

FREQUENCY OF CHILDHOOD FUNGAL NAIL DISORDERS AMONG CASES OF ONYCHOMYCOSIS

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ABSTRACT

Background: Fungal nail infections are reported mostly among developing countries. **Objective:** To assess frequency of childhood nail fungal infection among cases of onychomycosis. **Methodology:** Study Design: Cross sectional study. Setting: 1st January 2012 to 31st December 2017. A total of 300 diagnosed cases of onychomycosis were included in this study. Study Setting: Department of dermatology and Department of Microbiology, Quaid-e-Azam Medical College Bahawalpur. Specimen was processed by 20% Potassium hydroxide (KOH) mount for the presence of hyphae or spores were considered as a positive test, and mycological culture was done by using Sabouraud's dextrose agar, for 4 weeks and pathogen was identified by colony characteristics and microscopy. Presences of intensely stained reddish dots or threads like structures in between the cells of nail plate were considered to be positive results on histopathology with periodic acid Schiff (PAS). **Results:** Out of three hundred cases, 42 (14%) cases reveal fungal infection in children below 18 years of age. *Candida albicans* was most common fungal infection 18 out of 42 and *Trichophyton Rubrum* was found in 14 out of 42 cases. **Conclusion:** Onychomycosis in children was commonly observed in our population. The commonest pathogens were *Candida albicans*, *Trichophyton rubrum*, and *Aspergillus*.

Key words: Children, *Candida albicans*, *Trichophyton rubrum*, *Aspergillus*

INTRODUCTION

Onychomycosis traditionally refers to non dermatophytic infection of the nails but recently it is increasingly used as a general term to denote all fungal infections of the nails.^{1,2} Clinically Onychomycosis is classified into various types among from superficial to total dystrophic onychomycosis.^{3,4} Onychomycosis is a growing global health problem and mainly due to dermatophyte, non dermatophyte, molds or yeast. The term *Tinea unguium* applied when infection is due to dermatophyte. The prevalence of the disease is rising worldwide and ranges from 2.1% to 9.1%.^{5,6}

The general risk factors for any type of onychomycosis among children are nail biting infected socks, shoes immunodeficiency, nail trauma, and poor hygiene.⁷ Typically onychomycosis begins as a yellowish discoloration under the nail. The nail may thicken, become rough and crumbly and separate from the nail bed, and debris may accumulate under the nail. Thickening and dystrophy of the nail result in pressure erosions of the nail bed and *Hyponychium*.⁸⁻¹⁰ There is higher prevalence of dermatophyte in temperate zone and moulds such as *Aspergillus* species and *Fusarium* species found in tropical and subtropical countries.¹¹⁻¹⁶ Direct microscopic of affected nails in KOH does not allow to recognition of type of fungus and culture is needed for specific diagnosis.¹¹ It has been

documented that the periodic acid-Schiff (PAS) stain is a sensitive method and has been alternate to be superior to culture and potassium hydroxide preparation for the diagnosis of onychomycosis. Increasing reliance on PAS staining makes it a candidate for apparent “gold standard” in diagnosis of onychomycosis.¹² The objective of this study was to determine the frequency of childhood nail fungal infection among cases of onychomycosis.

METHODOLOGY

Three hundred patients of Onychomycosis, reporting to Dermatology outpatient department of Bahawal Victoria Hospital, Bahawalpur, a tertiary care hospital, were included in this cross sectional study. Non-probability convenience sampling technique was applied. The study was carried out from 1st January 2012 to 31st December 2017. Patients with history of antifungal therapy were excluded from the study. The most severely affected nail was selected for specimen collection. Patients presenting for the first time in the outpatient department of Dermatology with clinical diagnosis of Onychomycosis were selected and all the three tests (PAS, KOH microscopy and mycology culture) were used in the study. This study included patients of all ages and both genders, with more than one nails affected. Patients already receiving topical or systemic antifungal therapy for fungal infection and those with nail changes due to psoriasis, lichen planus, contact dermatitis and other systemic

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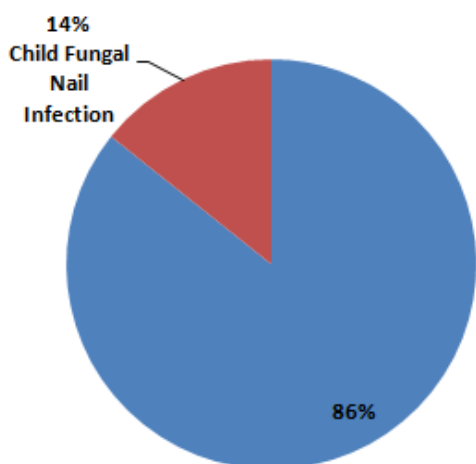
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diseases were excluded from this study. The specimens comprised of nail clipping immersed in 20% KOH were slightly warmed for softening. The softened nail material was examined under both low and high power of direct microscopy. The presence of fungal elements be it hyphae, spores, budding cells and pseudo-hyphae were noted. If fungal elements detected than nail inserted on Sabouraud's dextrose agar were incubated at 25°C and 37°C respectively. After 4 weeks periodically if growth observed follow colony characteristics by cotton blue solution for identification of species. Nail clippings were fixed in 10% formalin then treated with 4% phenol for softening and further processing like dehydration, embedding in paraffin blocks sectioning by microtome machine mounting on slide and finally PAS staining was performed that showed presence of intensely stained reddish dots or threadlike structures in between the cells of the nail plate was considered to a positive results. Data analysis was done by using SPSS version 17.

RESULTS

The frequency of childhood fungal nail infection was 42 (14%) out of three hundred patients. (Figure I)

Figure I: Child fungal nail infection among cases of onychomycosis.



Candida albicans was the most common etiological agent 18 out of 42 in children under age 18 year while *Trichophyton rubrum* was second common agent 14 out of 42. (Table I)

Table I: Distribution of Organisms in Cultured Nails infection among children (n=42)

Organism	Number (%)
Dermatophyte	17 (40.5%)
Trichophyton Rubrum	14
Trichophyton. Mentagrophytes	03
Non Dermatophytes	25(59.5%)
A. Fungi	5
Aspergillus	02
Aspergillusniger	01
Scopulariopsis	02
B. Yeast	20
<i>Candida albicans</i>	18
<i>Cadida spp</i>	02

DISCUSSION

The fungal infections that affect skin, hair, nails and mostly caused by fungi. The frequency of dermatophytes and non dermatophytes is observed low in both extremes of the ages (youngest and older patients). Onychomycosis caused by *Candida spp* that affecting specially finger nails due to finger sucking habits under age of three year old are more vulnerable.¹⁷ This study revealed that frequency of childhood fungal nail infection was found in 14% of patients and *Candida albicans* was most common agent is closely matched with Aghamirian MR et al¹⁸ that observed Onychomycosis in children was 12.9%. Jeelani et al¹⁹ recovered 3.4% onychomycosis in children having ≥ 12 years of age is co accordance with our study that represents 5% and the common agents isolated was *Trichophyton rubrum*, mentagrophytes that also is comparable to our study.

Present study showed nail Onychomycosis children and *Candida albicans* *Trichophyton rubrum* and *Aspergillus* was commonly isolated agents which is comparable with Hashem Al Sheikh²⁰ and Min-Kim D et al.²¹ Our results are strongly matched with another authors like Arenas R et al²² reported Onychomycosis in children to be more frequent in the finger nails and usually caused by *Candida spp* and now dermatophytes involvement is more prevalent in pediatric group. Comparing the present gold standard direct microscopy and fungal culture with histological examination with periodic acid-Schiff staining (PAS) by Wilsman-Theis D et al²³ showed in 1146 nail clippings samples in the diagnosis of onychomycosis and concluded that the sensitivity of culture was 53% followed by 82% PAS staining positive. An investigating different techniques for the diagnosis of onychomycosis by Gianni C et al²⁴ found fungal culture was positive in 52.9% , showing a dermatophyte 50% and KOH

microscopic was positive in 59.3% closely match with our study that showed mycological culture positive in 53% and among them 56.60% dermatophyte, and KOH direct microscopic revealed 60%. Study by Lawry MA et al²⁵ showed PAS was positive in 85%, PAS and culture in combination results in 94% positive.

CONCLUSION

Onychomycosis in children was observed low as compared with adults in our population. However, these finding needs for careful mycological examination to rule out the cause. The commonest pathogens were candida albicans, Trichophyton rubrum, and Aspergillus. An exact diagnosis of fungal infection is based on clinical finding, nails involvements and PAS histopathological staining can be performed regularly as a tool in pathology laboratory for improving the accuracy, to rule out Onychomycosis in children.

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