Ananthi C, Sarayu LA. Study of chronic dermatophytic infection in a rural hospital. *Ind j Dermatol Venereol Leprol* 2005; 71 (2): 129- 130.
- Lakshmanan A, Ganeshkumar P, Raam Mohan S, Hemamalini M, Madhavan R. Epidemiological and clinical pattern of dermatomycoses in rural India. *Indian J Medical Micro* 2015; 33 (5): 134 - 136.
- V M Ramesh, A Hilda. *Mycopathologia* 1998; 143: 139 - 145.
- Jain Neetu, Sharma Meenakshi, Saxena VN. Clinico-mycological study of dermatophytosis in Jaipur, Rajasthan. *Indian J Dermatol Venereol Leprol* 2008; 74(3): 274 - 275.
- SharmalNL, Gupta ML, Sharma RC, Singh P, Gupta N. Superficial mycoses in Shimla. *Ind J Dermatol Venereol Leprol* 1983; 49(6):266-269.
- Patwardhan N, Dave R. Dermatophytosis in and around Aurangabad. *Indian J Pathol Micro* 1999; 42(4): 455 - 462.
- Kannan P, Janaki C, Selvi G S. Prevalence of dermatophytes and other fungal agents isolated from clinical samples. *Indian J Medical Micro* 2006; 24(3): 212 - 215.

Total KOH positive 402(80)
KOH positive & culture negative 40(8)
KOH negative & culture positive 30(6)
Total culture positive 422(84)
Both positive 400(79.7)
Both negative 25(5)
Table 1: Microscopy and culture positivity of 502 clinical samples: n (%)

Clinical types	T. Rubrum	T. Mentagrophytes	T. verrucosum	T. violaceum	T. tonsurans	T. schoenleinii	T. Terrestre	M gypserum	M persicolor	Epiderm-ophyton floccosum	Total
T. unguium	23	14	2	0	0	0	0	0	0	1	40(14.9)
T. corporis	52	14	19	14	10	2	1	20	1	5	138(51.5)
T. Pedis	19	10	1	0	0	1	0	0	0	0	31(11.6)
T. cruris	26	7	1	2	0	0	0	0	0	0	36(13.4)
T. manum	10	2	0	0	0	0	0	0	0	0	12(4.5)
T. faciei	0	7	0	2	0	1	0	1	0	0	11(4.1)
Total	130(48.5)	54(20.1)	23(8.6)	18(6.7)	10(3.7)	4(1.5)	1(0.4)	21(7.8)	1(0.4)	6(2.2)	268(100)
Table 2: Distribution of Dermatophytes isolated from different Clinical types: n (%)											

Aspegillus species 64(41.6)
Candida species 56(36.4)
Penicillium species 24(15.6)
Mucor 7(4.6)
Fusarium 1(0.6)
Chrysosporium keratinophilum 1(0.6)
Hortaea werneckii 1(0.6)
Total 154(100)
Table 3: Distribution of non-dermatophytic moulds n = (%)



