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ORIGINAL ARTICLE

Sarcopenia and Frailty in Older Adults in Medellin. SABE Colombia 2015 Survey

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ABSTRACT

Introduction: Sarcopenia and frailty are important medical syndromes affecting the health of older adults.

Objectives: To determine the prevalence of sarcopenia and frailty in older adults in Medellín by conducting a secondary analysis of data from the 2015 National Survey on Health, Well-being, and Aging in Colombia (known as *SABE Colombia* 2015).

Methods: Sociodemographic, anthropometric, and health variables in adults ≥60 years were analyzed using the SABE Colombia 2015 data. Sarcopenia was defined according to the European Working Group on Sarcopenia in Older People 2 (EWGSOP2), while frailty was defined using Fried et al.'s phenotype. Binary logistic regression was used to identify factors associated with sarcopenia and frailty.

Results: A total of 496 individuals were studied for sarcopenia and 451 for frailty. Sarcopenia was present in 41 older adults (8.3%), while 48 were frail (11.6%). Logistic regression analysis showed that increasing age, lack of formal education, and lower BMI values increase the likelihood of sarcopenia: age (OR 1.08), no formal education (OR 4.4), and BMI (OR 0.66). The factors associated with frailty included age (OR 1.06), no formal education (OR 5.04), and primary education level (OR 4.56).

Conclusions: The prevalence of sarcopenia was lower than that of frailty, and both conditions increase with age and lack of formal education. Early detection of these syndromes and timely management will help reduce morbidity and mortality, contributing to healthier aging.

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ARTÍCULO ORIGINAL

Sarcopenia y fragilidad en personas mayores de Medellín. Estudio SABE Colombia 2015

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INFORMACIÓN ARTÍCULO

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RESUMEN

Introducción: la sarcopenia y la fragilidad son importantes síndromes que afectan la salud de las personas mayores.

Objetivos: determinar la prevalencia de sarcopenia y fragilidad en personas mayores de Medellín mediante el análisis secundario de datos de la Encuesta Nacional de Salud, Bienestar y Envejecimiento (SABE) 2015.

Métodos: de los datos de la SABE Colombia 2015 se analizaron variables sociodemográficas, antropométricas y de salud en adultos ≥60 años. La sarcopenia fue definida según el Grupo Europeo de Trabajo en Sarcopenia en Personas Mayores 2 (EWGSOP2) y la fragilidad de acuerdo con el fenotipo de Fried y colaboradores. Para identificar los factores asociados con sarcopenia y fragilidad se utilizó regresión logística binaria.

Resultados: fueron estudiadas 496 personas para sarcopenia y 451 para fragilidad. En 41 adultos mayores se presentó sarcopenia (8,3%), mientras que 48 fueron frágiles (11,6%). El análisis de regresión logística mostró que el aumento de la edad, no tener ningún nivel educativo y la disminución en los valores del IMC incrementan la probabilidad de generar sarcopenia: la edad (OR 1,08), ningún nivel educativo (OR 4,4), e IMC (OR 0,66); mientras que para la fragilidad resultaron asociados: la edad (OR 1,06), ningún nivel educativo (OR = 5,04) y nivel educativo de primaria (OR 4,56).

Conclusiones: la prevalencia de sarcopenia fue inferior a la de fragilidad y ambas condiciones aumentan con la edad y con no tener ningún nivel educativo. Detectar a tiempo estos síndromes y hacer un manejo oportuno contribuirá a disminuir la morbimortalidad y a lograr un envejecimiento saludable.

INTRODUCTION

Sarcopenia is a condition resulting from alterations in the central nervous, muscular, and hormonal systems, as well as lifestyle (1). In 2010, the European Working Group on Sarcopenia in Older People (EWGSOP1) (2) recommended three criteria for its classification: low muscle mass, low muscle strength, and reduced physical performance. Then, in 2019, the EWGSOP2 (3) updated the criteria for detecting sarcopenia and considered low muscle strength as one of the key parameters in the diagnosis, while the assessment of the other parameters can be used to determine the confirmation and severity of sarcopenia. This update also included new cut-off points for the determination of low muscle strength, with lower values than those established in the 2010 proposal (EWGSOP2: women 16 kg, men 27 kg vs. EWGSOP1: women 20 kg, men 30 kg) (3).

Globally, the prevalence of sarcopenia among the elderly ranges between 1% and 29% in the community-dwelling population, between 14% and 33% in the long-term care population, and reaches 10% in the acute hospital care population (4). In Colombia, a study conducted in Bogota found a 11.5% prevalence of sarcopenia in older adults (5). This condition has different health implications, such as the risk of falls (6), healthcare costs (7) and increased mortality rates (8). Frailty, on the other hand, results from the deterioration that occurs in multiple physiological systems due to age, the decrease in homeostatic reserves and the reduction in the body's ability to withstand stress (9). For its assessment, it is suggested to consider the five criteria proposed by Fried *et al.* (10): weight loss in the past year, physical fatigue or exhaustion, low muscle strength, decreased walking speed, and low physical activity.

The overall prevalence of frailty in community-dwelling older adults is reported to be between 4.9% and 27.3% (11), while data from the 2015 National Survey on Health, Well-being, and Aging in Colombia (known as *SABE Colombia 2015*) reported a prevalence of 17.9% (12). On the other hand, frailty is considered a strong predictor of disability (13), falls (13) and cardiovascular disease (14). Given this context, sarcopenia and frailty are two conditions that significantly impact the health of older adults globally and nationally. However, studies describing the prevalence of sarcopenia and frailty in the city of Medellín are currently lacking. Therefore, this study aimed to determine the prevalence of sarcopenia and frailty among older adults in Medellín, Colombia, using a secondary analysis of the SABE Colombia 2015 data.

MATERIALS AND METHODS

This cross-sectional study evaluated non-institutionalized individuals aged 60 years and older residing in Medellín, using the data obtained from the SABE Colombia 2015 survey. The sample consisted of 849 adults, representative for the city. The sampling design was clustered, multistage, probabilistic and stratified. For more detailed information on the SABE Colombia 2015 survey, see Gómez *et al.* (15). For the analysis, we worked with the grip strength subsample (n = 516), which represented the 715,357 older adults in the city.

Variables

The dependent variables in this study were sarcopenia and frailty. For sarcopenia, the review of the EWGSOP2 (3) was used. Low muscle mass was defined as a calf circumference of less than 31 cm (16). Low muscle strength was defined by measuring the grip strength of both hands using a Takei dynamometer (Takei Scientific Instruments Co., Tokyo, Japan). For this study, the greater of the two

measurements was taken. Values below 16 kilograms for women and 27 kilograms for men were defined as low muscle strength (3). Low physical performance was determined by measuring normal gait speed over 3 meters (12), with a cut-off point set at less than 0.8 m/s (3).

Probable sarcopenia was defined as having low muscle strength while *sarcopenia* was characterized as having low muscle strength accompanied by low muscle mass. *Severe sarcopenia* was defined as having low muscle strength in addition to low muscle mass and low gait speed. For the present study, *sarcopenia* and *severe sarcopenia* were grouped into the "Yes" category, while non-sarcopenic individuals and those with *probable sarcopenia* were classified in the "No" category. The classification of sarcopenia by the EWGSOP (2) was also considered for the analysis.

Frailty assessment was conducted using the five criteria proposed by Fried *et al* (9). Unintentional weight loss was considered for individuals who lost more than 3 kg unintentionally in the last 3 months. Physical fatigue or exhaustion was estimated through self-report: the participants were asked if they had experienced physical fatigue in the month prior to the survey; those who responded affirmatively were included in the frailty criterion. Weakness was determined when participants presented grip strength in the lowest quintile according to their sex and body mass index (BMI) classification. Low gait speed was determined when participants fell within the lowest quintile for their corresponding sex and average height group, as indicated by gait speed measurements in m/s (Table 1).

Table 1. Cut-off Points for Gait Speed and Grip Strength for the Diagnosis of Frailty.

Sex	Walking Speed (m/s)		Grip Strength (kg)			
	<avg. height	≥ avg. height	Quartile 1 BMI (Q1)	Quartile 2 BMI (Q2)	Quartile 3 BMI (Q3)	Quartile 4 BMI (Q4)
Female	<0.455	<0.492	<11	<13	<13	<14.2
Male	<0.485	<0.558	<19	<23.5	<24	<24

Average height (cm): men (163.79). women (151.68). BMI quartiles: men (Q1: ≤22.790; Q2: >22.790 - ≤25.100; Q3: >25.100 - ≤27.825; Q4: > 27.825); women (Q1: ≤24.010; Q2: >24.010 - ≤27.056; Q3: >27.056 - ≤30.306; Q4: > 30.306)

Source: Own work.

Finally, low levels of physical activity were estimated using Reuben's Advanced Activities of Daily Living Scale (17). Individuals meeting three or more criteria were classified as frail, whereas those meeting one or two criteria were classified as prefrail. For the purposes of this study, the *Non-Frail* and *Pre-Frail* groups were combined into a single *Non-Frail* category. The independent variables included sociodemographic factors such as *age, sex, marital status, educational level, socioeconomic status,* and *household composition*; health factors were assessed based on *number of morbidities* and *hospitalization in the last year;* and functional status aspects were determined using the Barthel Index for Activities of Daily Living . This scale ranges between 0 and 100, classifying as dependent those individuals with scores lower than or equal to 99 (18).

The anthropometric measurements of weight, height and circumferences—specifically waist circumference (WC) and calf circumference (CC)—were taken according to the standard methods described by Lohman *et al* (19). For CC, cut-off points of >88 cm for women and >102 cm for

men were used (20). Body Mass Index (BMI) was classified according to the criteria of the Pan American Health Organization: ≤23 = lean; >23 to <28 = normal; ≥28 to <32 = overweight; ≥32 = obese (21).

Statistical Analysis and Software

Data were described using absolute and relative frequencies. The association of the characteristics assessed with sarcopenia and frailty was calculated using the Chi-square test, which is preferred when expected values are greater than or equal to 5, or Fisher's exact test when any expected value in the cells was less than 5. A multivariate binary logistic regression analysis was conducted to identify factors associated with sarcopenia and frailty. The fit of the estimated models was assessed using the Hosmer–Lemeshow test. Sociodemographic variables, health aspects, functionality, and BMI were included in the multivariate analysis. Educational level was divided into three categories: *None, Primary and Secondary/Other* ("other" included Associate's /Technological degree, Bachelor/ Graduate school). Results were presented as *odds ratio* (OR), and their confidence intervals were 95%. SPSS version 23 software was used considering the sample weights for the grip strength subsample. The level of statistical significance was set at a value of $p < 0.05$.

RESULTS

The sociodemographic characteristics of the evaluated population are described in Table 2. Regarding the sarcopenia criteria and their prevalences, it was found that 40.5% (n = 210) presented low *muscle strength* (indicative of *probable sarcopenia*), 23.6% (n = 107) demonstrated low *gait speed,* and 14.4% (n = 70) had a CC of less than 31 cm (indicating *low muscle mass*). With these criteria, the prevalence of sarcopenia in the city was determined to be 8.3% according to the EWGSOP2 (Table 3). However, the frequency of sarcopenia was slightly higher when the EWGSOP1 criteria were used, at 11.3%.

Table 2. Sociodemographic Characteristics, Medellín, 2015

Characteristics	n	%
Socioeconomic Strata		
Stratum 1	58	10.1
Stratum 2	262	54.6
Stratum 3	173	31.8
Stratum 4	17	2.6
Strata 5 and 6	6	0.9
Sex		
Male	164	31.7
Female	352	68.3
Age	516	70.6 ± 7.7
60-69	278	52.9
70-79	168	33.5
80+	70	13.6
Marital Status		
Married	204	40.6
Domestic partnership	30	6.1
Divorced	55	9.5
Widowed	143	28.1
Single	84	15.7
Educational Level		
None	54	10
Primary	310	62.2
Secondary	126	23.1
Associate's /Technological Degree	19	3.7
Bachelor/Graduate school	7	1

Source: Own work

Table 3. Prevalence of Sarcopenia and Frailty by Sociodemographic Characteristics, Medellín, 2015

Characteristic	Sarcopenia				Frailty			
	Total	No	Yes	p*	Total	No	Yes	p*
		%	%			%	%	
Sex								
Male	155	93	7		144	89.9	10.2	
Female	341	91.1	8.9	0.545	307	87.7	12.3	0.446
Total	496	91.7	8.3		451	88.4	11.6	
Age								
60 - 69	267	95.6	4.4		256	91	9	
70 - 79	167	91.4	8.6	<0.001	143	87.8	12.2	0.021
80+	62	77.2	22.8		52	77.5	22.5	
Marital Status								
Married	198	94.6	5.4		183	89.3	10.7	
Domestic partnership	29	96.3	3.7		29	96.1	3.9	
Divorced	55	97.6	2.4	0.01	48	90	10	0.525
Widowed	134	88.1	11.9		117	86.8	13.2	
Single	80	85.3	14.7		74	84.2	15.8	
Socioeconomic Strata								
Stratum 1	57	95.1	4.9		54	86.5	13.5	
Stratum 2	251	89.9	10.1		227	89.1	10.9	
Stratum 3	166	94.9	5.1	0.179†	151	88.4	11.6	0.440†
Stratum 4	16	82.8	17.2		13	82.3	17.7	
Stratum 5 and 6	6	73.4	26.6		6	82.2	17.8	
Educational Level								
None	52	86.4	13.6		44	80.8	19.2	
Primary	299	90.7	9.3		266	85.6	14.4	
Secondary	120	94.9	5.1	0.473†	117	97.9	2.1	<0.001†
Associate's /Technological Degree	19	100	0		18	87	13	
Bachelor/Graduate school	6	100	0		6	100	0	

* Chi-square test of independence; †Fisher's exact test

Source: Own work

A bivariate analysis showed a positive association with *age* and a negative association with BMI (see Tables 3 and 4). Additionally, cardiovascular risk according to WC was associated with a lower prevalence of sarcopenia (Table 4). After applying the multivariate logistic model to determine the factors associated with sarcopenia, a direct relationship was found with having *no educational level* (OR = 4.44) and with *age* (OR = 1.08). In contrast, an inverse association was found with BMI (OR = 0.66) (Table 5).

Table 4. Behavior of Sarcopenia and Frailty Based on Dependency, Anthropometric C haracteristics, Hospitalization, and Morbidities, Medellín, 2015

Characteristic	Sarcopenia				Frailty			
	Total	No	Yes	p*	Total	No	Yes	p*
		%	%			%	%	
Barthel Classification (Dependency)								
Independence	405	92.1	7.9	0.7	379	90.6	9.4	0.001
Dependence	91	90.1	9.9		72	77.7	22.3	
BMI (OPS)								
Thin	90	76.8	23.2		90	90.3	9.7	
Normal	203	93.4	6.6		196	87.8	12.2	
Overweight	113	100	0	<0.001	109	88.9	11.1	0.906
Obese	58	100	0		55	86	14	
Total	464	92.3	7.7		450	88.3	11.7	
Waist Circumference								
Normal	239	88.2	11.8		220	90.2	9.8	
Cardiovascular Risk	241	97.2	2.8	<0.001	216	86.6	13.4	0.189
Total	480	92.7	7.3		436	88.4	11.6	
In the past year. have you been admitted to the hospital?								
Yes	71	88.9	11.1	0.607	57	83.7	16.3	0.374
No	425	92.2	7.8		394	89	11	
Morbidities								
0	88	91.9	8.1		85	90.2	9.8	
1	148	88.3	11.7		132	96.9	3.1	
2	126	92.4	7.6		115	82.2	17.8	
3	82	95.9	4.1	0.396 †	74	87.9	12.1	<0.001†
4	37	94.3	5.7		32	76	24	
5	14	85.8	14.2		12	91	9	
6	1	100	0		1	0	100	

* Chi-square test of independence; †Fisher's exact test

Source: Own work

Table 5. Disparity Ratios for Sarcopenia and Frailty, Medellín, 2015

Variables	Sarcopenia				Frailty			
	OR	p	CI 95% OR		OR	p	CI 95% OR	
			Lower	Upper			Lower	Upper
Sex								
Male	1				1			
Female	1.92	0.154	0.78	4.72	1.1	0.806	0.52	2.31
Age in Completed Years	1.08	0.004	1.03	1.14	1.06	0.013	1.01	1.1
Educational Level								
Secondary/others*	1				1			
None	4.44	0.044	1.04	19.03	5.04	0.016	1.35	18.82
Primary	2.7	0.068	0.93	7.83	4.56	0.006	1.56	13.3
Barthel Index (Dependence)								
Independent	1							
Dependent	0.94	0.912	0.3	2.98				
Number of Morbidities								
0	1				1			
1	1.06	0.92	0.36	3.15	0.32	0.071	0.09	1.1
2	1.05	0.941	0.31	3.54	1.61	0.349	0.59	4.39
3	0.53	0.438	0.11	2.62	0.95	0.926	0.3	3.01
4 to 7	0.91	0.923	0.13	6.32	1.99	0.262	0.6	6.58
In the past year, have you been admitted to the hospital?								
No	1				1			
Yes	0.79	0.723	0.13	6.32	1.38	0.473	0.57	3.36
BMI	0.66	<0.001	0.58	0.75	1	0.98	0.93	1.07

Nagelkerke: 0.372. Hosmer–Lemeshow: 0.804; Nagelkerke: 0.163 Hosmer–Lemeshow: 0.709.

* Includes secondary school, associate's/technological degree and bachelor/graduate school.

Source: Own work

On the other hand, the diagnostic criteria for frailty showed the following findings: 19 older adults (7.1%) experienced unintentional *weight loss* of more than 3 kg in the three months prior to the survey; 212 (40.4%) reported *physical fatigue or exhaustion;* 164 (33%) were classified as *inactive;* 85 (17%) showed low *muscle strength,* which was adjusted for BMI and *sex*; and 93 (21.9%) had low *gait speed,* which was adjusted for height and sex. The frequency of *prefrailty* was 53.8%, while the prevalence of frailty among the older adult population in Medellín was 11.6% (Table 3).

In the bivariate analysis, associations were found with *age, educational level, number of morbidities* and *dependence to perform basic activities of daily living* ($p < 0.05$) (Tables 3 and 4). Additionally, the multivariate logistic model showed that characteristics such as age (OR = 1.06) and having a primary educational level (OR = 4.56) or none (OR = 5.04) were associated with higher odds ratios for frailty (Table 5). Lastly, highlighting the interrelationship between sarcopenia and frailty, 14 older

adults (3.1%) presented both syndromes. The average *age* of this group was 75 ±9 (8 individuals were between 60 and 79 years, 9 were women, 12 were classified as stratum 2, and 11 had attained only a primary school education).

DISCUSSION

The main objective of this study was to determine the prevalence of sarcopenia and frailty among older adults in Medellín, Colombia, based on data from the SABE Colombia 2015 survey. The findings show a lower prevalence of sarcopenia compared to frailty, with both conditions associated with *age* and *educational level.* Additionally, BMI was found to have an inverse association with sarcopenia. The prevalence rates of sarcopenia in our study, assessed by EWGSOP2 criteria, are lower than those found using the EWGSOP1 consensus. This finding is similar to that reported in different contexts by several authors who have compared the results derived from both consensuses (22-25). Specifically, our results using EWGSOP2 are lower than those reported by Reiss *et al.* (18.1%) (22) and the meta-analysis by Petermann-Rocha *et al.* (10%– 27%) (26), but higher than the findings of Gomes-Fernandez *et al.* (2.9%) (27), Murphy *et al.* (5.5 %) (24) and Yang *et al.* (4.6%) (23).

The prevalence of sarcopenia, as defined by EWGSOP2, increases significantly with *age,* a result that is consistent with the systematic review and meta-analysis of Mayhew *et al* (28). This relationship may occur because the loss of muscle mass and strength is related to aging, starting around the fourth decade of life. By 80 years of age, individuals may have lost between 30% to 50% of their total muscle mass (29). In addition to muscle loss, there is also a loss of muscle strength, which occurs more rapidly. While at 75 years of age muscle mass is reduced between 0.6% and 0.7% per year in women and between 0.8% and 0.9% in men, the loss of strength occurs at rates of 3% to 4% per year in men and 2.5% to 3% in women (30). Therefore, it is important to prevent sarcopenia from an early age through a healthy lifestyle that includes proper nutrition and regular exercise (4,31).

Although the association between *educational level* and sarcopenia is not consistent in the literature, our study found evidence of an inverse association between both variables, similar to that reported by Yang *et al.* (23) in China and by Shafiee *et al***.** (32) in Iran (nevertheless, the latter observed this in men, not in women). Other authors, however, have not reported this association (33).

Most of our older adults with sarcopenia had a low BMI, a result which aligns with findings from a study conducted in China with 483 community-dwelling elderly individuals (23). When a multivariate analysis was conducted, for each point increase in the BMI of our older adults, there was a negative association with sarcopenia (OR: 0.62; 95% CI: 0.54–0.74). While BMI is commonly used as a global indicator of weight and is considered a risk factor for various chronic noncommunicable diseases, it has limitations. It cannot be used to differentiate the state of the body compartments (fat and lean mass), leading to an uncertain relationship between BMI and sarcopenia. For example, a person with this condition may have a low BMI, while another with sarcopenic obesity may have a normal or high BMI. Consequently, some researchers recommend against using BMI as the sole anthropometric indicator for making clinically important decisions regarding this condition, especially in older adults (34).

The prevalence of frailty found in our study was 2% higher than that observed in the SABE Bogotá study (11.6% vs. 9.4%, respectively) (5). This finding is consistent with the results from the Colombian Eje Cafetero (35) and Cali (Colombia) (36), but approximately 10% lower than that reported in the Caribbean region of Colombia (37). The prevalence of frailty found in the present paper was lower than the result in the SABE Colombia study (17.9%) (12), as well as rates reported in other Latin American and Caribbean countries (19.6%) (38).

There seems to be consensus on the fact that *age* is associated with frailty (12,39,40). As individuals age, there is a greater risk of losing functionality, which increases their state of vulnerability and, consequently, the risk of adverse events (dependence, morbidities, falls and others) (12). In Colombia, for example, the frailty results derived from the SABE study demonstrated a direct association between frailty and *age*. Moreover, this analysis shows that advanced age is a predictor of frailty (1.08; 95% CI 1.070–1.09) (12). Similarly, Buckinx *et al.* (41), in 2015, published their findings on the relationship between these two variables. These authors highlighted the increased frailty among older adult groups divided into quintiles and found a stability in the prevalence of frailty after the age of 75.

Regarding *educational level,* our study shows an association between this factor and frailty. However, there is divergence in the literature regarding this variable, as some studies have shown an inverse relationship (12,35,40,41), while in others no association has been described (5). Among the studies that support the inverse relationship between *educational level* and frailty, particularly in the context of lower income, are those by Buckinx *et al.* (41), conducted with older adults in 2015, and the systematic review by Feng *et al.* (40) in 2017.

Regarding the simultaneous presence of both events studied here, only 14 older adults (3.1%) exhibited both syndromes, which is a higher prevalence than that found in a Bogotá study (5), where 23 individuals (1.6%) were classified with both conditions. In that paper, sarcopenia was evaluated using the EWGSOP1 criteria. Similarly, the study by Petermann-Rocha *et al.* (42) reported a combined presence of these syndromes of 0.5%, but using the EWGSOP2 criteria. This shows that, while frailty and sarcopenia are closely related conditions, they are not identical, as they involve differential parameters for their classification (43). One of the criteria for frailty is global weight loss, while in the case of sarcopenia the criterion is specifically muscle loss (43). Additionally, in both syndromes, different cut-off points are used for classifying gait speed and grip strength (44). However, regardless of the diagnostic methodologies, the detection of both conditions should be implemented in the clinical setting to enable early identification of cases and the design of interventions tailored to the individual needs of patients (45).

This study has some limitations. They include the possible existence of genetic, ethnic, dietary and environmental determinants that may influence the prevalence of sarcopenia and frailty, which were not accounted for in the original SABE survey. It is worth noting that this type of study using secondary data is limited by the available variables and does not enable an analysis of other variables related to the two conditions studied. On the other hand, in the SABE results, some variables, such as height and BMI, presented missing data, which could affect the estimation of frailty prevalence, as some of its criteria are adjusted for these variables. Additionally, the higher frequency of older adults in stratum 2 limits the exploration of the issue across other socioeconomic strata in the city. Finally, the cross-sectional nature of the study does not allow us to establish a cause-effect relationship between the variables.

CONCLUSIONS

In the present study, the prevalence of frailty is higher than that of sarcopenia. Regarding the behavior of the sociodemographic variables, it is noteworthy that both syndromes are directly associated with age and low educational levels. When the EWGSOP2 criteria were used, the prevalence of sarcopenia decreased compared to when their EWGSOP1 counterparts were applied. Currently in Medellín, the joint presence of both syndromes does not represent an alarming health issue,

which is beneficial for this population segment, as having both conditions simultaneously increases the risk of morbidity and mortality. However, due to the aging population and the increase in life expectancy in Colombia, these geriatric syndromes will continue to increase, potentially becoming a public health issue for the city that should be prioritized in the government agendas for different development sectors.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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ETHICAL ASPECTS

The SABE Colombia 2015 survey was conducted in accordance with the principles of the Declaration of Helsinki and Resolution 008430 of 1993 of the Colombian Ministry of Health. Additionally, the procedures for this research were approved by the Bioethics Committees of the Universidad de Caldas (Minutes No. CBCS-021-14) and the Universidad del Valle (Minutes No. 09-014 and O11-015).

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