Research Article ISSN 2693-2326

International Journal of Infectious Diseases and Research

Retrospective Study of Onychomycosis Diagnosed in the Parasitology Laboratory at the Batna University Hospital-ALGERIA

HAMOUDA Ouanassa[1*] and KALLA Nabila[2]

[1,2]*Department of Medicine, Batna 2 University – Algeria.*

***Corresponding author**

HAMOUDA Ouanassa,

Department of Medicine, Batna 2 University – Algeria

Submitted : 14 Nov 2025 ; Published : 1 Dec 2025

Citation: HAMOUDA O., KALLA N., (2025). Retrospective Study of Onychomycosis Diagnosed in the Parasitology Laboratory at the Batna University Hospital-ALGERIA. I J Infectious Disea 6(3):1-5. DOI : https://doi.org/10.47485/2693-2326.1042

Background & Objective: *Onychomycosis is a chronic fungal infection of the nail apparatus, considered the most common nail disorder in dermatology. This pathology, although benign in the majority of cases, can have a significant functional and aesthetic impact, particularly in patients with underlying risk factors.*

Objective: *To analyze the epidemiological, clinical, and mycological characteristics of onychomycosis cases diagnosed at the Batna University Hospital. Methods: This was a retrospective study including patients consulting the parasitology laboratory at the Batna-University Hospital (ALGERIA) for suspected onychomycosis during the period from January 2019 to December 2024.*

Results: *Overall, we recorded a prevalence rate of 59.02%, with a slight male predominance. The mean age of patients was 42 years, and the most affected age range was between [41 and 55 years]. Toenails were the most frequently affected. Mycologically, dermatophytes were the most isolated pathogens (73.6%), dominated by Trichophyton rubrum (71%), followed by yeasts, of which Candida albicans was the most isolated species (5.7%). The most observed clinical forms were distolateral onychomycosis (54.2%) and total onychodystrophy (42.2%).*

Conclusion: *This study highlights the need for rigorous mycological screening and appropriate management to improve prognosis and reduce the risk of recurrence.*

Keywords: Onychomycosis, dermatophytes, yeast, Trichophyton rubrum, Candida albicans, Onychodystrophy.

Introduction

Superficial mycoses are common skin infections caused by microscopic fungi. They can affect the skin, mucous membranes, nails, and scalp [1]. Among superficial mycoses, onychomycosis is one of the most common infections. It results from the proliferation of microscopic fungi in the nail unit and is primarily caused by dermatophytes, although yeasts and molds can also be involved [2]. Onychomycosis is a widespread condition in dermatology and medical mycology, constituting the most frequently encountered onychopathy. Although considered benign, it can have significant repercussions on quality of life, and its prevalence varies according to several parameters, such as age, hygiene habits, and associated comorbidities [2]. Onychomycosis is an infection that remains difficult to diagnose, complex to manage, and costly to treat. Its effectiveness depends on appropriate prescribing based on rigorous identification of the clinical type and the causative pathogen [3]. Given its importance as a public health issue and its impact on patients' quality of life, a better understanding of its prevalence and risk factors is necessary. In this context, this study aims to analyze onychomycosis cases in the parasitology department of the University Hospital of Batna, Algeria, over a six-year period (January 1, 2019, to December 31, 2024).

It Aims To

- Evaluate the prevalence of the infection in the studied population.
- Identify the causative pathogens and their frequencies.
- Determine the risk factors that promote its occurrence.
- Propose recommendations to improve local prevention and management.

Methods

Type, location, and period of the study: This was a retrospective descriptive study conducted in the parasitology laboratory at the Batna University Hospital over a 6-year period, from January 2019 to December 2024.

Study Population

This study included patients presented to the parasitology department for mycological sampling due to clinical suspicion of onychomycosis.

Inclusion Criteria

All patients presenting with clinical manifestations suggestive of onychomycosis, with or without associated lesions, regardless of age or sex, were included in our study.

Exclusion Criteria

All patients with incomplete or blank information sheets, or whose diagnosis was suspected outside the study period, were excluded from our study.

Data Collection

We collected epidemiological, clinical, and mycological data for patients presenting with onychopathy, using archived patient information sheets containing various parameters: age, sex, location of the infection, type of nail involvement, main pathogens, associated pathologies and lesions, and lesion progression.

Data Analysis

The data were processed using SPSS version 29 (Statistical Package for the Social Sciences) to generate graphs and tables.

Ethical Considerations

Anonymity and confidentiality of patient information were strictly maintained.

Results

Overall Onychomycosis Data Observed During the Study Period

During the study period, 554 patients with onychopathy were referred to the parasitology department. Among them, 327 patients presented with onychomycosis proven by direct examination and/or culture, corresponding to a prevalence rate of 59.02%.

Distribution of Onychomycosis Cases by Year

Some variability is observed in the annual distribution of positive cases, with a peak in 2023 (100 cases), while a marked decrease was recorded in 2020. (Figure 1) The average annual frequency of onychomycosis was 54 cases/year.

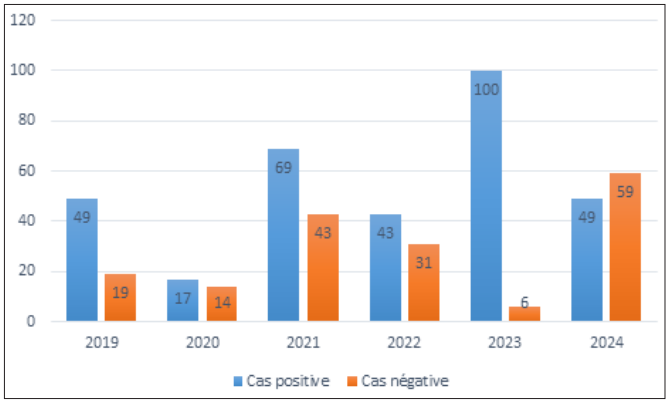

Figure 1: Distribution of onychomycosis cases by year.

Characteristics of the Study Population

We observed a predominance of males (53.2%) compared to females (46.8%). The male-to-female ratio was 1.13.

The mean age of the patients was 42 years, with a median of 41 years, and a range of ages from 1 to 80 years. The highest rate of onychomycosis was observed in patients aged 41 to 50 years (19%), while the lowest rate was observed in children aged 1 to 10 years, representing 3.1% of cases. (Figure 2)

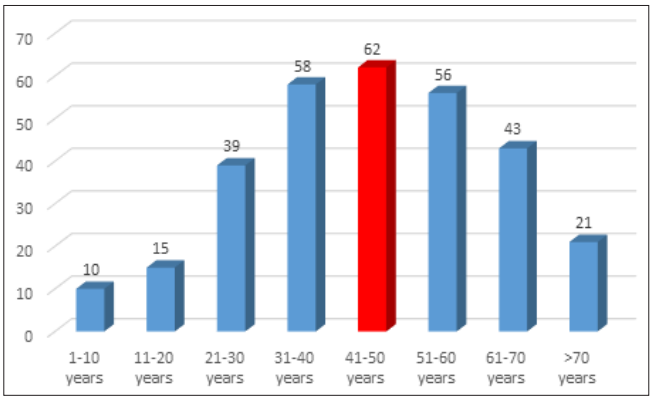

Figure 2: Distribution of patients with onychomycosis according to age.

Distribution of Onychomycosis Cases According to the Location of the Infection

We observed a predominance of onychomycosis of the feet (238 cases, or 74%), followed by hand involvement (78 patients, or 23%), and only 11 cases (3%) had mixed involvement (hands and feet). (Figure 3)

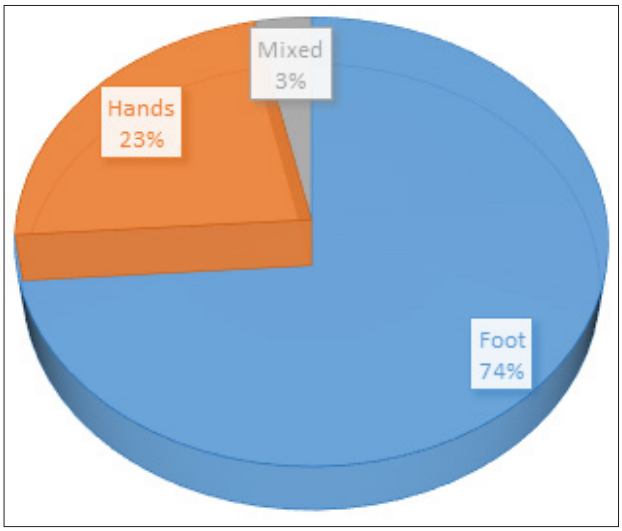

Figure 3: Distribution of cases according to the location of onychomycosis

Distribution According to the Clinical Aspects of Onychomycosis

Among the 327 cases of nail onychomycosis, the clinical appearance was only mentioned for 166 patients (50.8%). Among these, 54.2% (90/166) presented with OSLD, followed by OST in 42.2% (70/166) of cases, then OSP in 3% (5/166) and OS in 0.6% (1/166). (Figure 4)

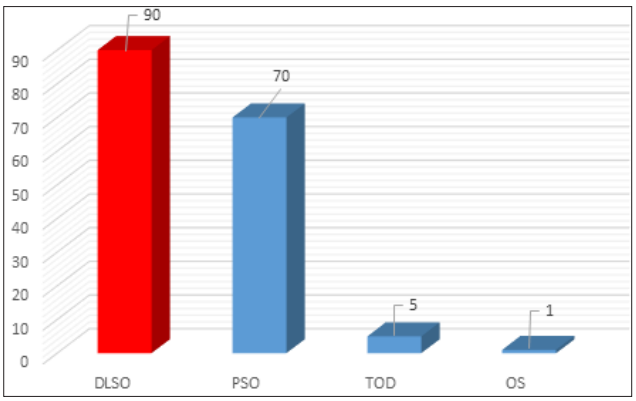

Figure 4: Distribution of nail lesions according to their clinical appearance

Mycological Data

We were able to isolate two groups of fungi: dermatophytes (73.6%) (181/246) of the observed cases, and yeasts (24.4%) (60/246) of the cases. In 2% (5/246) of the cases, an association of dermatophytes and yeasts was observed (Figure. 5)

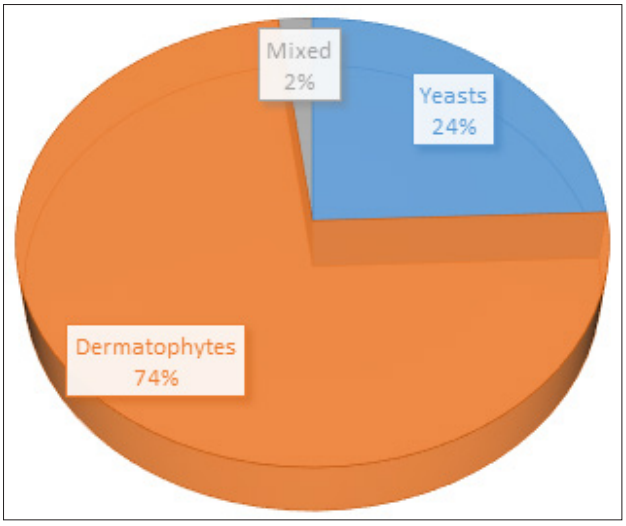

Figure 5: Distribution of onychomycosis according to fungal groups.

ω On the feet, dermatophytes were the most frequently isolated fungi (92%) (164/178). ω On the hands, yeasts were the most frequently isolated fungi (80%) (45/56). ω For mixed involvement, dermatophytes were responsible for 85% (6/7). Trichophyton rubrum was the most frequently isolated dermatophyte species (71%), while Candida albicans was the most frequently isolated yeast species (5.7%).

Distribution According to Associated Llesions

More than half of the patients with onychomycosis, 79.5% had no associated lesions. Associated lesions were present in 67 patients (20.5%). The three most frequent lesions were plantar hyperkeratosis in 37.3% of patients, followed by paronychia in 23.5% of patients.

Discussion

Onychomycosis is a fungal infection of the nail unit, representing a variable proportion of onychopathies according to studies. Its frequency varies depending on several epidemiological, clinical, and mycological factors, which will be analyzed in this discussion.

Our study revealed a prevalence rate of 59.02%, reflecting a high frequency of this pathology in our study population, compared to other studies: Khabil and Siaghi (2024) at the Tizi-Ouzou University Hospital reported a prevalence of 68% [4]. Azelmat (2020) at the Ibn Sina University Hospital in Rabat found a prevalence of 79.69% [5]. Guibal et al. (2016) in France recorded a prevalence of 47% [6].

These differences in prevalence can be attributed to climatic factors, socioeconomic factors, and diagnostic methods.

Thus, when analyzing the annual distribution of cases, particular attention should be paid to the year 2020. The decrease observed during this period is likely explained by the COVID-19 pandemic, which led to a reduction in medical consultations, restricted access to hospital services, and a reluctance among patients to visit healthcare facilities except in emergencies.

We observed a slight predominance of males (53.2%), with a male-to-female ratio of 1.13, suggesting that both sexes are almost equally susceptible to developing onychomycosis. However, Khabil and Siaghi (2024) reported a more pronounced male predominance (74%). Teggour et al. (2024) and Azelmat (2020) observed a predominance of females, with respective rates of 61% and 65% [4,5,7]. This distribution between the two sexes may be influenced by several factors, including occupational exposure, care habits, and physiological conditions specific to each sex.

On the one hand, certain occupations expose men more to repetitive micro trauma of the nails, such as those requiring prolonged wear of safety shoes or involving frequent contact with humid environments. On the other hand, women, generally being more attentive to the aesthetics of their nails, consult more frequently for nail abnormalities, which could explain a higher prevalence in some studies (Cheikhrouhou et al., 2021, sex ratio M/F = 0.66) [8].

In the present study, we observed that the average age of affected patients was 42 years, with a predominance in the 41-55 year age group (19%). The highest rate of onychomycosis was observed in individuals in this age group, which can be explained by several factors, including slower nail growth with age, a decreased ability to maintain good nail hygiene, a physiological decline in immunity, as well as local and general factors; among the latter are peripheral circulatory insufficiency, trophic disorders, toe malposition, and a high frequency of comorbidities such as diabetes) [9]. Our results are comparable to those of Teggour et al. (2024), who reported a frequency of 39.67% of cases in patients aged between 40 and 59 years [7]. Khabil and Siaghi (2024) found a very high prevalence in the 50-85 age group (80%) [4]. Furthermore, in our study, only 3.1% of cases Cases of onychomycosis were

observed in children aged 1 to 10 years, which is consistent with the findings of Zahrou (2014) in Marrakech, who reported a rate of 4% of cases in the 0-19 age group [10]. In this study, onychomycosis primarily affected the feet (72.8%), followed by the hands (23.9%) and mixed cases (3.4%). These results are comparable to those obtained in other studies: Zahrou (2014) [10] reported predominantly affecting the feet in 71% of cases. Cheikhrouhou et al. (2021) reported predominantly affecting the feet with a frequency of 59.62%. Guibal et al. (2016) recorded an even higher rate, with 88.7% of cases affecting the feet [6,8].

Onychomycosis can be attributed to various socio-cultural factors, including frequenting communal spaces such as swimming pools, hammams, and mosques, as well as performing ablutions within a religious context. Furthermore, certain habits, such as engaging in sports activities and prolonged shoe wear, create an environment conducive to the proliferation of the fungi responsible for onychomycosis.

In our study, 79.5% of patients (260 cases) with onychomycosis did not present with associated lesions, while 20.5% (67 cases) had concomitant lesions. The three most frequent lesions were plantar hyperkeratosis (37.3% of cases with lesions), paronychia (23.5%), and scaly lesions (14.5%). These results are similar to those found by Drouaz and Oudahmane (2019), who observed that 63.79% of patients had no associated lesions, while the main lesions found were interdigital intertrigo (22.4%), dermatophytosis (3.45%), keratoderma (1.72%), paronychia (7.75%), and paronychia (0.86%). Furthermore, Azelmat (2020), in his study conducted at the Ibn Sina University Hospital in Rabat, observed that paronychia was a frequently found clinical sign on the hands, thus confirming its role as one of the main manifestations associated with onychomycosis [5,11].

The most frequent clinical presentation in our series was distal lateral involvement, found in 54.2% of cases. This result is comparable to that reported by Zahrou (2014), who observed a frequency of 53% of OSDL, as well as by Guibal et al. (2016), where this form represented 74.2% of cases [6,10]. OSDL was followed by OST with 42.2%, then by OSP with a rate of 3%, and finally OS with a rate of 0.6%. In other studies, Azelmat (2020) at the Ibn Sina University Hospital in Rabat also reported a predominance of distal lateral onychomycosis (DLON), followed by total onychomycosis in 38.75% of cases, while in Algeria, Khabil and Siaghi (2024) at the Tizi-Ouzou University Hospital found a different distribution with 41% proximal onychomycosis and 37% DLON. In contrast, in Tunisia, total onychodystrophy (TOD) was identified as the most frequent clinical form in both hands and feet, according to the study by Gara et al. (2016) [4,5,12]. These results confirm that distal lateral onychomycosis remains the most widespread clinical form in most studies, due to the progressive penetration of the fungus from the free edge of the nail. However, variations are observed depending on the region, probably due to climatic differences, hygiene habits and associated risk factors.

Analysis of the mycological results in our study identified two main groups of fungi responsible for onychomycosis: dermatophytes in 73.6% of cases and yeasts in 24.4% of cases. An association between dermatophytes and yeasts was observed in 2% of cases, while no confirmed cases of onychomycosis due to molds were found. These results are comparable to those reported in other studies. Cheikhrouhou et al. (2021) found that dermatophytes were predominant in 80.1% of cases [8]. Azelmat (2020) at the Ibn Sina University Hospital in Rabat found a predominance of dermatophytes with a frequency of 74.22%, followed by yeasts (23.87%) [5]. Similarly, Khabil and Siaghi (2024) at the Tizi-Ouzou University Hospital identified dermatophytes (32%) and yeasts (13%) [4]. In France, Guibal et al. (2016) reported a clear predominance of dermatophytes (84%), followed by yeasts (8%) [6]. In Tunisia, Gara et al. (2016) found that dermatophytes were predominant (80.8%) [12]. Furthermore, a study conducted by Teggour et al. (2024) at the Tizi-Ouzou University Hospital revealed a predominance of yeasts (60%), followed by dermatophytes (37%) and molds (3%) [7].

Analysis of the sex distribution in our study shows that dermatophytes were isolated from 69 women and 112 men, while yeasts were more frequent in women (43 cases) compared to 17 in men. This difference is explained by the fact that yeasts are more often found in onychomycosis of the hands, where they account for 80% of cases, whereas dermatophytes are primarily responsible for foot infections (92%). These results confirm that the distribution of pathogens varies according to the affected anatomical site, individual risk factors, and environmental conditions.

Trichophyton rubrum was the most frequently isolated dermatophyte species (71%), while *Candida albicans* was the most frequently isolated yeast species (5.7%). These results are similar to those reported in several studies. Azelmat (2020) at the Ibn Sina University Hospital in Rabat found a frequency of 67.67% for *Trichophyton* and 11.90% for *Candida albican*s [5]. Similarly, Khabil and Siaghi (2024) at the Tizi-Ouzou University Hospital reported a prevalence of 32% for *Trichophyton rubrum* and 13% for *Candida albicans* [4]. In Tunisia, Gara et al. (2016) also found that Trichophyton rubrum was the most frequently isolated dermatophyte species, with a frequency of 66.66%, and *Candida albicans* the most frequently isolated yeast species, with a frequency of 26.95% [12]. Our results therefore confirm the predominance of *Trichophyton rubrum* as the main causative agent of onychomycosis, particularly on the feet, while *Candida albicans* and other yeasts are more frequently implicated in hand infections. Accurate identification of pathogenic species is essential to ensure appropriate treatment.

Conclusion

Onychomycosis is a common fungal infection that represents a significant public health challenge due to its high prevalence and its impact on patients' quality of life. This study analyzed the epidemiology of this infection, identified the causative pathogens, and examined the main associated risk factors.

Onychomycosis remains an underdiagnosed condition, often neglected by patients, which promotes progression to advanced forms and complicates treatment. Management relies on an approach tailored to the clinical type and the pathogen, combining topical and systemic antifungals. However, the prolonged duration of treatment and the need for rigorous follow-up pose major challenges to ensuring complete cure and limiting the risk of persistent infection.

Given the results obtained, this study highlights the need for greater awareness among healthcare professionals and patients to promote earlier detection and optimized management. It also paves the way for further research aimed at improving the therapeutic and preventive strategy for onychomycosis in the Batna region. This study represents a valuable contribution to the understanding of onychomycosis in the Batna region, providing a solid foundation for improving diagnostic and therapeutic practices.

List of Abbreviations

UHC : University Hospital Center
DLSO : Distolateral Subungual Onychmycosis
PSO : Proximal subungual onychomycosis
TOD : Total Onychodystrophy
SO : Superficial onychomycosis

Conflicts of Interest

None related to this article.

References

1. Lorier-Roy E (2019) Les mycoses cutanées. dermato-info.fr. [cité 26 févr 2025]. Disponible sur: https://dermato-info.fr/fr/les-maladies-de-la-peau/les-mycoses- cutan%C3%A9es
2. Gupta AK, Mays RR, Versteeg SG, Piraccini BM, Takwale A, Shemer A, et al. (2019) Global perspectives for the management of onychomycosis. Int J Dermatology. 58: 1118 1129.
3. Scher RK, Daniel CR (2007) Onychologie: Diagnostic, traitement, chirurgie. Elsevier Masson 384 p.
4. Khabil L, Siaghi H (2023-2024) Étude des onychomycoses diagnostiquées au niveau du CHU de Tizi-Ouzou [thèse]. Université Mouloud Mammeri, Faculté des Sciences Biologiques et des Sciences Agronomiques.
5. Azelmat S (2020) Les onychomycoses diagnostiquées au laboratoire de parasitologie- mycoIogie médicales du CHU Ibn Sina de Rabat : à propos d'une série de 2025 cas (2013-2019) [thèse]. Rabat : Université Mohammed V, Faculté de Médecine et de Pharmacie.
6. Guibal F, Baran R, Duhard E, Feuilhade De (2008) Chauvin M. Épidémiologie et prise en charge des onychomycoses en pratique dermatologique libérale en France. Annales de Dermatologie et de Vénéréologie. août 135: 561 566.
7. Teggour DS, Tahir A, Mederbel R (2023-2024) Les onychomycoses diagnostiquées au laboratoire de parasitologie-mycoIogie du CHU de Tizi-Ouzou [mémoire]. Tizi-Ouzou : Université Mouloud Mammeri, Faculté de Médecine, Département de Pharmacie.
8. Cheikhrouhou S, Attoini A, Aloui D, Bouchekoua M, Trabelsi S, (2021) Etude épidémiologique ,clinique et mycologique des onychomycoses chez le sujet diabetique. LA TUNISIE MEDICALE. 99: 911-918.
9. Kalel K (2007) Onychomycoses chez les sujets âgés. Annales de Dermatologie et de Vénéréologie [. 1 janv 2007 [cité 12 févr 2025]; Disponible sur: https://www.academia.edu/19970276/Onychomycoses_chez_les_sujets_%C3%A2g%C3 %A9s.
10. Zahrou F (2014) Les onychomycoses : aspects cliniques, mycologiques, thérapeutiques et évolutifs [thèse]. Marrakech : Université Cadi Ayyad, Faculté de Médecine et de Pharmacie.
11. Drouaz A, Oudahmane S (2019) Étude rétrospective sur l'onychomycose chez les sujets âgés de plus de 50 ans et essai de culture au CHU de Tizi-Ouzou [mémoire]. Université Mouloud Mammeri, Faculté des Sciences Biologiques et des Sciences Agronomiques, Département de Biologie.
12. Gara S, Litaiem N, Bouhlel S, Bouchakoua M, Jones M, et al. (2018) Prise en charge thérapeutique des onychomycoses en Tunisie. Annales de Dermatologie et de Vénéréologie. Mai. 145: A37.