Prevalence, risk factors and etiologies of onychomycosis in patients with psoriasis

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ABSTRACT

Introduction: Psoriasis is a chronic immune mediated inflammatory disease often involving nails, presenting significant physical and psychological impacts. Onychomycosis, frequently coexists with psoriatic nail manifestations, complicating diagnosis and treatment. This study aims to evaluate the prevalence, etiology, and risk factors for onychomycosis among psoriasis patients in a tertiary public hospital in Malaysia.

Materials and Methods: A prospective cross-sectional study was conducted involving 191 psoriasis patients from October 2023 to August 2024. Nail involvement was assessed using the Nail Psoriasis Severity Index (NAPSI), and fungal diagnostics included potassium hydroxide microscopy, fungal cultures, and polymerase chain reaction. Associations between clinical variables and onychomycosis were analyzed.

Results: The prevalence of onychomycosis was 13.6%, with dermatophytes being the most common etiological agent (69%), followed by moulds (23%) and yeasts (8%). Higher NAPSI scores were significantly associated with increased odds of onychomycosis (Adj. OR: 1.02, p=0.001). Smoking also emerged as a potential risk factor (p=0.054). Other variables, including diabetes, treatment for psoriasis and BMI, were not significantly associated with onychomycosis in this study.

Conclusion: Onychomycosis is prevalent among psoriasis patients, particularly those with severe nail involvement. Dermatophytes remain the primary pathogens, although moulds account for a notable proportion in this tropical setting. These findings underscore the importance of incorporating fungal diagnostics in psoriasis management to optimize outcomes and break the cycle of worsening disease.

KEYWORDS:
Psoriasis, Onychomycosis, Nail Psoriasis, Dermatophyte, Mould, Yeast, Nail dystrophy

INTRODUCTION

Psoriasis (PsO) is a chronic immune mediated inflammatory disease characterized by aberrant immune activation and accelerated epidermal cell proliferation. It affects approximately 2% of the population. In Malaysia, the prevalence of PsO is estimated to be 0.3% with an incidence of 34.2/100,000 person-year.[1] This condition primarily affects the skin, although it can also involve the nails and joints. Nail involvement, known as psoriatic nail dystrophy, is a common manifestation of psoriasis, occurring in approximately 57% of patients.[2-3] This condition not only leads to physical discomfort and pain but also has a significant impact on the quality of life and psychological well-being of affected individuals.[3-4]

Onychomycosis, a fungal infection of the nail unit, is a prevalent nail disorder worldwide. There are higher prevalence rates among older individuals (aged above 60 years old), immunocompromised patients, immunosuppressed patients i.e, Patients with Human immunodeficiency Virus (HIV), kidney transplant and dialysis patients. Obese patients and smokers are also at increased risk of onychomycosis.[5-7] Psoriasis may also be a risk factor for onychomycosis, the affected nails are prone to develop fungal infection.[8-10]

The clinical presentations of onychomycosis include onycholysis, nail plate thickening, crumbling, ridging, onychocryptosis, and partial or complete nail loss. These symptoms can lead to physical pain, functional impairment, and cosmetic concerns. These features share many similarities with the clinical presentation of nail psoriasis, and there may be an overlap between onychomycosis and psoriatic nail changes.

This study aimed to investigate the prevalence and etiological distribution of onychomycosis in psoriasis patients in a tertiary public hospital in Malaysia. We also hope to find out the risk factors for onychomycosis among patients with psoriasis.

This study provides valuable insights into the burden of onychomycosis in this specific patient population and contribute to the existing knowledge on onychomycosis as a disease itself.

MATERIALS AND METHODS

A prospective cross sectional study was conducted on patients with psoriasis who visited the dermatology clinic in Hospital Pulau Pinang (which serves as the public tertiary referral

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hospital for northern Malaysia) from October 2023 to August 2024.

Approval from the Malaysian Research and Ethics Committee was obtained on 27 October 2023, before study commencement (MRR ID-23-02480-SGV). The study was conducted in accordance with the Declaration of Helsinki.

A voluntary recruitment process was used to recruit all adult patients (over the age of 18) who had psoriasis. Patients with uncertain diagnosis, have acquired HIV infections and active malignancy were excluded.

The diagnosis of psoriasis was made through clinical evaluation by a dermatologist based on history and clinical examination of chronic, recurrent, multiple well demarcated erythematous scaly plaques with silvery scales over extensor surfaces of the body lasting at least 6 months.

Subsequently, data was collected using direct interview via structured data collection forms and questionnaires on quality of life (Dermatology Life Quality Index [DLQI]). Nail psoriasis severity index (NAPSI) scoring was used to assess the severity of nail psoriasis. Psoriasis area and severity index (PASI) and body surface area (BSA) assessment were used to assess the severity of psoriasis.

Nails with abnormalities such as nail dystrophy, leukonychia, onycholysis, pachyonychia and subungual hyperkeratosis, were sent for fungal culture and sensitivity. A maximum of two nails with the above changes were chosen for clipping. Selected nails were clipped with a sterilized 13cm nail nipper (Tekno-Medical, Germany) after cleaning the nail with alcohol swab containing 70% isopropyl alcohol. A fragment of at least 5 mm transversely and 2mm longitudinally of the chosen nail were cut. After each patient use, all nail nippers were autoclaved to ensure sterility to minimize the risk of transmission of infections.

The harvested clippings were sent to the microbiology lab in hospital Pulau Pinang for Potassium hydroxide (KOH) examinations and fungal cultures by the resident microbiologists. All nail clippings sent were innoculated on Sebouraud dextrose agar (SDA), Mycosel agar (containing chloramphenicol and cyclohexine asantimicrobial) and SDA + chloramphenicol. These clippings will be innoculated on all 3 agars at 25 degrees celcius +/- 2 degrees celcius for 3 weeks. The samples were read for a minimum of once a week for any growth for a duration of 3 weeks. Fungal identification was based on macroscopy and microscopy. (after staining with lactophenol cotton blue stain), and were sent for identification using polymerase chain reaction in Institute of Medical Research Malaysia.

Diagnosis of onychomycosis were based on clinical features (discoloured, deformed, hypertrophic, or hyperkeratotic, or has subungual debris) with either a positive KOH examination and/or suggestive culture results.

In the event that the cultures were suggestive of mould, a repeated culture was obtained from the same nail and the diagnosis of non-dermatophyte mould (NDM) onychomycosis were based on fulfilling at least 3 of the following criteria: Positive direct microscopy; Absence of a dermatophyte in culture; growth of non-dermatophyte mould in culture; similar growth of the causative agent in repeat culture.

All statistical analyses were performed using the Statistical Package for Social Sciences for Windows, SPSS 22.0 (SPSS Inc, Chicago, Illinois). Continuous variables are presented as means and standard deviations if they were normally distributed or median and interquartile range if not. Categorical variables are reported as proportions and percentages. Comparisons were made between those with and with- out nail psoriasis. Categorical data were analyzed using χ^2 or Fisher's exact test. Analysis of continuous data was performed using the independent t test. A multiple logistic regression model was applied with adjustment for confounders to determine the risk factors for nail onychomycosis. A p-value of < 0.05 was considered statistically significant.

RESULTS

A total of 191 patients were recruited. The mean age of psoriasis onset was 35.2 years (±16.0). The mean onset of psoriatic nail changes were 40.2 years (±15.3). The demographics and clinical characteristics of the patients are shown in Table I.

A total of 131 (68.6%) patients were found to have nail involvement. The mean age of patients who develop psoriatic nail changes was 51.5 years (SD 16.3). The majority of patients were male (81; 61.8%), and the predominant ethnic group was Chinese (63; 48.1%), followed by Malay (54; 41.2%) and Indian (14; 10.7%). A family history of psoriasis was present in 34 patients (26.0%). Smokers made up 21 patients (15.3%). The mean body mass index (BMI) was 27.3 kg/m² (SD 6.6). Common comorbidities included dyslipidemia (58; 44.3%), hypertension (46; 35.1%), and diabetes mellitus (37; 28.2%). Psoriatic arthropathy was observed in 35 patients (26.7%), while scalp involvement affected 119 patients (90.8%). The mean body surface area (BSA) affected was 5.9% (SD 10.2), with a mean Dermatology Life Quality Index (DLQI) score of 4.3 (SD 5.3). The mean Nail Psoriasis Severity Index (NAPSI) was 29.9 (SD 32.2), and the mean Psoriasis Area and Severity Index (PASI) was 3.8 (SD 6.1) in patients with psoriatic nail involvement. In this group of patients, all were on topical therapy (131; 100%), while one patient (0.8%) underwent phototherapy. Systemic therapy was administered to 62 patients (47.3%), with methotrexate (35; 26.7%) and acitretin (14; 10.7%) being the commonest treatments. The clinical characteristics of patients with nail involvement in psoriasis is detailed in Table II.

The prevalence of onychomycosis in our study population was 13.6%. Out of that figure, dermatophyte onychomycosis had a prevalence of 9.4%, mould onychomycosis stood at 3.1%, and yeast onychomycosis showed a prevalence of 1.1%. Within the dermatophyte category, we detected 18 cases, with *Trichophyton spp.* being the most prevalent species of dermatophyte affecting patients with psoriasis. In

Table I: Clinical characteristics of subjects

Variables	Mean±SD
Age of disease onset with nail involvement	40.22±15.26
Age of disease onset without nail involvement	48.53±17.39
PASI score	
With onychomycosis	5.7±6.76
Without onychomycosis	2.92±4.81
NAPSI	
With onychomycosis	45.23±37.35
Without onychomycosis	16.58±26.84
BSA	
With onychomycosis	8.88±10.85
Without onychomycosis	4.33±8.80
DLQI	3.97±4.88
BMI	27.08±6.27

Table II: Clinical characteristics of patients with nail involvement in psoriasis

Variables	Mean (SD)
Mean age, years (SD)	51.5 (16.3)
Mean age of psoriasis onset, years (SD)	35.7 (16.0)
Gender	
Male, n (%)	81 (61.8)
Female, n (%)	50 (38.2)
Ethnicity	
Malay, n (%)	54 (41.2)
Chinese, n (%)	63 (48.1)
Indian, n (%)	14 (10.7)
Family history of psoriasis	
Yes, n (%)	34 (26.0)
No, n (%)	97 (74.0)
Smoker	21 (15.3)
No, n (%)	111 (84.7)
BMI, kg/m2 (SD)	27.3 (6.6)
Comorbidities	
Diabetes Mellitus	
Yes, n (%)	37 (28.2)
No, n (%)	94 (71.8)
Hypertension	
Yes, n (%)	46 (35.1)
No, n (%)	85 (64.9)
Dyslipidaemia	
Yes, n (%)	58 (44.3)
No, n (%)	73 (55.7)
Arthropathy	
Yes, n (%)	35 (26.7)
No, n (%)	96 (73.3)
Scalp involvement	
Yes, n (%)	119 (90.8)
No, n (%)	12 (9.2)
BSA	5.9 (10.2)
DLQI	4.3 (5.3)
NAPSI	29.9(32.2)
PASI	3.8 (6.1)
Treatment	
Topical	
Yes, n (%)	131 (100)
No, n (%)	0 (0)
Phototherapy	
Yes, n (%)	1 (0.8)
No, n (%)	130 (99.2)
Systemic	
Yes, n (%)	62 (47.3)
No, n (%)	69 (52.7)
Methotrexate, n (%)	35 (26.7)
Acitretin, n (%)	14 (10.7)

Table III: Culture results

	N=26
Dermatophyte	18
Non dermatophyte	
Yeast	2
Mould	6
Etiology	N=26
Dermatophyte	
Trichophyton spp.	11
Trichophyton interdigitale	1
Microsporum spp.	3
Microsporum canis	1
Epidermophyton spp.	2
Non dermatophyte	
Yeast	
Trichosporon asahii	1
Candida albicans	1
Mould	
Fusarium incarnatum	1
Aspergillus niger	4
Penicillum spp.	1

Table IV: Factors associated with onychomycosis (simple logistic regression)

Variable		Crude OR	(95% CI OR)	X^2 stat. (df)[a]	p-value[a]
Age(years)		1.01	(0.98;1.0)	0.34(1)	0.558
Gender	Male	2.21	(0.88;5.5)	3.09(1)	0.091
	Female	1.00			
DM	Yes	1.15	(0.45;2.9)	0.09(1)	0.768
	No	1.00			
NAPSI		1.02	(1.01;1.0)	15.78(1)	<0.001
BMI		1.02	(0.96;1.0)	0.41(1)	0.519
BSA		1.04	(1.00;1.0)	4.36(1)	0.053
Treatment				0.73(2)	0.693
	Biologics	1.18	(0.30;4.6)	0.06(1)[b]	0.807[b]
	Non biologics	1.47	(0.61;3.5)	0.74(1)[b]	0.390[b]
	No systemic treatement	1.00			
Smoking	Yes	3.21	(1.18;8.7)	4.66(1)	0.023
	No	1.00			

[a]Likelihood Ratio(LR) test
[b]Wald test

Table V: Factors associated with onychomycosis (multiple logistic regression)

Variable		Adj. OR	(95% CI OR)	X^2 stat. (df)	p-value
Age (years)		1.01	(0.97;1.04)	0.11(1)	0.737
Gender		1.32	(0.46;3.78)	0.28(1)	0.600
DM		0.76	(0.25;2.28)	0.24(1)	0.625
NAPSI		1.02	(1.01;1.04)	10.73(1)	0.001
BMI		1.05	(0.98;1.13)	1.76(1)	0.184
BSA		1.02	(0.98;1.07)	0.75(1)	0.387
Treatment				0.52(2)	0.771
	Biologics	0.81	(0.15;4.50)	0.06(1)b	0.809b
	Non biologics	1.33	(0.51;3.53)	0.34(1)b	0.561b
Smoking		3.06	(0.98;9.53)	3.72(1)	0.054

*Adj. OR=Adjusted odds ratio
[a]Likelihood Ratio(LR) test
[b]Wald test

addition, we identified *Trichophyton interdigitale,* and *Microsporum spp.* among the dermatophytes. Among the mould infections, Aspergillus niger was the predominant species, observed in 4 patients. Only two patients had yeast onychomycosis caused by Candida albicans and *Tonsurans asahii.* The nail fungal culture results are summarized in Table III.

Among patients with dermatophyte onychomycosis, 12 had positive cultures for *Trichophyton spp.* and in this group, six patients were on systemic treatments : four were on methotrexate, one on Guselkumab, and one on sulphasalazine. The other six patients positive for *Trichophyton spp.* were on topical treatment only. Among the two patients who grew *Epidermophyton spp.*, one was on methotrexate while the other received only topical medications. Of the four patients who had onychomycosis due to *microsporum spp.*, two were on methotrexate, one was on acitretin and another on topical treatment only. Among the six positive cultures for mould, the patient positive for *Fusarium incarnatum* was treated with methotrexate for his psoriasis, while in the *Aspergillus spp.* patients, two were on methotrexate and the other two were on topical therapy. The patient who grew *penicillum spp.* was on topical treatment. In our patients who had yeast onychomycosis, the patient with *Trichosporon asahii* was taking methotrexate, while the patient with candida albicans was on topical medications.

We performed a simple logistic regression analysis to investigate the association between onychomycosis and various independent variables, including age, gender, diabetes mellitus (DM), NAPSI, smoking, BMI, body surface area (BSA) as a severity marker in psoriasis patients, and treatments. The results of this analysis are presented in Table V. The analysis indicated that NAPSI was a significant predictor of onychomycosis, with higher NAPSI scores correlating with increased odds of the condition. Additionally, smoking emerged as a significant factor, with smokers having over three times the odds of developing onychomycosis compared to non-smokers.

In this multiple logistic regression analysis, NAPSI score was a significant predictor of onychomycosis, with an Adj. OR of 1.02 (95% CI: 1.01–1.04; p=0.001). Smoking was associated with increased odds of onychomycosis with a borderline significance (p=0.054). Other factors, including age, gender, diabetes mellitus, BMI, BSA, and treatment type, did not show statistically significant associations with onychomycosis in this analysis and is summarized in Table V.

DISCUSSION

Nail involvement is a common finding in psoriasis that occurs in up to 60% of patients with psoriasis.1 The lifetime incidence of nail psoriasis has been reported to be 80% to 90%. Approximately 5% to 10% of patients may have exclusive nail psoriasis.[11-12] The nail changes in psoriasis include pitting, leukonychia, red lunula and nail dystrophy which are nail matrix abnormalities, while nail bed involvement causes splinter hemorrhages, onycholysis, oil spots (salmon patches), and subungual hyperkeratosis. These clinical manifestations associated with nail psoriasis may morphologically resemble onychomycosis.

In 2012, B. Sigurgeirsson et al. (13) conducted a population based study where a systematic review was done on 21 studies investigating the prevalence of onychomycosis in the general population and found that the prevalence of onychomycosis was 11.4%.[13]

Onychomycosis is encountered in psoriatic patients with an incidence that is reported to range from 13% up to 47%.[14] This tallied with our study prevalence of 13.6%. While this figure sits at the lower end of the range among psoriasis patients, it still shows that there is a higher prevalence of onychomycosis among patients with psoriasis compared to the general population. Klaassen et al. (15) reviewed all the available literature concerning the prevalence of onychomycosis in patients with and without nail psoriasis from January 1980 to April 2012 and found the prevalence of onychomycosis in psoriatic patients was 18%, while in the normal population, it was 9.1%.[15] The wide range in prevalence of onychomycosis among patients with psoriasis found in various studies could be attributed to factors such as variations in study design, population demographics, diagnostic methods, and geographical location.

In 2021, a study from thailand by Chularojanamontri L et al (16) found that treatment with methotrexate was a statistically significant risk factor for onychomycosis in psoriasis patients.[16] However, there was no increase risk of onychomycosis found among our studied population. This could be due to a difference in demographics as well as fungal distribution in the country as in that study, candida infection was found to be the commonest pathogen causing onychomycosis, which differed from our most prevalent causative organisms, which were dermatophytes.[16]

Nail involvement is strongly associated with the presence of onychomycosis, indicating that individuals with nail involvement are more likely to have onychomycosis than those without.

Among those with psoriatic nail changes, we found a positive correlation between more severe nail psoriasis, quantified using NAPSI score, and a risk of onychomycosis. NAPSI is a significant predictor of onychomycosis after adjusting for other variables with each unit increase in NAPSI associated with a 2% increase in the odds of developing onychomycosis. This highly significant p-value suggests that nail involvement is strongly associated with the presence of onychomycosis, underscoring the importance of NAPSI as a clinical indicator. A study by Rizzo at al. (17) also found worse NAPSI scores among psoriasis patients with onychomycosis than those without, however it was not statistically significant.[17]

We also noted that higher body surface areas of psoriasis skin involvement also increased the risk of onychomycosis. These factors show that, at least in the confines of our study population, an increased risk of onychomycosis is seen with increased severity of both skin disease and nail changes in psoriasis.

However, it is known that psoriatic nail changes themselves may not necessarily predispose to higher risks of onychomycosis. One of the functions of the nail plate is to provide protection against invading organisms.[18] This protection may be compromised in patients with psoriatic nail changes. Also onycholysis provides a moist subungual space that can be easily colonised by pathogens.[19] Therefore, nail psoriasis could contribute to the development of fungal infection of the nail. On the other hand, the rapid growth of the affected nails in psoriasis may inhibit the development of onychomycosis, due to the fast turnover and elimination of the distal nail plate, may reduce the opportunity for fungi to invade the nail keratin.[20] Serum- like glucoprotein material that was found in psoriatic oil drop spots may also have an inhibitory effect against dermatophytes.[21] It is known that peptides like psoriasins are being up-regulated in psoriasis and are antimicrobial in nature.[22] Dermatophytes do also seem to grow slower on the keratin of psoriatic nails compared to the growth on healthy nails.[23] The duality between the aggravating factors and the protective factors for and against microorganism invasion may explain the prevalence of onychomycosis among our study population.

It is interesting to note that in our study, smoking is found to be a significant risk factor for onychomycosis in psoriasis patients. A study in Turkey found that cigarette smoking is significantly associated with nail changes in psoriasis.[24] As we gathered in this present study, a worse NAPSI score indicating more severe nail involvement in psoriasis correlates with an increased risk of psoriasis. It is therefore important to address this risk factor among patients with psoriasis and nail involvement in clinical practice.

This study did not find a significant difference in risk factor among our patients across gender, diabetic status and body mass index (BMI). In the general population, onychomycosis seems to be more prevalent among male patients.[13] However, it seems that gender difference did not affect the risk of onychomycosis in psoriasis patients in our study. BMI, while a risk factor for having more severe psoriasis, did not affect the predilection for developing onychomycosis in this study. Diabetes, a known risk factor of reduced immunity to infections in general, does not seem to be a factor for developing onychomycosis in patients with psoriasis in this study.

Our study found dermatophytes to be the most common fungal agent which accounts for 69% of onychomycosis in this study, followed by mould which accounts for 23% and yeasts at 8% of the total etiological agents. This aligns with the findings of some studies, such as Gupta et al., 2024 (25) who reported dermatophytes as the predominant cause in psoriatic onychomycosis.[25] However, the significant proportion of mould infections in our study is noteworthy and differs from some previous reports where yeasts were found to be more prevalent.9 This discrepancy could be attributed to several factors, including variations in diagnostic methods, geographical differences in fungal flora, or underlying patient characteristics.

It is noted that some local studies in Malaysia that found mould to be the dominant aetiological agent in onychomycosis were done with single culture positive results on pre collected nail specimens.[26] These may represent environmental contamination or commensals rather than actual pathogenic mould or yeast onychomycosis. This may give a false perception of mould being a more common aetiological agent for onychomycosis in tropical countries. Further studies with a more controlled methodology in the local context will help shed more light on the fungal flora distribution in this region. Repeated isolation of the same mould is crucial from at least two different time points/patient visits in the absence of a dermatophyte growth in culture prior to confirming a diagnosis of NDM onychomycosis. Repeated cultures of the same NDM minimizes the possibility of it being a contaminant according to Koch's first postulate of pathogenicity, which states it is highly unlikely to isolate a contaminant consistently.[27-28] However, it should also be noted that the lower prevalence of NDM onychomycosis in our study could not be extrapolated to the general population as this could potentially be due to other patient and environmental factors, such as patient demographics, underlying psoriasis and treatment with systemic therapy. It is also limited by our relatively small sample size and study population of patients with underlying psoriasis as opposed to the general population.

This study also found some interesting fungal organisms that were cultured from the nails of 2 patients ie. *trichosporon asahii*, and *microsporom canis* which were organisms rarely attributed to onychomycosis.

T. asahii is a yeast that is more commonly found in immunodeficient and immunocompromised patients, and individuals with hematological malignancies29-30 An epidemiological study of *T. asahii* conducted in China, published in 2020 found that antifungal effect of triazoles, such as voriconazole, fluconazole and itraconazole was the most effective in the treatment of *T. asahii* infection.[31]

Microsporum canis is a zoophilic fungus and it is widely isolated from the hair coat of cats with dermatophytosis. It more frequently cause tinea capitis and tinea corporis in humans, although there have been case reports of onychomycosis caused by *microsporum canis* which were succesfully treated with oral terbinafine.[32-33]

The potential relationship between psoriasis and onychomycosis is very important as it influences patient management. The presence of undetected and untreated fungi in the nail plate may increase the severity of nail psoriasis through Koebner phenomenon and be the cause of the treatment failure.[15] While uncontrolled psoriasis could also manifest as uncontrolled nail psoriasis and larger BSA therefore giving a more severe NAPSI score. This severity in NAPSI score is correlated with increased risk of onychomycosis, and so does an increased BSA, as seen in our study. This may create a vicious cycle where onychomycosis increases severity of psoriasis and uncontrolled psoriasis predisposes to onychomycosis.

While treatment of psoriasis is thought to potentially alter the susceptibility of onychomycosis among patients with psoriasis, literature on the role of immunosuppressive medications on risk of acquiring onychomycosis is sparse. [34] Treatment of psoriasis includes topical therapy with corticosteroids, immunosuppresants like methotrexate and cyclosporin as well as biological agents including tumour necrosis factor (TNF) alpha inhibihors and interleukins 17 and 23 inhibitors. In 2022, Alves et al. (35) found that patients who received systemic treatment with methotrexate for their psoriasis had a 92.8% positivity rate for onychomycosis ($p < 0.05$). Increased rates of onychomycosis were also reported in patients treated with the TNF alpha inhibitors adalimumab and infliximab. The study provided some evidence that certain systemic treatments in psoriasis may predispose to onychomycosis.[35] Another study by Al Mutaifi (37) also found an increased risk of onychomycosis among patients who are on TNF alpha inhibitors with the highest preponderance among patients on infliximab.36 Methotrexate could also cause slowing of nail growth, which could predispose to fungal infection.[37] However, our study failed to find correlations between psoriasis treatment types including conventional systemic treatments as well as biological agents, and onychomycosis.

Onychomycosis in psoriasis patients with nail involvement also presented unique clinical considerations. The presence of pre-existing nail dystrophy and structural changes associated with psoriasis, such as nail pitting, subungual hyperkeratosis, and onycholysis, may influence the clinical presentation, severity, and treatment response of onychomycosis. These interactions between onychomycosis and psoriasis contribute to the complexity of managing both conditions simultaneously.

A diagnosis of onychomycosis may be missed due to the similarities in clinical features. Also, patients who present with nail changes associated with psoriasis may be mistakenly treated for onychomycosis thereby delaying a diagnosis of psoriasis, especially if their diseases manifest with predominantly nail presentations. The presence of both conditions can mask the true extent of either disease, making it difficult to accurately assess the severity and appropriate management strategies.

Differentiating onychomycosis from psoriatic nail dystrophy can be challenging due to overlapping clinical manifestations. Psoriatic nails often exhibit onycholysis, thickening, and discolouration, which can mimic the appearance of onychomycosis. This diagnostic dilemma can lead to delays in appropriate treatment, exacerbating the condition and impacting the patient's quality of life. The coexistence of psoriasis and onychomycosis can further complicate the diagnostic process.

The findings from this study underscore the importance of incorporating fungal screening in psoriasis patients, especially those exhibiting significant nail involvement as indicated by high NAPSI scores. Early identification of onychomycosis is crucial, as it can exacerbate psoriatic nail disease and complicate treatment regimens. Clinicians should consider a multidisciplinary approach, integrating dermatology and mycology expertise, to ensure accurate diagnosis and management.

For patients diagnosed with onychomycosis, tailored antifungal therapy should be initiated promptly. Systemic antifungal agents, such as terbinafine or itraconazole, may be indicated, particularly for dermatophyte infections, while localized treatment may be sufficient for mild cases. Moreover, treatment plans should address the underlying psoriatic condition, as effective control of psoriasis could potentially improve nail health and reduce the incidence of fungal infections.

Furthermore, education on nail care and hygiene practices can empower patients to manage their conditions better and minimize the risk of fungal infections. Clinicians should also remain vigilant for any recurrence of onychomycosis, considering it as part of a comprehensive management strategy for psoriasis patients.

CONCLUSION

This study highlights the significant prevalence of onychomycosis among psoriasis patients, particularly in those with severe nail involvement. A higher NAPSI score was a significant predictor of onychomycosis, emphasizing the relationship between the severity of nail psoriasis and fungal infection risk. While dermatophytes remained the predominant cause, the presence of non-dermatophyte mould in a notable proportion of cases underlines the need for thorough diagnostic approaches, particularly in regions with tropical climates where mould are more prevalent.

Given the diagnostic challenges in differentiating onychomycosis from psoriatic nail dystrophy, clinicians should maintain a high index of suspicion and pursue appropriate fungal investigations. Early detection and management of onychomycosis in psoriasis patients may prevent treatment failures and improve both nail and skin outcomes, contributing to better overall disease control and patient quality of life.

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