

# Prevalence of Onychomycosis in Patients with Autoimmune Diseases

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**Background:** Onychomycosis is the most common nail disorder in adults. Many studies reported a higher prevalence of onychomycosis among particular patients, such as those with diabetes, poor peripheral circulation or immunosuppression. However, studies of the prevalence of onychomycosis in autoimmune patients who carry many of these predisposing factors have been limited.

**Objective:** Study the prevalence of onychomycosis in autoimmune compared to non-autoimmune female patients

**Material and Method:** A cross-sectional study of the prevalence of onychomycosis in autoimmune patients and non-autoimmune female patients visiting a dermatology clinic over a period of 18 months. One hundred and sixty-five female autoimmune patients were enrolled.

**Results:** The prevalence of onychomycosis in autoimmune patients was 10.2% (95%CI 6.5%, 15.9%) compared to 6.7% (95%CI 3.8%, 11.6%), in non-autoimmune patients ( $p > 0.05$ , 2-sided). Of vesiculobullous patients, mainly presenting with pemphigus and who were mostly on immunosuppressive medication, 24% had onychomycosis [ $p = 0.013$ ; OR 4.39 (95%CI 1.27, 14.89)].

**Conclusion:** Exposure to humid microenvironments was an important factor in the occurrence of onychomycosis ( $p < 0.05$ , 2-sided). However, the number of patients with each individual disease was too small to conclude a prevalence of onychomycosis in conjunction with these individual cutaneous autoimmune diseases.

**Keywords:** Onychomycosis, Tinea unguium, Autoimmune diseases

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Onychomycosis is the most common nail disorder in adults<sup>(1)</sup>. Predisposing factors are immunosuppression, poor peripheral circulation, diabetes, increasing age, trauma, and tinea pedis<sup>(2-5)</sup>. Overall, the prevalence of onychomycosis is approximately 3-8%<sup>(3,6,7)</sup>, but it is somewhat higher in certain groups of patients. The prevalence of onychomycosis is 26% in diabetes mellitus patients<sup>(2)</sup>, 23.2% in HIV-positive individuals<sup>(4)</sup>, 36.1% in chronic venous insufficiency patients<sup>(5)</sup>, and 24% in systemic lupus erythematosus patients<sup>(8)</sup>.

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Autoimmune patients seem to have many of the predisposing factors, such as immunosuppression and poor peripheral circulation, but somehow studies of the prevalence in this group of patients have been limited. The authors, therefore, determined the prevalence of onychomycosis in a group of autoimmune patients compared to non-autoimmune patients visiting the dermatology clinic at Siriraj Hospital, Bangkok.

## Material and Method

A cross-sectional study was performed. The authors recruited only female patients into the study to avoid sexual bias because the dominant sex that exhibits autoimmune diseases is female. Over a period of 18 months, 165 female autoimmune patients were

enrolled and 164 age-matched female subjects without autoimmune disease were recruited as a control group. Ailments included systemic lupus erythematosus, progressive systemic scleroderma, mixed connective tissue disease, dermatomyositis, systemic vasculitis, and autoimmune vesiculobullous diseases. All patients were informed, consented, and the protocol was approved by the Ethics Committee of Siriraj Hospital, Mahidol University, Bangkok.

The demographic data and following clinical information were obtained: age, underlying autoimmune skin disease, immunosuppressive medication being taken and the duration of the present clinically abnormal nails. The authors studied the humidity factor by analyzing the occupational environment of the patients and classified them as either “wet” or “dry exposure”. ‘Wet hand or foot’ exposure refers to patients having exposure to humid microenvironments or wearing occlusive footwear/gloves and ‘dry exposure’ refers to patients having less exposure, that is, only in their routine daily lives.

An evaluation of nails was performed. The authors examined the findings concerning Raynaud’s phenomenon, digital pitted scars, digital ulcers, tapering digits, acral leukocytoclastic vasculitis and periungual infarction. The abnormal nails were obtained for mycological examination and cultured by standard methods<sup>(3)</sup>.

#### Statistical analysis

Results were evaluated by descriptive statistics. Differences were considered significant at  $p < 0.05$ ,

two-sided. Onychomycosis prevalence was tested using chi-squared testing. For multiple comparisons, the Bonferroni correction was performed. Odds Ratios (OR) and 95% Confidence Intervals (CI) were determined.

#### Result

In the present series, 165 autoimmune female patients, aged  $36.67 \pm 12.2$  years, and 164 non-autoimmune female patients, aged  $35.3 \pm 13.7$  years (mean  $\pm$  SD), were evaluated. The prevalence of onychomycosis was 10.2% in the autoimmune group while it was 6.7% in the non-autoimmune group. The difference was not statistically significant. The frequency of onychomycosis in conjunction with each disease is shown in the Table 1. The presence of onychomycosis was associated significantly with increasing age and exposure to humid microenvironments, without any difference between the groups.

In contrast, the presence of Raynaud’s phenomenon, digital pitted scars or ulcers, tapering digits, acral vasculitis and periungual infarction, which represented compromised microcirculation in the areas, was not found to be significantly associated with the presence of onychomycosis. There was no difference between the two groups in the clinical appearance of nails, affected location, number of affected nails or the causal fungi.

#### Discussion

The prevalence of onychomycosis varied according to geographical areas, ranging from 8 to

**Table 1.** The prevalence of onychomycosis by each autoimmune disease (n = 165)

N	Clinical OM (%)	Mycological-proven OM (%)
Non-autoimmune diseases	164	36 (21.9)
Autoimmune diseases	165	44 (26.6)
Connective tissue diseases	140	30 (21.4)
• - SLE	96	20 (20.8)
• - Scleroderma	23	7 (30.4)
• - MCTD	7	1 (14.3)
• - Cutaneous vasculitis	11	2 (18.2)
• - Dermatomyositis	3	0
Vesiculobullous diseases	25	14 (56)*
• - Bullous Pemphigoid	2	1 (50)
• - Pemphigus	21	12 (57.1)
• - Others	2	1 (50)

\* compared to non-autoimmune group,  $p = 0.0008$ ; OR 4.53 (95%CI 1.75-11.83)

# compared to non-autoimmune group,  $p = 0.013$ ; OR 4.39 (95%CI 1.27-14.89)

Bonferroni correction was done in sub-group analyses.  $p^* < 0.0167$  ( $\alpha$  0.05/3)

10%<sup>(1,6,7)</sup>. The prevalence observed in the present study was 6.7%. In the present study, the prevalence of onychomycosis increased by age in both groups. This is possibly because of a slower rate of nail growth and poor immunological status. Humidity could weaken cuticles and cause maceration of the skin, and soften nail keratin, therefore organisms have a higher chance of penetrating nails. Furthermore, damp areas are suitable for fungal growth. Thus, patients who have a higher chance of having wet hands or feet should have a higher chance of having onychomycosis. In the present study, autoimmune patients who had many predisposing factors, including immunosuppressive therapy and poor peripheral circulation, showed a prevalence of onychomycosis of 10.2%, higher than in non-autoimmune patients, but without statistical significance. This is not as high as in previous reports of diabetic<sup>(2)</sup>, HIV<sup>(4)</sup>, chronic venous insufficiency<sup>(5)</sup>, and SLE patients<sup>(8)</sup>. The autoimmune patients in the dermatology clinic usually have mild disease activity; therefore, the prevalence may have been higher if the authors had studied autoimmune patients in the Department of Internal Medicine.

The highest occurrence of onychomycosis in pemphigus patients could be explained by the fact that all of the pemphigus patients in the present study were undergoing immunosuppressive treatments, either prednisolone, with an average dose of 45 mg/day, or cyclophosphamide, with an average dose of 70 mg/day. However, the number of patients with each individual disease was too small to conclude a prevalence of onychomycosis in conjunction with these individual cutaneous autoimmune diseases. Future studies regarding the prevalence of onychomycosis in vesiculobullous patients could clarify this question.

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## การศึกษาความชุกของโรคติดเชื้อราที่เล็บในผู้ป่วยออโตอิมมูน

ปภาพิต ตูจันดา, วรรณญา บุญชัย, พวงเพ็ชร พฤกษ์ไพศาล, ไฉน เหมือนประสาธ, ป่วน สุทธิพิณิจธรรม

โรคเชื้อราที่เล็บเป็นความผิดปกติของเล็บที่พบบ่อยที่สุดในคลินิกผิวหนังทั่วไป มีการศึกษาอุบัติการณ์โรคเชื้อราที่เล็บในผู้ป่วยบางประเภทพบว่าผู้ป่วยเบาหวาน ผู้ป่วยที่มีการไหลเวียนโลหิตส่วนปลายไม่ปกติ และผู้ป่วยภูมิคุ้มกันบกพร่อง มีอุบัติการณ์สูงกว่าในคนทั่วไป การศึกษาในครั้งนี้เป็นการศึกษาอุบัติการณ์โรคเชื้อราที่เล็บในกลุ่มผู้ป่วยออโตอิมมูนที่มีปัจจัยเสี่ยงต่อการเกิดโรคเชื้อราที่เล็บหลายประการเช่น มีความผิดปกติของระบบภูมิคุ้มกัน มีการไหลเวียนโลหิตส่วนปลายไม่ปกติและมักจะได้รับยากดระบบภูมิคุ้มกัน เปรียบเทียบกับผู้ป่วยที่ไม่ได้เป็นโรคออโตอิมมูน และมารับการรักษาในคลินิกผิวหนัง โรงพยาบาลศิริราช พบอุบัติการณ์โรคเชื้อราที่เล็บเป็น 10.2% (95%CI 6.5%, 15.9%) และ 6.7% (95%CI 3.8%, 11.6%), ( $p > 0.05$ , 2-sided)ตามลำดับซึ่งไม่พบว่ามีอุบัติการณ์แตกต่างกันอย่างมีนัยสำคัญทางสถิติ อย่างไรก็ตามพบอุบัติการณ์สูงสุดในผู้ป่วยกลุ่ม Pemphigus คือ 24% [ $p = 0.013$ ; OR 4.39 (95%CI 1.27, 14.89)]

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