

## Superficial Mycoses in Menopausal Age Women: 21 years' Experience

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### Abstract

**Background:** Menopause is the permanent and irreversible absence of menstruation for at least a year. Usually, it is accompanied by typical physical and mental symptoms. Although, infections during menopause have been extensively documented, there is a lack of information regarding superficial mycoses.

**Objective:** Our objective was to determine the frequency of superficial mycoses in menopausal age women.

**Methods:** This is a retrospective chart review of menopausal age patients seen at the Mycology section in a single medical institution in Mexico City from 1994 to 2014. Clinical, epidemiological, and mycological data were reviewed.

**Results:** There were 881 patients studied and 811 cases were confirmed by a mycological test. Diagnoses in menopausal age women included onychomycosis (84.5%), tinea pedis (25.6%), candidiasis (7.8%), and tinea corporis (4.3%). The most common presentations of onychomycosis were distal and lateral subungueal (29.7%) and total dystrophic (32.2%). In 36.7% the diagnosis was simply "onychomycosis". The most common etiologic agents in onychomycosis were *Trichophyton rubrum* (39.8%) and *Candida* spp. (45.3%). The most common etiologic agent in tinea corporis and pedis was *T. rubrum*. The types of candidiasis were interdigital (29.6%), oral (45.3%), and intertrigo (17.1%). The most common isolates were *Candida* spp. (55.5%) and *C. albicans* (29.6%).

**Conclusions:** The most common superficial mycoses in menopausal age are onychomycosis and tinea pedis, followed by tinea corporis and candidiasis. Their frequency is similar to that seen in geriatric patients and comorbidities as diabetes and hypertension.

### Introduction

Menopause is the permanent cessation of menstruation for at least 1 year. It is due to declining ovarian function and estrogen deficiency [1]. In most women, menopause occurs at 50-55 years of age, although this is extremely variable. Premature (4th decade of life) and late (7th decade) onsets are not rare [2]. It is of interest that very little is known about cutaneous infections by dermatophytes and *Candida* spp during menopause. Herein, we will describe the frequency during a 21-year- period at a single teaching institution.

### Materials and Methods

Retrospective chart review of menopausal age patients documenting frequency of types and agents of superficial mycosis (SM) in women at the Mycology Section at "Dr. Manuel Gea Gonzalez, General Hospital" in Mexico City, from 1994 to 2014.

Menopause was defined as the absence of menstruation for at least 1 year and diagnosis of SM was established by a positive KOH/Chlorazol Black E® (Delasco, Council Bluffs, LA). Clinical and epidemiological data were gathered in all cases including age, occupation, date of service, co-morbidities and their treatment, clinical presentation, and mycological study. The latter included KOH/ Chlorazol Black tests and culture was done on Sabouraud and/or Sabouraud agar with chloramphenicol-actidione (Mycocel®, Difco, Ann Arbor, MI, USA). For all positive cultures, we performed macro-and microscopic identification of colonies and classification of etiologic agents. When an opportunistic fungus was identified, it was isolated at least 3 times. If a yeast was isolated a commercially chromogenic *Candida* speciation media was used (CHROMagar®, Becton Dickinson co, Heidelberg, Germany), incubated at 37°C for 48 hours and following manufacturer's instructions for identification (*C. glabrata*, *C. kruzei*, *C. albicans* and *C. tropicalis*).

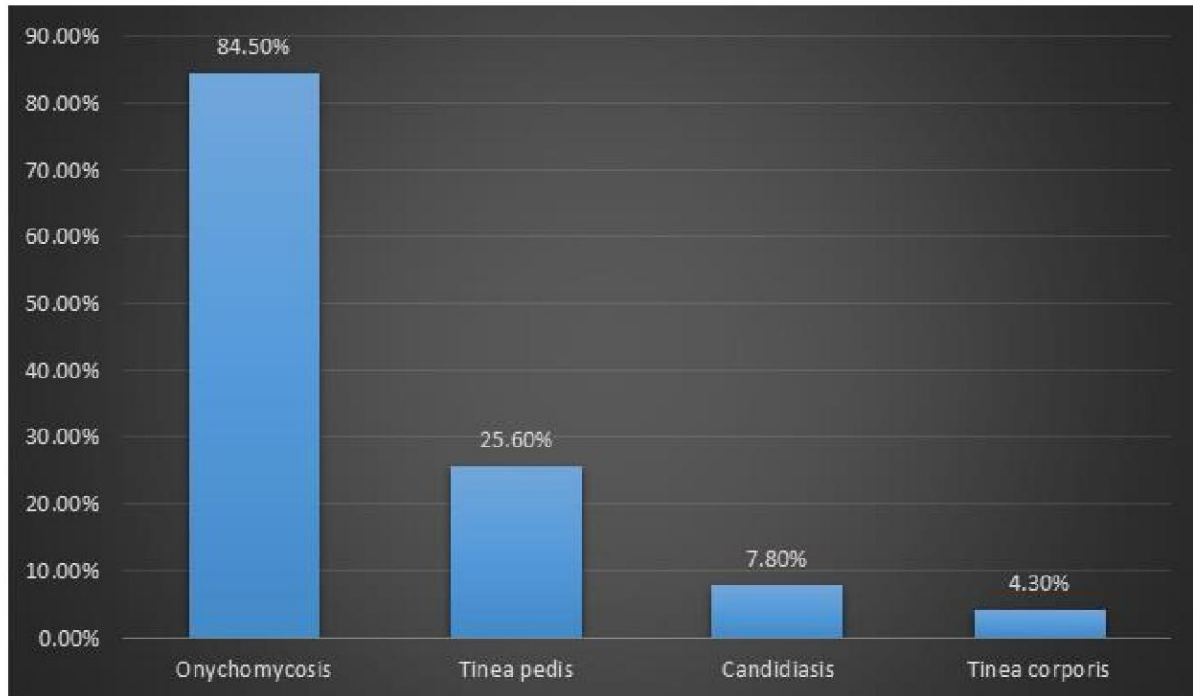
### Results

In our Institution at the Mycology Section 881 patients were studied and there were 811 menopausal age women with

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confirmed SM. 182 patients (22.44%) of these confirmed cases had more than one SM. All of them were between 50-55 years of age. The most common diagnoses were: onychomycosis in

686 cases (84.5%), tinea pedis in 208 (25.6%), candidiasis in 64 (7.8%), and tinea corporis in 35 (4.3%) (Figure 1).



**Figure 1:** Superficial mycoses in menopausal age women from 1994 to 2014.

**We documented the next occupations:** Housewives (72.1%), merchants (9.8%), employees (8.8%), graduates (8.3%), and others (0.7%). The most common co-morbidities were high blood pressure in 142 patients (17.5%) and diabetes in 141 (17.3%).

### Onychomycosis

There were 686 cases. The clinical presentation was not documented in 252 cases (36.7%). These cases were labeled “onychomycosis” only. There were 204 cases of distal lateral subungual onychomycosis (29.7%), 221 cases of total dystrophic onychomycosis (32.2%), 5 of white superficial

onychomycosis (0.7%), 2 of proximal white subungual onychomycosis (0.2%), and 2 cases of melanonychia (0.2%). We found in 18% association with tinea pedis.

The most common etiologic agents in onychomycosis were *Trichophyton rubrum* (39.8%) and *Candida* spp. (45.3%). Less commonly, we isolated *T mentagrophytes* (1%), *E floccosum* (0.01%), and *M canis* (0.01%). We isolated 12 non dermatophyte molds and the most frequent was *Acremonium* spp (<1%), as we mentioned before and in order to confirm the pathogenic role, these opportunistic fungi were isolated by culture at least three times (Table 1).

**Table 1:** Oportunistic fungi (non dermatophytes molds) isolated in menopausal age women with onychomycosis.

Oportunistic fungi	12 Cases	%
<i>Acremonium</i> spp.	3	24.99
<i>Fusarium</i> spp.	1	8.33
<i>Aspergillus</i> spp.	5	41.65
<i>Scopulariopsis</i> spp.	2	16.66
<i>Exophiala</i> spp.	1	8.33

## Tinea pedis

There were 208 cases. The most common etiologic agents were *T. rubrum* in 41 (83.6%), *T. mentagrophytes* in 6 (12.2%), *E. floccosum* in 1 (2%), and *M. canis* in 1 (2%). Plantar and interdigital involvement was observed in 204 cases and the vesiculobullous type in only 4 cases caused by *T. mentagrophytes*.

## Candidiasis

There were 64 cases. The most common presentations were oral candidiasis in 29 (45.3%), interdigital in 19 (29.6%), skin folds in 11 (17.1%), periungual in 2 (3.1%), and vaginal in 3 (4.6%). The most common etiologic agents were *C. albicans* in 8 (29.6%), *C. krusei* in 2 (7.4%), *C. tropicalis* in 2 (7.4%) and *Candida* speciation was not confirmed in 15 (55.5%). One out of every 3 cases, had diabetes mellitus.

## Tinea corporis

Of the 35 cases of tinea corporis, all with a positive KOH, 23 (65.7%) were affecting the trunk, buttocks, proximal extremities or face; 6 (17.1%) on the groin, and 6 (17.1%) on hands. The most common etiologic agents were *T. rubrum* in 12 (85.7%) and *M. canis* in 2 cases with trunk and hand involvement (14.2%).

## Discussion

There is an abundance of data documenting the immunologic changes and deficiencies that occur during menopause, including sex-specific mortality and infection rates. In general, men are more susceptible to certain infections by bacteria, viruses, fungi, and parasites. Testosterone is immunosuppressive, and increases severity of tuberculosis, amebiasis, leishmaniasis, and malaria.

On the other hand, normal estrogen levels in premenopausal females lead to lower mortality from pneumococcal, meningococcal, and other infections (except sexually transmitted diseases and vulvovaginal candidiasis) [3]. For example, in the USA, bacterial vaginosis was documented in 23-38% of postmenopausal women. In contrast, *Candida* was present in only 5-6% of these patients, and decreased by 7% with each year of age [4]. In Italy, *T. vaginalis* or *C. albicans* vaginal infection was made in one-third of menopausal patients [5].

It is important to mention that skin diseases and especially SM in this age group can be related not only with menopause, but also with elderliness and other comorbidities as diabetes mellitus.

We report 811 menopausal women with SM. The most common diagnoses were onychomycosis (84.5%), tinea pedis (25.6%), candidiasis (7.8%), and tinea corporis (4.3%).

Frequency of onychomycosis in our patients is higher than the literature suggests. In a study of people older than 60 years in Spain the incidence of onychomycosis was 21% [6].

Other studies have demonstrated that the incidence of onychomycosis increases with age: 40% in patients between 60-70 years old and 61.5% after 80 years of age [7]. The incidence also varies according to geographic location: Europe (22-26%), and Guatemala (65%) [8]. In our series, the most common etiologic agent was *T. rubrum* followed by *Candida* spp., and *T. mentagrophytes*. Clinically, the most common presentations were distal and lateral subungual and total dystrophic onychomycosis.

We found a similar frequency of tinea pedis (25.6%) to previous reports: 23% in patients older than 60 years of age in Spain [6], and 22-26% in Canada and Germany [7]. We also found as the most common etiologic agent *T. rubrum* followed by *T. mentagrophytes*.

As regards *Candida* infections, we found 3 predominant clinical presentations, including interdigital, oral, and intertriginous affection. The most common etiologic agent was *C. albicans* and *C. krusei* but *Candida* speciation was not confirmed in 15 (55.5%). The numbers were too small to draw significant conclusions, [4] and the literature regarding cutaneous candidiasis in menopause is very scarce. Most research has focused on mucosal infections. For example, in Italy *T. vaginalis* or *C. albicans* vaginal infection was found in one-third of menopausal patients [5].

Our cases include 35 patients with diagnosis of tinea corporis. The most common location was the trunk followed by buttocks, proximal extremities and face. The most frequent etiologic agents were *T. rubrum* and *M. canis*.

In sum, we have described a large series of menopausal women with documented cutaneous infections due to dermatophytes and *Candida*. The most interesting finding is an increased frequency of onychomycosis. The reasons for this increase are unknown but may be due to the various immunologic and endocrine changes that occur during menopause and aging. After menopause, there is an increase in several pro-inflammatory cytokines such as TNF-alpha, IL-6, and IL-1. Also, there is an enhanced response of immune cells to these molecules, a decrease in lymphocytes (B and CD4 T), and a weaker cytotoxic activity of NK cells. All these changes have been attributed to estrogen deprivation [9].

Additionally, in this age group, the skin suffers significant changes. There is dermal atrophy and decreased blood vessels, mast cells, and fibroblasts. The result is a thinner, dryer, and more fragile skin that is more prone to infection, trauma, and bleeding [10,11]. All these changes would suggest and explain an increased risk of infection by dermatophytes and *Candida*.

Limitations in our study include its retrospective nature and the lack of positive cultures in many cases. In addition, this paper is a purely descriptive study. Also, results from this Mexican cohort cannot be extrapolated to other populations.

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