TITLE: Sarcopenia and sarcopenic obesity in Spanish community-dwelling middle-aged and older women: Association with balance confidence, fear of falling and fall risk.

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Abbreviations:

EWGSOP , European Working Group on Sarcopenia in Older People; SO, Sarcopenic Obesity; FoF, Fear of Falling; BMI, Body Mass Index; HADS, Hospital Anxiety and Depression Scale; PBF, Percentage of Body Fat; SM, Skeletal Muscle Mass; SMI, Skeletal Muscle Mass Index; TUG, Timed Up and Go; ABC, Activities-specific Balance Confidence scale; FES-I, Falls Efficacy Scale-International;

Abstract
Objectives: To analyze the association of sarcopenia, obesity, and sarcopenic obesity (SO) with fear of falling (FoF) and balance confidence in a Spanish sample of middle-aged and older community-dwelling women.
Study design and outcome measures: A total of 235 women (69.21±7.56 years) participated in this study. Body composition (bioelectrical impedance analysis), hand-grip strength, and physical performance (gait speed) were evaluated for the diagnosis of sarcopenia, obesity, and SO. Anxiety and depression were measured using the Hospital Anxiety and Depression Scale. The Activities-Specific Balance Confidence Scale (ABC) and the Falls Efficacy Scale-International (FES-I) were employed to assess FoF and balance confidence respectively. Scores of >26 (FES-I) and <67% (ABC) were used to identify women at risk of falling. The independent associations of sarcopenia, obesity and SO with FoF, balance confidence, and fall risk were evaluated by multivariate linear and logistic regressions, adjusting for potential confounding variables.
Results: Our findings showed that 27.23% and 18.72% of women presented sarcopenia and SO respectively. Gait speed, body mass index (BMI), and fall history were independently associated with ABC score (adjusted-R^2=0.152) and fall risk (ABC) (adjusted-R^2=0.115). FES-I was independently related (adjusted-R^2=0.193) with fall history, gait speed, BMI, and depression, which together with obesity (BMI) and SO remained independent factors for fall risk measured with FES-I (adjusted-R^2=0.243).
Conclusion: In community-dwelling middle-aged and older Spanish women, BMI, gait speed, and fall history were independently associated with FoF, balance confidence, and fall risk. Depression was only related to FoF, and together with obesity (BMI) and SO, it was an independent predictor of fall risk as assessed by FES-I.

Keywords: Sarcopenia; Obesity; Sarcopenic Obesity; Fall risk, Fear of Falling; Balance Confidence.

1. Introduction

Population aging is a global problem affecting both developed and developing countries, as it is accompanied by changes in body composition that can negatively affect functional status in older adults [1].

Sarcopenia is the term traditionally used to describe an age-related decrease in muscle mass [2], although new diagnostic criteria have been recently added. According to the European Working Group on Sarcopenia in Older People (EWGSOP), sarcopenia is defined as a progressive and generalized loss of skeletal muscle mass and strength, with a risk of adverse outcomes such as physical disability, reduction in physical function, and poor quality of life [3].

In menopause, the loss of muscle mass accelerates as a result of the decrease in estrogen levels [4]. The transition from premenopause to postmenopause status has also been linked to an increase in intra-abdominal fat and total body weight [5]. The coexistence of sarcopenia and increased fat mass is referred to as sarcopenic obesity (SO) [6]. With age, intramuscular and visceral fat increases, leading to poor muscle quality, possibly through the chronic inflammatory state induced by this high body fat, which may adversely impact mobility function and physical activity [7].

One of the main problems related to such changes is an increase in the risk of falling. Falls represent a major health care problem in the elderly population, given their high associated morbidity and mortality [8]. Numerous fall risk factors have been identified [9]. Balance confidence and fear of falling (FoF) may lead to further self-restriction and avoidance of daily-life activities, causing a decline in physical and mental performance that increases the risk of falling and its associated fear, thus creating a vicious circle that affects quality of life and makes people more isolated and dependent [10].

Thus, balance confidence and FoF have been shown to be essential psychological factors to consider when developing fall intervention strategies for the elderly population [11]. Robust associations between FoF and being female have been described [12], and for this reason postmenopausal women may be described as a population at risk.

Based on the above, the objective of the present study was to analyze the association of sarcopenia (as a whole but also considering its components), obesity, and SO with fear of falling, balance confidence, and the risk of falling in a Spanish sample of middle-aged and older community-dwelling women.

2. Methods

2.1. Study design and participants

An analytical cross-sectional study was conducted from October 2016 to March 2017. For this study, 250 postmenopausal women from Eastern Andalusia were initially contacted, of which 235 finally took part in this study. Participants were recruited after we contacted several associations of postmenopausal women in the Eastern Andalusia region (Granada, Jaén and Málaga). A flow diagram of the participants is presented in Figure 1. This study was approved by the Research Ethics Committee of the University of Jaén, Spain. All participants gave their written informed consent to participate in this study, which was conducted in accordance with the Declaration of Helsinki, good clinical practices, and all applicable laws and regulations.

Ambulant women with at least 12 months of amenorrhea were included in the protocol. Exclusion criteria were: currently undergoing hormone therapy, conditions that limit balance and physical activity, functional blindness (acuity level worse than 20/200), severe auditory or vestibular alterations, and central or peripheral neurological disease. Those who were taking vestibular sedatives or other central nervous system depressants were also excluded.

2.2 Study parameters

All women were questioned by well-trained interviewers, who collected demographic and clinical data such as age, weight, height, marital and occupational status, academic education, years of menopause, smoking habits, and history of falls in the previous year (fall history). Participants were classified as physically active if they regularly performed moderate-intensity exercise (more than 30 minutes, three times per week) [13]. A 100g-130 kg precision digital weight scale (Tefal) and a T201-T4 Asimed adult height scale were employed for weight and height assessment. Body mass index (BMI) was calculated by dividing the participant's weight (kg) by her height squared (m^2). A BMI <25 kg/m^2 indicates normal weight, 25 ≤BMI >30 kg/m^2 indicates overweight, and BMI ≥30 kg/m^2 is a sign of obesity [14].

The Hospital Anxiety and Depression Scale (HADS) [15] is a self-administered questionnaire widely used for detecting anxiety and depressive disorders. It comprises 14 items, seven of which relate to anxiety symptoms and seven to depressive symptoms. The total HADS scores range from 0 to 21 for both depression and anxiety, with a cutoff value of 11 or greater indicating both anxiety and depression cases. The Spanish version of the scale was employed in the present study [16].

Bioelectrical impedance analysis was used to measure body composition. Skeletal muscle mass and percentage of body fat (PBF) were examined using the InBody 720 (Biospace Co., Ltd.; Seoul, Korea) bioelectrical impedance analyzer, with an operating frequency of 50 kHz at 800 μA. Participants stood upright with their arms abducted apart from their trunk and legs slightly spread. Regarding PBF, obesity values have been defined as over 35% for women [17]. Skeletal muscle mass (SM) was calculated using the BIA equation from a previous study [18]:

SM (kg)=[0.401×(height2/resistance)+(3.825×gender)- (0.071×age)+5.102], where height is in cm and resistance is in ohms. The gender was zero for women, and one for men. The height-adjusted skeletal mass index (SMI) was calculated by dividing height by meters squared (kg/m^2), and a cutoff point of 6.42 was used for low muscle mass [19].

Hand-grip strength, measured by an analogue dynamometer (TKK 5001, Grip-A, Takei, Tokyo, Japan) with a grip span of 4.5 cm, was employed for muscle strength. Participants were asked to apply their maximum grip strength three times with both left and right hands, with 30s resting intervals between measurements. The maximal measured effort was regarded as their grip strength, and values <20kg were considered as indicative of low muscle strength [20].

Physical performance was assessed through gait speed with the timed Up and Go (TUG) test [3]. It requires standing up from a sitting position on a chair, walking three meters, turning around, and sitting down again. The time scored in the TUG test was converted to an estimate of gait speed using the formula [6/(TUG time)]*1.62. The standard cutoff of ≤0.8 m/s for slow gait speed was used [20].

According to the EWGSOP [3], sarcopenia is defined as the presence of low muscle mass plus low muscle strength or low physical performance. Conversely, the presence of low muscle mass with normal muscle strength and normal physical performance is

defined as presarcopenia, and severe sarcopenia is identified when all three criteria of the definition are met. SO was defined as obesity regarding PBF in addition to the presence of sarcopenia.

The Activities-specific Balance Confidence scale (ABC) [21] is a 16-item questionnaire which is commonly used to quantify the level of confidence in performing a specific task without losing balance or becoming unsteady, and to assess functional balance. The Spanish version of the ABC scale has been employed in this study [22]. Each item score ranges from 0-100%, and the total score of the ABC is obtained by summing the ratings (0-160) and then dividing by 16. The higher the percentage, the higher the patient's degree of self-confidence. A score <67% has been identified as a reliable means of predicting a future fall [23].

The Falls Efficacy Scale-International (FES-I) [24] has been demonstrated to be a valid and reliable instrument for measuring FoF in an older population. In this study, we have used the Spanish version of the FES-I, which has been validated for a postmenopausal population [25]. The FES-I evaluates a wide range of physical, social, and functional aspects related with concerns about falling. It consists of 16 items, and total score ranges from 16 (complete absence of concern) to 64 (extreme concern). A FES-I score >26 points has been shown to be a independent predictive factor for future falls in postmenopausal women aged 50 years or more [26].

2.3 Statistical analysis

Continuous variables were described using means and standard deviations, whereas categorical variables were described using frequencies and percentages. Variable normality was analyzed using the Kolmogorov-Smirnov test. FES-I and ABC total scores were individually introduced as dependent variables in separate models. Pearson's correlation and Student's *t* test were employed to explore the possible relationships of the different components of sarcopenia and obesity, as well as other covariables such as fall history, level of physical activity, anxiety, depression and the number of years since menopause, with ABC and FES-I scores: Those exhibiting significant associations ($p<0.05$) were included in the multivariate linear regression. As for the risk of experiencing future falls as assessed by ABC and FES-I cutoff scores, Student's t test and the chi-squared test were used to analyze the differences between the different components of sarcopenia, obesity, and the previously described covariates. The same procedure was applied, but using multivariate logistic regression, and those that were significantly associated ($p<0.05$) were selected for the logistic regression model. A stepwise method was employed for introducing variables into the model. Adjusted-R^2 was used to calculate the effect size coefficient of multiple determination in the linear models, and R^2 of Nagelkerke was used for the logistic regression model. According to Cohen, R^2 can be deemed insignificant when <0.02, small if between 0.02 and 0.15, medium if between 0.15 and 0.35, and large if >0.35[27]. A 95% confidence level was used ($p<0.05$). Data management and analysis were carried out using the SPSS statistical package for the social sciences for Windows (SPSS Inc., Chicago, IL, USA).

3. Results

Descriptive data of the sample group are presented in Table 1. From a total of 235 participants (69.21 [SD = 7.56] years), 11 (4.7%) were smokers and 29 (9.8%) and 114 (48.5%) had depression and anxiety respectively, according to HADS. The mean total

scores for ABC and FES-I questionnaires were 72.73 (20.12) and 25.89 (8.94) respectively.

Table 2 shows that 39.15%, 27.23% and 8.51% presented presarcopenia, sarcopenia, and severe sarcopenia respectively, and that 18.72% presented sarcopenic obesity. The bivariate analysis of the average differences showed that significantly worsened ABC and FES total scores were observed in women affected by obesity as assessed through BMI ($p=0.001$ and $p<0.001$ respectively), by fall history ($p<0.001$ for both scores), and by depression ($p=0.001$ and $p<0.001$ respectively).

Concerning the bivariate correlation analysis, it showed that both FES-I and ABC total scores were associated with BMI, muscle strength, time since menopause onset ($p<0.001$ for the three of them), physical performance as assessed by gait speed ($p<0.005$), and fat mass percentage ($p<0.001$ and $p<0.005$ for ABC and FES-I, respectively). Meanwhile, no correlation was observed regarding SMI (Table 3).

Parameters showing a previous significant association with the ABC and FES-I scores were included in the linear regression analysis (Table 4). Physical performance ($p<0.001$), as well as BMI ($p=0.001$) and fall history ($p=0.001$) remained independent predictors for balance confidence as assessed through the ABC total score, with a medium-sized effect (adjusted-R^2 of 0.152). As for fear of falling evaluated by FES-I, fall history ($p<0.001$), physical performance ($p=0.001$), BMI ($p=0.008$), and depression ($p=0.010$) were identified as independent predictors, with an adjusted-R^2 of 0.193, which also indicates a medium-sized effect.

According to ABC and FES-I cutoff points, 31.91% and 38.3% of the participants were at risk of falling, respectively. The analysis of every individual association between the components and covariates of sarcopenia and obesity with the risk of falling (Table 5) revealed that participants with an ABC score higher than 76 showed lower hand-grip strength ($p=0.025$) and gait speed ($p=0.011$), and higher values for BMI ($p=0.007$), PBF ($p=0.036$), fall history ($p=0.002$) and depression ($p=0.035$). On the other hand, the presence of obesity as assessed by BMI ($p=0.016$), SO ($p=0.016$), low hand-grip strength ($p=0.001$), gait speed ($p<0.001$) and BMI ($p=0.033$) were associated with ABC scores <26, as did the years since menopause onset ($p=0.008$), fall history ($p=<0.001$) and depression ($p=<0.001$).

Logistic regression analysis was employed to identify factors independently related to the risk of falling as assessed with ABC and FES-I scores (Table 6), and included the variables for which significant differences were found in the exploratory analysis. Multiple logistic regression analysis showed that BMI ($p=0.031$), physical performance measured by gait speed ($p=0.035$), and depression ($p=0.010$) were significant independent predictors of ABC scores higher than 26. As for the FES-I cutoff score, physical performance assessed by gait speed ($p=0.014$), fall history ($p=0.011$), depression ($p=0.001$), obesity assessed by BMI ($p=0.026$), and SO ($p=0.010$) remained as independent factors. Effect sizes in the multiple logistic regression models were small (adjusted-$R^2=0.115$) and medium (adjusted-$R^2=0.243$) for the ABC and FES-I, respectively.

4. Discussion

The objective of this study was to analyze whether sarcopenia, obesity and SO could be independently associated with fear of falling, balance confidence, and fall risk in non-institutionalized Spanish middle-aged and older women. Our findings indicated that, after adjusting for potential confounding variables, BMI and physical performance measured by gait speed were independent significant predictors of worsened balance

confidence, higher FoF, and an increased fall risk as assessed by ABC and FES-I. In addition, obesity and SO assessed by BMI and PBF respectively were also independently associated with a higher risk of falling as evaluated by the FES-I total score.

The estimation of the prevalence of sarcopenia in the older population varies due to several factors such as race or ethnicity differences, and the variety of definitions or the different diagnostic parameters employed. In our study, 39.15% of the participants had sarcopenia, but this percentage decreases to 27.23% when only low SMI was considered. According to this definition, sarcopenia ranges from 19.3% in the United States (37.4% among the Hispanic population) [28] to 33% in Barcelona (Spain) [29] in community-dwelling older women. Meanwhile, Mohseni et al. [30] found that 22% of postmenopausal women (57.6 years) were identified as affected by sarcopenia (EWGSOP criteria). Apart from the factors mentioned above, variations from our observations may be due to differences in the average age of participants in each study.

As for SO, it was identified in 18.72% of the participants of the present study. Similarly to sarcopenia, the incidence of SO greatly depends on the algorithm being applied. In Spain, the EXERNET Multicenter Study, performed in older adults aged 65 years and over, showed a prevalence of 21% and 14% for sarcopenia (only low muscle mass was considered) and SO, with a mean BMI of 29.32 and 39.41% of PBF [31]. The results in the case of our participants were similar for BMI (29.78%) and slightly higher for PBF (42.20%). These variations may be attributable to different cutoff scores used for SMI (<6.56 kg/m^2) and PBF (>40.91%).

Few studies have looked into the association of sarcopenia and SO with FoF and balance confidence, and most of those have analyzed their components separately. In the analysis of individual associations, our results showed that sarcopenia, SO, and muscle mass were not significantly related to FES-I and ABC scores, whereas physical performance measured by gait speed, muscle strength, PBF, BMI, and obesity assessed with BMI showed significant associations. In the multivariate linear regression, only decreased BMI and gait speed remained as independent predictors for both decreased balance confidence and increased FoF, in addition to other variables such as fall history and depression (only with FES-I). Although gait problems appeared to be linked to FoF and balance confidence, results are not conclusive in this regard [32, 33]. As for BMI, studies show contradictory findings and, in a recent study, Tiernan et al. [34] found that balance confidence was inversely related to BMI, although these associations did not reach significance. Meanwhile, other authors demonstrated that higher BMI was independently associated with poor balance confidence [35] and increased fear of falling [36]. These differences may be explained by several factors such as differences in physical performance, FoF and balance confidence assessment methods, or other differences between populations.

Decreased muscle strength has been demonstrated to be independently associated with increased FoF [32], although some of those studies did not account for the influence of potential confounders, especially falls or reduced physical activity level [37]. In our study we found only individual but not independent associations of hand-grip strength with FES-I and ABC scores. Our findings were obtained after adjusting for potential confounding variables such as fall history, anxiety and depression, level of physical activity, or time since menopause onset. Some of these variables were independent predictors for both FoF and balance confidence (fall history), or just for the FES-I total score (depression). These observations are in accordance with those of Hoang et al. [38], who described that these two variables, together with age, were significantly and positively related to FES-I total score. Also, other studies have

identified anxiety [39] and depression [40] symptoms as risk factors for FoF in community-dwelling older adults.

The influence of psychological factors on fall risk has already been demonstrated. FES-I has been shown to be highly correlated with fall risk in postmenopausal women [41], and Landers et al. [11] stated that balance confidence assessed by ABC was the best predictor of falling. When analyzing fall risk as determined by ABC and FES-I cutoff scores, we found that physical performance evaluated by gait speed and fall history were independent predictors of future falls for both scales. In this regard, fall history has been described as one of the most important fall-risk factors and predictors [42], and gait speed is linked to falls, hospitalization, functional decline, and mortality in older people [43]. In agreement with other studies [44,45], our findings showed that total BMI and obesity were independently associated with fall risk (ABC and FES-I respectively).The association of sarcopenia and falls is inconsistent in the literature [46,47], although the combination of low muscle strength and obesity (but not sarcopenic obesity) has been shown to be predictive of increased fall risk [48]. In this respect, our results showed that sarcopenic obesity, together with depression, remained an independent predictor of future falls with regard to FES-I but not to the ABC scale.

In conclusion, the present study demonstrates that, in community-dwelling Spanish middle-aged and older women, BMI, gait speed, and fall history were independently associated with FoF, balance confidence, and fall risk as assessed with both FES-I and ABC questionnaires. Depression was only related to FoF, and together with obesity (BMI) and SO, it was an independent predictor of fall risk as assessed by FES-I. These results allow us to propose that, when studying sarcopenia, SO and age-related changes in body composition, gait speed, and BMI, as well as other variables such as fall history and depression, it may be of help to identify women with increased fear of falling, decreased balance confidence, and increased fall risk.

Contributors

Agustín Aibar-Almazán participated in the study concept and design, data acquisition, interpretation of analyses, and preparation of the manuscript.

Antonio Martínez-Amat participated in the study design and concept, interpretation of analyses, and critical revision of the paper.

David Cruz-Díaz participated in the study design, interpretation of analyses and critical appraisal of its content.

José D. Jiménez-García participated in data acquisition, interpretation of analyses, and critical revision of the paper.

Alexander Achalandabaso participated in the interpretation of analyses, and critical revision of the paper.

Indalecio Sánchez-Montesinos participated in the interpretation of analyses, and critical revision of the paper.

Manuel J. De la Torre-Cruz participated in data analysis, and critical revision of the paper.

Fidel Hita-Contreras participated in the study concept and design, data analysis, interpretation of analyses, preparation and writing of the manuscript. and critical revision of the paper.

Conflict of Interest

The authors have no conflicts of interest to declare.

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Figure 1. Flow diagram of the study participants.

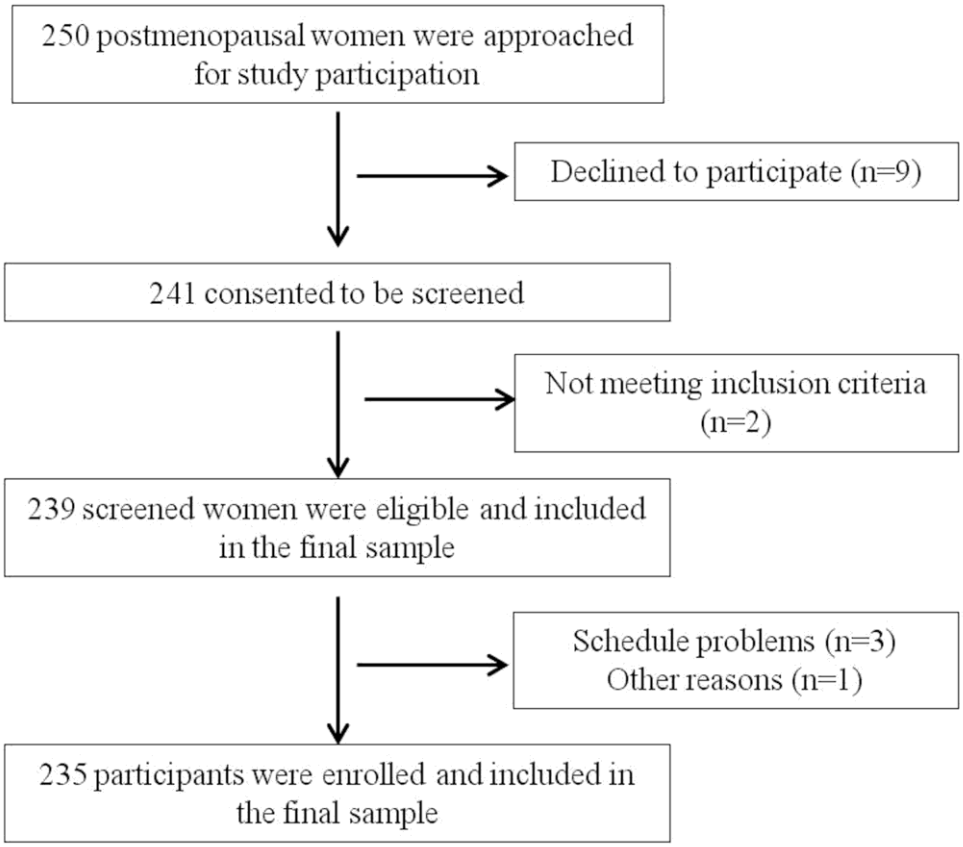

Table 1. Descriptive data of the sample.

		Study sample=235
Age, mean (SD), y		69,21±7,56
Weight, mean (SD)		71,01±10,22
Height, mean (SD)		1,53±0,12
BMI, mean (SD)		29,78±4,20
Time since menopause, mean (SD), y		20,18±8,72
Marital status, n (%)	Single	5(2,1%)
	Married/cohabiting	127(54,0%)
	Separated/divorced/ Widowed	103(43,8%)
Educational status, n (%)	No formal education	67(28,5%)
	Primary education	111(47,2%)
	Secondary education	38(16,2%)
	University	19(8,1%)
Occupational status, n (%)	Retired	164(69,8%)
	working	34(14,5%)
	Unemployed	37(15,7%)
Smoker, n (%)	Yes	11(4,7%)
	No	224(95,3%)
SMI, mean (SD), Kg/m^2		6,94±1,50
PBF		42,20 ±6,24
Muscle strength, mean (SD), kg		18,49±5,12
Gait speed, mean (SD), m/s		1,07±0,31
ABC total score, mean (SD),		72,73±20,12
FES-I total score, mean (SD),		25,89±8,94

BMI: Body Mass Index. HADS: Hospital Anxiety and Depression Scale. SMI: Skeletal Muscle Index. PBF: Percentage of Body Fat. ABC: Activities-Specific Balance Confidence Scale. FES-I: Falls Efficacy Scale International Scale.

Table 2. Body composition and covariates according to the fear of falling and balance confidence.

			ABC		FES-I	
		Frequency (%)	Mean±SD	p-value	Mean±SD	p-value
Presarcopenia	Yes	92(39,15%)	74,39±18,10	0,312	25,37±8,04	0,480
	No	143(60,85%)	71,66±21,31		26,22±9,50	
Sarcopenia	Yes	64(27,23%)	72,77±18,80	0,986	26,38±8,36	0,609
	No	171(72,77%)	72,72±20,64		25,70±9,17	
Severe sarcopenia	Yes	20 (8,51%)	71,16±13,98	0,622	26,95±7,43	0,579
	No	215 (91,49%)	72,88±20,62		25,79±9,08	
Obesity (BMI)	Yes	112(47,66%)	68,13±22,00	0,001	28,04±10,25	<0,001
	No	123 (52,34%)	76,92±17,29		23,92±7,05	
Obesity (PBF)	Yes	180 (76,60%)	71,65±20,25	0,135	26,34±9,40	0,155
	No	55 (23,40%)	76,28±19,46		24,38±7,14	
Sarcopenic obesity	Yes	44(18,72%)	70,65±19,86	0,448	28,16±9,04	0,061
	No	191(81,28%)	73,21±20,20		25,36±8,86	
Fall history		66(28,09%)	70,41±18,77	<0,001	27,79±8,59	<0,001
		169(71,91%)	73,64±20,61		25,14±8,99	
Physically active	Yes	103(43,83%)	70,66±19,96	0,165	26,11±8,25	0,738
	No	132(56,17%)	74,34±20,17		25,71±9,48	
Anxiety	Yes	114(48,51%)	70,95±20,69	0,190	25,94±8,82	0,929
	No	121(51,49%)	74,40±19,50		25,83±9,10	
Depression	Yes	23(9,79%)	61,08±20,63	0,003	32,48±10,82	<0,001
	No	212(90,21%)	73,99±19,70		25,17±8,44	

BMI: Body Mass Index. PBF: Percentage of Body Fat. ABC: Activities-Specific Balance Confidence Scale. FES-I: Falls Efficacy Scale International Scale.

Table 3. Pearson's correlations between ABC and FES-I total scores, obesity and sarcopenia components.

	BMI		PBF		SMI		Handgrip strength		Gait speed		Years since menopause	
	Pearson Correlation	p-value	Pearson Correlation	p-value	Pearson Correlation	p-value	Pearson Correlation	p-value	Pearson Correlation	p-value	Pearson Correlation	p-value
ABC	-0.255	<0.001	0.184	0.005	-0.057	0.386	0.164	0.012	0.258	<0.001	-0.204	0.002
FES-I	0.227	<0.001	0.150	0.021	0.021	0.746	-0.164	0.012	-0.275	<0.001	0.200	0.002

BMI: Body Mass Index. PBF: Percentage of Body Fat. SMI: Skeletal Muscle Index. ABC: Activities-Specific Balance Confidence Scale. FES-I: Falls Efficacy Scale International Scale.

Table 4. Multivariate linear regression analyses for factors associated with ABC and FES-I total scores.

Variable		B	β	95% CI	p-value
ABC					
	Fall history	8,376	,203	3,378;13,373	0,001
	Gait speed	14,397	,219	6,541;22,252	<0,001
	BMI	-0,991	-,207	-1,567;-0,415	0,001
FES-I					
	Fall history	-4,400	-,240	-6,572;-2,227	<0,001
	Gait speed	-6,172	-,211	-9,609;-2,735	<0,001
	BMI	-3,121	-,175	-5,209;- 1,034	0,004
	Depression	-4,644	-,155	-8,203;-1,085	0,011

B: Unstandardized Coefficient. β: Standardized Coefficient. CI: Confidence Interval. ABC: Activities-Specific Balance Confidence Scale. FES-I: Falls Efficacy Scale International Scale. BMI: Body Mass Index.

Table 5. Body composition and covariates in accordance to the risk of falling assessed by FES-I and ABC cutoff points .

		Risk of falling					
		ABC			FES-I		
		Yes (n=75)	No (n=160)	p	Yes (n=90)	No (n=145)	p
Years since menopause		21,72±8,81	19,46±8,61	0,064	22,09±8,53	19,00±8,65	0,008
BMI		30,85±4,53	29,28±3,95	0,007	30,56±4,66	29,30±3,83	0,033
PBF		43,45±6,19	41,62±6,19	0,036	42,80±6,79	41,83±5,86	0,245
SMI		7,01±1,47	6,91±1,51	0,644	6,94±1,46	6,94±1,53	0,983
Handgrip strength		17,40±4,92	19,00±5,15	0,025	17,06±5,03	19,37±4,99	0,001
Gait speed		0,99±0,28	1,10±0,31	0,011	0,97±0,27	1,12±0,32	<0,001
Presarcopenia	Yes	31(34%)	61(66%)	0,669	33(36%)	59(64%)	0,584
	No	44(31%)	99(69%)		57(40%)	86(60%)	
Sarcopenia	Yes	22(34%)	42(66%)	0,639	41(47%)	47(53%)	0,179
	No	53(31%)	118(69%)		49(33%)	98(67%)	
Severe Sarcopenia	Yes	9(45%)	11(55%)	0,213	10(50%)	10(50%)	0,336
	No	66(31%)	149(69%)		80(37%)	135(63%)	
Obesity (BMI%)	Yes	42(38%)	70(63%)	0,093	52(46%)	60(54%)	0,016
	No	33(27%)	90(73%)		38(31%)	85(69%)	
Obesity (PBF%)	Yes	61(34%)	119(66%)	0,321	70(39%)	110(61%)	0,754
	No	14(25%)	41(75%)		20(36%)	35(64%)	
Sarcopenic obesity	Yes	17(39%)	27(61%)	0,288	24(55%)	20(45%)	0,016
	No	58(30%)	133(70%)		66(35%)	125(65%)	
Fall history		40(44%)	50(56%)	0,002	48(53%)	42(47%)	<0,001
		35(24%)	110(76%)		42(29%)	103(71%)	
Physically active	Yes	32(31%)	71(69%)	0,888	43(42%)	60(58%)	0,347
	No	43(33%)	89(67%)		47(36%)	85(64%)	
Anxiety	Yes	40(35%)	74(65%)	0,330	46(40%)	68(60%)	0,592
	No	35(29%)	86(71%)		44(36%)	77(64%)	
Depression	Yes	12(52%)	11(48%)	0,035	18(78%)	5(22%)	<0,001
	No	63(30%)	149(70%)		72(34%)	140(66%)	

BMI: Body Mass Index. PBF: Percentage of Body Fat. SMI: Skeletal Muscle Index. ABC: Activities-Specific Balance Confidence Scale. FES-I: Falls Efficacy Scale International Scale.

Table 6. Multivariate logistic regression analyses for factors associated with the risk of falling according ABC and FES-I cutoff points.

		Multiple regression			
		OR	95% CI		p-value
ABC	BMI	0,925	0,862	0,993	0,031
	Gait speed	2,904	1,079	7,817	0,035
	Fall history	2,152	1,203	3,850	0,010
FES-I	Gait speed	3,643	1,296	10,235	0,014
	Fall history	2,172	1,198	3,937	0,011
	Depression	5,991	1,991	18,033	0,001
	Sarcopenic obesity	2,639	1,256	5,546	0,010
	Obesity (BMI)	1,982	1,085	3,622	0,026

ABC: Activities-Specific Balance Confidence Scale. FES-I: Falls Efficacy Scale International Scale.BMI: Body Mass Index. OR: odds ratio. CI: confidence interval. PSQI: Pittsburgh Sleep Scale Index.