

Research Article

Study of various clinical and microbiological patterns of onychomycosis in western Rajasthan

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ABSTRACT:

Background:-Onychomycosis is invasion of nail plate by fungus, caused by both dermatophytes & non-dermatophytes. In this study, the main aims & objectives are identification of various clinical forms, microbiological agents & epidemiology of onychomycosis as well as its association with various dermatological conditions & systemic diseases in western Rajasthan.

Materials and Methods:-The study involved a total of 150 cases of onychomycosis which was suspected on clinical basis. Subsequently KOH examination & culture was done for identification of microbiological agents causing the disease. Patients were also looked for other skin & systemic diseases.

Results:-In our study, the incidence of onychomycosis was 1.8%. It occurs more commonly in men between age group of 20-50 years, accounting for 80% of total cases. Housewives, office workers, farmers & cattle workers were more commonly affected. Distal & lateral subungual onychomycosis (DLSO) was seen in 85.33% cases. Toenails & fingernails were affected in 55.9% & 34.6% cases, respectively. KOH was positive in 48.6% cases. Culture showed growth in 37.3% cases. *Trichophyton rubrum* was the most common etiological agent. Associated Keratoderma, asteotic eczema, psoriasis & raised blood sugar was seen in 5%, 2.5%, 2.5% & 6.66% cases, respectively.

Conclusion:-The present study concluded that onychomycosis has an incidence of 1.8% & occurs mainly in age group of 30-40 years of housewives, office workers, farmers & cattle workers. DLSO was most common clinical type affecting toenails more commonly than fingernails & *T.rubrum* was the most common etiological agent.

Key words: onychomycosis, Dermatophytes, *Trichophyton rubrum*, distal and lateral subungual onychomycosis.

INTRODUCTION

Onychomycosis is invasion of the nail plates by fungus both dermatophytes & non-dermatophytes. Invasion of nail plate by a dermatophyte is specifically described as tinea unguis. Onychomycosis is caused by dermatophytes, candida & saprophytes. The principal dermatophytes concerned are—*T. rubrum*, *T. mentagrophytes*, *T. tonsurans*, *T. violaceum* and *T. soudanensei* & *E. floccosum*. *Microsporum* species does not cause onychomycosis. Although onychomycosis may be the only manifestation of fungus disease in a patient, in the great majority of cases they are associated with tinea pedis or tinea manuum.

Some factors such as diabetes, aging, atopy, immunodeficiency virus, immunosuppressive therapy, psoriasis, trauma, genetic factor, tinea pedis & hyperhidrosis are considered as predisposing factors. Dermatophytes are evolving as major causative pathogens in countries such as Pakistan, Korea, Canada, India & UK while yeasts are most frequently reported in Spain, Italy, Saudi Arabia & Iran.

Four distinct patterns of onychomycosis have been described-

(1) Distal and lateral subungual onychomycosis (DLSO):- It is the most common pattern and usually presents as a streak or a patch of discoloration, white or yellow at the free edge of the

nail plate, often near the lateral nail fold. The nail plate becomes thickened & there may be subungual hyperkeratosis.

(2) Superficial white onychomycosis(SWO):- The dorsal surface of the nail plate is eroded in well-circumscribed powdery white patches, often away from the free edge. Toenail is more affected & is seen more commonly due to *T. mentagrophytes*.

(3) Proximal subungual onychomycosis(PSO):- mainly seen in AIDS patients & is commonly caused by *T. rubrum*. Rapid invasion of the nail plate from the posterior nail fold may develop to produce a white nail with only marginal increase in thickness.

(4) Endonyx onychomycosis:-This is associated with endothrix scalp infections, notably by *T.soudanense*. The nail plate is scarred with pits and lamellar splits.

BODY TEXT- The aim of the study was-

(1) Identification of various clinical forms & etiological agents of onychomycosis in Western Rajasthan.

(2) Epidemiology of onychomycosis.

(3) Association of various skin conditions with onychomycosis.

(4) Prevalence of onychomycosis in some systemic diseases.

MATERIALS AND METHODS

This study was conducted on 150 cases of onychomycosis attending the OPD of department of skin & VD of MDM hospital associated with Dr. S. N. medical college, Jodhpur.

Disease was suspected on clinical basis. Distal end of nail was taken for examination. KOH examination & culture on Sabouraud's was done for identification of microbiological agents causing the disease. Patient was also looked for other skin & systemic diseases.

DISCUSSION

In the present study the incidence of onychomycosis was found to be 1.8% of total patients the OPD of skin department. The incidence of superficial mycosis reported earlier from different part of India varied [Sobhandhari et al in Guntur(1970) 0.5%¹;Reddy et al 2.23%²;Prasad & Prakash (1979) in Ranchi 10.2%³;Kaur et al in Delhi(2007) 45%⁴;Karmakar et al in Rajasthan(1995) as 2.8% which is in the same lines of our finding⁵].

The worldwide prevalence of onychomycosis is increasing. A number of factors may contribute to this rise such as diabetes, poor peripheral circulation, immunosuppression (due to HIV & immunosuppressive drugs), increased participation in sports activity, genetic factor, trauma to nail etc.

Onychomycosis is the disease of middle age group and so maximum number of cases was seen in 20 to 50 years old patients forming 80% of the total onychomycosis cases in the study⁴.Maximum percentage was seen between 30-40 years old patients.Children formed only 7.5% of the total cases. None of the child was below 10 years of age, specifying the disease usually present in middle age group. Kaur et al(2007) analyzed average age of patients as 34.9 years, & 60% of the patients were in 25-45 years of age which is in accordance with our study.

Male outnumbered females in all the age groups forming 61.6% of total cases. This observation matched well with the majority of survey reported so far Shah et al(1976) as 67%; Mehrotra et al(1978) as 64%⁷;Dalal(1984) as 59%⁶;Kaur(2007) as 52.5%⁴.The reason for this might be more number of males work in office, wearing closed footwear. Also males are more prone for trauma and other pressure changes making them more liable for harboring the infection.

Family history of onychomycosis was seen only in 9% cases. RSN Brilhante in northeast Brazil found 14% of patients giving family history of onychomycosis.

Urban patients were more in numbers as than rural ones because of prolonged wearing of closed footwear by office workers & more works with water by housewives.

Most cases presented, were having onychomycosis since 6 months making it a chronic disease.Shukla et al (1981) also

reported that most cases of onychomycosis had disease since 3 months which coincide with our findings.

Toenail onychomycosis (56%) was more frequent than fingernail onychomycosis(34%). Also 10% had concurrent involvement of both toe & fingernails. Gupta et al in Shimla also found greater involvement of toenails (57%) as compared to fingernails(32%).

In various studies right thumb was the commonest fingernail involved. Greater toenail onychomycosis has been reported frequently, this is in agreement with other studies(Gupta et al 1995), because of its bigger size predisposing to increased trauma.

In the study, DLSO(85%) was the commonest clinical type followed by WSO(6%).Rook's textbook of Dermatology also states DLSO as the most common subtype. Gupta et al also found DLSO (73.1%) as the most common subtype. Toenail dystrophy was seen in 6 patients only which indicates patients does take up treatment in time for onychomycosis. In both toenail & fingernail DLSO was the most common subtype. White superficial onychomycosis was most commonly seen in toenails.

Culture positivity in present study was 37.3% and KOH was positive in 48.6%.Both investigations were positive in 30% of the cases. While Gupta et al observed 67.7% positivity for both the tests, KOH & culture positivity were 59.2% and 37% which is in concordance with our study of higher positivity of KOH. T.rubram appears to be the most common dermatophyte causing DLSO in 30-35% culture positive patients as compared to T.mentegrophytes which were only detected in only a few patients. Nilay Kanti Das et al also reported T.rubram (29%) amounting for the majority of dermatophytes. This high prevalence of T.rubram has been attributed to its ability to adapt to hard keratin of the nail.C.albicans has been reported to be most commonly found non-dermatophyte isolate in many studies[Alfred Ammoury et al in Lebanon(56%).C.albicans is reported as the commonest cause of paronychia onychomycosis. This is reflected in our study where all the paronychia cases grew candida albicans on culture. Isolation of non dermatophyte mould in our 32% cases is higher than that seen in other studies [Nilay Kanti Das et al(22%);Gupta et al(19%).This could be because of frequent exposure to soil saprophytes in our patients.

The most common mould isolate was the Aspergillus species seen in 9 patients which was also the most common mould reported by other studies [Gupta et al(6.4%) and Nilay Kanti Das et al(18%)]. Other non-dermatophytes mould isolated were Rhizopus, Mucor, Curvalaria & Penicillium.

T.rubram was the most common organism infecting both finger & toenails. C.albicans was mostly isolated from fingernails indicating the fungus as an important organism seen in paronychia. Similar results were seen in a study done in Indonesia(1998). Toenail were commonly affected by Aspergillus & Mucor species, both saprophytes usually found in soil.Nilay Kanti Das et al also recorded saphrophytes commonly infecting the toenail in his study.

Tenia pedis, Tenia mannum, Tenia capitis & Tenia cruris were found in 8, 6, 3, & 2 patients, respectively.

Some of the other dermatological conditions seen in association with onychomycosis were keratoderma, asteatotic eczema, psoriasis in 7, 4 & 4 patients, respectively. Nilay Kanti Das et al(1998) did a study in which psoriasis was present in 5 cases showing fungal growth. In all these diseases nail trauma might be there due to scratching & also nail might be diseased by these primary causes, leading to secondary infection by fungus. 10 patients (6.6%) having onychomycosis showed increased blood sugar level. As stated by many studies that diabetes is an important predisposing factor for onychomycosis.

Only 2 patients were found HIV positive. One showed proximal nail involvement which is in lines with the previous studies.

RESULT

The incidence of onychomycosis in our department was 1.8%. Most of the cases were in the age group between 20-50 years forming 80% of total cases. Males overshadowed females in all age group forming 61.6% cases.

Farmers, cattle workers, office workers & housewives were the main people affected by the disease forming 60% of the total cases. Fingernails were affected mainly in housewives while toenail was involved mainly in office workers. 60% of the total cases were from urban area.

Most common clinical variant seen was DLSO, forming 85.3% cases. Most of the nails affected were toenails forming 56% of the diseased nail seen.

Associated tenia capitis, tinea mannum, tinea pedis and tinea cruris were seen in 2%, 4%, 5.33% & 1.33% cases, respectively.

48.6% cases were KOH positive & 37.3% cases were culture positive while 30% of cases were both KOH & culture positive.

Trichophyton rubrum, Aspergillus & Mucor species were commonly seen in toenail. Most common organism isolated was trichophyton rubrum.

Keratoderma was associated with 5% cases while asteatotic eczema & psoriasis were recorded in 2.5% cases. Raised blood sugar was seen in 6.6% of cases. Two cases of HIV were seen in which one case presented with proximal subungual onychomycosis.

Table 1. KOH % culture positivity in clinically suspected cases

Investigation	Total cases	%
KOH positives	72	48.66%
Culture	56	37.33%
Both KOH & culture	45	30.0%

Table 2. Fungal isolates and clinical types of onychomycosis

Fungal Pathogens	Clinical types of onychomycosis							Number (%)
	DLSO	WSO	PSO	EO	TDO	DLSO+SWO	DLSO+TDO	
Dermatophytes								
T.rubram	17	1	1	-	1	1	1	22(39.28%)
T.mentagrophytes	1	1	-	-	1	-	-	3(5.35%)
T.verrucosum	-	-	-	-	-	-	-	0
Yeasts								
Candida Albicans	9	1	-	-	2	-	-	12(21.4%)
Moulds								
Rhizopus	3	-	-	-	-	-	-	3(5.35%)
Aspergillus	7	-	-	-	1	-	1	9(16.1%)
Mucor	5	-	-	-	-	1	-	6(10.7%)
Curvalaria	1	-	-	-	-	-	-	1(1.78%)
Penicillium	-	-	-	-	-	-	-	0
Fusarium	-	-	-	-	-	-	-	0
Total	43	3	1	0	5	2	2	56(100%)

Table 3. Relation of site of infection with occupation

Occupation	Fingernails	Toenails	Finger+Toenails	Total
Farmers	6	14	2	22
Cattle workers	13	3	3	19
Office workers	1	34	3	38
Housewives	20	7	3	30
Students	1	9	0	10
Teachers	1	4	0	5
Tea stall	3	1	1	5
Miscellaneous	8	12	2	22
Total	52	84	14	150

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