Prevalence and associated factors of dynapenia in postmenopausal women from urban-marginal community areas of Guayaquil

Prevalencia y factores asociados de dinapenia en mujeres postmenopáusicas de zonas comunitarias urbano-marginales de Guayaquil

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Abstract

Background: Dynapenia is a prevalent diagnosis in older adults. However, there is limited information regarding the prevalence of dynapenia or sarcopenia in socially vulnerable communities in low to middle-income countries.
Objective: This study aimed to estimate the prevalence of dynapenia and to analyze the factors associated with a sample of postmenopausal women in community-dwelling urban marginal areas of Guayaquil.
Methods: A cross-sectional study of 171 postmenopausal women was conducted in Guayaquil from November 2019 to December 2020. Participants were asked to complete a self-reported survey to collect sociodemographic data. Handgrip strength, weight, height, body mass index (BMI), body fat index, and appendicular skeletal muscle index were measured.
Results: In our sample, the prevalence of dynapenia was 57.9%. There were no differences in sociodemographic and clinical characteristics between the dynapenia and non-dynapenic groups. Participants with dynapenia showed higher weight, BMI, body fat index, and appendicular skeletal muscle index.
Conclusion: Dynapenia was prevalent among postmenopausal women of community-dwelling urban marginal areas of Guayaquil. There are opportunities to tailor strategies to prevent and manage dynapenia in vulnerable communities.

Keywords

Dynapenia; handgrip strength; postmenopausal women; sarcopenia; factors associated.

Resumen

Antecedentes: Existe información limitada sobre la prevalencia de dinapenia o sarcopenia en comunidades socialmente vulnerables en países de ingresos bajos a medianos, y la dinapenia es un diagnóstico prevalente en adultos mayores.
Objetivo: Este estudio tuvo como objetivo estimar la prevalencia de dinapenia y analizar los factores asociados a una muestra de mujeres posmenopáusicas de zonas urbanas marginales de vivienda comunitaria de Guayaquil.
Métodos: Se realizó un estudio transversal de 171 mujeres posmenopáusicas en Guayaquil desde noviembre de 2019 hasta diciembre de 2020. Se pidió a las participantes que completaran una encuesta autoinformada para recopilar datos sociodemográficos. Se midieron la fuerza de prensión manual, el peso, la altura, el índice de masa corporal (IMC), el índice de grasa corporal y el índice del músculo esquelético apendicular.
Resultados: En nuestra muestra la prevalencia de dinapenia fue del 57,9%. No hubo diferencias en las características sociodemográficas y clínicas entre los grupos con dinapenia y no dinapénicos. Los participantes con dinapenia mostraron mayor peso, IMC, índice de grasa corporal e índice de músculo esquelético apendicular.
Conclusión: La dinapenia fue prevalente entre mujeres posmenopáusicas de zonas urbanas marginales de Guayaquil. Existen oportunidades para adaptar estrategias para prevenir y controlar la dinapenia en comunidades vulnerables.

Palabras clave

Dinapenia; fuerza de agarre; mujeres postmenopáusicas; sarcopenia; factores asociados.

Introduction

Global population data shows that individuals are getting older due to an increased life expectancy in several countries, including Ecuador, which has a life expectancy of 77.9 years (Amaral et al., 2016). Aging is considered a multifactorial process that leads to muscle weakness attributed to diverse biological and external factors (Arokiasamy & Selvamani, 2018). This process decreases the neuromuscular union, impacting physiological and functional capabilities. Moreover, significant health disparities are evidenced by more significant adverse effects in lower socioeconomic and education populations (Cheval et al., 2018). Research on the aging process has gained attention worldwide. Nevertheless, studies focusing on individuals from urban-marginal areas are still limited (Confortin & Barbosa, 2015), as do middle-aged and older women.

The definition of sarcopenia and its diagnosis has changed since Rosenberg first described it (Rosenberg, 2011). Muscle strength (MS) has gained importance in the diagnosis algorithm and is also considered a good predictor of health problems (Cruz-Jentoft et al., 2019). Muscle mass assessment is considered a nondefining parameter because of the lack of precision in measurement techniques and the variability of cut-off points (Sanchez-Rodriguez et al., 2020). The Global Leadership Initiative in Sarcopenia (GLIS) recently addressed the first global concept of sarcopenia as an age-related loss of muscle mass and strength/function to develop an operational definition for the clinical and research environment (Kirk et al., 2024).

One of the most relevant changes in the aging process is the loss of muscle strength, known as dynapenia (Clark & Manini, 2012). MS begins to decline by approximately 21% in the fifth and sixth decades of women's lives (Milanović et al., 2013). Prevalence of dynapenia is more prevalent than sarcopenia diagnosis in older adults. Research shows that it ranges from 17.2 to 38.2%, being higher in female individuals and those aged 65 and over (Alexandre et al., 2019; Neves et al., 2018). Dynapenia has more significant clinical relevance and better predicts adverse outcomes such as impaired morbidity and mortality (Sayer & Cruz-Jentoft, 2022).

Menopause is a physiological event in a woman's life characterized by the permanent cessation of ovarian follicular activity, causing an abrupt drop in estrogen levels, resulting in the classic signs and symptoms of menopause (Santoro et al., 2015). Symptoms like sleep disturbances can affect well-being, leading to changes in body composition as weight gain, mainly in fat mass, including visceral adiposity (Muscogiuri et al., 2019). The menopausal transition is also associated with loss of estradiol levels, body composition alterations like higher visceral adiposity, and lower muscle mass and strength (La Colla et al., 2015), also these changes can be related to the aging process (Marlatt et al., 2022).

Obesity diagnoses are usually reported in the postmenopausal period, attributed to the lack of estrogen effect and estradiol lipolytic effect (Verde et al., 2022). Factors such as body composition alterations and hormonal changes can lead to the clinical condition called sarcopenic obesity and cause direct consequences on the health of postmenopausal women (Geraci et al., 2021).

Despite the heterogeneity of research protocols and the limited population-based research on aging in developing countries, the prevalence of dynapenia is increasingly recognized as a modifiable factor of interest to public health (Borges et al., 2020a). This study aims to estimate the prevalence of dynapenia and its associated factors in a sample of postmenopausal women living in community-dwelling, urban marginal areas of Guayaquil.

Method

An observational community-based cross-sectional study was conducted from November 2019 to December 2020. Postmenopausal women aged 50 living in urban-marginal neighborhood areas in Guayaquil, Ecuador were invited to enlist in the survey. Women aged 50 years and older of low socioeconomic level were enrolled by open invitation and from three health centers: Nuestra Señora de la Visitación (Isla Trinitaria), Fundación Obra de Dios (Cooperativa 25 de Julio, and Mapasingue). According to Stages of Reproductive Aging Workshop criteria, postmenopausal status was described as the continuous cessation of menstrual period, at least 1 year.

The inclusion criteria included independent women who could perform all the tests, agreed to participate, and signed informed assent. The exclusion criteria included incapacity to fulfill all the tests, severe musculoskeletal disorders, institutionalized individuals, significant neurological diseases such as dementia or severe cognitive impairment, cancer diagnosis, functional dependence, severe peripheral neuropathy, and hand osteoarthritis. The Ethics Committee of "Hospital Clínica Kennedy" approved protocol CEISH No: HCK-CEISH-19-0038.

Participants

Participants completed a self-reported survey with basic standardized information about ethnicity, marital status, education level, and clinical medical conditions. A multidisciplinary team of registered dietitians, physical therapists, and medical researchers conducted self-reported surveys, anthropometric measurements (including body composition), and handgrip assessments. This procedure was performed in community health centers, ensuring a controlled and standardized environment.

The final sample size (n = 171) for this study was determined using the formula for estimating a proportion for a cross-sectional study.

Parameters included an expected prevalence (p=30%), and a 95% confidence level (Z=1.96), with a margin of error (d=0.05). The initial calculation yielded n=161 and was adjusted for a 5% potential non-response rate, resulting in a final sample size of 171 participants.

The categorization of the sample into age groups (50–59, 60–69, 70–79, and 80+) is based on the importance of age as a critical determinant of health in postmenopausal women, comparability with prior research, sample heterogeneity, and clinical relevance.

Procedure

Anthropometric measurements

Participant's body mass (weight) was measured on a SECA 700® mechanical physical scale and recorded in kilograms (kg) to the nearest 0.1 decimal. Height was recorded on a SECA 213® portable stadiometer and reported in centimeters (cm). Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared (kg/m2) and registered with a decimal.

Handgrip strength

A Jamar hydraulic mechanical dynamometer (Lafayette model) was used to assess HGS. The equipment was previously calibrated and checked for the study. The protocol was based on criteria established by the American Society of Hand Therapists (ASHT). The HGS procedure was measured in a sitting position with a chair without extremity support, and the elbow flexed at 90 degrees. All participants were allowed a first test trial and then performed three test measurements on both hands, and the highest value was recorded for data collection. The measurements were in both hands, and the higher result was registered. Weak handgrip strength was defined as an HGS of <16 kg according to EWGSOP2 sarcopenia criteria (Cruz-Jentoft et al., 2019).

Body composition

The procedure was performed under standardized conditions using an octopolar electrical bioimpedance (BIA) SECA BMC 550®. Before the procedures, participants received physiological indications regarding liquids and eating conditions, hydration status, and metal objects. The measurements were performed with individuals in the supine position, and eight electrodes were placed in the upper and lower extremities, two on each wrist/hand for the upper extremities and two on each ankle/foot of the lower extremities to carry out the bioimpedance procedure.

Appendicular skeletal muscle mass (ASMM) was calculated using the Sergi formula and expressed in kg. Appendicular skeletal muscle mass index (ASMI) was calculated as ASMM divided by the square of height. Low ASMI was defined as values < 5.5 kg/m^2, the cut-off value provided in the revised version of the European Working Group on Sarcopenia of Older People (EWGSOP2) (Cruz-Jentoft et al., 2019). Body fat index was registered in percentage.

Data analysis

Collected data were analyzed using IBM SPSS Statics 25. The study participants were separated into two groups according to their dynapenia status. In the descriptive analysis, continuous variables are shown as mean and standard deviation or median and range, and categorical variables are shown as frequencies and percentages. For the bivariate analysis, the numerical variables with normal distribution were compared using the Student's *T* test; contrary to this, we used the Mann-Whitney U test.

Results

The study included 171 participants categorized into age groups: 50-59, 60-69, 70-79, and 80 and older. The mean data of the participants were age 72.7±11.3 years, weight 63.1±14.3, height 148.6 ± 8.1, BMI was 28.4±5.4 kg/m², Body(kg/m2) 12.4 ± 3.7, ASMI (kg/m2) 6.8 ± 1.1, HGS (kg) 15 ± 6.2. The characteristics of the studied population according to the age groups are shown in Table 1. In terms of sociodemographic characteristics, most participants were mestizos (69.6%, n=119), married (33.9%, n=58), and had primary education (54.9%, n=94). Moreover, over half of the participants had hypertension (54.9%, n=94). When assessing nutritional status, most participants were found to be at nutritional risk (43.8%, n=75). Regarding functional status, the most common category was independent (39.8%, n=68). Lastly, frailty was diagnosed in 22.2% (n=38), risk of sarcopenia in nearly half at 47.9% (n=82), and dynapenia was measured in 57.9% (n=99).

Table 1. Characteristics of the studied population according age groups

Variable	Total (n=171)	50-59 years (n=27)	60-69 years (n=45)	70-79 years (n=50)	80 years or more (n=49)	p-value
Ethnicity, n (%)						
Mestizo	119(69.6)	19(70.3)	34(75.6)	36(72.0)	30 (61.2)	0.008*
Afro-Ecuadorian	24 (14)	7 (25.9)	8 (17.8)	6 (12.0)	3 (6.1)	
Caucasian	15 (8.7)	0 (0)	0 (0.0)	5 (10.0)	10 (20.4)	
Indigenous	13 (7.6)	1 (3.7)	3 (6.7)	3 (6.0)	6 (12.2)	
Marital status, n (%)						
Single	48 (28.1)	6 (18.7)	17(37.8)	14(28.0)	11 (22.4)	0.001*
Married	58 (33.9)	15(55.5)	12(26.7)	21(42.0)	10 (20.4)	
Widowed	48(28.01)	1 (3.7)	10(22.2)	13(26.0)	24 (49.0)	
Divorced	17 (9.9)	5 (18.5)	6 (13.3)	2 (4.0)	4 (8.2)	
Education level, n (%)						
None	45 (26.3)	3 (9.3)	15 (33.3)	10 (20.0)	17 (34.7)	0.186
Primary	94 (54.9)	15(56.2)	22(48.9)	29(58.0)	28 (57.1)	
Secondary	27 (15.8)	8 (28.1)	7 (15.6)	9 (18.0)	3 (6.1)	
Tertiary	5 (2.9)	1 (6.2)	1 (2.2)	2 (4.0)	1 (2.0)	
Medical conditions, n (%)						
None	13 (7.6)	2 (7.4)	4 (8.9)	3 (6.0)	4 (8.2)	0.706
T2D	25 (14.6)	4 (14.8)	9 (20.0)	7 (14.0)	5 (10.2)	
Hypertension	94 (54.9)	10(37.0)	23(51.1)	28(56.0)	33 (67.3)	
Dyslipidemia	10 (5.8)	2 (6.25)	3 (6.7)	3 (6.0)	2 (4.1)	
GERD	2 (1.2)	0 (0)	1 (2.2)	1 (2.0)	0 (0)	
Arthritis	12 (7)	4 (12.5)	3 (6.7.)	3 (6.0)	2 (4.1)	
Constipation	15 (8.7)	5 (15.6)	2 (4.4)	5 (10.0)	3 (6.1)	
Nutritional status, n (%)						
Malnutrition	25 (14.6)	6 (22.2)	3 (6.6)	6 (12)	10 (20.4)	0.068
Nutritional risk	75 (43.8)	8 (29.6)	17(37.7)	28 (56)	22 (49.8)	
Normal	71 (41.5)	13(48.1)	25(55.5)	16 (32)	17 (34.6)	
Functional status, n (%)						
Very dependent	8 (4.6)	1 (3.7)	0 (0)	1 (2)	6 (12.2)	0.064
Partially dependent	61 (35.6)	10 (37)	14(31.1)	20 (40)	17 (34.6)	
Minimally dependent	34 (19.9)	8 (29.6)	13(28.9)	6 (12)	7 (14.3)	
Independent	68 (39.8)	8 (29.6)	18 (40)	23 (46)	19 (38.7)	
Frailty, n (%)	38 (22.2)	11(40.7)	8 (17.7)	10 (20)	9 (18.4)	0.092
Sarcopenia risk, n (%)	82 (47.9)	16(59.2)	21(46.7)	21 (42)	24 (48.9)	0.543
Dynapenia, n (%)	99 (57.9)	11(40.7)	21(46.7)	28 (56)	39 (79.6)	0.002
Weight (kg)	63.1±14.3	76.3±14.8	65.7±11.7	62±13.3	54.6±10.8	<0.001*
Heigh (kg)	148.6±8.1	152±6.8	149.5±9.9	149±7.9	145.5±6.4	0.005
BMI (kg)	28.4 ± 5.4	32.9 ± 5.5	29.4 ± 4.5	27.8±4.8	25.8 ± 4.7	<0.001*
Body fat index (kg/m²)	12.4 ± 3.7	14,7 ± 3,7	13.1 ± 3.5	12 ± 3.7	10.8 ± 3	<0.001*
ASMI (kg/m²)	6.8 ± 1.1	7,8 ± 1.2	7.2 ± 0.8	6.6±0.9	6.1± 0.8	<0.001*
HGS (kg)	15 ± 6.2	16.3 ± 6.2	17.2 ± 6.6	15.2±6.4	12.1± 4.2	<0.001*

The dynapenia status was diagnosed in 57.9 % of the sample. Table 2 shows the main characteristics of the participants according to dynapenia status. Dynapenic participants were older than those without dynapenia (75.1 ± 11.6 vs. 69.4 ± 10.1). In individuals with dynapenia, most of the participants were mestizos (71.7%, n=71) and married (33.3%, n=33). More than half of the participants with dynapenia had a primary education level (33.3%, n=33). Hypertension was the most reported medical condition in the dynapenia group (49.5%, n=49), whereas almost half presented a malnutrition risk (47.5%, n=47). There were no differences in sociodemographic and clinical characteristics between those with and without dynapenia. However, there were several significant differences between non-dynapenia and dynapenia groups. Compared with those with no dynapenia, participants with dynapenia showed higher weight ($p < 0.001$), BMI ($p < 0.001$), body fat index ($p < 0.001$), and ASMI ($p < 0.001$).

Table 2. Characteristics of the studied population according to dynapenia status

Variable	Non dynapenia (n=72)	Dynapenia (n=99)	p-value
Age (years)	69.4 ± 10.1	75.1 ± 11.6	0.001
Ethnicity, n (%)			
Mestizo	48 (66.6)	71 (71.7)	0.144
Afro-Ecuadorian	15 (20.8)	9 (9.1)	
Caucasian	5 (6.9)	10 (10.1)	
Indigenous	4 (5.6)	9 (9.1)	
Marital status, n (%)			
Single	22 (30.6)	26 (26.3)	0.868
Married	25 (34.7)	33 (33.3)	
Widowed	18 (25)	30 (30.3)	
Divorced	7 (9.7)	10 (10.1)	
Education level, n (%)			
None	19 (26.4)	26 (26.3)	0.700
Primary	39 (54.2)	55 (55.6)	
Secondary	13 (18.1)	14 (14.2)	
Tertiary	1 (1.38)	4 (4)	
Medical conditions, n (%)			
None	5 (6.9)	8 (8,1)	0.127
T2D	6 (8.3)	19 (19.2)	
Hypertension	45 (62.5)	49 (49.5)	
Dyslipidemia	4 (5.5)	6 (6.1)	
GERD	1 (1.4)	1 (1)	
Arthritis	2 (2.8)	10 (10.1)	
Constipation	9 (12.5)	6 (6.1)	
Nutritional status, n (%)			
Malnutrition	10 (13.9)	15 (15.2)	0.423
Nutritional risk	28 (38.9)	47 (47.5)	
Normal	34 (47.2)	37 (37.4)	
Functional status, n (%)			
Very dependent	2 (2.8)	6 (6.1)	0.378
Partially dependent	23 (31.9)	38 (38.4)	
Minimally dependent	18 (25)	16 (16.2)	
Independent	29 (40.2)	39 (39.4)	
Frailty, n (%)	15 (20.8)	23 (23.2)	0.709
Sarcopenia risk, n (%)	32 (44.4)	50 (50.5)	0.443
Weight (kg)	60.4 ± 13.5	75.7 ± 10.7	< 0.001*
Heigh (kg)	148.8 ± 8.5	147.8 ± 6.5	0.005*
BMI (kg)	27.1 ± 4.8	34.6 ± 3.2	< 0.001*
Body fat index (kg/m^2)	11.7 ± 3.8	15.5 ± 3.5	< 0.001*
ASMI (kg/m^2)	6.6 ± 1	7.9 ± 0.8	< 0.001*
HGS (kg)	15.8 ± 6.4	11.1 ± 2.2	< 0.001*

Data are presented as frequencies n (%) and media ± standard deviation; * p values as determined with the chi square test.
T2D, Type 2 Diabetes; GERD, Gastroesophageal Reflux Disease; BMI; Body Mass Index; ASMI, Appendicular Skeletal Muscle Index; HGS, Hand Grip Strength

Discussion

Our study found that the prevalence of dynapenia was significantly higher at 57.9% compared to previous reports of 32.2% from Ecuador (Orces, 2017). It is recognized that differences in the prevalence of dynapenia could be explained by several factors, including age groups (Lee, 2024; Patiño-Villada et al., 2023), age at menopause (García-Alfaro et al., 2022), ethnicity, and different cut-off points for diagnosis (Patiño-Villada et al., 2023).

However, our findings suggest a significantly higher prevalence of dynapenia in our sample than that previously reported in our country (Orces, 2017), despite using the same cut-off points for diagnosis and including a sample with a similar mean age. This may be explained by the fact that our sample is more representative of marginal areas of Guayaquil. In contrast, the previous study is a nationally representative sample of older adults in Ecuador (Orces, 2017). It has been shown that hand grip strength can significantly vary even in the same ethnic group living in different locations within the same country (Woo et al., 2014).

Regional reports show a lower prevalence of dynapenia among Brazilians, ranging from 17.7 to 52.4% (Alexandre et al., 2019; Borges et al., 2020; Confortin & Barbosa, 2015; Neves et al., 2018). In Mexicans, the prevalence of dynapenia was 40.3% (Rodríguez-García et al., 2018). In other regions, such as Korea, the prevalence was 33.3%, lower than our findings, whereas, in China, the prevalence of dynapenia in older women is 69.9% (Zhou et al., 2024).

Elbow position can influence age and handgrip strength (HGS) levels in both younger and older individuals(Pereira Pedro et al., 2023). We followed the ASHT protocol for HGS evaluation. Regardless of the elbow position angle, dynapenia was frequently diagnosed. A study conducted by Enriquez-Reyna et al. (2023) reported a prevalence of dynapenia of 37.5% and found an association between muscle mass and upper limb strength. As age progressed, muscle mass and strength gradually decreased (Enríquez Reyna et al., 2019). Anthropometric values, such as corrected arm muscle area, may correlate with postmenopausal individuals' muscle strength(Álvarez-Córdova et al., 2024).

Regarding the pathogenesis of dynapenia, some mechanisms may be involved in the onset and progression, such as advancing age (Haynes et al., 2020), malnutrition (Lengelé et al., 2021; Xie et al., 2022), lifestyle (De Lima et al., 2021), and chronic diseases (Maza Moscoso et al., 2023; Xie et al., 2022). In our study, the prevalence of dynapenia was significantly higher in the older participants. Similar findings were reported by Confortin & Barbosa (Confortin & Barbosa, 2015) and Alexandre (Alexandre et al., 2019). Our study did not find differences in sociodemographic and clinical characteristics between those with and without dynapenia. Unlike previous reports, malnutrition diagnosis was not associated with dynapenia (Alexandre et al., 2019).

In our study, participants with dynapenia showed higher weight, BMI, body fat index, and ASMI than those without dynapenia. We found similar results to those of Zhou et al. (Zhou et al., 2024), showing that dynapenia was positively correlated with functional statuses such as weight, BMI, body fat index, and ASMM. Conversely, other studies have found no difference among HGS concerning BMI in postmenopausal women (García-Alfaro et al., 2022). However, the same study found that for each 1% of adiposity, women were more likely to have dynapenia (García-Alfaro et al., 2022), which is consistent with the results of our study.

As high rates of sarcopenia and dynapenia are major clinical problems in older adults, some recommendations to prevent or ameliorate these conditions have been proposed. A systematic review of randomized clinical trials found that physical training improved muscle strength, quality, and function (De Mello et al., 2019). Similarly, a four-arm randomized controlled trial in sarcopenic and dynapenic older adults found a synergistic effect of bodyweight resistance training and protein supplement with vitamin D on muscle quality and strength (Yamada et al., 2019). Despite the current knowledge about the positive effects of physical activity on preventing and managing dynapenia, systematic reviews have found several barriers to physical activity (Garcia et al., 2022). Factors related to the built environment (e.g., the existence of, distance to, and/or access to recreational spaces and infrastructure) are more abundant than intrapersonal factors (e.g., knowledge, skills, and beliefs), and interpersonal factors (e.g., support of family and friends) (Garcia et al., 2022). As dynapenia appears to be associated with higher weight, BMI, body fat index, and ASMI, it is essential to design intervention strategies that target all these risk factors. Decreasing the barriers to physical activity while promoting a healthy diet like the Mediterranean diet (Frias-Toral et al., 2021) may be an effective way to improve muscle strength while decreasing weight, BMI, body fat index, and ASMI(Cassotta et al., 2024; Kim et al., 2024).

The strength of our study lies in including information from vulnerable populations. To the best of our knowledge, this is the first study with a sample with those characteristics. The limitations are mainly the methodological cross-sectional design and the difficulty of analyzing causality. We did not collect

physical activity information primarily due to the recent reports of low rates in urban-rural areas (Schmidt et al., 2022), and to avoid participant burden.

Conclusions

We found that dynapenia was prevalent in urban-marginal postmenopausal women of Guayaquil. Weight, BMI, body fat index, and ASMI were associated with dynapenia. It is essential to highlight the importance of preventing dynapenia and sarcopenia among urban-marginal areas, as these populations appear disproportionally affected. There are opportunities to develop community outreach programs targeting these populations to decrease barriers to physical activity while also educating them about high-quality and affordable meal options to maintain an optimal nutritional status and prevent dynapenia.

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L A-C: Writing – original draft, review & editing, Conceptualization, Methodology, Project administration; C A-P: Writing – original draft, Formal Analysis, review & editing; D R-M: Writing – review & editing; D F-P: Writing – review & editing; N G-P: Writing – review & editing; E F-T: Writing – review & editing.

Conflict of interest

The authors report no conflicts of interest and are alone responsible for the writing and content of this document.

References

Alexandre, T. da S., Duarte, Y. A. de O., Santos, J. L. F., & Lebrão, M. L. (2019). Prevalence and associated factors of sarcopenia, dynapenia, and sarcodynapenia in community-dwelling elderly in São Paulo—SABE Study. *Revista Brasileira De Epidemiologia = Brazilian Journal of Epidemiology*, *21Suppl 02*(Suppl 02), e180009. https://doi.org/10.1590/1980-549720180009.supl.2

Álvarez-Córdova, L. R., Artacho, R., Chedraui, P., Arteaga-Pazmiño, C., Sánchez-Briones, M., & Ruiz-López, M. D. (2024). Arm muscle area is correlated to handgrip strength in postmenopausal women. *Gynecological Endocrinology: The Official Journal of the International Society of Gynecological Endocrinology*, *40*(1), 2420937. https://doi.org/10.1080/09513590.2024.2420937

Amaral, T. F., Santos, A., Guerra, R. S., Sousa, A. S., Álvares, L., Valdiviesso, R., Afonso, C., Padrão, P., Martins, C., Ferro, G., Moreira, P., & Borges, N. (2016). Nutritional Strategies Facing an Older Demographic: The Nutrition UP 65 Study Protocol. *JMIR Research Protocols*, *5*(3), e184. https://doi.org/10.2196/resprot.6037

Arokiasamy, P., & Selvamani, Y. (2018). Age, socioeconomic patterns and regional variations in grip strength among older adults (50+) in India: Evidence from WHO's Study on Global Ageing and Adult Health (SAGE). *Archives of Gerontology and Geriatrics*, *76*, 100-105. https://doi.org/10.1016/j.archger.2018.02.007

Borges, V. S., Lima-Costa, M. F. F., & Andrade, F. B. de. (2020). A nationwide study on prevalence and factors associated with dynapenia in older adults: ELSI-Brazil. *Cadernos De Saude Publica*, *36*(4), e00107319. https://doi.org/10.1590/0102-311X00107319

Cassotta, M., Quiles, J. L., Giampieri, F., & Battino, M. (2024). Aging, age-related diseases, oxidative stress and plant polyphenols: Is this a true relationship? *Mediterranean Journal of Nutrition and Metabolism*, *17*(3), 255-259. https://doi.org/10.3233/MNM-240057

Cheval, B., Boisgontier, M. P., Orsholits, D., Sieber, S., Guessous, I., Gabriel, R., Stringhini, S., Blane, D., Linden, B. W. A. van der, Kliegel, M., Burton-Jeangros, C., Courvoisier, D. S., & Cullati, S. (2018). Association of early- and adult-life socioeconomic circumstances with muscle strength in older age. *Age and Ageing*, *47*(3), 398. https://doi.org/10.1093/ageing/afy003

Clark, B. C., & Manini, T. M. (2012). What is dynapenia? *Nutrition (Burbank, Los Angeles County, Calif.)*, *28*(5), 495-503. https://doi.org/10.1016/j.nut.2011.12.002

Confortin, S. C., & Barbosa, A. R. (2015). Factors Associated With Muscle Strength Among Rural Community-Dwelling Older Women in Southern Brazil. *Journal of Geriatric Physical Therapy (2001)*, *38*(4), 162-168. https://doi.org/10.1519/JPT.0000000000000027

Cruz-Jentoft, A. J., Bahat, G., Bauer, J., Boirie, Y., Bruyère, O., Cederholm, T., Cooper, C., Landi, F., Rolland, Y., Sayer, A. A., Schneider, S. M., Sieber, C. C., Topinkova, E., Vandewoude, M., Visser, M., Zamboni, M., & Writing Group for the European Working Group on Sarcopenia in Older People 2 (EWGSOP2), and the Extended Group for EWGSOP2. (2019). Sarcopenia: Revised European consensus on definition and diagnosis. *Age and Ageing*, *48*(4), 601. https://doi.org/10.1093/ageing/afz046

De Lima, T. R., González-Chica, D. A., D'Orsi, E., Sui, X., & Silva, D. A. S. (2021). Individual and Combined Association Between Healthy Lifestyle Habits With Muscle Strength According to Cardiovascular Health Status in Adults and Older Adults. *Journal of Physical Activity and Health*, *18*(8), 973-980. https://doi.org/10.1123/jpah.2021-0105

De Mello, R. G. B., Dalla Corte, R. R., Gioscia, J., & Moriguchi, E. H. (2019). Effects of Physical Exercise Programs on Sarcopenia Management, Dynapenia, and Physical Performance in the Elderly: A Systematic Review of Randomized Clinical Trials. *Journal of Aging Research*, *2019*, 1-7. https://doi.org/10.1155/2019/1959486

Enríquez Reyna, M. C., Carranza Bautista, D., & Navarro Orocio, R. (2019). Nivel de actividad física, masa y fuerza muscular de mujeres mayores de la comunidad: Diferencias por grupo etario. *Retos*, *35*, Article 1. http://eprints.uanl.mx/17070/

Frias-Toral, E., Chapela, S., de los Angeles Carignano, M., Moretti, D., Martinuzzi, A., Rodríguez-Veintimilla, D., Guerrero, M., Pugliese, G., Muscogiuri, G., & Barrea, L. (2021). Mediterranean Diet and Physical Activity for Successful Aging: An Update for Nutritionists and Endocrinologists. *Endocrines*, *2*(4), Article 4. https://doi.org/10.3390/endocrines2040034

Garcia, L., Mendonça, G., Benedetti, T. R. B., Borges, L. J., Streit, I. A., Christofoletti, M., Silva-Júnior, F. L. E., Papini, C. B., & Binotto, M. A. (2022). Barriers and facilitators of domain-specific physical activity: A systematic review of reviews. *BMC Public Health*, *22*(1), 1964. https://doi.org/10.1186/s12889-022-14385-1

García-Alfaro, P., García, S., Rodríguez, I., & Pérez-López, F. R. (2022). Handgrip strength, dynapenia, and related factors in postmenopausal women. *Menopause*, *29*(1), 16-22. https://doi.org/10.1097/GME.0000000000001872

Geraci, A., Calvani, R., Ferri, E., Marzetti, E., Arosio, B., & Cesari, M. (2021). Sarcopenia and Menopause: The Role of Estradiol. *Frontiers in Endocrinology*, *12*, 682012. https://doi.org/10.3389/fendo.2021.682012

Haynes, E. M. K., Neubauer, N. A., Cornett, K. M. D., O'Connor, B. P., Jones, G. R., & Jakobi, J. M. (2020). Age and sex-related decline of muscle strength across the adult lifespan: A scoping review of aggregated data. *Applied Physiology, Nutrition, and Metabolism*, *45*(11), 1185-1196. https://doi.org/10.1139/apnm-2020-0081

Kim, H., Suh, H. S., & Lee, E. E. (2024). Association between dietary supplements and frailty: A cross-sectional study using national survey data in South Korea. *International Journal of Food Sciences and Nutrition*, *75*(5), 486-495. https://doi.org/10.1080/09637486.2024.2356802

Kirk, B., Cawthon, P. M., Arai, H., Ávila-Funes, J. A., Barazzoni, R., Bhasin, S., Binder, E. F., Bruyere, O., Cederholm, T., Chen, L.-K., Cooper, C., Duque, G., Fielding, R. A., Guralnik, J., Kiel, D. P., Landi, F., Reginster, J.-Y., Sayer, A. A., Visser, M., … Global Leadership Initiative in Sarcopenia (GLIS) group. (2024). The Conceptual Definition of Sarcopenia: Delphi Consensus from the Global Leadership Initiative in Sarcopenia (GLIS). *Age and Ageing*, *53*(3), afae052. https://doi.org/10.1093/ageing/afae052

La Colla, A., Pronsato, L., Milanesi, L., & Vasconsuelo, A. (2015). 17β-Estradiol and testosterone in sarcopenia: Role of satellite cells. *Ageing Research Reviews*, *24*(Pt B), 166-177. https://doi.org/10.1016/j.arr.2015.07.011

Lee, D.-Y. (2024). Prevalence and Risk Factors for Hand-Grip-Determined Dynapenia in the Korean Population: A Cross-Sectional Study. *Sports*, *12*(7), 187. https://doi.org/10.3390/sports12070187

Lengelé, L., Bruyère, O., Beaudart, C., Reginster, J.-Y., & Locquet, M. (2021). Impact of Malnutrition Status on Muscle Parameter Changes over a 5-Year Follow-Up of Community-Dwelling Older Adults from the SarcoPhAge Cohort. *Nutrients*, *13*(2), 407. https://doi.org/10.3390/nu13020407

Marlatt, K. L., Pitynski-Miller, D. R., Gavin, K. M., Moreau, K. L., Melanson, E. L., Santoro, N., & Kohrt, W. M. (2022). Body composition and cardiometabolic health across the menopause transition. *Obesity (Silver Spring, Md.)*, *30*(1), 14-27. https://doi.org/10.1002/oby.23289

Maza Moscoso, C. P., Calvo Higuera, I., Gómez Carrillo, A., Abril, T., & Frías-Toral, E. (2023). Estado nutricional y disminución de fuerza muscular en pacientes hospitalizados. *Bionatura*, *8*(4), 1-10. https://doi.org/10.21931/RB/2023.08.04.21

Milanović, Z., Pantelić, S., Trajković, N., Sporiš, G., Kostić, R., & James, N. (2013). Age-related decrease in physical activity and functional fitness among elderly men and women. *Clinical Interventions in Aging*, *8*, 549-556. https://doi.org/10.2147/CIA.S44112

Muscogiuri, G., Barrea, L., Annunziata, G., Di Somma, C., Laudisio, D., Colao, A., & Savastano, S. (2019). Obesity and sleep disturbance: The chicken or the egg? *Critical Reviews in Food Science and Nutrition*, *59*(13), 2158-2165. https://doi.org/10.1080/10408398.2018.1506979

Neves, T., Ferriolli, E., Lopes, M. B. M., Souza, M. G. C., Fett, C. A., & Fett, W. C. R. (2018). Prevalence and factors associated with sarcopenia and dynapenia in elderly people. *Journal of Frailty, Sarcopenia and Falls*, *3*(4), 194-202. https://doi.org/10.22540/JFSF-03-194

Orces, C. H. (2017). Prevalence of clinically relevant muscle weakness and its association with vitamin D status among older adults in Ecuador. *Aging Clinical and Experimental Research*, *29*(5), 943-949. https://doi.org/10.1007/s40520-016-0678-3

Patiño-Villada, F. A., Estrada-Restrepo, A., & Aristizábal, J. (2023). Handgrip strength in older adults from Antioquia-Colombia and comparison of cutoff points for dynapenia. *Scientific Reports*, *13*(1), 1718. https://doi.org/10.1038/s41598-023-28898-1

Pitombeira Pereira Pedro, K., Machado de Oliveira, I., & Cancela Carral, J. M. (2023). Influencia de la edad y del sexo en los niveles de fuerza de agarre en función del ángulo del codo empleado (Influence of age and sex on grip strength levels applying a protocol with different elbow angles). *Retos*, *47*, 853–858. https://doi.org/10.47197/retos.v47.91585

Rodríguez-García, W. D., García-Castañeda, L., Vaquero-Barbosa, N., Mendoza-Núñez, V. M., Orea-Tejeda, A., Perkisas, S., Vandewoude, M., & Castillo-Martínez, L. (2018). Prevalence of dynapenia and presarcopenia related to aging in adult community-dwelling Mexicans using two different cut-off points. *European Geriatric Medicine*, *9*(2), 219-225. https://doi.org/10.1007/s41999-018-0032-8

Rosenberg, I. H. (2011). Sarcopenia: Origins and clinical relevance. *Clinics in Geriatric Medicine*, *27*(3), 337-339. https://doi.org/10.1016/j.cger.2011.03.003

Sanchez-Rodriguez, D., Marco, E., & Cruz-Jentoft, A. J. (2020). Defining sarcopenia: Some caveats and challenges. *Current Opinion in Clinical Nutrition and Metabolic Care*, *23*(2), 127-132. https://doi.org/10.1097/MCO.0000000000000621

Santoro, N., Epperson, C. N., & Mathews, S. B. (2015). Menopausal Symptoms and Their Management. *Endocrinology and Metabolism Clinics of North America*, *44*(3), 497-515. https://doi.org/10.1016/j.ecl.2015.05.001

Schmidt, L. L., Johnson, S., Rebecca Genoe, M., Jeffery, B., & Crawford, J. (2022). Social Interaction and Physical Activity Among Rural Older Adults: A Scoping Review. *Journal of Aging and Physical Activity*, *30*(3), 495-509. https://doi.org/10.1123/japa.2021-0046

Verde, L., Barrea, L., Vetrani, C., Frias-Toral, E., Chapela, S. P., Jayawardena, R., de Alteriis, G., Docimo, A., Savastano, S., Colao, A., & Muscogiuri, G. (2022). Chronotype and Sleep Quality in Obesity: How Do They Change After Menopause? *Current Obesity Reports*, *11*(4), 254-262. https://doi.org/10.1007/s13679-022-00479-9

Woo, J., Arai, H., Ng, T. P., Sayer, A. A., Wong, M., Syddall, H., Yamada, M., Zeng, P., Wu, S., & Zhang, T. M. (2014). Ethnic and geographic variations in muscle mass, muscle strength and physical performance measures. *European Geriatric Medicine*, *5*(3), 155-164. https://doi.org/10.1016/j.eurger.2014.04.003

Xie, L., Jiang, J., Fu, H., Zhang, W., Yang, L., & Yang, M. (2022). Malnutrition in Relation to Muscle Mass, Muscle Quality, and Muscle Strength in Hospitalized Older Adults. *Journal of the American Medical Directors Association*, *23*(5), 722-728. https://doi.org/10.1016/j.jamda.2021.11.025

Yamada, M., Kimura, Y., Ishiyama, D., Nishio, N., Otobe, Y., Tanaka, T., Ohji, S., Koyama, S., Sato, A., Suzuki, M., Ogawa, H., Ichikawa, T., Ito, D., & Arai, H. (2019). Synergistic effect of bodyweight resistance exercise and protein supplementation on skeletal muscle in sarcopenic or dynapenic older adults. *Geriatrics & Gerontology International*, *19*(5), 429-437. https://doi.org/10.1111/ggi.13643

Zhou, W., Tong, J., Wen, Z., Mao, M., Wei, Y., Li, X., Zhou, M., & Wan, H. (2024). Prevalence and factors associated with dynapenia among middle-aged and elderly people in rural southern China. *Preventive Medicine Reports*, *38*, 102630. https://doi.org/10.1016/j.pmedr.2024.102630

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