Prevalence of foot problems in older adults in southern ecuadorian gerontological centers

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Summary

Objective: *to determine the prevalence of foot problems in older adults in southern Ecuadorian gerontological centers.* **Materials and methods:** *a transversal study was conducted on 136 older adults from 11 gerontological centers. The data were collected through a written form and processed through the SPSS software version 15. Statistics such as frequency, percentage, average, and standard deviation were calculated.* **Results:** *of 136 older adults, 59.6% were women, 34.6% were between 65 and 74 years of age, and 34.6% between 75 and 84 years of age. 71.3% resided in rural areas, and 66.2% had primary education. 100% of the population presented at least one foot problem. The most prevalent pathology was dermatological (97.1%), followed by biomechanical pathology (80.1%), and vascular and neuro-peripheral pathology (61.8%). The most prevalent lesion, regardless of sex, was hyperkeratosis with 77.8%.* **Conclusions:** *approaching foot problems in the older adult population requires early recognition of risk, etiological, and psychosocial factors. The high prevalence of foot problems found in this study highlights the importance of training health personnel and patients about foot care with a preventive approach.*

Keywords: *podiatry, foot, elderly, geriatrics.*

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Prevalencia de problemas en los pies en adultos mayores de los centros gerontológicos del sur del Ecuador

Resumen

Objetivo: *determinar la prevalencia de problemas en los pies de los adultos mayores de los centros gerontológicos del sur del Ecuador.* **Materiales y métodos:** *se realizó un estudio transversal en 136 adultos mayores de 11 centros gerontológicos. Los datos fueron recolectados a través de un formulario escrito y procesados a través del software SPSS versión 15. Se calcularon estadísticas como frecuencia, porcentaje, promedio y desviación estándar.* **Resultados:** *de 136 adultos mayores, 59,6% fueron mujeres, 34,6% tenían entre 65 y 74 años y 34,6% entre 75 y 84 años. El 71,3% residía en zonas rurales y el 66,2% tenía estudios primarios. El 100% de la población presentó algún problema en los pies. El tipo de patología más prevalente fue la dermatológica (97,1%), seguida de la biomecánica (80,1%) y la vascular y neuroperiférica (61,8%). La lesión más prevalente, independientemente del sexo, fue la hiperqueratosis con un 77,8%.* **Conclusiones:** *el abordaje de los problemas en los pies de la población adulta mayor requiere el reconocimiento temprano de los factores de riesgo, etiológicos y psicosociales. La alta prevalencia de problemas en los pies encontrada en este estudio pone de manifiesto la importancia de formar al personal sanitario y a los pacientes sobre el cuidado de los pies con un enfoque preventivo.*

Palabras clave: *podología, pie, ancianos, geriatría.*

Introduction

The World Health Organization determines that the population aging rate is increasing faster than before. Between 2000 and 2050, the world's population over 60 will increase from 11% to 22%. In other words, this population group will grow from 605 million to 2 billion in half a century. This demographic change will be faster in low- and middle-income countries. Hence, by 2050, 80% of all older people will live in these countries [1]. According to projections based on the last national census of 2010, in Ecuador, in 2019, the older adult population was 1.264.423, representing 7.3% of the total population. In the future, this number will increase following a global trend [2].

During the aging process, humans present physiological and anatomical changes that can affect their functional capacities. One of these changes involves the ankle-foot complex, which frequently results in dermatological, nail, vascular, and neuropathic alterations aggravated by the appearance of comorbidities [3][4]. International literature reports a prevalence between 80 and 100% of foot problems in this age group [3][5][6][7]. The most frequent are onychodystrophies (94.2%), structural deformities of the feet, with a prevalence between 64.2% and 87%, and less common are peripheral vascular diseases (22.9%) [8][9]. The study of foot problems in the elderly aims to improve their life quality and reduce their repercussions at the physical, mental, and social levels in the medium and long term. However, the ankle-foot complex constitutes a region that Has not been thoroughly examined in geriatric consultation or primary care, overlooking multiple alterations that could be easily prevented and treated [3]. These alterations are correlated with a low life quality, loss of balance, increased risk of falls and fractures, restriction of mobility, and the

decreased performance of daily living activities [10]. It is estimated that one-third of people over 65 years suffer falls every year, resulting in intensive demand of the health system and the institutionalization of the geriatric population [11]. It is noteworthy that, despite the high prevalence of foot problems and their consequences in this population group, studies regarding them are scarce. For this reason, this study aims at determining the prevalence of foot problems in older adults in southern Ecuadorian gerontological centers.

Material and methods

A cross-sectional study was conducted on a sample population of older adults. They belonged to the gerontological centers of the Cuenca canton, located in southern Ecuador. They underwent a podiatric physical examination to identify the most prevalent foot problems. All the older adults from 11 gerontological centers who signed the informed consent from a universe of 521 were included by simple randomization. With a prevalence of 12%, an error of 5%, and a confidence interval (CI) of 95%, a sample of 124 individuals were defined. For nonresponse, 10% were increased, resulting in 136 older adults.

The study was authorized by the Bioethics Commission of the Faculty of Medical Sciences of the University of Cuenca and by the directors of the gerontological centers. The information collected during the project was kept with absolute confidentiality and exclusively used for research purposes.

The data were collected using a form developed by the authors, and for quality control, a pilot study was conducted. Sociodemographic data such as age, sex, education, residence, and occupation were collected. Subsequently, the podiatry assessment was performed, and a skin and toenail sample was collected. The authors adapted the sample collection technique based on the Processing Manual of the superficial samples of the Spanish Association of Mycology [12] and the recommendations of the Hermano Miguel Laboratory, where the samples were processed. The data were analyzed and processed in the SPSS software version 15, and the statistics reported were frequency, percentage, average, and standard deviation.

Results

There were two age groups, between 65 and 74 and between 75 and 84, with the higher prevalence corresponding to 34.6%. The mean age found was 79.5 years, with a standard deviation of ± 9 years. The majority of the participants were women. More than two-thirds resided in urban areas and had primary education. A quarter of the older adults were previously engaged in domestic work (Table 1).

Table 1. Characterization of the study population

Variable		n=136	100%
Age	Youngest-old (65–74)	47	34.6
	Middle-old (75–84)	47	34.6
	Oldest-old (85 or more)	42	30.9
Sex	Female	81	59.6
	Male	55	40.4
Residence	Urban	97	71.3
	Rural	39	28.7
Education	None	27	19.9
	Elemantary School	90	66.2
	High School	15	11
	University	4	2.9
Occupation	Homemaker	37	27.2
	Farmer	20	14.7
	Merchant	18	13.2
	Bricklayer	1	0.7
	Craftsman	24	17.6
	Other	36	26.5

$\bar{x}$ = 79.5 years SD = ± 9 years
Source: own elaboration

The most prevalent foot lesions were the dermatological type with 97.1%; being higher in the male sex with 98.2% and in the group of 75-84 years old with 97.9%; followed by biomechanical type lesions with a prevalence of 80.1% being more frequent in the female sex with 80.2%. Finally, vascular and neurope-

ripheral pathology was present in 61.8% and had a significant presence in the male sex with 63.6% (Table 2).

The most prevalent lesion of dermatological type, regardless of sex, was hyperkeratosis with 77.8%, followed by interdigital fissures with 65.4% (Table 3). The most prevalent biomechanical alterations were hallux valgus with 43.4%, hammer-toe with 34.6%, and claw toe with 29.4%, all more frequent in the female sex (Table 4), the peripheral vascular disease was present in 27.9% of cases as peripheral arterial disease, and in 58.1% of cases as peripheral venous disease (Table 5).

Table 2. Prevalence of foot problems in older adults in southern ecuadorian gerontological centers according to type of pathology by age and sex

VARIABLE	AGE				SEX		
	Youngest- old (65 - 74)	Middle-old (75 - 84)	Oldest-old (85 or more)	Total	Female	Male	Total
	n = 47	n = 47	n = 42	n = 136	n = 81	n = 55	n = 136
BIOMECHANICAL PATHOLOGY							
Present	42 (89.4)	41 (87.2)	26 (61.9)	109 (80.1)	65 (80.2)	44 (80)	109 (80.1)
Absent	5 (10.6)	6 (12.8)	16 (38.1)	27 (19.9)	16 (19.8)	11 (20)	27 (19.9)
DERMATOLOGICAL PATHOLOGY							
Present	45 (95.7)	46 (97.9)	41 (97.6)	132 (97.1)	78 (96.3)	54 (98.2)	132 (97.1)
Absent	2 (4.3)	1 (2.1)	1 (2.4)	4 (2.9)	3 (3.7)	1 (1.8)	4 (2.9)
VASCULAR AND NEUROPERIPHERAL PATHOLOGY							
Present	22 (46.8)	32 (68.1)	30 (71.4)	84 (61.8)	49 (60.5)	35 (63.6)	84 (61.8)
Absent	25 (53.2)	15 (31.9)	12 (28.6)	52 (38.2)	32 (39.5)	20 (36.4)	52 (38.2)

The table must be read in columns, where **n** is the number of individuals per age group and sex. The cells follow the format **A (B)**, where **A** represents the number of cases per variable, and **B** represents the percentage per variable.
Source: own elaboration

Table 3. Foot problems according to dermatological pathology in older adults in southern ecuadorian gerontological centers

VARIABLE	AGE				SEX		
	Youngest- old (65 - 74)	Middle-old (75 – 84)	Oldest-old (85 or more)	Total	Female	Male	Total
	n = 47	n = 47	n = 42	n = 136	n = 81	n = 55	n = 136
DERMATOPATHIES							
Hyperkeratosis							
Present	36 (76.6)	40 (85.1)	30 (71.4)	106 (77.9)	62 (76.5)	44 (80)	106 (77.9)
Absent	11 (23.4)	7 (14.9)	12 (28.6)	30 (22.1)	19 (23.5)	11 (20)	30 (22.1)
Interdigital fissures							
Present	31 (66)	33 (70.2)	25 (59.5)	89 (65.4)	51 (63)	38 (69.1)	89 (65.4)
Absent	16 (34)	14 (29.8)	17 (40.5)	47 (34.6)	30 (37)	17 (30.9)	47 (34.6)
Skin mycosis							
Present	24 (51.1)	20 (42.6)	21 (50)	65 (47.8)	33 (40.7)	32 (58.2)	65 (47.8)
Absent	23 (48.9)	27 (57.4)	21 (50)	71 (52.2)	48 (59.3)	23 (41.8)	71 (52.2)
ONYCHOPATHIES							
Onychomycosis							
Present	10 (21.3)	15 (31.9)	16 (38.1)	41 (30.1)	21 (25.9)	20 (36.4)	41 (30.1)
Absent	37 (78.7)	32 (68.1)	26 (61.9)	95 (69.9)	60 (74.1)	35 (63.6)	95 (69.9)

VARIABLE	AGE				SEX		
	Youngest- old (65 - 74)	Middle-old (75 – 84)	Oldest-old (85 or more)	Total	Female	Male	Total
	n = 47	n = 47	n = 42	n = 136	n = 81	n = 55	n = 136
Onychogryphosis							
Present	20 (42.6)	24 (51.1)	26 (61.9)	70 (51.5)	33 (40.7)	37 (67.3)	70 (51.5)
Absent	27 (57.4)	23 (48.9)	16 (38.1)	66 (48.5)	48 (59.3)	18 (32.7)	66 (48.5)
Onychocryptosis							
Present	26 (55.3)	24 (51.1)	21 (50)	71 (52.2)	46 (56.8)	25 (45.5)	71 (52.2)
Absent	21 (44.7)	23 (48.9)	21 (50)	65 (47.8)	35 (43.2)	30 (54.5)	65 (47.8)
Subungual hematoma							
Present	8 (17)	6 (12.8)	6 (14.3)	20 (14.7)	15 (18.5)	5 (9.1)	20 (14.7)
Absent	39 (83)	41 (87.2)	36 (85.7)	116 (85.3)	66 (81.5)	50 (90.9)	116 (85.3)

The table must be read in columns, where **n** is the number of individuals per age group and sex. The cells follow the format **A (B)**, where **A** represents the number of cases per variable, and **B** represents the percentage per variable.
Source: own elaboration

Table 4. Foot problems according to biomechanical pathology in older adults in southern ecuadorian gerontological centers

VARIABLE	AGE				SEX		
	Youngest- old (65 - 74)	Middle-old (75 – 84)	Oldest-old (85 or more)	Total	Female	Male	Total
	n = 47	n = 47	n = 42	n = 136	n = 81	n = 55	n = 136
ALTERATION OF THE FIRST FINGER							
Hallux valgus							
Present	21 (44.7)	25 (53.2)	13 (31)	59 (43.4)	38 (46.9)	21 (38.2)	59 (43.4)
Absent	26 (55.3)	22 (46.8)	29 (69)	77 (56.6)	43 (53.1)	34 (61.8)	77 (56.6)
ALTERATIONS OF THE LESSER FINGERS							
Claw toe							
Present	8 (17)	23 (48.9)	9 (21.4)	40 (29.4)	27 (33.3)	13 (23.6)	40 (29.4)
Absent	39 (83)	24 (51.1)	33 (78.6)	96 (70.6)	54 (66.7)	42 (76.4)	96 (70.6)
Hammertoe							
Present	19 (40.4)	19 (40.4)	9 (21.4)	47 (34.6)	29 (35.8)	18 (32.7)	47 (34.6)
Absent	28 (59.6)	28 (59.6)	33 (78.6)	89 (65.4)	52 (64.2)	37 (67.3)	89 (65.4)
Finger on mallet							
Present	8 (17)	11 (23.4)	6 (14.3)	25 (18.4)	17 (21)	8 (14.5)	25 (18.4)
Absent	39 (83)	36 (76.6)	36 (85.7)	111 (81.6)	64 (79)	47 (85.5)	111 (81.6)
ALTERATIONS OF THE FIFTH METATARSAL							
Tailor's bunion							
Present	8 (17)	11 (23.4)	4 (9.5)	23 (16.9)	16 (19.8)	7 (12.7)	23 (16.9)
Absent	39 (83)	36 (76.6)	38 (90.5)	113 (83.1)	65 (80.2)	48 (87.3)	113 (83.1)
Cavus Foot							
Present	1 (2.1)	2 (4.3)	2 (4.8)	5 (3.7)	1 (1.2)	4 (7.3)	5 (3.7)
Absent	46 (97.9)	45 (95.7)	40 (95.2)	131 (96.3)	80 (98.8)	51 (97.2)	131 (96.3)
Flat Foot							
Present	12 (25.5)	5 (10.6)	1 (2.4)	18 (13.2)	11 (13.6)	7 (12.7)	18 (13.2)
Absent	35 (74.5)	42 (89.4)	41 (97.6)	118 (86.8)	70 (86.4)	48 (87.3)	118 (86.8)

The table must be read in columns, where **n** is the number of individuals per age group and sex. The cells follow the format **A (B)**, where **A** represents the number of cases per variable, and **B** represents the percentage per variable.
Source: own elaboration

Table 5. Foot problems according to vascular and neuroperipheral pathology in older adults in southern ecuadorian gerontological centers

VARIABLE	AGE				SEX		
	Youngest- old (65 - 74)	Middle-old (75 – 84)	Oldest-old (85 or more)	Total	Female	Male	Total
	n = 47	n = 47	n = 42	n = 136	n = 81	n = 55	n = 136
ULCERS							
Vascular Ulcers							
Present	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Absent	47 (100)	47 (100)	42 (100)	136 (100)	81 (100)	55 (100)	136 (100)
Pressure ulcers							
Present	1 (2.1)	0 (0)	0 (0)	1 (0.7)	0 (0)	1 (1.8)	1 (0.7)
Absent	46 (97.9)	47 (100)	42 (100)	135 (99.3)	81 (100)	54 (98.2)	135 (99.3)
Neuropathic ulcers							
Present	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Absent	47 (100)	47 (100)	42 (100)	136 (100)	81 (100)	55 (100)	136 (100)
PERIPHERAL ARTERIAL DISEASE							
Present	9 (19.1)	12 (25.5)	17 (40.5)	38 (27.9)	20 (24.7)	18 (32.7)	38 (27.9)
Absent	38 (80.9)	35 (74.5)	25 (59.5)	98 (72.1)	61 (75.3)	37 (67.3)	98 (72.1)
PERIPHERAL VENOUS DISEASE							
Present	18 (38.3)	31 (66)	30 (71.4)	79 (58.1)	46 (56.8)	33 (60)	79 (58.1)
Absent	29 (61.7)	16 (34)	12 (28.6)	57 (41.9)	35 (43.2)	22 (40)	57 (41.9)

The table must be read in columns, where **n** is the number of individuals per age group and sex. The cells follow the format **A (B)**, where **A** represents the number of cases per variable, and **B** represents the percentage per variable.
Source: own elaboration

Discussion

Foot problems have acquired importance in the branch of geriatrics and internal medicine, thanks to international research results in recent years. The research affirms the correlation between foot problems and quality of life, balance, walking, risk of falls, fractures, and mobility disorders in older adults [4][5][9]. Despite the high prevalence of foot problems in older adults and their possible complications, this problem is not fully addressed in Ecuador. Knowing the prevalence of these pathologies is the first step to understanding this reality. It is imperative to know the statistics in the region to establish strategies, such as the mitigation of associated risk factors, and to improve, as far as possible, the quality of life of the geriatric population. These were the reasons that fostered the development of the study in the geriatric centers in southern Ecuador.

The research revealed that 59.6% of the study group was female, with an average age of 79.5 years. Similarly, in the studies of Vázquez and Olivares [5] and Carmona [13], the female population represented 89% and 69.9%, respectively. The high percentage of the female population may explain the high prevalence of foot problems found in the study groups. This is because women are more susceptible to these lesions due to the long-term use of inadequate footwear [14][15].

The predominant instruction level was primary, with 66.2%. A similar result was reported by González et al. where the maximum degree achieved was incomplete primary (38%) [3]. Regarding occupation, it was found that 27.2% were engaged in domestic chores, 26.5% in other occupations, 17.6% in crafts, and 14.7% in agriculture. This is consistent with what was reported by Ferreira et al., where 23% were engaged in domestic chores

and 20.1% in agriculture [16]. These results may be similar due to the sociocultural context in which the studies were developed. Further studies are needed to analyze whether there is a relationship between the educational level of patients and insufficient knowledge of foot care.

The results indicated that the prevalence of foot problems in adults was 100%; i.e., all the older adults who participated in this study presented at least one lesion, either biomechanical, dermatological, or vascular and neuroperipheral. This percentage is similar to those obtained in the research of González et al. [3], Vázquez and Olivares [5], Lázaro et al. [6] and Lai et al. [7], with a prevalence of 100%, 99%, 90.7%, and 81%, respectively. The high prevalence of foot problems in this age group could be attributed primarily to the natural aging process. Considering that the entire foot is involved in this process, with structural, vascular, and trophic changes [17]; besides, other factors such as chronic inappropriate footwear use and the presence of comorbidities.

Dermatological pathology was the most prevalent, in 97.1% of the study population, 98.2% of the male sex, and 97.9% in the age group between 75 and 84. The most prevalent lesion, regardless of sex, was hyperkeratosis with 77.8%, followed by interdigital fissures with 65.4%. Martínez et al. found that the prevalence of hyperkeratosis was 46.19% [18], Romero et al. reported a 53,4% [19], and Estellés a 69% [20]. These results indicate that older adults have more dermatological-type lesions related to a lack of foot care and hygiene or to the presence of concomitant diseases that predispose to trophic changes in the skin and nails of the lower limbs.

Biomechanical pathology was present in 80.1% of the study population and was more prevalent in the 65-74 age group. The most prevalent pathologies were hallux valgus with 43.4%, hammer-toe with 34.6%, and claw toe with 21.4%, all more frequent in the female sex. These data coincide withVázquez and Olivares who concluded the most prevalent lesions were hallux valgus with 54% and claw toe with 41% [5]. Similarly, Martínez et al. reported a prevalence of claw toes of 65.4%, and hallux valgus of 36.8% being the most frequent [18]. The high prevalence of biomechanical pathology in these studies could be attributed to inadequate footwear, particularly because the study groups were constituted mainly by women.

In this study, the prevalence of vascular and neuroperipheral pathology was 61.8%, it was higher in the male sex with 63.6%, and in the age group over or equal to 85 years old with 71.4%. Peripheral vascular disease was present in 27.9% of cases as peripheral arterial disease and 58.1% as peripheral venous disease. According to Martínez et al., the prevalence of vascular pathology was 43.27% [18]. In both cases, the diagnosis was made based on the older adult's foot inspection, making it challenging to diagnose early-stage lesions. This could explain the lower prevalence of this type of lesion. The results obtained will serve as a starting point for future research on factors associated with foot problems.

Conclusions

The high prevalence of foot problems found in this study makes evident the importance of educating older adults, their families, and health care personnel about foot care. Understanding foot problems in the elderly is critical due to their relationship with walking and their significant impact on life quality and functional capacity, besides the psychosocial implications and increased costs of health services. For this reason, addressing foot problems in this population group requires early recognition of risk factors, etiological factors, and physical, mental, and social manifestations. Preventive and therapeutic interventions against foot

problems require thorough research, and this research lays the groundwork and emphasizes the relevance of studying this type of pathology in the older adult population.

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