

# Candida Onychomycosis: Retrospective Study At Uhc Hassan II Fez

El yaacoubi R<sup>1,2</sup>, Kadiri M<sup>1,2</sup>, Adadi S<sup>1,2</sup>, Tlamçani Z<sup>1,2</sup>

<sup>1</sup>Parasitology unit, Hassan II University Hospital Center, Fez

<sup>2</sup>Faculty of Medicine, Pharmacy, and Dental Medicine, Sidi Mohamed Ben Abdellah University Fez

**Abstract :** Nail candidiasis is the second cause of onychomycosis after the dermatophytic origin and of which *Candida albicans* constitutes the main pathogen. Mycological sampling is essential to confirm the diagnosis, identify the pathogen and adapt the treatment. Our study is retrospective analytical descriptive carried out in the parasitology laboratory of the Hassan II university hospital center in Fez, spread over a period of 6 years and covering the files of 72 patients suffering from nail candidiasis. Results: among the 1204 nail samples received, 15.2% of cases were confirmed to have *Candida onychomycosis*. The age of the patients ranged from 1 year to 84 years with an average age of 44.5 years. The attack was more common in women than in men with a sex ratio M/F=0.33. Location at the hands predominated with a percentage of 58.5%. 45.8% of patients had an underlying pathological condition. *Candida Albicans* was the majority genus (38.9%), followed by *Candida tropicalis* (12.6%), *Candida parapsilosis* (8.3%), *Candida krusei* (8.3%), *Candida lusitanae* (4.2%), *Candida glabrata* (2.7%), for *Candida spp* represent a rate of 25%.

**Keywords:** onychomycosis, nail candidiasis, candida albicans, candida non albicans

## Introduction:

Onychomycosis is a fungal infection of the nail apparatus that can lead to a change in the color or thickness of the nails, as well as onycholysis and ultimately nail destruction. Although primarily caused by dermatophytes with keratinolytic properties, several other groups of fungi, including yeasts and molds, can cause this type of infection [1].

Yeasts, mainly *Candida albicans*, are the primary pathogens responsible for secondary onychomycosis. To better understand the pathogenesis of this nail infection, it is necessary to study host-related factors and consider the virulence factors that *Candida* employs to defend against the host [2].

Mycological sampling is a crucial step to confirm the diagnosis of onychomycosis, identify the pathogen, and tailor the treatment [3].

The objective of our study is to describe the epidemiology of nail candidiasis within the parasitology-mycology laboratory at Hassan II University Hospital in Fes.

## Materials and Methods:

This is a retrospective analytical descriptive study conducted at the parasitology-mycology laboratory of Hassan II University Hospital in Fes, spanning six years from March 2017 to March 2023. The study includes 72 mycological samples from the nails of hands and feet, where direct examination and/or culture indicate *Candida* involvement.

## Inclusion Criteria:

Our study included the records of all patients who were referred to the medical parasitology-mycology laboratory due to suspicious symptoms of onychomycosis with or without associated skin lesions. These patients underwent mycological examination to confirm the diagnosis.

Mycological samples were taken within the laboratory by a biologist or an experienced technician. To avoid falsely negative cultures, mycological samples were taken away from any form of antifungal treatment. In this context, a window of 3 months after systemic treatment, the application of nail polish, or a film-forming solution is recommended. If only an antifungal cream has been used, the therapeutic window is 15 days.

Nail samples were taken after brushing with a neutral soap to eliminate environmental molds. The altered nail is collected at the junction of the healthy area and the affected area, corresponding to the zone where the fungus is active, and collected in a sterile glass Petri dish. In the case of paronychia, pus is collected using a sterile swab.

Then, a direct examination between a slide and a cover slip was performed for all samples after clarification with 30% potassium hydroxide, as well as seeding on gelose culture media: Sabouraud agar, Sabouraud agar + chloramphenicol with and without Actidione, in tubes incubated at 20-25 °C and 37 °C for 3 weeks.

Yeast identification was based on the rate of growth, macroscopic and microscopic characteristics, physiological, immunological, and enzymatic features.

Data were collected in an Excel file, and the statistical analysis involved descriptive analysis methods consisting of calculating percentages for qualitative variables and means and standard deviations for quantitative variables.

**Results:**

Over a 6-year period, 1204 samples were sent to the Parasitology and Mycology Service for suspected onychomycosis. Among them, 731 were negative, and 473 were positive, with 72 indicating Candida involvement, accounting for 15.2% of all species isolated in culture. The population consisted of 54 females (75%) and 18 males (25%), with a male-to-female ratio of 0.33. The average age of patients was 44.5 years, ranging from 1 to 85 years. The adult population represented 96.3% of patients, while the child population did not exceed 9.7% of cases. 33 patients (45.8%) had an underlying pathological condition.

Table 1: Distribution of Patients Based on Associated Pathologies

Pathologie Associée	Nombre	Pourcentage
Diabète	9	12.5%
Pathologies rhumatismales	7	9.8%
Terrain psychiatrique	3	4.2%
Hypertension artérielle	3	4.2%
Virus d'immunodépression humain	2	2.7%
Cancer sous chimiothérapie	2	2.7%
Goitre	2	2.7%
Virus de l'hépatite C	1	1.4%
Maladie de Biermer	1	1.4%
Déficit immunologique congénital	1	1.4%
Lupus érythémateux disséminé	1	1.4%
Psoriasis	1	1.4%

The involvement of the hands accounted for 58.5%, followed by the feet at 36%. Only 4 cases (5.5%) of dual involvement were identified. Clinically, 39 patients (54%) presented with pachy-onychomycosis, 18 patients (25%) had onycholysis, 10 patients (14%) exhibited leukonychia, and 5 patients (7%) showed xanthonychia. Among the latter, 24 (33.3%) had an underlying dermatological condition, including palmoplantar keratoderma (9.8%), paronychia (8.3%), interdigital intertrigo (8.3%), xerosis (5.5%), and pruritus (1.4%).

Direct examination revealed the presence of yeast in 77.8% of cases, and 90.3% of cultures were positive. Various Candida species were isolated in culture.



Figure 1: Pseudohyphal Filaments

*Candida albicans* tops the list (38.9%), followed by *Candida tropicalis* (12.6%), *Candida parapsilosis* (8.3%), *Candida krusei* (8.3%), *Candida lusitaniae* (4.2%), and *Candida glabrata* (2.7%), making up a total of 25% for *Candida spp.*

Concerning fingernail infections, five *Candida species* were identified, with the most prevalent being *Candida albicans* (45.4%), followed by *Candida tropicalis* (21.4%), *Candida parapsilosis* (7.1%), and *Candida lusitaniae* (7.1%).

Simultaneously, in toenail infections, the most commonly found species were also *Candida albicans*, *Candida krusei*, and *Candida parapsilosis*, with respective rates of 34.6%, 15.4%, and 11.5%.

Regarding dual infections of fingernails and toenails, the main *Candida species* simultaneously isolated were *Candida albicans* (75%) and *Candida parapsilosis* (25%).



Figure2: Yeasts in culture on Sabouraud media

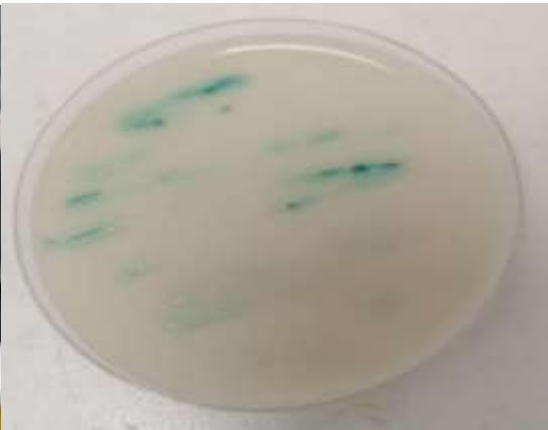


Figure 3: *Non-albicans Candida* on chromogenic media



Figure4: Auxacolor Staining Gallery Confirming *Candida Parapsilosis*

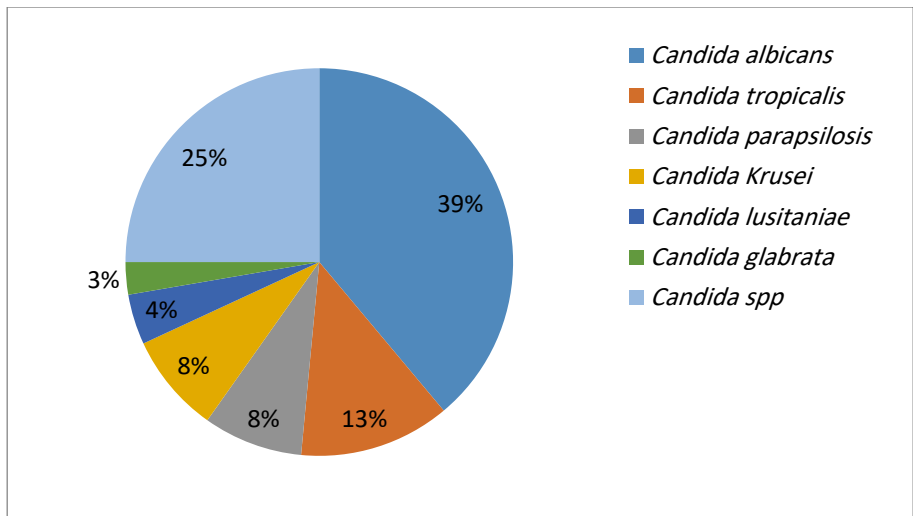


Figure 5: Distribution of Isolated *Candida Species*

**Discussion:**

Fungal nail infections, specifically Candidal onychomycosis, involve the invasion of the nail plate by *Candida* yeast. In our series, this condition ranks second after dermatophytic onychomycoses, with a prevalence of 15.2% of all samples. These findings closely align with Romano C's study, which reported a rate of 16.2% [4].

The average age of our patients was 44.5 years, a result consistent with Hafize Sav's study, where the mean age was 45.68 years [5]. Onychomycosis, regardless of the cause, is typically considered an affliction of adults and is rare in the pediatric population [6]. In our series, children accounted for only 9.7% of all patients, with a peak in the age group between 45 and 55 years. This increase with age can be attributed to slow nail growth, diabetes, poor peripheral blood circulation, repeated microtrauma to the nails, and age-related physiological immunosuppression [7,8].

Numerous studies indicate a female predominance in onychomycoses, including Candidal infections [5,9], which is in line with our study's findings, where the female percentage was 75%. This could be explained by chronic exposure to water and detergents during domestic activities, as well as the greater expression of functional discomfort and aesthetic concerns among women compared to men [10].

The occurrence of onychomycosis is influenced by various factors, including individual factors such as age, gender, genetic, immune and hereditary background, as well as environmental factors such as lifestyle, occupation, and sports activities [11]. Diabetes, in particular, is a significant factor in the development and progression of onychomycoses due to immune deficiency, microcirculation abnormalities, and trophic disorders. Approximately one-third of diabetic patients suffer from onychomycosis [12][13]. In our study, only 12.5% of cases with Candida onychomycosis were diabetic, a result similar to Farhi.D's finding of 13.9% [14]. Congenital or acquired immune deficiencies, such as advanced stages of HIV, autoimmune diseases, neoplasia, or patients undergoing immunosuppressive treatment, can also significantly affect the development of onychomycoses [15]. In our series, 8.4% of patients had a history of immunosuppression.

Regarding localization, our study confirmed the predominance of Candidal onychomycoses in the fingers compared to the toes, accounting for 58.5%, a result also reported in other studies [16,17]. Conversely, the prevalence of Candidal onychomycosis in the toenails in a study in southeast Serbia from 2011 to 2015 was 52.20% [18]. The preponderance of *C. albicans* among the isolated fungal species, both in fingernails (45.4%) and toenails (34.6%), has been noted in several studies. It was approximately 36.59% in southeast Serbia, 79.1% of isolated strains in Ivory Coast, and 71.4% in Brazil [18,2,19]. In our study, *C. tropicalis* ranked second, followed by *C. parapsilosis*, which contrasts with Ilkit et al.'s study, where *C. tropicalis* was the most frequently isolated causal agent [20]. On the other hand, R. Segal's study found an increasing prevalence of *C. parapsilosis* [21].

Nails affected by Candida exhibit dystrophic changes in the nail fold, thickening, and onycholysis [2]. Pigmentation of the nail tissues is a clinical feature of Candidal onychomycosis, attributed to melanin produced by *C. albicans*, considered one of its virulence mechanisms [22]. In our study, 42.10% of patients exhibited pachy-onychomycosis, with 15.78% of them showing distal onycholysis.

#### Conclusion:

Candidal onychomycoses are relatively common, with *Candida albicans* being the most frequently isolated species regardless of the localization. Treating these infections poses a significant challenge, underscoring the importance of mycological examination in confirming the diagnosis before initiating treatment.

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