

PROFILE OF PATIENTS WITH OSTEOPOROTIC FRACTURES AND FACTORS THAT DECREASE PREVENTION

PERFIL DE PACIENTES COM FRATURAS OSTEOPORÓTICAS E FATORES QUE DIMINUEM ADERÊNCIA À PREVENÇÃO

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ABSTRACT

Objective: To evaluate the epidemiological profile of patients with osteoporotic fractures compared to patients with osteoarthritis (OA) and identify factors that diminish adherence to secondary prevention. **Methods:** A total of 108 patients with osteoporotic fractures (OF) were compared to 86 patients with OA. **Results:** Patients in the OF group were older ($p < 0.001$); had a lower body mass index ($p < 0.001$); were less literate ($p = 0.012$); were more frequently Caucasian ($p = 0.003$); were less frequently married ($p < 0.001$); experienced more falls, cognitive deficiency, previous fractures, old fracture, falls in the last year, and fall fractures; needed more help and took more medicine for osteoporosis ($p < 0.05$); and showed less pathology in the feet, muscle weakness, less vitamin D intake, and lower Katz & Lawton scores ($p < 0.001$). Factors that increased the chance of nonadherence included older age ($p = 0.020$), falls ($p = 0.035$), cognitive deficiency ($p = 0.044$), and presence of depression/apathy/confusion ($p < 0.001$). **Conclusion:** Patient age, ethnicity, marital status, previous falls, foot pathologies, muscle weakness, previous fractures, use of vitamin D, use of osteoporosis drugs, and lower Katz & Lawton scale score defined the OF group. Factors that increased the chance of nonadherence included older age, sedative use, cognitive disorders, and symptoms of depression/apathy/confusion. **Level of Evidence III, Case-control.**

Keywords: Osteoporotic Fractures. Osteoporosis. Epidemiology. Prevalence. Secondary Prevention.

RESUMO

Objetivo: Avaliar o perfil epidemiológico de pacientes com fraturas osteoporóticas, comparando com pacientes com osteoartrite (OA) e identificar fatores que diminuem a aderência à prevenção secundária. **Métodos:** 108 pacientes com FO foram comparados a 86 pacientes com OA. **Resultados:** Grupo FO era mais velho ($p < 0,001$), com menor IMC ($p < 0,001$), menos alfabetizado ($p = 0,012$), com maior frequência de brancos ($p = 0,003$), menor frequência de casados ($p < 0,001$). Apresentaram mais quedas, deficiência cognitiva, fraturas prévias, fratura antiga, queda no último ano, fraturas por queda. Necessitam de mais auxílio e tomam mais medicamento para osteoporose ($p < 0,05$); apresentaram menos patologia nos pés, fraqueza muscular. Tomam menos vitamina D e menor Katz & Lawton ($p < 0,001$). Tem aumento da chance de não aderência: maior idade ($p = 0,020$), sedativo ($p = 0,020$), quedas ($p = 0,035$), deficiência cognitiva ($p = 0,044$) e presença de depressão/apatia/confusão ($p < 0,001$). **Conclusão:** Idade do paciente, etnia, estado civil, quedas prévias, patologias nos pés, fraqueza muscular, fraturas prévias, uso de vitamina D, uso de medicamentos para osteoporose e a escala Katz & Lawton definem o grupo FO. Aumentam a chance de não aderência: maior idade, sedativos, distúrbios cognitivos e sintomas de depressão/apatia/confusão. **Nível de Evidência III, Estudo de caso controle.**

Descritores: Fraturas por osteoporose. Osteoporose. Epidemiologia. Prevalência.

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INTRODUCTION

Osteoporosis, the most common bone disease,¹ is characterized by a progressive decrease in bone mass that leads to a decrease in bone strength and higher risk of fractures¹ and considered a public health problem responsible for the expenditure of R\$ 290 million from 2008 to 2010 by the Brazilian Unified Health System.² As the Brazilian population ages, the incidence of osteoporotic fractures

(OF) is increasing. The number of proximal femoral fractures is estimated to increase from 80,640 in 2015 to 198,000 in 2040.³ In addition to the economic impact, OF have a great social cost since they are associated with an increased mortality rate, decreased independence,⁴ loss of self-esteem, depression, and distortion of body image.⁵ Although osteoporosis treatment has been available since the 1990s, up to 80% of eligible patients do not receive

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treatment.⁶ This treatment failure is associated with the disastrous socioeconomic consequences of OF, especially proximal femoral fractures. This led to the development of secondary prevention programs⁷ aiming at reducing the incidence of OF, especially proximal femoral fractures.

Although these programs are cost-effective⁸ and capable of reducing mortality rates,⁹ they have not been able to reduce the incidence of new proximal femoral fractures, which may be due to low treatment adherence.^{10,11}

Unfortunately, studies on the epidemiology of patients with OF in Brazil are scarce, which makes it difficult to implement a program to reduce the impacts of osteoporosis.

This study aimed to evaluate the epidemiological profile of the population affected by OF (proximal femoral fractures, proximal humeral fractures, distal radial fractures, and thoracolumbar spinal fractures) treated in an orthopedic tertiary care hospital over a 12-month period with or without a previous diagnosis of osteopenia or osteoporosis and compare this profile with that of patients with osteoarthritis (OA) treated in the same period and identify factors that may decrease the adherence rates of OF patients to a secondary prevention program.

OBJECTIVES

Primary objective

The primary objective of this study was to describe the epidemiological profile of patients with OF treated in a tertiary orthopedic care hospital and identify the possible factors associated with this fracture compared to patients with OA treated during the same period.

Secondary objective

The secondary objective of this study was to describe the characteristics associated with lower adherence rates to a secondary prevention program and the function of patients with OF.

MATERIALS AND METHODS

The Osteometabolic Diseases Group conducted this study upon receiving ethics committee approval (number 76629217.3/0000.0068). All patients signed an informed consent form after having their doubts clarified. The study included all patients admitted in the Orthopedic Institute for treatment of the OF in the period of twelve months and patients with knee OA (only those treated in the osteometabolic diseases group of a tertiary orthopedic care hospital).

Inclusion criteria: Study group (patients with OF): Patients > 45 years of age who had one or more of the following fractures: proximal femur, proximal humerus, distal radius, and thoracolumbar spine. Patients with high-energy fractures were not included.

Control group (patients with OA): Patients > 45 years of age with a clinical and radiographic diagnosis of knee OA isolated or not and with or without comorbidities.

Exclusion criteria: Patients < 45 years of age with suspected or confirmed pathological fractures; non-collaborative patients.

Interventions: The participants answered a questionnaire (Table 1) that was used to collect data such as demographic profile, fracture type, ethnicity, education level, personal history, previous fractures, physical activity level, mobility, place and time of the accident that caused the fracture, use of medications and behavioral measures to treat osteoporosis, and evaluation of functionality according to Katz and Lawton & Brody (12,13). Following the international protocol, all patients in the OF group were referred to a secondary prevention outpatient clinic.⁷

Statistical analysis

We describe the characteristics of the patients using absolute and relative frequencies by groups for qualitative variables and

verified the association using chi-square tests or Fisher's exact test. We calculated summary measurements (mean and standard deviation or median, minimum, and maximum) by groups for quantitative variables and compared the groups using Student's t-test or the Mann-Whitney U-test. In fractured patients, the characteristics were described according to adherence or loss of follow-up and the same tests were performed as previously described. The unadjusted odds ratio of each variable was used to estimate the chance of OF; in the fractured patients, the chance of loss of follow-up was determined with the respective intervals at a 95% confidence level. Multiple logistic regression models were estimated to explain the group of osteoporotic fractures; in the fractured patients, loss of follow-up, selecting the variables that were significant in the bivariate tests and using stepwise backward regression to select the variables with criteria for entry and exit of variables at 5% ($p < 0.05$). SPSS for Windows version 20.0 was used to perform the analyses and the data were entered in Microsoft Excel 2003. The tests were performed using a significance level of 5%.

RESULTS

The results of the questionnaires administered to 108 patients with OF and 86 patients with knee OA (or OA of multiple joints including the knee) are summarized in Table 1.

Table 1 shows that, in isolation, the patients with OF were older ($p < 0.001$) and had a lower mean weight and lower BMI ($p < 0.001$). The frequency of literacy was lower ($p = 0.012$), the frequency of Caucasian race was higher ($p = 0.003$), and the frequency of married individuals was lower ($p < 0.001$) in the OF group.

Patients with OF had more previous falls, cognitive impairment, previous fractures, old fracture (>1 year), fall in the last 12 months, fracture after a fall, needed more help, and took more medication for osteoporosis ($p < 0.05$). They had fewer foot pathologies, muscle weakness, took less vitamin D, and had lower Katz & Lawton's Activities of Daily Living (ADL) and Instrumental ADL (IADL) scores ($p < 0.001$). Table 2 shows that patient age, ethnicity, marital status, previous falls, foot pathologies, muscle weakness, previous fractures, use of vitamin D, use of medications for osteoporosis and Katz & Lawton's IADL explained the occurrence of OF in the patients regardless of the other evaluated characteristics ($p < 0.05$). For each 1-year increase in patient age, the chance of OF increased 8%; Caucasian patients were 6.58 times more likely to have OF than non-Caucasian patients; those who were widowed or single or had another marital status were more likely to have OF than married patients; patients with previous falls were 8.15 times more likely to have OF than those without previous falls; patients with previous fractures were 4.55 times more likely to have OF than those without previous fractures; and patients who used medications for osteoporosis were 27.39 times more likely to have OF than those who did not. The factors that decreased the chance of OF were: foot pathologies (decreased the chance of OF by 91%); muscle weakness (decreased the chance of OF by 92%); use of vitamin D (decreased the chance of OF by 90%); and level of independence on the Katz & Lawton scale (decreased the chance of OF by 38% for each unit increase in scale score).

Table 3 shows that, in isolation, fractured patients who were lost to follow-up more frequently were older ($p = 0.020$), used more sedatives ($p = 0.020$), had more falls ($p = 0.035$), or had cognitive impairment ($p = 0.044$) or depression/apathy/confusion ($p < 0.001$). Table 4 shows that, together, the chance of loss of follow-up increased 10% with each 1-year increase in patient age; the chance of follow-up loss in patients who used sedation was 8.69 times higher than that of patients who did not; and the chance of follow-up loss in patients who had depression/apathy/confusion was 8.50 times higher than that chance of patients who did not have these symptoms.

Table 1. Description of patient characteristics by group and results of the unadjusted analyses.

Variable	Group			OR	95% confidence interval		p
	Control (n = 86)	Osteoporosis (n = 108)	Total (N = 194)		Lower	Superior	
Gender (female), n (%)	68 (79.1)	78 (72.2)	146 (75.3)	0.69	0.35	1.34	0.272
Age (years), mean SD	65 ± 8.9	75.2 ± 11.1	70.7 ± 11.3	1.11	1.07	1.14	<0.001**
Weight (kg), mean SD	73.7 ± 14.2	66.9 ± 13.7	69.9 ± 14.3	0.97	0.95	0.99	<0.001**
Height (cm), mean SD	160.7 ± 7.3	160.7 ± 8.5	160.7 ± 8	1.00	0.96	1.04	0.971**
BMI (kg/m ²), mean SD	28.5 ± 5	26 ± 5.3	27.1 ± 5.3	0.91	0.86	0.96	<0.001**
Education (literate), n (%)	84 (97.7)	95 (88)	179 (92.3)	0.17	0.04	0.79	0.012
Education (school years), median (min.; max.)	8 (0; 30)	8 (0; 18)	8 (0; 30)	0.96	0.91	1.02	0.160£
Ethnicity (Caucasian), n (%)	60 (69.8)	94 (87)	154 (79.4)	2.91	1.41	6.01	0.003
Civil status, n (%)							<0.001
Married	52 (60.5)	34 (31.5)	86 (44.3)	1.00			
Widower	11 (12.8)	42 (38.9)	53 (27.3)	5.84	2.64	12.90	
Single	7 (8.1)	16 (14.8)	23 (11.9)	3.50	1.30	9.39	
Other	16 (18.6)	16 (14.8)	32 (16.5)	1.53	0.68	3.46	
Living with, median (min.; max.)	1 (0; 5)	1 (0; 6)	1 (0; 6)	0.97	0.77	1.23	0.454£
Father or mother with hip fx, n (%)	5 (5.8)	12 (11.1)	17 (8.8)	2.03	0.69	5.99	0.195
Current smoker, n (%)	9 (10.5)	18 (16.7)	27 (13.9)	1.71	0.73	4.03	0.215
Glucocorticoid, n (%)	4 (4.7)	8 (7.4)	12 (6.2)	1.64	0.48	5.64	0.429
Secondary osteoporosis, n (%)	8 (9.3)	6 (5.6)	14 (7.2)	0.57	0.19	1.72	0.316
Alcohol use >3 doses per day, n (%)	5 (5.8)	3 (2.8)	8 (4.1)	0.46	0.11	1.99	0.470*
Sedatives, n (%)	9 (10.5)	9 (8.3)	18 (9.3)	0.78	0.30	2.05	0.611
Previous falls, n (%)	16 (18.6)	56 (51.9)	72 (37.1)	4.71	2.43	9.13	<0.001
Cognitive impairment, n (%)	3 (3.5)	15 (13.9)	18 (9.3)	4.46	1.25	15.96	0.013
Visual impairment, n (%)	38 (44.2)	55 (50.9)	93 (47.9)	1.31	0.74	2.32	0.351
Lower limb impairment, n (%)	15 (17.4)	10 (9.3)	25 (12.9)	0.48	0.21	1.14	0.091
Foot pathologies, n (%)	25 (29.1)	8 (7.4)	33 (17)	0.20	0.08	0.46	<0.001
Change in balance, n (%)	25 (29.1)	33 (30.6)	58 (29.9)	1.07	0.58	2.00	0.822
Muscle weakness, n (%)	35 (40.7)	29 (26.9)	64 (33)	0.54	0.29	0.98	0.042
Altered gait, n (%)	24 (27.9)	29 (26.9)	53 (27.3)	0.95	0.50	1.79	0.870
Postural hypotension, n (%)	14 (16.3)	16 (14.8)	30 (15.5)	0.89	0.41	1.95	0.779
Dizziness, n (%)	20 (23.3)	24 (22.2)	44 (22.7)	0.94	0.48	1.85	0.864
Depression/apathy/confusion, n (%)	13 (15.1)	22 (20.4)	35 (18)	1.44	0.68	3.05	0.344
Diabetes, n (%)	27 (31.4)	35 (32.4)	62 (32)	1.05	0.57	1.93	0.881
SAH, n (%)	52 (60.5)	56 (51.9)	108 (55.7)	0.70	0.40	1.25	0.230
Hypothyroidism, n (%)	19 (22.1)	15 (13.9)	34 (17.5)	0.57	0.27	1.20	0.135
Previous fractures, n (%)	15 (17.4)	48 (44.4)	63 (32.5)	3.79	1.93	7.43	<0.001
Old fracture (>1 year), n (%)	15 (17.4)	50 (46.3)	65 (33.5)	4.08	2.08	8.00	<0.001
Physical activity before fracture, n (%)	30 (34.9)	25 (23.1)	55 (28.4)	0.56	0.30	1.06	0.072
Fear of falling, n (%)	52 (60.5)	67 (62)	119 (61.3)	1.07	0.60	1.91	0.823
Falls in the last 12 months, n (%)	18 (20.9)	58 (53.7)	76 (39.2)	4.38	2.31	8.33	<0.001
Fracture due to fall, n (%)	2 (2.3)	104 (96.3)	106 (54.6)	1092.0	195.2	6107.8	<0.001
Help, n (%)	7 (8.1)	62 (57.4)	69 (35.6)	15.21	6.43	36.02	<0.001
Previous diagnosis of osteoporosis, n (%)	27 (31.4)	35 (32.4)	62 (32)	1.05	0.57	1.93	0.881
Calcium use, n (%)	30 (34.9)	26 (24.1)	56 (28.9)	0.59	0.32	1.11	0.099
Sunbathe 3x week, n (%)	49 (57)	56 (51.9)	105 (54.1)	0.81	0.46	1.44	0.477
Vitamin D use, n (%)	53 (61.6)	32 (29.6)	85 (43.8)	0.26	0.14	0.48	<0.001
Osteoporosis drug use, n (%)	4 (4.7)	15 (13.9)	19 (9.8)	3.31	1.06	10.36	0.032
Katz & Lawton DLA, median (min.; max.)	6 (3; 6)	6 (0; 6)	6 (0; 6)	0.49	0.29	0.82	<0.001£
Katz & Lawton IADL, median (min.; max.)	8 (1; 8)	8 (0; 8)	8 (0; 8)	0.73	0.62	0.86	<0.001£

Chi-square test; *Fisher's exact test; **Student's t-test; £Mann-Whitney's U-test.

Table 2. Results of the joint model to explain the fracture group by osteoporosis according to evaluated characteristics.

Variable	OR	CI (95%)		p
		Lower	Superior	
Age (years)	1.08	1.03	1.13	0.002
Ethnicity (caucasian)	6.58	1.71	25.00	0.006
Civil status				
Married	1.00			
Widower	4.27	1.22	15.02	0.024
Single	31.35	5.35	183.61	<0.001
Other	6.41	1.50	27.38	0.012
Previous fall	8.15	2.21	30.07	0.002
Foot pathologies	0.09	0.02	0.42	0.002
Muscle weakness	0.08	0.02	0.32	<0.001
Previous fracture	4.55	1.45	14.24	0.009
Vitamin D use	0.10	0.03	0.31	<0.001
Osteoporosis drug use	27.39	3.00	249.99	0.003
Katz & Lawton IADL	0.62	0.47	0.82	0.001

Multiple logistic regression.

DISCUSSION

We found that patients with OF were older, weighed less, had a lower mean BMI, and were more likely to be Caucasian, findings that are in agreement with the results of other studies.^{14,15} However, no great influence of glucocorticoid consumption, alcohol consumption, or smoking was observed as described in the literature.¹⁴ We found a protective relationship against OF in married patients compared to those with other marital statuses (Table 1) as in our previous studies.¹⁵ Patients with osteoporosis had more previous falls, a greater number of falls in the last year associated with bone fragility, old fractures (>1 year), and more previous fractures. The OF group used more medication for the treatment of osteoporosis, needed more help, and had lower Katz & Lawton's ADL and IADL scores. The greater number of falls can be explained by higher age and eventual

Table 3. Description of the characteristics of the fractured patients according to loss of follow-up and result of the unadjusted analyzes.

Variable	Attendance			OR	CI (95%)		p
	Adhere (N = 87)	Loss of contact (N = 14)	Total (N = 101)		Lower	Superior	
Gender (female), n (%)	63 (72.4)	11 (78.6)	74 (73.3)	0.88	0.36	2.11	0.754
Age (years), mean SD	73.8 ± 11	81.2 ± 10.2	74.8 ± 11.2	1.02	0.98	1.06	0.020**
Weight (Kg), mean SD	67.7 ± 13.6	64.1 ± 11.5	67.2 ± 13.4	0.98	0.94	1.02	0.344**
Height (cm), mean SD	160.3 ± 8.5	161.5 ± 8.6	160.4 ± 8.5	1.02	0.95	1.09	0.611**
BMI (Kg/m ²), mean SD	26.5 ± 5.4	24.5 ± 3.5	26.2 ± 5.2	0.91	0.80	1.05	0.190**
Education (literate), n (%)	78 (89.7)	13 (92.9)	91 (90.1)	0.36	0.13	1.03	>0.999
Education (school years), median (min.;max.)	8 (0; 18)	8 (1; 15)	8 (0; 18)	1.01	0.90	1.13	0.653£
Ethnicity (Caucasian), n (%)	76 (87.4)	11 (78.6)	87 (86.1)	0.81	0.26	2.54	0.406
Civil status, n (%)							0.844#
Married	26 (29.9)	5 (35.7)	31 (30.7)	1.00			
Widower	34 (39.1)	6 (42.9)	40 (39.6)	0.70	0.26	1.88	
Single	14 (16.1)	2 (14.3)	16 (15.8)	1.69	0.58	4.95	
Orther	13 (14.9)	1 (7.1)	14 (13.9)	0.36	0.07	1.89	
Living with, median (min.; máx.)	1 (0; 6)	1 (0; 4)	1 (0; 6)	0.95	0.63	1.45	0.815£
Father ou mother with hi fx, n (%)	11 (12.6)	1 (7.1)	12 (11.9)	0.53	0.06	4.47	>0.999
Current somoker, n (%)	17 (19.5)	1 (7.1)	18 (17.8)	0.32	0.04	2.59	0.454
Glucocorticoid, n (%)	6 (6.9)	2 (14.3)	8 (7.9)	2.25	0.41	12.46	0.306
Secondary osteoporosis, n (%)	5 (5.7)	0 (0)	5 (5)	&			>0.999
Alcohol use > 3 doses per day, n (%)	3 (3.4)	0 (0)	3 (3)	&			>0.999
Sedatives, n (%)	5 (5.7)	4 (28.6)	9 (8.9)	6.56	1.51	28.52	0.020
Previous fall, n (%)	42 (48.3)	11 (78.6)	53 (52.5)	3.93	1.02	15.07	0.035§
Cognitive impairment, n (%)	7 (8)	4 (28.6)	11 (10.9)	4.57	1.14	18.41	0.044
Visual impairment, n (%)	46 (52.9)	6 (42.9)	52 (51.5)	0.67	0.21	2.09	0.486§
Lower limb impairment, n (%)	8 (9.2)	2 (14.3)	10 (9.9)	1.65	0.31	8.69	0.626
Foot pathologies, n (%)	6 (6.9)	2 (14.3)	8 (7.9)	2.25	0.41	12.46	0.306
Change in balance, n (%)	25 (28.7)	7 (50)	32 (31.7)	2.48	0.79	7.80	0.130
Muscle weakness, n (%)	20 (23)	6 (42.9)	26 (25.7)	2.51	0.78	8.10	0.184
Altered gait, n (%)	21 (24.1)	6 (42.9)	27 (26.7)	2.36	0.73	7.57	0.192
Postural hypotension, n (%)	12 (13.8)	2 (14.3)	14 (13.9)	1.04	0.21	5.24	>0.999
Dizziness, n (%)	17 (19.5)	5 (35.7)	22 (21.8)	2.29	0.68	7.71	0.179
Depression/apathy/confusion, n (%)	13 (14.9)	9 (64.3)	22 (21.8)	10.25	2.96	35.48	<0.001
Diabetes, n (%)	28 (32.2)	6 (42.9)	34 (33.7)	1.58	0.50	4.99	0.544
SAH, n (%)	45 (51.7)	9 (64.3)	54 (53.5)	1.68	0.52	5.42	0.382§
Hypothyroidism, n (%)	11 (12.6)	3 (21.4)	14 (13.9)	1.88	0.45	7.83	0.406
Previous fractures, n (%)	38 (43.7)	8 (57.1)	46 (45.5)	1.72	0.55	5.38	0.348§
Old fracture (> 1 year), n (%)	40 (46)	8 (57.1)	48 (47.5)	1.57	0.50	4.90	0.437§
Physical activity before fracture, n (%)	24 (27.6)	1 (7.1)	25 (24.8)	0.20	0.03	1.63	0.179
Fear of falling, n (%)	54 (62.1)	10 (71.4)	64 (63.4)	1.53	0.44	5.27	0.500§
Falls int he last 12 months, n (%)	46 (52.9)	8 (57.1)	54 (53.5)	1.19	0.38	3.71	0.766§
Fracture due to fall, n (%)	84 (96.6)	14 (100)	98 (97)	&			>0.999
Help, n (%)	49 (56.3)	9 (64.3)	58 (57.4)	1.40	0.43	4.51	0.576§
Previous diagnosis of osteoporosis, n (%)	29 (33.3)	4 (28.6)	33 (32.7)	0.80	0.23	2.77	>0.999
Calcium use, n (%)	22 (25.3)	3 (21.4)	25 (24.8)	0.81	0.21	3.16	>0.999
Sunbathe 3x week, n (%)	46 (52.9)	7 (50)	53 (52.5)	0.89	0.29	2.76	0.842§
Vitamin D use, n (%)	28 (32.2)	3 (21.4)	31 (30.7)	0.58	0.15	2.23	0.541
Osteoporosis drug use, n (%)	15 (17.2)	0 (0)	15 (14.9)	&			0.121
Katz & Lawton DLA, median (min.; máx.)	6 (0; 6)	6 (3; 6)	6 (0; 6)	0.91	0.59	1.40	0.224£
Katz & Lawton IADL, median (min.; máx.)	8 (0; 8)	5 (0; 8)	8 (0; 8)	0.86	0.70	1.06	0.245£

Chi-square test; *Fisher's exact test; **Student's t-test; £Mann-Whitney's U-test.

Tabla 4. Results of the joint model to explain follow-up loss of fracture patients according to evaluated characteristics.

Variável	OR	CI (95%)		p
		Lower	Superior	
Age (years)	1.10	1.02	1.19	0.012
Sedative use	8.69	1.36	55.45	0.022
Depression/apathy/confusion	8.50	2.19	33.09	0.002

Multiple logistic regression

sarcopenia,^{16,17} and possible sequelae of previous fractures due to pain and changes in alignment reducing the frequency of physical activity, which leads to decreased bone and muscle mass, which predisposes patients to further falls and fractures.¹⁸ Patients with OF had fewer foot pathologies and muscle weakness and took less vitamin D. We believe that this is a bias since the patients in the OA group are currently in outpatient follow-up associated with a holistic multiprofessional educational program for the treatment of OA,¹⁹ which enables these patients to recognize deformities, pathologies, and muscle weaknesses. Moreover, they are actively studied for

vitamin D deficiency. It is worth mentioning that muscle weakness was self-reported; we did not perform functional objective tests. Approximately 14% of patients with OF refused to participate in the secondary prevention program. The variables identified as risk factors for follow-up loss were age, use of sedatives, cognitive deficit, greater number of falls, and presence of depression/apathy/confusion. The greatest number of falls may be associated with the use of sedatives and cognitive disorder, although we cannot confirm this with our data. Using multiple logistic regression, we found that: the chance of follow-up loss increased 10% with each 1-year increase in patient age; the use of sedatives increased the chance of follow-up loss by 8.69 times; symptoms of depression/apathy/confusion increased the chance of follow-up loss by 8.5 times. To improve adherence to the secondary prevention program of this subgroup, patients and their families may need an intensive educational program²⁰ that has already reduced falls, increased the frequency of physical activity, improved adherence to drug treatment, and increased the overall quality of life in patients with osteoporosis.

CONCLUSION

Together, patient age, ethnicity, marital status, previous falls, foot pathologies, muscle weakness, previous fractures, use of vitamin D, use of osteoporosis drugs, and Katz & Lawton IADL scale score define patients with OF. The risk factors for non-adherence to the secondary prevention program are patient age, sedative use, cognitive disorder, and the presence of depression/apathy/confusion.

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