



## **Candida and Other Yeasts as Nail Pathogens in Chronic Paronychia and Onycholysis of Fingernails**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/JAMMR/2018/44051

#### Editor(s):

(1) Dr. Elvira Bormusov, The Lloyd Rigler Sleep Apnea Research Laboratory, Unit of Anatomy and Cell Biology, Israel.

#### Reviewers:

(1) Blanca Rosa Del Pozzo-Magana, Western University, Canada.

(2) Carla Andréa Avelar Pires, Federal University of Pará, Brazil.

Complete Peer review History: <http://www.sciencedomain.org/review-history/26740>

**Short Research Article**

**Received 03 July 2018**

**Accepted 14 September 2018**

**Published 22 October 2018**

### **ABSTRACT**

Paronychia and onycholysis are the common nail disorders with similar fundamental pathological findings. Fungi especially yeasts are frequently isolated. Seventy six patients with chronic paronychia and onycholysis attending the dermatology clinic in Tripoli Medical Center (TMC) were enrolled in a one year study. A detailed history and clinical examination was taken. The majority of cases were females (97.4%), with female to male ratio of 37.5:1. A history of chronic exposure to water was obtained in 88.2% of cases. Chronic paronychia was more common on the right hand; the right middle finger was the most commonly affected organ. Nail clippings and debris under nails were collected for direct microscopic examination and culture. *Candida albicans* was the most frequently isolated organism (37.9%), followed by *Candida tropicalis* (30%); *C.parapsilosis* (20%) and other yeasts were isolated less frequently. This study revealed that *C. albicans* and other yeasts were important causes of chronic paronychia and onycholysis in the country.

**Keywords:** *Paronychia; onycholysis; yeasts; Candida albicans.*

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## 1. INTRODUCTION

Paronychia and onycholysis are the common disorders of the nails from which fungi especially yeasts are frequently isolated. Trauma and maceration are the main predisposing factors due to prolonged contact with water, chemicals and detergents (especially alkali). The main pathological lesions consist of traumatic mechanical separation of the nail-plate from its normal attachment to the adjacent soft tissue [1]. Prolonged contact with water and detergents (especially alkali) will expose these grooves to macerations followed by invasions through microorganisms, especially certain bacteria and *Candida albicans* [1]. Frain-bell [2] isolated *Candida* spp. in 70% of cases and bacteria in 10% among 590 chronic paronychia cases, while Marten [3] cultured *C. albicans* from 33 of 34 cases in the mycological and bacteriological study. Whittle and Gresham [4] experimentally demonstrated the infection of the nail fold by *C. guillorondii* and *C. parapsilosis* following prolonged occlusion of the finger. Stone and Mullin [5] reported a series of experimental studies indicate that chronic paronychia develop only in presence of *C. albicans* after prolonged occlusion of nail fold for 30 days. In 1990, Al-Sogair et al. [6] endorsed that yeasts, especially *C. albicans* were an important cause of disease of nails and skin in Saudi Arabia. El-labib et al. [7] isolated yeasts (especially *C. albicans*) from fingernails of 84 Libyan patients. This study aims to determine the frequency and causative agents of chronic paronychia and onycholysis among patients attending the dermatology clinic in Tripoli Medical Center (TMC).

## 2. MATERIALS AND METHODS

A retrospective case series study was carried out at the dermatology outpatient's clinic in TMC. Seventy six patients with chronic paronychia and onycholysis were participated in a one year study. A detailed history and clinical examination were done according to a prepared

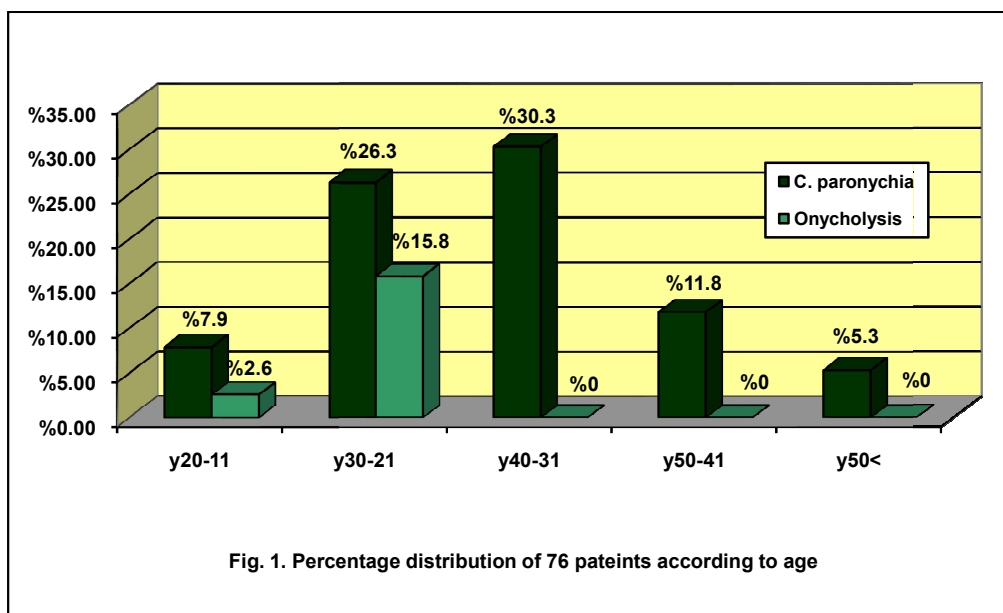
questionnaire. The patients were investigated as follows; nail clippings and debris under nails were taken and sent to the mycological unit in Central laboratory in TCH for direct microscopic examination using 20% potassium hydroxide (KOH) and culture on Sabouraud's dextrose agar with gentamicin and chloramphenicol (SDAGC) only, and SDAGC with cyclohexamide was incubated at 30°C for 7 days. Samples were collected from patients not receiving antifungal agents for the last 2-4 weeks. Identification of *Candida* spp.s and other yeasts were done by colony characteristics, germ tube test, corn meal Tween 80 agar, and API 20 C Aux system. Urease test was used for the identification of *Saccharomyces* spp. However, acetate ascospore media was used mainly for identification of both *Saccharomyces* spp. and *Kloeckera* spp.

## 3. RESULTS

Chronic paronychia and onycholysis were seen in 41.1% of diagnosed fungal nail infections and approximately 0.35% of the total patients attending the dermatology clinic in TMC. A total of 62 patients (81.6%) were suffering from chronic paronychia, while 14 patients (18.4%) had onycholysis. Majority of the patients were females (97.4%) and a female to male ratio was 37.5:1, the main age group involved was 21-40 years as shown in Fig. 1. Most of the patients were housewives (57.9%), 13 patients were teachers (17.1%), 11 patients were students (14.5%), 3 doctors (3.90%), 2 employees (2.60%), while other occupations reported less frequently. The duration of chronic paronychia ranged from one month to 20 years with a mean of 2.9 years. A history of prolonged exposure to water, chemicals and detergents was obtained in 88.2% of patients. Among which 35 patients (46%) had an associated clinical illness especially interdigital tinea pedis and housewife dermatitis in the same frequency (10.5%) as shown in Table 1.

**Table 1. Frequency of cases associated with clinical illness**

Clinical illness	Frequency	Percentage
Interdigital tinea pedis	8	10.5%
Housewife dermatitis	8	10.5%
Atopy	5	6.6%
Chilblains	4	5.3%
Diabetes mellitus	4	5.3%
Vaginal discharge	2	2.6%
Autoimmune diseases	2	2.6%
Hypothyroidism	2	2.6%
Total	35	46%



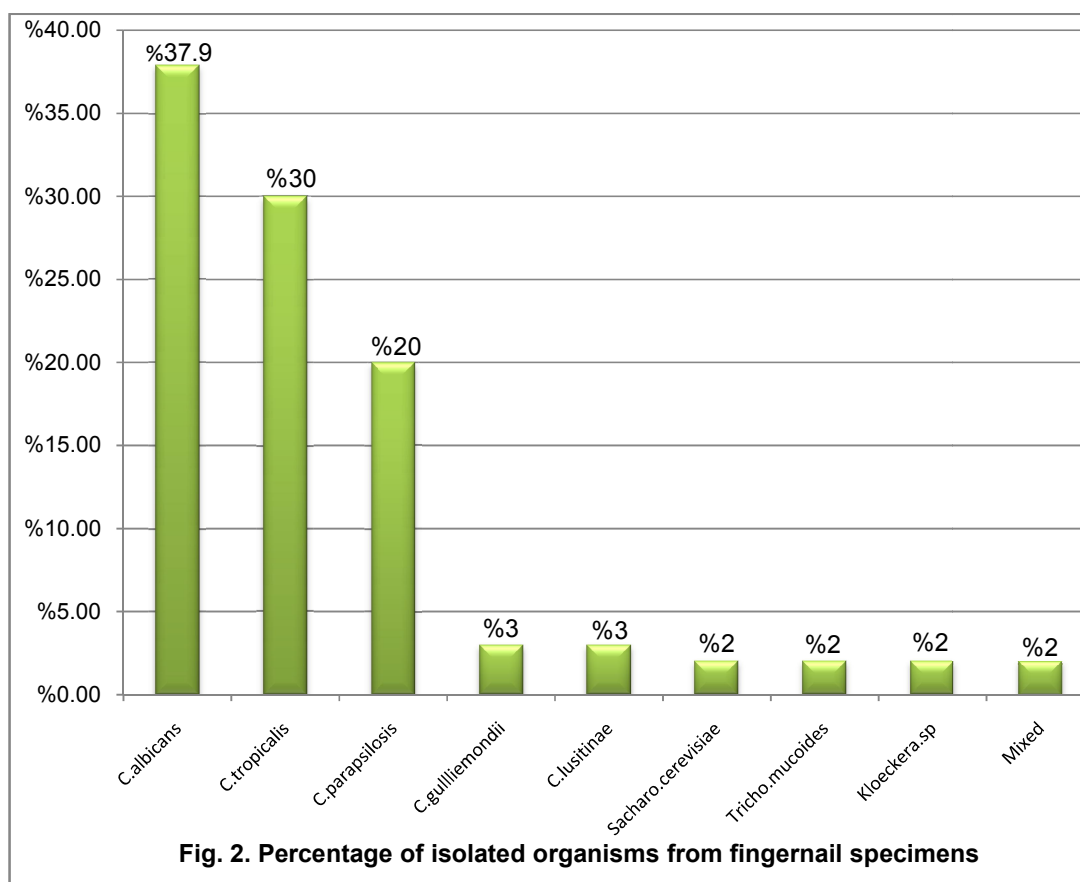
Chronic paronychia and onycholysis were more common on the right hand (88.2%), and the right middle finger was most frequently affected followed by the right thumb. Budding yeast cells, pseudohyphae, and/or hyphae were demonstrated by the direct microscopy (KOH) in 90.8% cases suggesting that yeast infection and the etiologic agents were determined by culture in 88.2% cases. *Candida albicans* (37.9%) was the most frequently isolated organism, followed by *C. tropicalis* (30%), *C. parapsilosis* (20%), *C. guilliermondii* (3%), and *C. lusitinae* (3%), where as other yeasts (*Saccharomyces cerevisiae*, *Trichosporon mucoides*, and *Kloeckera*. sp. were isolated less frequently as shown in Fig. 2.

#### 4. DISCUSSION

Chronic paronychia and onycholysis are one of the common skin diseases that cause discomfort and annoyance to the patient due to their intractable course [8].

Chronic paronychia (81.6%) was the most common clinical form observed in the present study. The majority of cases were females with an age group 21-40 years and most of them were housewives as reported by previous studies [8,9]. This may conclude that females are more engaged in homework with frequent exposure to water, detergents and mechanical trauma. This study showed that chronic paronychia tends to occur dominantly in the patient's right hand suggesting the significant role of mechanical and chemical trauma as an important predisposing

factor for chronic paronychia. These findings concurred with the earlier reports [8,10]. Although the number of patients is low, it is clear from this study that *Candida* spp. especially *C. albicans* (37.9%), *C. tropicalis* (30%), and *C. parapsilosis* (20%) are involved in the pathogenesis of chronic paronychia and onycholysis. The combination of a prolonged history of exposure to water, chemicals and detergents was obtained in 88.2% of patients. Clinical signs of nail involvement, positive direct microscopic examination with the presence of budding yeasts, pseudohyphae, and/ or hyphae, and positive culture indicate that *Candida* spp. plays an important role in the pathogenesis of chronic paronychia and onycholysis. The higher isolation rate of *C. albicans* (37.9%) in the present study differs from findings of Shroff et al. [11], El Sogair et al. [6], Elabib et al. [7] in United States, India, and Egypt respectively, while concurred with studies done by Midgley et al. [12]. *C. guilliermondii* was isolated less frequently (2.98%) in this study, although it was encountered as one of the causative agents of paronychia as reported by Odds [13]. Isolation of *S. cerevisiae*, *Trichosporon* spp., *Mucoids* spp., *C. rugosa*, *Geotrichum candidium*, *Rhodotorula* spp. and *Kloeckera* spp. was recorded in the present study for the first time in low frequency which needs further evaluation. This could be due to an increase in the range of reported fungi causing nail infection as the level of the predisposing factors has changed and methods of laboratory investigations has improved as stated by Crozier [14].



## 5. CONCLUSION

This study revealed that chronic paronychia and onycholysis were more frequent in females of age group between 21 to 40 years and *Candida albicans* was the most frequently isolated organism. A further study is needed to assess the prevalence and predisposing factors of chronic paronychia and onycholysis among the general population in the country.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

As per international standard or university standard ethical approval has been collected and preserved by the authors.

## ACKNOWLEDGEMENT

We acknowledge the support of technical staff of Department of Microbiology and medical staff of

out-patients clinic of Dermatology in the Tripoli Medical Center.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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