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Clinical considerations for sarcopenia in older Colombian Afro-descendant and mestizo women

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Abstract

Objectives: To identify the frequencies of clinical suspicion of sarcopenia (CSS) and probable sarcopenia (PS) and their association with ethnic groups.

Methods: This cross-sectional study categorized 700 women into Afro-descendant and mestizo ethnic groups. Calf circumference, muscle strength, and gait speed were measured. CSS was assessed using a sarcopenia risk scale and the measurement of calf circumference; the muscle strength of the dominant hand was used to establish PS. Unadjusted logistic regressions assessed associations between CSS/PS and ethnicity. Two adjusted logistic regression models included relevant covariates.

Results: CSS and PS were identified in 10.4% to 20.7% and 7.8% to 14.1% of study participants, respectively. Compared with mestizos, Afro-descendants had a more favorable sarcopenia risk score, greater calf circumference, and greater muscle strength and were associated with a lower risk for CSS (odds ratio [OR]: 0.13, 95% confidence interval [CI]: 0.06–0.28 and OR: 0.12, 95% CI: 0.07–0.21) and PS (OR: 0.12, 95% CI: 0.05–0.30 and OR: 0.11, 95% CI: 0.06–0.21).

Conclusion: Compared with mestizos, CSS and PS were less frequent among Afro-descendants, who had 87% to 88% lower probability of CSS and 88% to 89% lower probability of PS.

Keywords

Healthy aging, sarcopenia, ethnic group, muscle strength, African Continental Ancestry Group, strength, assistance in walking, rise from a chair, climb stairs, falls scale

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Introduction

The number of adults over 65 years of age has increased in recent decades and represents 9.1% of the world's population.[1] By 2040, 80.8 million older adults—more than double the population in 2000—are expected to be living in the United States.[2] In Europe, the number of adults over 80 years of age doubled between 2001 and 2020.[3] In Latin America, the proportion of older adults is expected to double in less than 25 years (from 12% in 2018 to 23% in 2040) given the increase in life expectancy.[4] By 2050, life expectancy is estimated to be slightly higher than 84.6, 81.2, and 79.0 years in the United States, Europe, and Latin America, respectively.[2–4]

In all population groups, the morphological and functional alterations of organs and systems increase with age and are accompanied by an increased risk of disease due to accumulated cellular and molecular damage over time.[5] Several authors[6–11] have indicated that aging, genetic predisposition, environmental exposure, lifestyle, and ethnic considerations cause unfavorable changes in body composition and the progressive and generalized loss of mass, strength, and skeletal muscle function that negatively affect physical performance. The European Working Group on Sarcopenia in Older People (EWGSOP),[12,13] the World Health Organization,[14] the Foundation for the National Institutes of Health,[15] the Asian Working Group for Sarcopenia,[16] the International Working Group on Sarcopenia,[17] and other organizations have defined aspects of sarcopenia. The deterioration of muscle mass and function is a subject of recent and growing interest worldwide and is associated with falls, physical disability, decreased quality of life, frailty, and increased mortality.[11] Sarcopenia is considered by some scholars as a geriatric syndrome, although significant deterioration in muscle mass and strength has also been reported in middle-aged women.[18] Sarcopenia should not be considered solely a specialized medical event; identifying sarcopenia in community care or prehospital or primary consultation facilitates early or preventive interventions.[19]

Despite its methodological limitations, the Strength, Assistance in walking, Rise from a chair, Climb stairs, and Falls (SARC-F) scale is accepted as a screening test that establishes the risk of sarcopenia. The SARC-F scale is a short and simple tool that has been validated in various populations and has adequate specificity but low sensitivity.[20–24] To improve its sensitivity, combining the scale with calf circumference measurement—a strategy called SARC-F + CalF—has been suggested. Yang et al.[22] observed that specificity was 95.6% and sensitivity was 20.0% when the SARC-F was used alone, whereas specificity was maintained at 90.6% and sensitivity reached 48.9% with the SARC-F + CalF strategy. Measurement of the muscular strength of the dominant hand remains the recommended strategy for identifying a reduction in muscular strength, and two cut-off points are indicated.[12,13] Notably, anthropometric measurements of muscle mass and strength alone are insufficient as an assessment method for sarcopenia.[12,13] Mathematical calculations and complex equations that include measurements obtained from advanced imaging studies have been suggested for diagnosing sarcopenia; however, these methods have limitations in clinical practice.[12,13,20] International criteria that involve clinical and imaging considerations are important, valid, and recommended for establishing the presence and severity of sarcopenia.[12,13,15–17] A flowchart proposed by the EWGSOP2[12] (a more recent version of the EWGSOP) establishes a route for the identification, evaluation, and confirmation of sarcopenia and involves clinical aspects, such as the clinical suspicion of sarcopenia (CSS), probable sarcopenia

(PS), and imaging aspects, that allow diagnosis.[19]

Gaps exist in the study of sarcopenia. Most studies have been conducted on men or groups of both sexes, resulting in a lack of data specifically in women.[11] Many studies have addressed the imaging aspects of sarcopenia, and the few that have explored the clinical considerations of the disease have indicated the need to seek early health care and have facilitated the adoption of early prevention measures.[11,12,18,19] Although the impact of ethnicity on human morbidity and mortality is well-known in various regions, the investigation of the association between ethnic groups and the clinical aspects of sarcopenia has been limited. Studies in Latin American women in which the clinical considerations of sarcopenia are compared between ethnic groups were not found. The study objective was to identify the prevalences of CSS and PS in older Colombian women and their association with ethnic groups.

Method

Design and study population

This cross-sectional study belongs to the research project *Sarcopenia in Colombian Women*. The project was approved by the institutional and research ethics committee of the University of Cartagena, Colombia in accordance with the university's Resolution 02062-2019. Subsequently, the Health Research Group of Women and the university's Vice-Rector for Research signed the commitment document 123-2019 to conduct the project. The suggestions, recommendations, and checklist of the STROBE initiative were considered when structuring the research report.[25]

Women between 60 and 74 years of age who resided in cities in the Western or Colombian Caribbean regions were invited to join the study after they had received detailed information about the project. Participation was anonymous, voluntary, and unpaid and complied with the following phases. First, an informed consent was signed by the participants. Then, the following anthropometric measurements were taken: weight, height, and abdominal, hip, and calf circumference. Muscle strength and gait speed were also measured. Third, the participants completed a form that queried the respondents about ethnic, sociodemographic, and clinical information. Fourth, the participants attended a short educational talk on the general aspects of sarcopenia and aging. Data that allowed the identification of the participants were not requested. Women who did not wish to participate, those with cognitive disabilities, literacy deficiencies, edema in the lower limbs, severe cardiac or renal failure, oncological pathologies, or physical morbidity that limited anthropometric measurements or gait, and those who considered that they could not participate were excluded. Women who could not conduct daily activities and those who were hospitalized at home under the home care model while receiving medical treatment and periodic visits from health professionals were also excluded. Women could freely request withdrawal during any of the phases of fieldwork. Invitations were distributed and information was collected by auxiliary medical or nursing personnel during visits to housing units between Mondays and Saturdays until the forms assigned for each city were exhausted. Women confined to hospital centers were not invited to participate.

Measures

Body weight (kg) and height (m) were measured using a digital scale and a wall-mounted height rod, respectively, as the participants stood barefoot wearing light clothing. The measurements allowed the

calculation of body mass index (BMI; kg/m^2), and nutritional status was defined as follows: underweight (BMI: $\leq$18.49), normal (BMI: 18.50–24.99), overweight (BMI: 25.00–29), and obese (BMI: $\geq$30.00).[26] The abdominal, hip, and calf circumferences were measured with a measuring tape (cm) at the level of the umbilical scar, the anterior superior iliac spines, and the thickest area of both legs, respectively. Abdominal obesity was defined as an abdominal circumference $\geq$89 cm.[27] Android obesity was defined as a waist/hip ratio $\geq$0.85.[28] Anthropometric and clinical measurements proposed by several authors[12,13,29] were used in the study. Reduced muscle mass was identified in two ways: calf circumference <31.0 cm and calf circumference <33.0 cm. To estimate muscle strength, three measurements of the grip strength of the dominant hand (kg) were taken with a Trailite dynamometer (LiteXpress GmbH, Coesfeld, Germany) at 1-minute intervals while the participant remained seated with their shoulder in adduction, elbow flexed 90°, and forearm and wrist in a neutral position. The average grip strength of the dominant hand <16.0 kg was considered a reduced muscle strength. Gait speed (m/second) was calculated with a stopwatch while the participant walked at a moderate pace a length of 4 m that was demarcated on the floor, and two measurements were taken with a 3-minute interval. An average gait speed of <0.8 m/second indicated low physical performance.

The SARC-F scale was used to establish the risk of sarcopenia. The form captures the scale's five items, which cover muscle strength, assistance in walking, difficulty in rising from a chair or climbing stairs, and the number of falls in the last year. The potential answers to the first four questions are rated as "no difficulty" (0 points), "some difficulty" (1 point), "many difficulties," or "total disability" (2 points). The potential answers to the last question are "no falls" (0 points), "from one to three falls" (1 point), and "four or more falls" (2 points) in the past year. The total SARC-F score ranges from 0 to 10. A score between 0 to 3 points suggests a healthy muscular state, whereas a score $\geq$4 indicates a risk of sarcopenia. Sánchez-Rodríguez's[24] validated and Spanish-translated scale was used in the study.

To establish CSS, calf circumference measurement was added to the SARC-F assessment. Two cut-off points for calf measurement have been suggested: $\leq$31 cm and $\leq$33 cm.[21,22,29,30] Therefore, two CSS measurement points were used: SARC-F $\geq 4 +$ CalF ≤ 31 and SARC-F $\geq 4 +$ CalF ≤ 33.To identify the presence of PS, the measurement of the muscular strength of the dominant hand was added to the assessment, which included the SARC-F scale and calf circumference. Although several cut-off points are indicated for assessing muscle strength, <16.0 kg was used, as suggested in the EWGSOP2 criteria.[12,13,29,30] Two measurements were established for PS: SARC-F $\geq 4 +$ CalF $\leq 31 +$ muscle strength (MS) < 16 and SARC-F $\geq 4 +$ CalF $\leq 33 +$ MS < 16, which differed based on calf circumference cut-off point.

Other variables were also measured: age, education, ethnic group, and time in postmenopause, which was classified as late postmenopausal (6–10 years) or remote (>10 years). Based on the information provided and ethnic self-recognition, two groups were formed: Afro-descendants and mestizos. The first group consisted of women who were considered descendants of Africans brought to America during colonial times, were daughters of Black parents who came from Black settlements or communities, and had skin phototype VI (i.e., very dark or black skin), black or dark brown eyes, and black and curly hair. The second group included women who did not self-identify as Afro-descendants, who had at least one parent who was not of Black

ethnicity, and who had skin phototype I–V (i.e., a skin color other than black).

The completed forms were reviewed daily and kept in the custody of members of the research group. The correctly filled-out forms were numbered and transcribed into a Microsoft Excel® database. The incorrectly filled-out forms were archived and not considered in the analysis.

Sample size

The sample size was calculated using the OpenEpi program with data from the 2018 Colombian population census, which projected a 2019 population of 25,271,995 women of which 17.1% were between 60 and 74 years of age. In the geographical departments of Bolivar and Santander, which were selected at convenience, 378,932 of the estimated 2,215,932 resident women were between 60 and 74 years of age. A sample size of 385 women was calculated with a 95% confidence level, 50% heterogeneity, and a 5% margin of error. One hundred (26.0%) forms were added to replace incomplete or poorly completed forms. In addition, given that women who resided in distant and geographically separated areas were targeted for enrollment, 275 (56.7%) forms were added as a precaution against the possible loss of documents. A total of 760 forms were printed and distributed equally among the Colombian cities that were chosen at convenience.

Statistical analysis

The statistical analysis was performed using EPI-INFO-7 (Centers for Disease Control and Prevention, Atlanta, USA). Continuous variables were expressed as mean and standard deviation and categorical variables as absolute and relative values. The significance of the differences between continuous data was estimated using analysis of variance or the Mantel–Haenszel procedure, depending on the distribution of variance based on Bartlett's test. The percentage differences were evaluated using χ^2. Unadjusted logistic regression odds ratios (ORs) and corresponding 95% confidence intervals were used to measure the association between CSS (the dependent variable) and Afro-descendant or mestizo ethnicity (the independent variables) and between PS (the dependent variable) with the same independent variables. In addition, two adjusted logistic regression models were developed with the same dependent variables and Afro-descendant versus mestizo ethnicity, age ranges, nutritional status, postmenopausal status, abdominal and android obesity, and physical performance as independent variables. The goodness of fit was calculated using the likelihood ratio. A p-value <0.05 indicated statistical significance.

Ethical concerns

Women were informed of the research objectives, and no personal data that allowed identification were collected. The participants provided written informed consent and received no incentives in return. The Declaration of Helsinki on research in human beings and the ethical principles of the Belmont Report were considered. Resolution 8430-1993 of the Colombian Ministry of Health allowed the classification of this study as research of minimum risk to the participants.

Results

Eight hundred seventy-four women completed all of the relevant forms and were invited to participate in the study. Because 114 (13.0%) women met the exclusion criteria, they were not included in the study. Sixty (7.8%) forms were incompletely filled out and were excluded. The study was ultimately conducted with the information provided by 700 women, 81.8% above the calculated sample size.

The mean age of all of the participants was 66.9 ± 4.6 years. Among the participants, 42.8% were of mestizo ethnicity and 57.2% were Afro-descendants. None of the participants self-identified as Amerindian. The mean number of years since menopause was 18.9 ± 6.3 and the mean calf circumference was 34.1 ± 4.0 cm. The mean SARC-F score was 1.09 ± 1.70. Overall, 50.7% of the participants had reduced MS, 83.4% had a low physical performance, and a 9.4% risk of sarcopenia was estimated using the SARC-F scale. Greater calf circumference, more MS, a higher frequency of abdominal obesity, and a higher frequency of android obesity were observed (all $p < 0.05$) among the Afro-descendant women compared with the mestizo women. Furthermore, the mean score of all five items and the total score of the SARC-F scale were more favorable among the Afro-descendant women than among the mestizo women. A risk of sarcopenia was observed in 1.7% of Afro-descendant women and 19.6% of mestizo women ($p = 0.001$; Table 1).

CSS was identified in 10.4% of the participants with SARC-F $\geq 4 +$ CalF ≤ 31 and 20.7% of those with SARC-F $\geq 4 +$ CalF ≤ 33. PS was identified in 7.8% of the participants with SARC-F $\geq 4 +$ CalF $\leq 31 +$ MS < 16 and 14.1% of those with SARC-F $\geq 4 +$ CalF $\leq 33 +$ MS < 16. At both cut-off points for calf circumference, CSS and PS were more prevalent in mestizo women than in Afro-descendants ($p < 0.05$; Figure 1).

The unadjusted logistic regression indicated that compared with mestizo ethnicity, Afro-descendant ethnicity was associated with a lower risk for CSS and PS at both of the established cut-off points for calf circumference ($p < 0.05$). The association was preserved when adjusting for the covariates. The estimated ORs were 0.13 (95% CI: 0.06–0.28) and 0.12 (95% CI:0.07–0.21) for CSS, and 0.12 (95% CI: 0.05–0.30) and 0.11 (95% CI: 0.06–0.21) for PS based on the two cut-off points for calf circumference (Table 2).

Discussion

Using the SARC-F scale, we estimated that the risk of sarcopenia in the total sample of participants was 9.4%, lower than the 15.2% estimated by Gomez-Tabares et al.[31] in a population of Colombian women with a mean age of 68.4 ± 8.5 years, the 19.5% in a Mexican population of both sexes older than 60 years of age,[32] and the 21.0% observed in Brazilian women.[33] In contrast, a low frequency of 6.1% has been reported in Chinese men and women with a mean age of 76.0 ± 6.3 years.[34] The heterogeneity of the populations that were included in the studies and several biological, nutritional, and cultural factors may explain this difference. The low sensitivity of the SARC-F scale should always be an important consideration; complementing the scale with anthropometric and clinical measurements is suggested.

By combining the SARC-F scale with calf circumference, we estimated CSS frequency between 10.4% and 20.7%, depending on the cut-off point used for calf circumference. Using the SARC-F $\geq 4+$CALF ≤ 33, Barreto et al.[33] observed that 40.0% of Brazilian women had CSS, a higher frequency than that observed in our study. Adding the grip strength of the dominant hand to the two previous assessments, we observed that 7.8% to 14.1% of the study participants had PS, depending on the cut-off point of calf circumference. Vidal-Cuellar et al.[35] reported PS in 29.2% of women who attended a geriatric clinic; however, only MS was measured and a cut-off point of < 16.0 kg was used in the study. The best alternative to clinically assessing sarcopenia may be to combine the information provided by the SARC-F screening scale with anthropometric and MS measurements. Research is

Table 1. Sociodemographic and clinical characteristics.

Variables	All n = 700	Mestizo n = 300 (42.8%)	Afro-descendants n = 400 (57.2%)	p-value
Age, years, ±SD	66.9 ± 4.6	67.5 ± 4.85	66.53 ± 4.5	0.003*
Age of menopause onset, years, ±SD	48.1 ± 4.1	48.0 ± 4.2	48.2 ± 4.1	0.412†
Years since menopause onset years, ±SD	18.9 ± 6.3	19.5 ± 6.5	18.2 ± 5.9	0.006*
Weight, kg, ±SD	67.6 ± 12.8	69.6 ± 11.3	66.0 ± 13.5	0.001*
Waist, cm, ±SD	90.2 ± 14.5	86.7 ± 11.7	92.8 ± 15.8	0.001*
Hips, cm, ±SD	103.6 ± 10.9	101.2 ± 9.1	105.3 ± 11.8	0.001*
Calf circumference, cm, ±SD	34.1 ± 4.0	33.2 ± 4.1	34.7 ± 3.9	0.001*
Muscle strength, kg, ±SD	16.6 ± 6.1	15.6 ± 5.4	17.2 ± 6.5	0.001*
Gait speed, m/s, ±SD	0.6 ± 0.1	0.67 ± 0.19	0.63 ± 0.12	0.002*
Body mass index, kg/m^2, ±SD	26.5 ± 4.8	27.6 ± 3.9	25.6 ± 5.2	0.001*
Difficulty lifting and carrying 10 pounds, ±SD§	0.32 ± 0.62	0.50 ± 0.70	0.19 ± 0.52	0.001*
Difficulty walking across a room, ±SD§	0.06 ± 0.27	0.14 ± 0.40	0.00 ± 0.07	0.001*
Difficulty transferring from a chair or bed, ±SD§	0.11 ± 0.36	0.21 ± 0.49	0.03 ± 0.20	0.001*
Difficulty climbing a flight of 10 stairs, ±SD§	0.24 ± 0.55	0.53 ± 0.73	0.03 ± 0.17	0.001*
Number of falls in the past year, ±SD§	0.35 ± 0.65	0.59 ± 0.76	0.16 ± 0.47	0.001*
SARC-F screen total score, ±SD§	1.09 ± 1.70	1.98 ± 2.07	0.42 ± 0.91	0.001*
Risk of sarcopenia, n (%) [95% CI]§	66 (9.4) [7.4-11.8]	59 (19.6) [15.5-24.5]	7 (1.7) [0.8-3.5]	0.001‡
Age 60–64 years, n (%) [95% CI]	258 (36.8) [41.2-48.5]	103 (34.3) [29.1–39.8]	155 (38.7) [34.1–43.6]	0.230‡
Age 65–69 years, n (%) [95% CI]	203 (29.0) [24.6–31.2]	67 (22.3) [17.9–27.3]	136 (34.0) [29.5–38.7]	0.001‡
Age 70–74 years, n (%) [95% CI]	239 (34.1) [27.1–36.7]	130 (43.3) [37.8–48.9]	109 (27.2) [23.1–31.8]	0.001‡
Normal nutritional status i.e., BMI: 18.5–24.9, n (%) [95% CI]	253 (36.1) [32.6–39.7]	73 (24.3) [19.8–29.4]	180 (45.0) [40.2–49.9]	0.001‡
Overweight i.e., BMI 25.0–29.9), n (%) [95% CI]	257 (36.7) [33.2–40.3]	140 (46.6) [41.1–52.3]	117 (29.2) [25.1–33.8]	0.001‡
Obese i.e., BMI > 30), n (%) [95% CI]	166 (23.7) [20.7–27.0]	87 (29.0) [24.1–34.3]	79 (19.7) [16.1–23.9]	0.004‡
Abdominal obesity i.e., abdominal circumference >88 cm, n (%) [95% CI]	368 (52.5) [48.8–56.2]	128 (42.6) [37.2–48.3]	240 (60.0) [55.1–64.6]	0.001‡
Android obesity i.e., waist/hip ratio > 0.85), n (%) [95% CI]	410 (58.7) [54.8–62.1]	143 (47.6) [42.0–53.3]	267 (66.7) [61.9–71.1]	0.001‡

(continued)

Table 1. Continued.

Variables	All n = 700	Mestizo n = 300 (42.8%)	Afro-descendants n = 400 (57.2%)	p-value
Low physical performance i.e., <0.8 m/s, n (%) [95% CI]	584 (83.4) [80.4–86.0]	232 (77.3) [72.2–81.7]	352 (88.0) [84.4–90.8]	0.001‡
Reduced muscle strength i.e., <16 kg, n (%) [95% CI]	355 (50.7) [47.0–54.4]	175 (58.3) [52.6–63.7]	180 (45.0) [40.2–49.9]	0.001‡
Reduced muscle mass i.e., calf circumference <31 cm, n (%) [95% CI]	161 (23.0) [20.0–26.2]	86 (28.6) [23.8–34.0]	75 (18.7) [15.2–22.8]	0.002‡
Reduced muscle mass i.e., calf circumference <33 cm), n (%) [95% CI]	315 (45.0) [41.3–48.7]	161 (53.6) [48.0–59.2]	154 (38.5) [33.8–43.3]	0.001‡
Late postmenopause i.e., 6–10 years since menopause onset, n (%) [95% CI]	69 (9.8) [7.8–12.2]	28 (9.3) [6.5–13.1]	41 (10.2) [7.6–13–6]	0.687‡
Remote postmenopause i.e., >11 years since menopause onset, n (%) [95% CI]	631 (90.1) [87.7–92.1]	272 (90.6) [86.8–93.4]	359 (89.7) [86.3–92.3]	

*Analysis of variance.
SD: standard deviation, CI: confidence interval, SD: standard deviation, BMI: body mass index.
†Mantel–Haenszel.
§Strength, Assistance in walking, Rise from a chair, Climb stairs, and Falls scale screen for sarcopenia.
‡Chi^2.

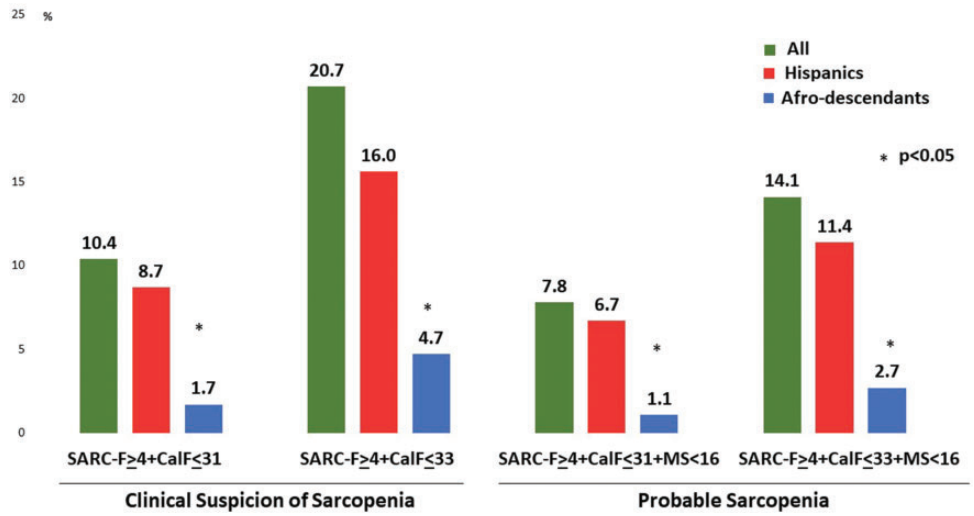

Figure 1. Frequencies of clinical suspicion of sarcopenia (CSS) and probable sarcopenia (PS) based on established measurement criteria. Comparison of ethnic groups ($p < 0.05$).

Table 2. Odds ratios for the association between Afro-descendant ethnicity and the clinical suspicion of sarcopenia and probable sarcopenia (95% confidence interval).

	Odds Ratio for Clinical Suspicion of Sarcopenia				Odds Ratio for Probable Sarcopenia			
	Unadjusted logistic regression		Adjusted logistic regression*		Unadjusted logistic regression		Adjusted logistic regression*	
	SARC-F ≥ 4 + CalF ≤ 31	SARC-F ≥ 4 + CalF ≤ 33	SARC-F ≥ 4 + CalF ≤ 31	SARC-F ≥ 4 + CalF ≤ 33	SARC-F ≥ 4 + CalF ≤ 31 + MS < 16 kg	SARC-F ≥ 4 + CalF ≤ 33 + MS < 16 kg	SARC-F ≥ 4 + CalF ≤ 31 + MS < 16 kg	SARC-F ≥ 4 + CalF ≤ 33 + MS < 16 kg
Mestizo	1							
Afro-descendants	0.12 (0.06–0.22)†	0.15 (0.09–0.23)†	0.13 (0.06–0.28)†	0.12 (0.07–0.21)†	0.10 (0.05–0.23)†	0.13 (0.08–0.23)†	0.12 (0.05–0.30)†	0.11 (0.06–0.21)†

*Age ranges, postmenopausal status, nutritional status, abdominal obesity, android obesity, physical performance classification. Likelihood ratio $p < 0.0001$.
SARC-F: Strength, Assistance in walking, Rise from a chair, Climb stairs, and Falls, CALF: calf circumference.
†$p < 0.001$.

needed to define universal cut-off points for anthropometric measurements. In this study, no differences in the clinical assessment of sarcopenia were observed between the two calf circumference cut-off points used.

A 27.6% prevalence of sarcopenia has been reported based on measurements of muscle mass using electrical bioimpedance and MS based on the grip of the dominant hand.[36] A systematic review found a range in the prevalence of sarcopenia (24.2%–40.4%) that was estimated by measuring appendicular lean mass using dual-energy X-ray absorptiometry (DEXA).[37] Separately, the prevalence of sarcopenia varied between 9.9% and 18.6% when MS or physical performance was included in the assessment.[37] The lack of uniformity in the clinical and imaging aspects used to establish sarcopenia and in the recommendations of various measurement tools make cross-study comparisons difficult. Adding to these differences are the influences of genetic and nutritional aspects, habits and customs, physical activity, and lifestyles. Up to 40% variation in the frequency of sarcopenia has been observed across the various suggested measurement criteria.[38]

Our study found a lower frequency of CSS and PS in Afro-descendant women than in mestizo women. Although studies that compare the clinical considerations of sarcopenia between ethnic groups are lacking, studies that include imaging assessments are available. Du et al.[39] found that the prevalence of sarcopenia defined by DEXA measurement of appendicular lean mass in people over 65 years varied by sex and ethnicity and was lower in Afro-American women than in other ethnic subpopulations residing in the United States, according to information in the National Health and Nutrition Examination Survey. The authors observed the following frequencies of sarcopenia: Hispanic (26.7% male vs. 27.1% female), non-Hispanic White (15.4% male vs. 15.1% female),

and non-Hispanic Black (8.5% male vs. 1.5 female); the frequency of sarcopenia in a diverse and multiracial group that included Asians and Native Americans was 16.4% in men and 23.1% in women. Similar differences were observed in women older than 50 years of age; the prevalence of sarcopenia based on the measurement of lean mass using DEXA were 26.6%, 53.0%, and 54.6% in Afro-descendants, Caucasians, and Chinese patients, respectively.[40] The mechanisms that explain the differences in sarcopenia frequency between ethnic groups are unclear, and relatively limited information exists on this topic. However, one of the mechanisms involved is the positive correlation between endogenous testosterone levels and MS and physical performance.[41] Gallagher et al.[42] found that Afro-American women had higher serum testosterone levels (1.1 nmol/L vs. 0.9 nmol/L, $p < 0.05$) and greater muscle mass (20.5 ± 2.8 vs. 18.6 ± 2.6, $p < 0.001$) as measured with DEXA than Caucasians. A study exclusively in men found a greater lean mass as measured with DEXA in Blacks and Hispanics than in Whites.[43] In a group of women aged 18 to 80 years, Afro-Americans had the highest musculoskeletal mass in kilograms across their lifespans, followed by Whites, Hispanics, and Asians.[9] We contribute to the literature by concluding that in Afro-descendant women, the percentage of women with reduced MS was lower and the SARC-F scores were better compared with mestizo women. We observed greater calf circumference, android obesity, and MS in the dominant hand among Afro-descendant women than among mestizo women. Studies should be conducted in other populations to more clearly determine ethnic differences. The higher muscle mass indices that are typical of some ethnicities could prevent muscle loss that results in a high frequency of sarcopenia and frailty.[44]

In this study, Afro-descendant ethnicity was statistically associated with a lower risk of CSS and PS compared with mestizo ethnicity based on both of the measurements of calf circumference. Although other studies that provide similar comparisons of clinical aspects were not identified, studies in sarcopenia using imaging yield similar results. Bigman et al.[8] observed that non-Hispanic Black people had a lower probability of sarcopenia than White people (OR:0.26, 95% CI: 0.18–0.39, $p < 0.001$) in a cross-sectional study that included both sexes and measured appendicular lean mass using DEXA. Similarly, using DEXA, Jeng et al.[6] showed that Black ethnicity had a 0.19 ($p < 0.001$) odds ratio for sarcopenia compared with White ethnicity. New studies with different designs should be conducted to identify whether clinical findings of sarcopenia correspond with imaging findings in comparisons of Afro-descendant and non-Afro-descendant women.

Strengths, limitations, and recommendations

A study strength is that this is one of the first studies to evaluate and compare clinical considerations of sarcopenia across ethnic/racial groups in Latin America in non-hospital settings under the conceptualization of community care. Ours should be considered initial findings, and additional studies should be performed. Our study underlines the importance of using the SARC-F scale and anthropometric measurements in identifying and evaluating sarcopenia, the steps required before confirmation with imaging, in accordance with the flowchart proposed by Ciudin et al.[19] Finally, our study takes the first step in proposing the use of the term "Afro-descendant" to refer to populations that have African ancestors brought to Latin America. The proposed term allows differentiation from the term "Afro-American,"

which is widely used to refer to the descendants of Africans brought to North America.

The study has several limitations. Given its cross-sectional design, the results indicate statistical associations and not causality. Although the number of women included is based on population data, the results are specific to the study group and extrapolations should be made with caution. Because of the community approach that was used, evaluation with bioimpedanciometry, DEXA, CT, or magnetic resonance was impossible given that these tools were unavailable. Moreover, attempts were made to reduce selection, information, and recall biases, but these biases may have been present and may have resulted in overestimation or underestimation. Establishing ethnic groups based on skin phototype, racial phenotyping, paternal and/or maternal ancestry, community settlements, and self-identified characteristics limit ethnic identification, which can be better determined with the quantification of ancestry genes[45]—a laboratory technique that was not available in the study setting. However, ethnic self-identification offers the added benefit of tacitly including cultural or ancestral customs, habits, and traditions. The inability to easily compare our results with the findings of other authors is an important limitation for two main reasons. First, few studies have explored sarcopenia in a clinical setting and compared results across ethnicities. Second, the heterogeneity in the definitions of ethnic/racial foci made comparisons challenging. For example, several studies[1,6–10,39,42,43] group under the term "Hispanic" all migrants from Central or South America or their descendants. The connotation is more geographic than ethnic or racial and can refer equally to Afro-descendants, Amerindians, and mestizos. The lack of inclusion of Amerindian or indigenous women is another study limitation. Studies that evaluate sarcopenia in indigenous Latin American women were not identified. Afro-descendant, mestizo, and indigenous women who reside in Latin America have different educational levels, nutritional habits, cultural behaviors, menopausal symptoms, and sexuality disorders.[46,47]

We recommend that government authorities authorize policies that ensure that sarcopenia is investigated equally in geriatric settings, community programs, and primary care. Health education institutions are invited to increase training and the number of academic programs that facilitate the exploration of all conditions, including musculoskeletal disorders, that affect older adults' health. Healthcare guidelines and health professionals can query middle-aged people and older adults about the symptoms of sarcopenia using the SARC-F scale because the scale is brief, easy to use, and is considered the best screening tool for sarcopenia.[21] The measurement of calf circumference, grip strength, and gait speed are recommended as part of the physical examination and clinical history to ensure the comprehensive approach that older adults deserve to maintain healthy aging. Healthcare professionals are invited to use criteria such as those of the EWGSOP (and its most recent version EWGSOP2) and those provided by various international scientific societies.[12–17] We also recommend a recently proposed flowchart, which is a good alternative for facilitating the progression from clinical suspicion to confirmation of sarcopenia.[19] These approaches can reduce the heterogeneity in the use and interpretation of measurement tools, a situation that makes comparisons difficult and prevents obtaining solid conclusions, irrespective of whether they are based on clinical or imaging considerations. Finally, given that ethnic or racial aspects have been statistically or causally associated with various morbid conditions, the role of ethnicity or race in relation to sarcopenia and muscle function

must be better established. Accordingly, the possible superior muscle health that one ethnic group possesses compared with another should be fully reflected in the clinical care guidelines for the adult population.

Conclusions

In a group of older adult Colombian women that were evaluated in their places of residence, the risk of sarcopenia that was estimated using a screening scale was lower among Afro-descendant women than among mestizo women. Similarly, compared with mestizo study participants, the frequencies of CSS and PS were significantly lower among Afro-descendants at the two cut-off points that have been proposed for calf circumference. The Afro-descendant group had an 87% to 88% lower probability of CSS and an 88% to 89% lower probability of PS compared with the mestizo group. The data suggest that the frequencies of CSS and PS differ by ethnic group and that the association of the clinical considerations of sarcopenia is lower with Afro-descendant ethnicity than with mixed-race ethnicity. Studies that explore the clinical considerations of sarcopenia and their relationship with ethnic/racial aspects are insufficient. The investigation of other ethnic communities and research designs is warranted to better establish the relationship.

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Author contributions

AM-C (conceptualization, data curation, methodology, writing – original draft, writing – review and editing). MP-T (conceptualization, supervision, writing – review and editing). AM-B (conceptualization, investigation, methodology, writing – original draft; writing – review and editing). All authors approved this manuscript.

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