

# Assessment of Psoriatic Patients for Onychomycosis

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## Abstract:

**Introduction:** Psoriasis is a chronic, common, immune-mediated inflammatory disease that affects the skin, joints and nails. Nail involvement is very common in the course of psoriasis; Psoriasis can involve any element of the nail apparatus-nail bed or matrix, or both. Resulting a disturbance in the nail morphology (pitting, leukonychia, onycholysis, subungual hyperkeratosis, oil spot) and nail dystrophy, the psoriatic nails lose their natural preventing barrier and therefore are more predisposed to fungal infections. Onychomycosis is fungal infection of nails caused by yeasts, dermatophyte and nondermatophytemoulds. Psoriatic patients with nail changes more liable to invasion by fungal elements than psoriatic patients without nail changes.

**Objective:** To assess the frequency of onychomycosis in psoriatic patients nails due to the presence of predisposing nail changes to fungal elements infection.

**Materials and Methods:** The nail specimens were prepared by scrubbing and clippings from the 30 psoriatic patients with nail changes and another 30 without nail changes. The nail specimens were taken from each patient undergoes 2 laboratory examinations: direct microscopy with (20%) KOH and Sabouraud's Dextrose agar culture.

**Result:** Totally, we studied 60 psoriatic patients (30 men and 30 women). The mean age was  $24.5 \pm 13.7$  years. The most common clinical form of psoriasis was psoriasis vulgaris (85%) and (15%) Arthropathic psoriasis. The percentage of positive mycology in psoriatic patients with nail changes 21(70%) is higher than; the group of psoriatic patients without nails changes 10(33.3%). The fungal agents, which isolated in this study, were Yeast like fungi (candida spp.) and Non Dermatophyte Moulds (NDM).

**Conclusion:** This study revealed statistically significant relation between nail psoriasis and mycological results were the P-value= 0.037.

**Keywords:** Nail Psoriasis, Onychomycosis, Yeasts, Non Dermatophyte Moulds.

## Introduction:

Psoriasis is a chronic, immune-mediated inflammatory skin disease. It ranges in severity from few scattered red, silvery scales plaque to involvement of almost the entire body surface <sup>(1)</sup>. Psoriasis occurs in (1%) to (3%) of population and it transmitted genetically; most likely Mandilian dominant mode with variable penetrance, environmental influences may modify the course and severity of disease <sup>(2)</sup>. It characterized by T-cell-driven a complex alteration in epidermal proliferation and

differentiation and multiple biochemical, immunologic, and vascular abnormalities <sup>(3)</sup>.

Psoriasis is one of the most frequent dermatoses affecting nails <sup>(4)</sup>. Nail changes often accompany skin lesions; Nails are affected in (10-55%) of all patients with psoriasis. Among patients with psoriatic arthritis, nails are affected in (75-86%) of the patients <sup>(5)</sup>. The spectrum of nail changes in psoriasis is very wide. It includes: Nail Matrix psoriasis (pitting, leukonychia,

Trachyonychia, Beau lines, Red lunulae), Nail bed Psoriasis (Onycholysis, Subungual hyperkeratosis, Oil spots, Splinter haemorrhages) <sup>(6)</sup>. The nail changes in psoriatic patients morphologically resemble fungal infection; yellowish or white colour of the nail, hyperkeratosis and thickening of the plates, onychorrhexis or even total dystrophy of the nail plate. The clinical diagnosis may be especially difficult if there are no skin lesions and nail abnormalities are the only symptom of psoriasis <sup>(7)</sup>. In addition, psoriatic onychopathy and onychomycosis may also coexist <sup>(8)</sup>. The morphological abnormalities and nail dystrophies in psoriatic patients are predisposing factors for onychomycosis. In healthy nails, the compact orthokeratotic nail plate acts as a natural barrier preventing the development of fungal infections, which is disturbed in abnormal nail plates in diseases such as nail psoriasis. Therefore, it is suggested that the prevalence of onychomycosis in patients with nail psoriasis might be higher than in the general population <sup>(9)</sup>.

Onychomycosis is a common fungal infection of the nail apparatus and may be due to dermatophytes, yeasts, and nondermatophyte moulds <sup>(10)</sup>.

Onychomycosis is the most common nail disease worldwide and constitutes about half of all onychopathies <sup>(11)</sup>. According to the way they originate, onychomycosis are classified as primary and secondary. In primary onychomycosis, the fungal attacks unaltered nail apparatus. Secondary onychomycosis develops on an already damaged nail structure caused by various diseases or traumatic injury <sup>(5)</sup>. Dystrophic nails in psoriasis patients are more predisposed to fungal infections.

In these cases, additional diagnostic procedures are essential to exclude the presence of concomitant fungal infection <sup>(12)</sup>.

### **Aims of the study:**

-To assess the frequency of fungal infection in the nails of psoriatic patients.

-To determine whether the changes in psoriatic nails predisposing to fungal infection.

-Investigate which causative pathogen (fungal agents) frequently isolated from the nail of psoriatic patients.

### **Materials and methods:**

A comparative, investigative, clinical study was performed on the (60) psoriatic patients, who attended to the dermatological clinic in Salah Aldeen General Hospital. In the period between January 2017 and September 2017, all the patients subjected to dermatological examination. The diagnosis was made clinically, based on the presence of characteristic psoriatic lesions then special attention was paid to detecting the presence or absence of nail changes, then information's had been taken and arranged in a questionnaire sheet. Psoriasis Vulgaris, Arthropathic Psoriasis was included in this study; the percentage of nail changes highly seen in these types of psoriasis <sup>(13)</sup>. Psoriatic patients were divided into two groups each of thirty as the following:

**Group A:** Included 30 psoriatic patients with nail changes. The changes of the **nail matrix** like pitting, Leukonychia, Trachonychia, Beau lines and Red spots lunula. And/ or of the **nail bed** like Onycholysis, Subungual hyperkeratosis, Oil spots, and Splinter hemorrhage.

**Group B:** Included 30 psoriatic patients without nail changes.

The nail specimens were taken from

fingers nails, toes nails, or from both of them, by nail clipping and scrubbing under the nail after cleaning the affected area with (70%) ethanol, the sample of each patient were placed in separated sterile test tube. Then undergone in to two laboratory examination: The first, direct microscopy with (20%) KOH. The second, Sabouraud's Dextrose agar culture, supported with chloramphenicol and gentamycin to reduce contamination with bacteria, for each sample inoculated in to 2 agars, were incubated at 25-30 C<sup>0</sup> for up to four weeks, and observed periodically (every 2-3 days) for growth. If no growth was found after four weeks, it was taken as negative for the growth of fungi.

The identification of each fungus was based on its characteristic colonies and microscopic morphology.

**Our Diagnostic criteria of onychomycosis** were based on the following criteria:

1. Positive KOH preparation with the presence of hyphae, arthrospores or growth of dermatophytes at least on one culture.
2. Growth of yeasts and NDP moulds at least on two cultures with coexisting positive direct microscopy, Failure to isolate a dermatophyte in culture <sup>(14, 15)</sup>.

### **Results:**

Overall 60 psoriatic patients were examined for onychomycosis. 30(50%) were male and 30(50%) were female. The mean age was 24.5±13.7 years, ranged between 6-68 years. 17(56.7%) of male had positive mycology; 10(33.3%) positive with yeast (candida spp.) and 7(23.3%) with mould (NDM). The females were 14(46.7%) of them had positive mycology; 9(30%) positive with yeast (candida spp.), 5(16.7%) with mould (NDM).

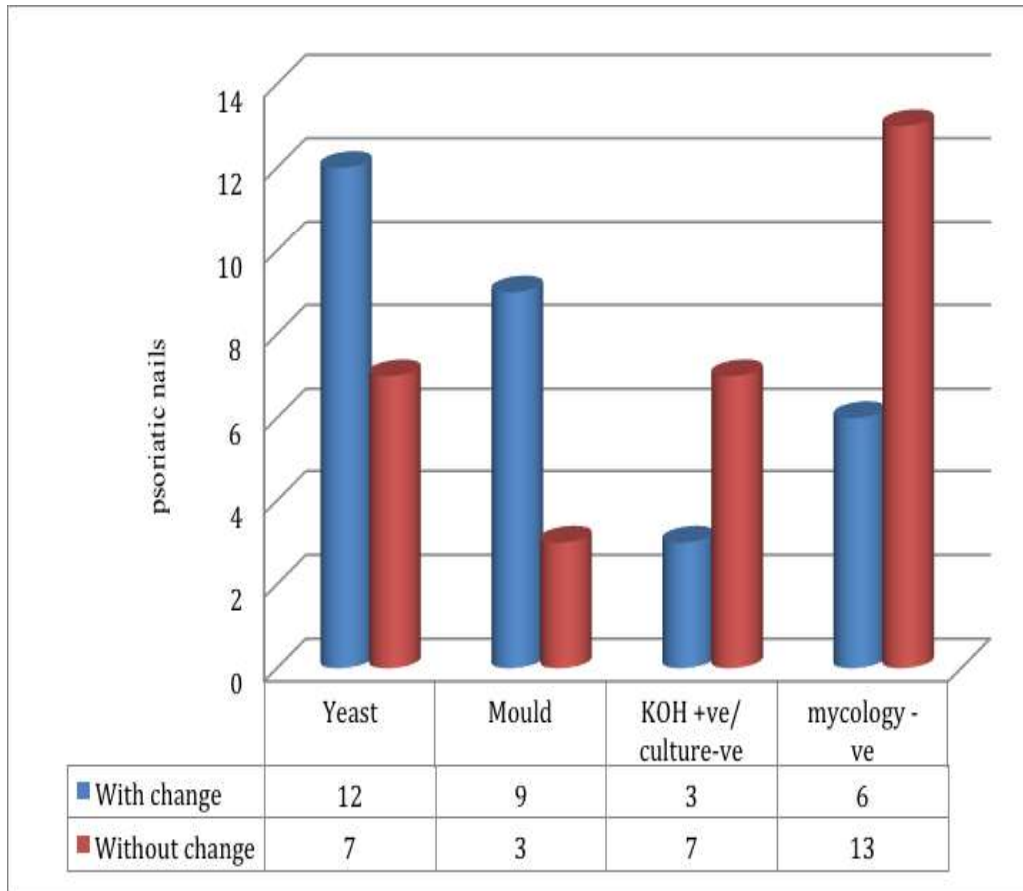
The most common clinical form of psoriasis was psoriasis vulgaris 51 patients (85%); only 25(49%) with positive mycology. Other clinical forms of psoriasis were Arthropathic psoriasis 9 patients (15%); 6(66.7%) with positive mycology and 3(33.3%) with negative mycology.

The duration of Psoriasis with mycological results shown; the longer duration of psoriasis gave more positive mycology than the shorter duration of disease, in which the mean duration of psoriasis ± SD [(10.94±9.4) in group of positive mycology and (8.02±7.79) years in group of negative mycology].

Among the 60 studied patients, the fungal agent was isolated from 31(51.7%) patients, who are suffering from psoriasis, 21(35%) of them with nail changes while 10(16.7%) of them without nail changes according to the results of direct microscopy and culture.

**The group of psoriatics with nail changes** had 21(70%) positive mycology; [12 (40%) positive with yeasts (candida spp.), 9(30%) with NDM], while, 3(10%) with positive KOH but no fungal growth on culture and 6(20%) with negative mycology.

**The group of psoriatics without nail changes** had 10(33.3%) mycological positive results; [7(23.3%) infected with yeast (candida spp.), 3(10%) with NDM.], while 7(23.3%) of them had KOH positive but culture negative and 13(43.3%) negative mycological testes. So there is a significant relation between nail changes and mycological results were the P-value=0.037. The isolated fungal agents were Yeasts (candida spp.) and Non Dermatophytic Moulds (NDM). Which mainly affected psoriatic patients with nail changes than psoriatic patients without nail changes figure (1).



**Figure (1):** Mycological results and psoriatic nail with or without changes.

### **Discussion:**

Psoriasis is one of the most common causes of abnormal nail morphology and for the development of nail dystrophy. Sometimes it is difficult to distinguish it from onychomycosis<sup>(5)</sup>.

The fungal agents isolated from 31(51.7%) patients, the frequency of fungal nail infections in patient suffering from psoriasis with the presence of nail abnormalities were 21(35%) and its higher than psoriatic patients with clinically normal nails, which are 10(16.7%) because onychomycosis is uncommon in normal appearing nails according to Gupta et al.<sup>(12)</sup>. Other authors are of the opinion that the changed psoriatic nail plate is a good ground for the addition of fungal growth and demonstrate a higher incidence of

onychomycosis among patients with psoriasis. In addition to that the nails in psoriatic patients lose their natural preventing barrier and therefore are more susceptible to fungal infections<sup>(12, 16, 17, 18, 19, 20)</sup>.

Also it is mentioned that abnormal capillary units in nail psoriasis impairs the defence normally supplied by healthy hyponychium and weakens the defence system of the nail against invading microorganisms<sup>(21)</sup>. In additionally those psoriasis patients may use systemic and topical immune-suppressive drugs, which may facilitate the development of fungal infections of the nail, is rarely mentioned but certainly may be of importance<sup>(22)</sup>.

In contrast to many authors believe that the rapid growth of the nails is a cause

for the lack in the incidence of onychomycosis in patients with psoriasis<sup>(17, 18, 23, 24)</sup>.

The prevalence of onychomycosis in the general population appears to increase in direct relation to age. It is higher among elderly subjects<sup>(12, 25)</sup>. The present study of psoriatic patients found the younger ages mainly between 21-30 years(18%), until about 40 years of age more frequently affected by fungal agents, the mean age  $\pm$  SD of patients with positive mycology were (25.7 $\pm$ 14.53). This finding is probably biased by the fact that the recruitment was made among younger psoriatic patients seeking eagerly for treatment than the elderly patients<sup>(8)</sup>.

Regarding the duration of psoriasis, in-group of positive mycology the mean duration  $\pm$ SD= (10.94 $\pm$ 9.4), it is longer than that in-group of negative mycology; mean duration  $\pm$ SD= (8.02 $\pm$ 7.79). The present study showed no significant relation between duration of psoriasis and mycological results that is agreed with many studies<sup>(8, 12, 15)</sup>. Since the duration of psoriasis was self-reported by the patient, inaccuracy in their recall may obscure the true relationship between the duration of psoriasis and the onychomycosis<sup>(12)</sup>.

The most frequently isolated fungal agent were yeasts (*Candida* spp.); 19(31.7%) of 60 psoriatic patients in-group A (with nail changes) isolated from 12 patients (40%) while from group B (without nail changes) detected in 7 patients (23.3%). The second commonly isolated fungi were non-dermatophytic moulds (NDM), 12(20%) of 60 psoriatic patients; 9 from group A (30%) and 3 from group B (10%). *Aspergillus* spp. followed by *Penicillium* spp. was the most frequently isolated NDM. This result agree with

many studies mainly done in Iran, such data being found in their region, where this fungus was the most widespread of all non-dermatophytic fungi<sup>(4, 8, 17, 27)</sup>. Seven studies concluded that yeast and/or non-dermatophyte moulds were more frequently found in psoriatic nails compared to the pathogens found in nails of non-psoriatic patients<sup>(18, 22, 24, 28, 29, 30)</sup>.

Most authors impose the conclusion that yeast is more frequently isolated from nails damaged by psoriasis. This, most probably, is a secondary colonization of already pre-damaged nail plate<sup>(18, 29, 31)</sup> and the dystrophic nail may constitute a favorable milieu for yeast growth, such as in chronic paronychia or onycholysis<sup>(32)</sup>.

Some studies concluded that dermatophytes were most frequently found in psoriatic patients<sup>(19, 33)</sup>. This is disagree with the present results in which no any dermatophyte isolated, that may explained by the fast turnover and increase desquamation rate, and thereby decreasing the opportunity for dermatophyte to invade the nail keratin compared to healthy nails<sup>(18)</sup>. In addition, it was suggested that glycoprotein material, present in the nail, might be inhibitory to dermatophytes<sup>(34)</sup>. However, localization of onychomycosis must be taken into account as dermatophytes are the most common causative pathogens of onychomycosis in toenails, while yeasts are more frequently isolated from fingernails<sup>(35)</sup>. Many of the included studies took nail clippings from clinical affected nails of both finger-and toenails. Onychomycosis in healthy controls is most likely localized on toenails while psoriasis patients more frequently also have dystrophic fingernails<sup>(9)</sup>.

## **Conclusion:**

This comparative study showed that psoriatic patients with nail changes more liable to invasion with fungal agents than psoriatic patients without nail changes. The most common fungal agents were yeasts (*Candida* spp.), followed by non-dermatophytic filamentous fungi, they considered as secondary invaders to the damaged dystrophic psoriatic nails. Therefore, in reasonable cases the mycological examination is required, especially when the clinical picture of the nails suggests fungal infection, without these observations no need for antifungal treatment in psoriatic patients.

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