Podiatric habits in people with nail disorders

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Abstract

Objective: To determine the prevalence of onychocryptosis and onychomycosis confirmed by culture in subjects attending a Podiatric University Hospital and to describe their podiatric habits. **Method:** Cross-sectional study of prevalence. The study was carried out at the Clinic University of Podology of A Coruna University (Ferrol, Spain). Review of 1082 clinical histories, of which 170 were selected, persons who had onychocryptosis diagnosed clinically. The presence of onychomycosis confirmed by cultivation, presence of onychocryptosis through clinical diagnosis and a questionnaire was handed out of podologic habits. **Results:** Mean age of the total sample ($n = 1082$) was 47.9 ± 22.1 years. Prevalence of onychocryptosis was 15.7% ($n = 170$) with a mean age of 54.1 ± 20.1 years and with a significantly higher affection in women and people under 65. Prevalence of onychomycosis was 17.6% ($n = 30$), mean age 59.5 ± 20.5 years with greater involvement in women and people over 65 years. With regard to the questionnaire of habits, the footwear more employee was the closed, cordoned off and heel flat. The majority of the subject came to a podiatrist for the first time; walked approximately 1 hour and their daily activity made of foot with short displacements. **Conclusions:** A high prevalence of onychocryptosis and onychomycosis in people attending Podiatric services has been found. For its part using a type of flat or low heel and who does the care of toenails are shown as predictive variables of onychomycosis.

KEY WORDS: Foot care. Foot disease. Podiatric habits. Onychocryptosis. Onychomycosis. Nail pathology.

Introduction

Podiatric disorders constitute a highly prevalent problem in the population, especially in people older than 65 years¹. In this sense, Munro and Steele² refer that 70% of people older than 65 years suffer from some type of foot problem. Recently, claw toes (69.7%) and hallux valgus (38%) have been observed to be most common podiatric alterations in people older than 40 years in Spain³. Secondly, both conditions can act as etiologic factors for onychocryptosis (ONC), a pathology that often is accompanied by pain, inflammation and infection that, in case of becoming chronic, elicits the appearance of granulation tissue that

covers the nail groove and major complications such as osteomyelitis⁴⁻⁶. ONC is variable, and although there is no unanimity with regard to which gender is more affected, most authors agree that it occurs more commonly in adolescents and young adults on the second and third decades of life^{9,10}. At the same time, it is considered to be more prevalent in the first toe, with the peroneal canal being more affected, at a 2:1 ratio with regard to the tibial canal. In turn, the incidence of onychomycosis (ONM) has experienced an increase in the past few years owing mainly to population aging. It accounts for between 18 and 40% of nail disorders, and its prevalence ranges from 2 to 18% among the world population^{7,11-13}. Both pathologies (ONC and ONM) are highly common nail

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disorders seen in the daily podiatric consultation, with ONC being observed to be associated with onychomycotic infections to a greater extent from the third decade of life on, although it can also occur as a complication of oral antifungal therapy^{4,7,14-16}.

Method

A cross-sectional study was carried out at the Podiatry University Clinic of the Universidade da Coruña (Ferrol, Spain) by means of the review of the medical histories of people attending an appointment for the first time and for any reason between September 2012 and September 2014. Around 1000 people were estimated would be attending an appointment during that period, which is a sample size that allows knowing the characteristics presented by these people with regard to the pathologies to be studied (ONC and ONM) with a 95% confidence interval and an accuracy of $\pm 3\%$. Data were registered by a single clinician, with all subjects that granted freely and voluntarily their written consent being included. People with amputation of any of their lower extremities, people with suspected ONM but with negative cultures and all those not granting written informed consent were excluded, with final sample comprising 1082 reviewed medical histories. Sociodemographic (age and gender) and clinical (presence of ONC) variables were collected from each medical history. In addition, from the 1082 reviewed histories, those people with clinically diagnosed ONC were selected in order to collect information regarding the podiatric habits questionnaire that as per protocol is completed during the first visit (Fig. 1), as well as to determine the culture-confirmed presence of ONM.

The study was approved by the Research Ethics Committee of the Galician Health Service (Xunta de Galicia, Spain), with registration code 2015/113. At all times, the ethical standards picked up by international regulations for epidemiological studies and biomedical research in human subjects ethical evaluation were followed, and patient anonymity was ensured by obeying the Law for the Protection of Personal Data (Organic Law 15/1999 of December 13), the Law 41/2002 (basic regulatory of patient autonomy and of rights and obligations in matters of clinical information and documentation), the Law 3/2001 (regulatory of patient informed consent and medical history) and the Law 3/2005, which is a revision of Law 3/2001.

The information was analyzed with the IBM SPSS® clinical package (version 20.0) for Windows®, and a descriptive analysis of the variables included in the

CASE No.: _____	
1. Sociodemographic variables	
Gender:	☐ Male ☐ Female
Age:	_____
2. Clinical variables	
Presence of onychocryptosis:	
R FOOT	☐ 1 st finger ☐ Other
L FOOT	☐ 1 st finger ☐ Other
BILATERAL	☐ 1 st finger ☐ Other
Presence of onychomycosis (confirmed by culture):	
R FOOT	☐ 1 st finger ☐ Other
L FOOT	☐ 1 st finger ☐ Other
BILATERAL	☐ 1 st finger ☐ Other
Habit 1	Is this your first visit to the podiatrist?
	☐ Yes ☐ No
Habit 2	During your daily activity, you walk approximately
	☐ Half hour or less ☐ 1 hour ☐ 2 to 3 hours ☐ 4 hours or more
Habit 3	In your daily activity you spend much time (mark only the most frequent)
☒ Sitting	
☒ Standing up with short walks	
☒ Standing up with long walks	
Habit 4	Do you practice any kind of sport or hobby that involves physical activity?
	☐ Yes ☐ No
Habit 5	Who looks after the care of your toenails? (mark only the most common)
	☐ Yourself ☐ Family member ☐ Podiatrist ☐ Other
Habit 6	In case of looking after your nails by yourself, what do you use? (mark only the most commonly used)
	☐ Nail scissors ☐ Nail clipper ☐ Nail ☐ Nail pliers ☐ File ☐ Other
Habit 7	Do you apply moisturizing cream to your feet?
	☐ Yes ☐ No
Habit 8	How often do you apply moisturizing cream to your feet?
	☐ Everyday ☐ Every 2 or 3 days ☐ once a week ☐ once a month
Habit 9	How often do you clean your feet?
	☐ More than once daily
	☐ Once daily
	☐ Twice or thrice weekly
	☐ Once a week
	☐ Less than once a week
	☐ Other
Habit 10	In case of having suffered callosities or patches of hard skin, what solution have you chosen? (Mark only the most common)
	☐ Callous treatments ☐ Blades ☐ Pumice ☐ Attending the podiatrist ☐ Nothing
Habit 11	How often do you visit the podiatrist?
	☐ Once a month or more ☐ More than twice a year ☐ Once a year ☐ Only if it hurts
Habit 12	What are the characteristics of the footwear you use more often?
	☐ Closed ☐ Flat shoes ☐ Boots ☐ Sandals ☐ Sneakers ☐ Other
Habit 13	What kind of fastening system does your most commonly used footwear have? (mark only the most commonly used)
	☐ Laces ☐ Buckle ☐ Velcro ☐ Zipper ☐ Other
Habit 14	What kind of heel does your most commonly used footwear have? (mark only the most commonly used)
	☐ Flat ☐ Low (2 cm) ☐ Medium (2 to 4 cm) ☐ High (more than 4 cm)

Figure 1. Podiatric habits questionnaire.

Table 1. Patient description according to age, gender and number of onychocryptosis and onychomycosis localizations

	Onychocryptosis (n = 170)	Onychomycosis (n = 30)
	Mean $\pm$ SD	Mean $\pm$ SD
Age	54,09 $\pm$ 20,09	58,57 $\pm$ 19,86
Number of localizations	1.56 $\pm$ 0.62	1.2 $\pm$ 0.41
	n (%)	n (%)
Gender		
Male	49 (28.8)	11 (36.7)
Female	121 (71.2)	19 (63.3)
Localizations		
Right foot		
First toe	127 (74.7)	16 (9.4)
Other toes	8 (4.7)	2 (6.7)
Left foot		
First toe	122 (71.8)	17 (10)
Other toes	9 (5.3)	1 (3.3)
Both feet first toe	83 (48.8)	5 (16.7)

SD: standard deviation.

study was carried out. Quantitative variables were expressed as the mean, and qualitative variables, as absolute values (n) and percentages. To compare the quantitative variables' means with regard to dichotomous qualitative variables, Student's t-test or Mann-Whitney test were used as appropriate after quantitative variables normality was verified with the Kolmogorov-Smirnov test. Qualitative variables association was estimated by means of the chi-square test and, in turn, the risk for the event to occur was estimated by calculating the odds ratio and its 95% confidence interval.

Results

General characteristics of the studied sample are presented in table 1, where it can be appreciated that mean age of the 170 participants with ONC is 54.09 years ($\pm$ 20.09), and that the female gender is predominant (71.2% vs. 28.8%). Mean number of sites in these patients is 1.56 ($\pm$ 0.62), with both left and right foot first toe localizations being predominant (71.8% vs 74.7%). Sites with this pathology in both feet are presented by 48.8% of people. Of the 170 subjects with ONC, 30 have ONM (17.6%), with a mean age of 58.57 years ($\pm$ 19.86) and female gender predominance as well (63.3% vs. 36.7%).

Mean number of sites with ONM in these patients is 1.2 ($\pm$ 0.41), with both left and right foot localizations similarly predominating (9.4% vs. 10%).

Table 2. Patient description according to their habits by type of pathology

Habits	Onychocryptosis (n = 170)	Onychomycosis (n = 30)
	n (%)	n (%)
1		
No	68 (47.2)	12 (50.0)
Yes	76 (52.8)	12 (50.0)
2		
Less than half an hour	51 (30.0)	11 (44.0)
1 hour	58 (34.1)	8 (32.0)
Between 2 and 3 hours	20 (11.8)	3 (12.0)
4 or more hours	12 (7.1)	3 (12.0)
3		
Sitting	43 (25.3)	8 (32.0)
Standing up/short walks	76 (44.7)	15 (60.0)
Standing up/long walks	27 (15.9)	2 (8.0)
4		
No	34 (36.9)	5 (35.7)
Yes	58 (63.1)	9 (64.3)
5		
Yourself	107 (71.3)	21 (80.8)
Family member	20 (13.3)	0
Podiatrist	15 (10.0)	5 (19.2)
Other	11 (7.3)	2 (7.7)
5-rec		
Yourself or a professional	121 (80.7)	25 (96.2)
Non-professional	29 (19.3)	1 (3.8)
6		
Nail scissors	43 (28.5)	6 (23.1)
Nail clipper	57 (37.7)	9 (34.6)
Nail pliers	38 (25.2)	8 (30.8)
File	21 (13.9)	2 (7.7)
7		
No	82 (55.8)	17 (70.8)
Yes	65 (44.2)	7 (29.2)
8		
Everyday	22 (31.4)	3 (42.9)
Every 2-3 days	25 (35.7)	1 (14.3)
Once a week	17 (24.3)	1 (14.3)
Once a month	6 (8.6)	2 (28.6)
9		
More than once daily	29 (20.3)	2 (8.7)
Once daily	78 (54.5)	15 (65.2)
2-3 times per week	31 (21.7)	4 (17.4)
Once weekly	4 (2.8)	2 (8.7)
Other	1 (0.7)	0
10		
Callous treatments	11 (9.0)	0
Blades	18 (14.8)	1 (5.0)
Pumice stone	36 (29.5)	5 (25.0)
Visit the podiatrist	31 (25.4)	5 (25.0)
Nothing	30 (24.6)	7 (35.0)
11		
Once monthly	11 (19.3)	1 (3.3)

(Continue)

Table 2. Patient description according to their habits by type of pathology (Continued)

Habits	Onychocryptosis (n = 170)	Onychomycosis (n = 30)
	n (%)	n (%)
More than twice yearly	9 (15.8)	4 (40.0)
Once yearly	5 (8.8)	1 (10.0)
Only if it hurts	32 (56.1)	4 (40.0)
12		
Closed	88 (58.7)	16 (59.3)
Flat shoes	20 (13.3)	2 (7.4)
Boots	34 (22.7)	5 (18.5)
Sandals	29 (19.3)	3 (11.1)
Sneakers	53 (35.3)	12 (44.4)
Other	9 (6.0)	0
12-rec	121 (80.7)	24 (88.9)
Closed	29 (19.3)	3 (11.1)
Open		14 (58.3)
13		
Shoelaces	81 (58.7)	
Buckle	7 (5.1)	1 (4.2)
Velcro	29 (21.0)	4 (16.7)
Zipper	22 (15.9)	2 (8.3)
None	37 (26.8)	4 (16.7)
14-rec		
Plain-low	96 (73.3)	19 (95.0)
Medium-high	35 (26.7)	1 (5.0)

Podiatric habits by pathology (ONC and ONM) are shown in table 2. Of the people with ONC, 71.3% trim their nails themselves, with 37.7% using a nail clipper. In case of suffering from callosities or patches of hard skin, the most widely used method is pumice stone (29.5%). Most usual footwear is closed (58.7%), and the most common fastening system is with shoelaces (58.7%), with flat heel being most widely used (44.7%). As for those with ONM, 80.8% trim their nails themselves, and the most widely used method is nail clipper (34.6%). In they suffer from callosities or patches of hard skin, 35% does nothing to solve it. Most widely used footwear is closed (59.3%), with fastening by means of shoelaces (58.3%) and with plain heel (47.6%).

When a bivariate analysis was performed to determine if age, localization and number of localizations predict the occurrence of ONM, we found out that none of these variables has an independent effect to predict this pathology (Table 3).

To describe which variables can be predictors of ONM, a bivariate analysis was performed according to the studied subjects' habits (Table 4). In addition, a logistic regression bivariate analysis was carried out in order to establish if podiatric habits 1 ("Is this your

Table 3. Bivariate analysis to predict onychomycosis according to the age and localizations number variables

	Onychomycosis		p
	Yes (n = 140)	No (n = 30)	
	Mean $\pm$ SD	Mean $\pm$ SD	
Age			0.180
Number of onychocryptosis localizations	1,57 $\pm$ 0,68	1,57 $\pm$ 0,61	0.841
	n (%)	n (%)	
Localizations			
Right foot			
First toe	22 (73.3)	8 (26.7)	0.849
Other toes			
Left foot			
First toe	22 (73.3)	8 (26.7)	0.833
Other toes			
Both feet first toe			

Means were compared using Student's t-test for the age and Mann-Whitney U-test for the number of onychocryptosis and onychomycosis localizations. The association between categorical variables is established by means of the chi-square test. SD: standard deviation.

Table 4. Bivariate analysis to predict onychomycosis according to patient habits

Habits	Onychomycosis		p
	Yes (n = 30)	No (n = 140)	
	n (%)	n (%)	
1			0.765
No	12 (50.0)	56 (46.7)	
Yes	12 (50.0)	64 (53.3)	
2			0.644
Less than half hour	11 (40.0)	40 (34.5)	
1 hour	8 (32.0)	50 (43.1)	
Between 2 and 3 hours	3 (12.0)	17 (14.7)	
4 hours or longer	3 (12.0)	9 (7.8)	
3			0.917
Sitting	8 (32.0)	35 (29.4)	
Standing up/short walks	15 (60.0)	61 (51.3)	
Standing up/long walks	2 (8.0)	25 (21.0)	
4			0.028
No	5 (35.7)	29 (37.2)	
Yes	9 (64.3)	49 (62.8)	
5-rec			0.028
Yourself or a professional	25 (96.2)	96 (77.4)	
Non-professional	1 (3.8)	28 (22.6)	
6			
Nail scissors	6 (23.1)	37 (29.6)	
Nail clip	9 (34.6)	48 (38.4)	
Nail pliers	8 (30.8)	30 (24.0)	
File	2 (7.7)	19 (15.2)	
7			
No	17 (70.8)	65 (52.8)	0.105
Yes	7 (29.2)	58 (47.2)	

(Continue)

Table 4. Bivariate analysis to predict onychomycosis according to patient habits (Continued)

Habits	Onychomycosis		p
	Yes	No	
	(n = 30)	(n = 140)	
	n (%)	n (%)	
8			
Everyday	3 (42.9)	19 (30.2)	
Every 2-3 days	1 (14.3)	24 (38.1)	
Once a week	1 (14.3)	16 (24.5)	
Once a month	2 (28.6)	4 (6.3)	
9			
More than once daily	2 (8.7)	27 (22.5)	
Once daily	15 (65.2)	63 (52.5)	
2-3 times a week	4 (17.4)	27 (22.5)	
Once a week	2 (8.7)	2 (1.7)	
Less than once a week	0 (0.0)	1 (0.8)	
Other			
10			
Callous treatments	0 (0.0)	11 (10.8)	
Blades	1 (5.0)	17 (16.7)	
Pumice stone	5 (25.0)	31 (30.4)	
Visit the podiatrist	5 (25.0)	26 (25.5)	
Nothing	7 (35.0)	23 (22.5)	
11			
Once a month	1 (10.0)	10 (21.3)	
More than twice a year	4 (40.0)	5 (10.6)	
Once a year	1 (10.0)	4 (8.5)	
Only if it hurts	4 (40.0)	28 (59.6)	
12			0.017
Closed	24 (88.9)	97 (78.9)	
Open	3 (11.1)	26 (21.1)	
13			
Shoelaces	14 (58.3)	67 (58.8)	
Buckle	1 (4.2)	6 (5.3)	
Velcro	4 (16.7)	25 (21.9)	
Zipper	2 (8.3)	20 (17.5)	
None	4 (16.7)	33 (28.9)	
14			0.017
Plain-low	19 (95.0)	7 (69.4)	
Medium-low	1 (5.0)	34 (30.6)	

*86.4% of sneaker users claim to use plain-low heel, as well as 74.7% of closed footwear users.

first visit to the podiatrist?), 2 ("During your daily activity, approximately how much do you walk?"), 4 ("Do you practice any kind of sport or hobby that involves physical activity?"), 5 ("Who looks after your toenails care?"), 7 ("Do you apply moisturizing cream to your feet?"), 12 ("What are the characteristics of the footwear you use more often?") and 14 ("What type of heel has the footwear you use more often?") predict the occurrence of ONM. Habits 5 and 14 were observed to have an independent effect to predict the occurrence of said pathology in the sense that attending a professional (podiatrist) is related to a higher

Table 5. Association of onychocryptosis localizations and footwear type (habit 12) and heel height (habit 14)

Habit 12	Localization on left foot, first toe		p
	Yes	No	
Closed	85 (77.3)	36 (90.0)	0.081
Open	25 (22.7)	4 (10.0)	
	Localization on left foot, other toes		
	Yes	No	
Closed	7 (77.8)	114 (80.9)	0.821
Open	2 (22.2)	27 (19.1)	
	Localization on right foot, first toe		
	Yes	No	
Closed	92 (81.4)	29 (78.4)	0.685
Open	21 (18.6)	8 (21.6)	
	Localization on right foot, other toes		
	Yes	No	
Closed	3 (37.5)	118 (83.1)	0.001
Open	5 (62.5)	24 (16.9)	
	Bilateral localization, first toe		
	Yes	No	
Closed	58 (76.3)	63 (85.1)	0.171
Open	18 (23.7)	11 (14.9)	
Habit 14	Localization on left foot, first toe		
	Yes	No	
Plain-low heel	70 (71.4)	26 (78.8)	0.409
Medium-high heel	28 (28.6)	7 (21.2)	
	Localization on left foot, other toes		
	Yes	No	
Plain-low heel	5 (62.5)	91 (74.0)	0.477
Medium-high heel	3 (37.5)	32 (26.0)	
	Localization on right foot, first toe		
	Yes	No	
Plain-low heel	72 (74.2)	24 (70.6)	0.680
Medium-high heel	25 (25.8)	10 (29.4)	
	Localization on right foot, other toes		
	Yes	No	
Plain-low heel	6 (85.7)	90 (72.6)	0.445
Medium-high heel	1 (14.3)	34 (27.4)	

(Continue)

Table 5. Association of onychocryptosis localizations and footwear type (habit 12) and heel height (habit 14) (Continued)

Habit 12	Localization on left foot, first toe		p
	Yes	No	
	Bilateral localization, first toe		
	Yes	No	
Plain-low heel	46 (69.7)	50 (76.9)	0.350
Medium-high heel	20 (30.3)	15 (23.1)	

probability of suffering from ONM. This relationship may be due to the fact that a complaint that drives seeking help from a podiatrist is having nail disorders, in the same way that people who do not seek a specialist's aid are less likely to be diagnosed with ONM. With regard to habit 14, people who use plain or low heels are less likely to suffer from ONM. This may be due to the fact that those who use plain or low heel are people who use closed shoes (74.7%), and among them, 86.4% use sneakers. Habit 7 is in the limit of clinical significance, in the sense that adhering to this habit is associated with higher probability to suffer from ONM. The remaining habits studied in the bivariate analysis have no independent effect to predict the occurrence of ONM.

In the bivariate analysis looking to establish a possible association of ONC localization and footwear type, a borderline statistically significant association was found between the footwear type and left foot (first toe) ONC localization ($p = 0.081$) and, hence, using closed footwear is associated with the presence of ONC on this foot's first toe.

Finally, a bivariate analysis was also carried out in order to establish the association between ONM localization and footwear type and heel height (Table 6). The use of plain-low heels was found to be associated with the presence of ONM on left foot first toe, with no statistically significant association with the rest of ONM localizations being shown.

Discussion

Onychopathies account for approximately 10% of all skin conditions^{11,17} and, out of them, ONM represents about 50%¹¹. Different authors have tried to establish the prevalence of ONC. Lloyd and Brill¹⁸ claim that it affects 20% of people with any foot pathology, whereas Krausz¹⁹ points out that 61% of the population has some type of nail pathology, with ONC standing out above all of them. In the studied sample, an ONC

Table 6. Association of onychomycosis localizations and footwear type (habit 12) and heel height (habit 14)

Habit 12	Localization on left foot, first toe		p
	Yes	No	
Closed	14 (93.3)	107 (79.3)	0.190
Open	1 (6.7)	28 (20.7)	
Localization on left foot, other toes			
	Yes	No	
Closed	1 (100)	120 (80.5)	1.000
Open	0	29 (19.5)	
Localization on right foot, first toe			
	Yes	No	
Closed	11 (78.6)	110 (80.9)	0.835
Open	3 (21.4)	26 (19.1)	
Localization on right foot, other toes			
	Yes	No	
Closed	2 (100)	119 (80.4)	1.000
Open	0	29 (19.6)	
Bilateral localization, first toe			
	Yes	No	
Closed	3 (75.0)	118 (80.8)	0.771
Open	1 (25.0)	28 (19.2)	
Habit 14	Localization on left foot, first toe		
	Yes	No	
Plain-low heel	11 (100)	85 (70.8)	0.036
Medium-high heel	0	35 (29.2)	
Localization on left foot, other toes			
	Yes	No	
Plain-low heel	1 (100)	95 (73.1)	1.000
Medium-high heel	0	35 (26.9)	
Localization on right foot, first toe			
	Yes	No	
Plain-low heel	9 (90.0)	87 (71.9)	0.214
Medium-high heel	1 (10.0)	34 (28.1)	
Localization on right foot, other toes			
	Yes	No	
Plain-low heel	1 (100)	95 (73.1)	1.000
Medium-high heel	0	35 (26.9)	
Bilateral localization, first toe			
	Yes	No	
Plain-low heel	2 (100)	94 (72.9)	1.000
Medium-high heel	0	35 (27.1)	

prevalence of 15.7% has been found, with the female gender and subjects younger than 65 years being more affected. This figure is very similar to that published for the Galician population older than 65 years²⁰. There is no unanimity on which gender is more affected by ONC. While García and Fernández⁴ demonstrate higher frequency in the female gender, other authors refer that it is more common in males^{8,21}. In turn, ONM is regarded as the main cause of nail conditions in developed countries. In the past few years, it has experienced an increased prevalence, generating considerable expenses to the health system¹³. In our study, the prevalence of ONM in subjects with ONC was 17.6%, which is consistent with previously published figures²⁰, and it was most frequently localized on the first toe²². This result would support the thesis that ONM prevalence in subjects with ONC is not higher than in subjects without an ONC diagnosis, since the obtained figure is within the range described for the general population¹².

It should be pointed out that we haven't found studies in the Spanish population that have determined the prevalence of ONM in people with ONC. The most similar data were found in a study where, by means of a literature review, the incidence of ONC was analyzed in patients treated with oral antifungals²³. Other studies carried out in North America and Mexico have observed an ONC incidence ranging from 18 to 37% after antifungal treatment by oral route^{14,15}.

With regard to podiatric habits, a study in subjects older than 65 years observed that 55% of them cleaned their feet daily, less than half used moisturizing cream, the majority looked after their nails by themselves and only 28.9% resorted to a podiatrist in the face of a problem of hyperkeratosis or helomas²⁴. These figures are highly similar to those in the present study (54.5%, 44.2%, 71.4% and 26.1%, respectively), although in our case most subjects with ONC were younger than 65 years. In another study carried out among students of the Universidad Complutense de Madrid (Spain), the totality of participants stated having attended a podiatrist some time, and 72% of them moisturized their feet daily²⁵.

Guidelines for correct hygiene and care of the nails and of feet in general have been published. In this sense, daily washing the feet with subsequent moisturizing cream application is advisable^{26,27}. Sometimes, the use of a pumice stone for hard skin patches elimination, an emery board or metal nail file for correctly grinding down and shaping the nails, or regular visit to a podiatrist is suggested. In general terms,

studies analyzing habits of foot hygiene and care are quite scarce; nevertheless, they are abundant in the diabetic population²⁸.

As for footwear, we know that adequate footwear and in good state can help to maintain balance, avoid pain and contribute to general wellbeing and individual independence for daily life activities, and that, conversely, the use of inadequate or defective footwear that elicits repeated microtrauma or favors a humid environment, promotes the development of ONM and other lesions such as hyperkeratosis and helomas. In our work, the most widely used footwear was of the closed type, coinciding with other studies carried out in Spanish populations older than 60 years²⁹. However, we don't know the footwear characteristics with regard to shape or material, which may have been narrow, insufficiently long or poorly-transpiring shoes, in which case they might be considered as of risk for developing the pathologies under study. Sneakers have been observed to be the most widely used footwear in college student populations, with percentages even higher than that obtained in our study population, probably owing to differences in the study subjects' mean ages in one case and the other³⁰.

These results indicate a priori that the prevalence of ONM in people with ONC is not higher than that found in subjects not diagnosed with ONC. However, given the scarcity of studies relative to this condition, we believe it is necessary to keep investigating for a better understanding of such a common nail disorder.

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