

Original Research

Assessment of cases of dermatophyte toenail onychomycosis

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ABSTRACT:

Background: Dermatophyte toenail onychomycosis is a fungal infection of the toenails caused primarily by dermatophytes, a group of fungi that includes *Trichophyton rubrum* and *Trichophyton mentagrophytes*. The present study was conducted to assess cases of dermatophyte toenail onychomycosis. **Materials & Methods:** 56 cases of dermatophyte toenail onychomycosis of both genders were selected. A clinical diagnosis of OM was made on the basis of findings that included whitish or brownish yellow opacities in the nail, subungual hyperkeratosis, dystrophy and/or onycholysis. **Results:** Out of 56 patients, males were 31 and females were 25. Common types were DSLO in 38, SO in 12, PSO in 4 and DSLO and SO in 2 cases. Organisms were *T. interdigitale* in 46, *T. rubrum* in 8 and *T. verrucosum* in 2 cases. Symptoms were discoloration in 51 and brittle nails in 42 patients. The difference was significant ($P < 0.05$). **Conclusion:** Males are more likely to have toenail OM. The most prevalent etiological fungus causing toenail OM was *T. interdigitale*, while the most prevalent clinical variation was DSLO.

Keywords: Dermatophyte, toenail onychomycosis, *T. rubrum*

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INTRODUCTION

Dermatophyte toenail onychomycosis is a fungal infection of the toenails caused primarily by dermatophytes, a group of fungi that includes *Trichophyton rubrum* and *Trichophyton mentagrophytes*.¹ This condition leads to thickening, discoloration, and deformation of the toenails and can be challenging to treat.²

The most common causative agents are *Trichophyton rubrum* and *Trichophyton mentagrophytes*. It is more common in older adults. Exposure to moist environments, such as public swimming pools, gyms, and communal showers. Injury to the nail can predispose to infection.³ Diabetes, peripheral vascular disease, and immunosuppression. A family history of onychomycosis. Symptoms such as nails may become white, yellow, brown, or black, infected nails often become thickened and brittle, changes in shape and texture, including crumbling edges, the nail may lift away from the nail bed (onycholysis). In severe cases, the infection can cause pain and difficulty walking.⁴ Numerous factors impact the prevalence, origin, progression, and treatment result of OM. These

factors include age, trauma, sports activity, diabetes, HIV, poor peripheral circulation, occupation, and climate.⁵ *Candida albicans*, dermatophytes, and non-dermatophyte molds (NDM) such as *Aspergillus*, *Fusarium*, *Onychocola canadensis*, *Scopulariopsis brevicaulis*, and *Scytalidium dimidiatum* can all cause it.⁶ *Trichophyton rubrum* and *Trichophyton interdigitale* (formerly known as *Trichophyton mentagrophytes* var *interdigitale*) are the most commonly implicated agents in nail OM, accounting for almost 90% of toenail OM and at least 50% of fingernail OM.⁷ The present study was conducted to assess cases of dermatophyte toenail onychomycosis.

MATERIALS & METHODS

The present study was conducted on 56 cases of dermatophyte toenail onychomycosis of both genders. All were informed regarding the study and their written consent was obtained. A clinical diagnosis of OM was made on the basis of findings that included whitish or brownish yellow opacities in the nail,

subungual hyperkeratosis, dystrophy and/or onycholysis.

Data such as name, age, gender etc. was recorded. The nail with the most serious damage served as a specimen. After using 70% alcohol to disinfect the area, full thickness clippings of the discolored,

dystrophic, brittle nail were extracted from the closest area. The obtained specimen was examined under direct microscope. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 56		
Gender	Males	Females
Number	31	25

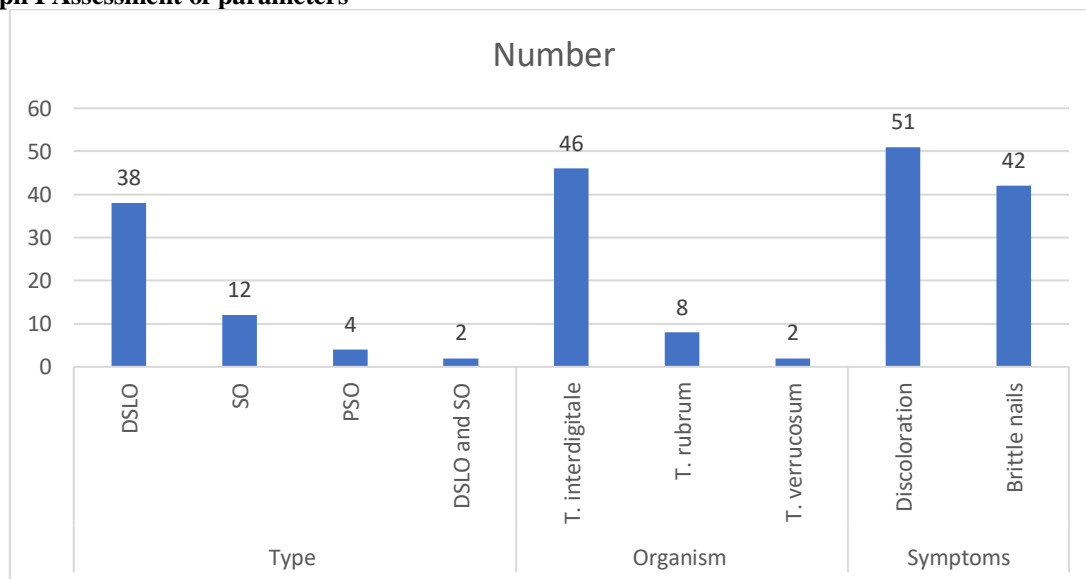
Table I shows that out of 56 patients, males were 31 and females were 25.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Type	DSLO	38	0.02
	SO	12	
	PSO	4	
	DSLO and SO	2	
Organism	T. interdigitale	46	0.01
	T. rubrum	8	
	T. verrucosum	2	
Symptoms	Discoloration	51	0.75
	Brittle nails	42	

Table II shows that common types were DSLO in 38, SO in 12, PSO in 4 and DSLO and SO in 2 cases. Organisms were T. interdigitale in 46, T. rubrum in 8 and T. verrucosum in 2 cases. Symptoms were discoloration in 51 and brittle nails in 42 patients. The difference was significant (P< 0.05).

Graph I Assessment of parameters



DISCUSSION

There are a number of recognized clinical forms of OM, and recently there is a new categorization that includes primary and secondary OM.⁸ Clinical variations such as proximal subungual onychomycosis (PSO), endonyx onychomycosis (EO), distal lateral subungual onychomycosis (DLSO), superficial onychomycosis (SO), mixed pattern onychomycosis (MPO), and total dystrophic onychomycosis (TDO) are included in the primary category.[3] The KOH

examination, culture, and histological analysis of nail clippings or nail biopsies are the main methods used for diagnosis.⁹ Genetic susceptibility, decreased nail development in the aged, underlying disorders such as psoriasis, peripheral vascular diseases, diabetes, immunosuppression, HIV infection, and cigarette smoking are among the variables that contribute to relapse of OM.¹⁰The present study was conducted to assess cases of dermatophyte toenail onychomycosis.

We found that out of 56 patients, males were 31 and females were 25. Yadav et al¹¹ defined the epidemiological and mycological characteristics of patients with dermatophyte toenail OM in a tertiary care hospital. Hundred consecutive patients of KOH and culture-positive dermatophyte toenail OM were subjected to detailed history, clinical examination and investigations. Maximum number of patients (40%) belonged to 31-45 years age group and there was a male preponderance (M:F = 6.7:1). The mean duration of disease was 54 months. Thirty-three patients had fingernail involvement in addition to the toenail OM and 37% had co-existent cutaneous dermatophyte infection. Discoloration was the most common symptom (98%). Ninety-four (94%) patients had distal lateral subungual onychomycosis (DSLO) while two had superficial onychomycosis (SO) and only one had proximal superficial onychomycosis (PSO). *Trichophyton interdigitale* was the most common etiological agent (61%) followed by *Trichophyton rubrum* and *Trichophyton verrucosum*. We observed that common types were DSLO in 38, SO in 12, PSO in 4 and DSLO and SO in 2 cases. Organisms were *T. interdigitale* in 46, *T. rubrum* in 8 and *T. verrucosum* in 2 cases. Symptoms were discoloration in 51 and brittle nails in 42 patients. Kaur et al¹² in their study 400 patients with clinical suspected fungal nail infections were selected. 400 nail specimens of suspected onychomycosis were evaluated clinically, KOH examination and fungal culture was done. Onychomycosis was present in 218 (54.5%) by culture and /or direct examination. Fingernails and toenails were infected in 65% and 32% respectively and remaining 3% had both. Conclusions: This study demonstrated that dermatophytes were main agents causing onychomycosis in our region, as well as the importance of performing direct examination and culture in diagnosis of onychomycosis. Grover et al¹³ analyzed the morphological variants and mycological isolates of onychomycosis was carried out in 50 patients attending the dermatology outpatient departments. The commonest age group affected (56%) was the 20-40 years age group. The fingernails alone were involved in 24 (48%) patients, the toenails alone in 15 (30%) patients, and both in 11 (22%) patients. Distal and lateral subungual onychomycosis was encountered in 41 (82%) patients, proximal superficial onychomycosis and total dystrophic onychomycosis in 3 each (6%), paronychia in 2 (4%) and superficial white onychomycosis in 1. Of the 59 samples cultured, dermatophytes were grown in 14 (23.7%), non-dermatophyte moulds (NDM) in 13 (22.0%), candida in 10 (16.8%) and no growth in 22 (37.2%) samples. Dhib et al¹⁴ included 7151 patients (4709 women and 2442 men) with suspected fingernails and/or toenails onychomycosis. No significant relation was found between gender and toenails onychomycosis, whereas fingernails were frequently involved in women. As far

as aetiological agents are considered, dermatophytes, yeast and moulds were responsible for 49.9%, 47.4% and 2.7% of onychomycosis cases respectively. In fingernail infections, yeast were the most frequent fungi (83.6%), *Candida albicans* being the leading species (51.6%). In contrast, in toenail infections, dermatophytes were more frequent (74.1%). *Trichophyton rubrum* was by far the dominant species (88.1%). Yeast were observed more frequently in women whereas dermatophytes were more common in men. Moulds were involved in 4.2% of cases. The shortcoming of the study is small sample size.

CONCLUSION

Authors found that Males are more likely to have toenail OM. The most prevalent etiological fungus causing toenail OM was *T. interdigitale*, while the most prevalent clinical variation was DSLO.

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