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Original article

Three definitions of probable sarcopenia and associations with falls and functional disability among community-dwelling older adults

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ABSTRACT

Objectives: To assess the prevalence of probable sarcopenia according to 3 different definitions ("strength, assistance with walking, rise from a chair, climb stairs, falls"- SARC-F score, low grip strength, and the guidelines indicated by the European Working Group on Sarcopenia in Older People 2 - EWGSOP2) and assess the association of probable sarcopenia with functional disability and falls among community-dwelling older adults.

Methods: Cross-sectional study with 419 older adults. Probable sarcopenia was assessed by 3 definitions: a SARC-F $\geq$ 4, low grip strength (< 27 kg for men and < 16 kg for women), and the EWGSOP2 criteria. Associations were investigated using Pearson's chi-square test and prevalence ratios were estimated by Poisson regression ($P < 0.05$).

Results: Of the total, probable sarcopenia was identified in 23.0% of participants (SARC-F $\geq$ 4 score), 33.7% (low grip strength), and 10.4% (EWGSOP2) according to each different definition. In adjusted regression models, having at least 1 instrumental activities of daily living (IADL) disability and having fallen in the last 12 months were significantly associated with a SARC-F $\geq$ 4 (prevalence ratio, PR = 1.60; and PR = 2.50, respectively) and EWGSOP2 (PR = 1.78; and PR = 2.19, respectively).

Conclusions: IADL disability and falls were associated with a SARC-F $\geq$ 4 and the EWGSOP2 criteria (SARC-F $\geq$ 4 and low grip strength). Probable sarcopenia may be used in clinical practice in order to facilitate the diagnosis of definite sarcopenia and to implement early interventions that could prevent functional decline and falls in older people.

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1. Introduction

Sarcopenia is defined as an accentuated loss of both muscle mass and strength [1]. It is a prevalent condition in late life associated to several negative adverse outcomes [1–4], such as falls [5–9], functional disability [10–15], cognitive impairment [12,16], depressive symptoms [11,17,18], multimorbidity [19], worse quality of life [1,4,20], hospital admission [1,3,4,13,14], and mortality [9,21]. Sarcopenia can be treated and even prevented, especially with resistive physical activity and protein supplementation [1].

These findings highlight the need of early detection (screening) of sarcopenia, especially in clinical practice [1,11,19,22,23], as a first step towards its definitive diagnosis (eg, low muscle strength and low muscle mass) in order to search for reversible causes, implement initial treatment measures and potentially prevention of negative consequences [1,4]. In 2018, the European Working Group on Sarcopenia in Older People 2 (EWGSOP2) updated its initial guidelines aiming to standardize screening, diagnosis and treatment of

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sarcopenia [1]. The EWGSOP2 recommended the use of the "strength, assistance with walking, rise from a chair, climb stairs, falls (SARC-F)" questionnaire to investigate suggestive signs of sarcopenia [1,13,14,22,24], and to facilitate the screening process in clinical practice [1,3,13–15,23].

The SARC-F is a simple self-report questionnaire with low to moderate sensitivity and very high specificity to identify low muscle strength [2,21–23], mainly excluding those without sarcopenia. According to the EWGSOP2, probable sarcopenia corresponds to a positive screening with SARC-F plus the presence of low muscle strength identified with a handgrip dynamometer, which has moderate correlation with strength measures in other body parts [13].

Although not considered standard diagnostic instruments for sarcopenia, SARC-F and grip strength [1,2,18,23] can be fast and useful instruments to identify high risk older adults for sarcopenia. Moreover, they enable health care professionals to rapidly implement easy and low-cost treatments to benefit those individuals (eg, physical activity, nutritional screening and counseling), especially in community-dwelling and primary care older adults [1,13,14,19,22]. It is well known that the evaluation of muscle mass quantity can be challenging in clinical practice, as its definition requires costly or less accessible exams, such as computed tomography, magnetic resonance imaging or dual energy X-ray absorptiometry (DXA).

Few studies have applied measures of probable sarcopenia in community samples. Three studies from high-income countries reported the prevalence of probable sarcopenia between 2.2% and 19% [19,22,25], and only 2 studies have investigated the association between probable sarcopenia according to the EWSGOP2 definition and adverse outcomes such as functional disability and falls [19,22]. Moreover, probable sarcopenia is associated with a specific disease cluster at the long-term, which included multimorbidity, polypharmacy, osteoarthritis and sedentarism [22,25]. Previously, studies have used the EWSGSOP2 criteria for screening sarcopenia, but none evaluated its association with adverse health outcomes [2,26].

Therefore, this study aims [1] to assess the prevalence of 3 definitions of probable sarcopenia with the SARC-F, a low grip strength and based on the definitions of the EWGSOP2, and [2] the association of probable sarcopenia (according to the 3 definitions) with functional disability and falls in community dwelling older adults from a middle-income country. We hypothesize that probable sarcopenia presents similar prevalence to definitive sarcopenia and it is associated to functional disability and falls.

2. Methods

A population-based cross-sectional study was conducted using data from the second wave of the *Estudo de Fragilidade em Idosos Brasileiros* [Study on Frailty in Brazilian Older Adults] (FIBRA 70+ Study) conducted in the city of Campinas and in Ermelino Matarazzo, a sub-district of the city of São Paulo, both of which are located in southeastern Brazil. The project received approval from the Ministry of Health and its local university-based ethical board (Brazil Platform process number: C.A.A.E. 49987615.30000.5404 and 92684517.5.1001.5404).

2.1. Participants and procedures

The sample was composed of individuals aged ≥ 70 years residing in urban areas who had participated in the first wave of the FIBRA Study between 2008 and 2009 (detailed information about the baseline sample recruitment strategy, sample characteristics and main results are found elsewhere, see Neri et al.) [27].

Data for the present analyses were collected in home visits between 2016 and 2017, including participants who were located at the original residential addresses and who did not meet exclusion criteria for the follow up assessment. Data collection lasted an average of 80 min and was carried out in a single session by a pair of previously trained interviewers. The nature and procedures of the study were explained to the participants and respective family members prior to the interview. Individuals who agreed to participate signed an informed consent.

Participants were excluded according the presence of at least one of the following conditions: memory, attention, language, spatial or temporal orientation problems, suggestive of cognitive impairment; permanent or temporary inability to walk (except those who used a walking aid device); localized loss of strength and aphasia due to stroke; severe impairment of motor skills, speech or affection associated with advanced Parkinson's disease; severe auditory or visual deficit; and terminal illness.

Among the 549 participants identified for the follow up assessment, 130 were considered ineligible to answer part of the study protocol due to having a score below the educational adjusted cutoff point of the cognitive screening test the Mini Mental State Examination (MMSE): 17 for illiterates; 22 for 1–4 years; 24 for 5–8 years; 26 points for 9 or more years of education [28–30]. The present analyses included information on 419 older adults who scored above the cutoff point on the MMSE and answered fully to all items of interest (Fig. 1).

2.2. Measures

a) Probable sarcopenia:
   - *SARC-F*: a screening instrument that has 5 items (strength, walking, standing up from a chair, climbing stairs and falls) and is scored from 0 to 10 points (ie, 0–2 points for each component; 0 = best to 10 = worst). In the present study, the cutoff score for the presence of probable sarcopenia was ≥ 4 points [13,14];
   - *Low grip strength*: assessed in kilograms (kg) with a Jamar dynamometer (Lafayette Instruments, Lafayette, Indiana, USA) in the dominant hand. Three trials were performed with a 1-minute rest interval between trials and the mean value was considered in the analysis. Individuals were considered to have low strength if < 27 kg for men and < 16 kg for women [1].
   - *EWGSOP2* [1]: evaluated using the SARC-F questionnaire and grip strength. Probable sarcopenia was defined with the presence of a SARC-F ≥ 4 points and a low strength of < 27 kg for men and of < 16 kg for women [1].

b) *Functional disability*: participants were asked if they needed for assistance to use a telephone, to use transportation, go shopping, cooking, do household chores, take medications and management money. Those who reported requiring partial or full assistance to perform one or more IADL on the Lawton scale [31], were considered dependent, that is, or having disability;

c) *Falls*: participants were asked if they had fallen in the previous 12 months, and the variable was categorized as none or one or more falls;

d) *Covariates*: sex (female and male), age group (70–79, and 80 or older) and education (none, 1–4 years and 5 or more years of study); health-related behavior, categorized as no unhealthy behavior, one unhealthy behavior or 2 and more unhealthy behaviors – defined as follows: smoking, evaluated as a single yes or no item regarding whether the individual currently smoked; alcohol intake, evaluated by the frequency of the consumption of alcoholic beverages and categorized as never/one to 4 times per month/two to three

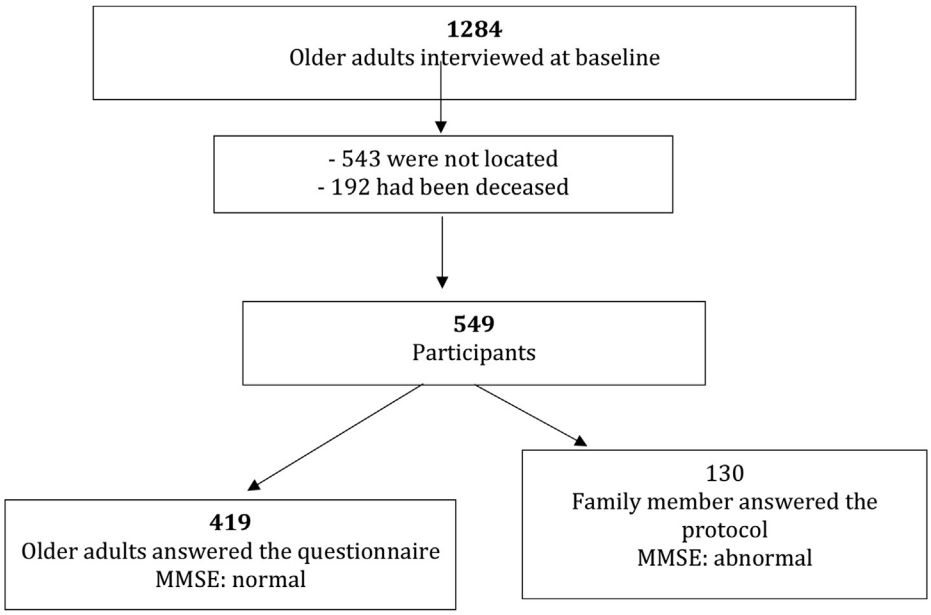

Fig. 1. Flowchart of final sample. FIBRA Study 2016/17.
MMSE: mini-mental state examination.

times per week (healthy behavior), and 4 or more times per week (unhealthy behavior); food intake, evaluated using questions from the Mini Nutritional Assessment, as the frequency of the consumption of milk, legumes and vegetables and categorized as "consumes milk, legumes and vegetables daily" or "does not consume milk, legumes and vegetables daily" [32]; physical activity, corresponding to the weekly frequency and daily duration of physical exercise based on the items of the Minnesota Leisure-Time Physical Activity Questionnaire [33], with the individuals classified as either active or sedentary according to the guidelines of the American College of Sports Medicine [34], which considers active individuals those who accumulate at least 120–150 min weekly of vigorous and moderate exercise. Multimorbidity was categorized according to the number of chronic noncommunicable diseases: was composed by 9 dichotomous items on whether a physician had given the participant a diagnosis of heart disease, hypertension, stroke, diabetes mellitus, cancer, arthritis/rheumatism, depression, lung disease or osteoporosis, and categorized as none or one disease and two or more. *Depressive symptoms*: assessed using the 15 dichotomous items on the Geriatric Depression Scale (GDS-15) [35], with a cutoff point of $\geq$ 6 considered positive for clinically significant depressive symptoms.

2.3. Statistical analysis

Descriptive analyses (measures of absolute and relative frequency) were performed for the characterization of the sample. Percentage distributions were estimated with 95% confidence intervals. Associations between IADL disability and fall with SARC-F, low grip strength and probable sarcopenia based on the definitions of the EWGSOP2, with covariates in the model, were determined using Pearson's chi-square test, considering a 5% significance level. Poisson regression was used to estimate prevalence ratios (PR) and respective 95% confidence intervals (CI). The variables that presented a level of significance lower than 20% ($P < 0.20$) were introduced into the Poisson multiple regression model, in the association with the IADL disability and fall. The data analysis was performed using the Stata software, version 15.0 (Stata Corp., College Station, TX, USA).

3. Results

A total of 419 older adults participated in the present study, being 69.9% were women, mean age was 80.3 ± 4.6 years, 58.2% had between 1 and 4 years of education and 65.3% were white. Only 16.7% had no unhealthy habits (ie, good food intake, regular physical activity, no smoking, safe alcohol consumption), 67.3% had 2 or more chronic diseases, and 20.1% exhibited clinically relevant depressive symptoms. A total of 23.0% had SARC-F $\geq$ 4 points, 33.7% had a low grip strength, and 10.4% were classified as having probable sarcopenia taking into account the SARC-F score combined with the low grip strength (Table 1). Moreover, approximately half (49.6%) reported having difficulty on at least one IADL and 32.2% had fallen in the previous 12 months (Table 1).

The prevalence of difficulties varied between the 5 components of the SARC-F tool: lack of strength (33.7%), walking (20.4%), rising from a chair (24.7%), climbing stairs (49.0%), and falls (32.2%). For those who scored positive for the SARC-F ($\geq$ 4) points, the highest prevalence was for climbing stairs (96.8%) and lack of strength (81.1%) (Table 2).

Table 3 displays the prevalence of having at least one IADL disability and falls according to the independent variables. Individuals classified as having at least one IADL disability were more likely to have SARC-F $\geq$ 4 points, low grip strength, probable sarcopenia, multimorbidity, GDS $\geq$ 6, and be a woman. As to functional disability, when the sample is separated according to sex, it was observed that women with a lower educational level, that had SARC-F $\geq$ 4 points, low grip strength (probable sarcopenia based on the definitions of the EWGSOP2), multimorbidity, and scored $\geq$ 6 points on the GDS-15 showed a higher prevalence of difficulties to perform IADLs. In relation to men, those with SARC-F $\geq$ 4 points and probable sarcopenia based on the definitions of the EWGSOP2 showed a higher prevalence of difficulties to perform IADLs ($P < 0.05$ data not shown). Individuals who had fallen in the previous 12 months were more likely to have SARC-F $\geq$ 4, low grip

Table 1
Characteristics of the subjects.

Variables	n	%	CI 95%
Sex			
Male	126	30.1	25.8–34.6
Female	293	69.9	65.3–74.1
Age group			
70–79 years	184	44.1	39.4–48.9
80 years and over	233	55.9	51.0–60.6
Education			
None	57	13.6	10.6–17.2
1–4 years	244	58.2	53.4–62.9
5 years or more	118	28.2	24.0–32.7
Unhealthy behaviors			
None	66	16.7	13.3–20.8
1 unhealthy behavior	223	56.6	51.6–61.4
2 or more unhealthy behavior	105	26.7	22.5–31.2
Number of diseases			
0–1	131	32.7	28.2–37.4
2 or more	270	67.3	62.6–71.7
Clinically relevant depressive symptoms			
No (GDS 0–5)	335	79.9	75.8–83.5
Yes (GDS 6–15)	84	20.1	16.4–24.2
SARC-F			
< 4	318	77.0	72.7–80.8
≥ 4	95	23.0	19.2–27.3
Grip strength			
≥ 27 kg male and ≥16 kg female	278	66.3	61.6–70.7
< 27 kg male and <16 kg female	141	33.7	29.3–38.3
EWGSOP2			
Probable sarcopenia: No	370	89.6	86.2–92.2
Probable sarcopenia: Yes	43	10.4	7.8–13.7
Functional capacity			
Dependent	211	50.4	45.5–55.1
Independent	208	49.6	44.8–54.4
Falls in the last 12 months			
No	284	67.8	63.1–72.1
Yes	135	32.2	27.9–36.9

CI 95%, 95% confidence interval; GDS, geriatric depression scale; SARC-F evaluates strength, assistance with walking, rise from a chair, climb stairs, falls.
EWGSOP2, European Working Group on Sarcopenia in Older People 2.

Table 2
Prevalence of each SARC-F component in relation to the presence of sarcopenia (SARC-F ≥ 4 points).

SARC-F components	SARC-F classification, % (n)		
	0–3	≥4	Total
Lack of Strength	P < 0.001		
None	80.4 (258)	18.9 (18)	66.3 (276)
Some	13.1 (42)	33.7 (32)	17.9 (74)
A lot or unable	6.5 (21)	47.4 (45)	16.0 (66)
Assistance in walking	P < 0.001		
None	92.5 (297)	35.8 (34)	79.6 (331)
Some	6.2 (20)	36.8 (35)	13.2 (55)
A lot, use aids or unable	1.2 (4)	27.4 (26)	7.2 (30)
Difficulty to rise from a chair	P < 0.001		
None	88.5 (284)	30.5 (29)	75.2 (313)
Some	11.2 (36)	56.8 (54)	21.6 (90)
A lot or unable without help	0.3 (1)	12.6 (12)	3.1 (13)
Difficulty to climb stairs	P < 0.001		
None	65.1 (209)	3.2 (3)	51.0 (212)
Some	31.8 (102)	34.7 (33)	32.4 (135)
A lot or unable	3.1 (10)	62.1 (59)	16.6 (69)
Falls in the last 12 months	P < 0.001		
None	76.0 (244)	40.0 (38)	67.8 (282)
1–3 times	16.5 (53)	25.3 (24)	18.5 (77)
4 or more times	7.5 (24)	34.7 (33)	13.7 (57)

Sample size = 416 participants with 3 missing data in SARC-F.

strength, probable sarcopenia and be 80 years or older (Table 3).

Table 4 shows the results of Poisson regressions models, with IADL adjusted for sex, education, number of diseases and depressive symptoms, and falls adjusted for age. Multiple regression models showed a higher prevalence of at least one IADL disability and falls in individuals with SARC-F ≥ 4, and probable sarcopenia based on the definitions of the EWGSOP2 (Table 4).

Table 3
Prevalence of IADL disability and falls, according to SARC-F, low grip strength, probable sarcopenia and independent variables.

Variables	IADL disability	Falls
SARC-F, %	P < 0.001	P < 0.001
< 4 points	41.2	23.6
≥ 4 points	75.8	60.0
Grip strength, %	P = 0.039	P = 0.034
≥ 27 kg male and ≥16 kg female	46.0	28.8
< 27 kg male and <16 kg female	56.7	39.0
EWGSOP2, %	P < 0.001	P < 0.001
Probable sarcopenia: No	44.9	28.1
Probable sarcopenia: Yes	86.0	65.1
Sex	P < 0.001	P = 0.892
Male	36.5	31.7
Female	55.3	32.4
Age group, %	P = 0.645	P = 0.004
70–79 years	48.4	25.0
80 years and over	50.6	38.2
Education, %	P = 0.059	P = 0.465
None	63.2	31.6
1–4 years	49.2	34.4
5 years or more	44.1	28.0
Unhealthy behaviors, %	P = 0.283	P = 0.484
None	40.9	30.3
1 unhealthy behavior	49.3	34.1
2 or more unhealthy behavior	53.3	27.6
Number of diseases, %	P = 0.013	P = 0.389
0–1	41.2	29.8
2 or more	54.4	34.1
Clinically relevant depressive symptoms, %	P < 0.001	P = 0.590
No (GDS 0–5)	44.5	32.8
Yes (GDS 6–15))	70.2	29.7

IADL, Instrumental Activities of Daily Living; GDS, geriatric depression scale.
SARC-F evaluates strength, assistance with walking, rise from a chair, climb stairs, falls.
EWGSOP2, European Working Group on Sarcopenia in Older People 2.

4. Discussion

This study sought to investigate the prevalence of probable sarcopenia based on SARC-F scores, grip strength, and EWGSOP2 definitions. It also aimed to identify the variables associated with this condition in a sample of community-dwelling older adults, especially its association with adverse outcomes, such as functional disability and falls. Of the total sample, 23.0% had a score ≥ 4 points on the SARC-F (and a higher prevalence of any difficulties on climbing stairs and strength), 33.7% had low grip strength, and 10.4% of probable sarcopenia based on the definitions of the EWGSOP2. In adjusted regression models, having at least one IADL disability and having fallen in the previous 12 months were associated with probable sarcopenia according to the definition of SARC-F ≥ 4 based on the definitions of the EWGSOP2. Therefore, low grip strength alone was not associated with IAD disability or falls.

In our study, 23% of the participants had a score ≥ 4 points of 4 or more on the SARC-F. In the study by Malmstrom and colleagues [13], a SARC-F score ≥ 4 points was used to identify sarcopenia in 3 large American samples, namely the African American Health Study, the Baltimore Longitudinal Study of Aging, and the National Health and Nutrition Examination Study, with prevalences of 18.4%, 6.3% and 15.4%, respectively [13]. In the present study, according to answers to SARC-F, difficulty in the components climbing stairs lack of and strength were the most frequently referred by the

Table 4
Prevalence Ratios of IADL disability and falls according to SARC-F, low grip strength and EWGSOP2.

	IADL Disability	Falls
Variables	PR crude analysis (CI95%)	PR crude analysis (CI95%)
SARC-F		
< 4 points	1	1
≥ 4 points	1.60 (1.18–2.17)	2.50 (1.77–3.53)
Grip strength		
≥ 27 kg male and ≥16 kg female	1	1
< 27 kg male and <16 kg female	1.30 (0.97–1.73)	1.27 (0.90–1.80)
EWGSOP2		
Probable sarcopenia: No	1	1
Probable sarcopenia: Yes	1.78 (1.24–2.55)	2.19 (1.44–3.34)

PR, prevalence ratio; IADL, Instrumental Activities of Daily Living; Model IADL disability = Poisson regression adjusted for sex, education, number of disease and depressive symptoms; Model falls, = Poisson regression adjusted age. SARC-F, strength, assistance with walking, rise from a chair, climb stairs, falls. EWGSOP2, European Working Group on Sarcopenia in Older People 2.

participants. Dodds and colleagues found that climbing stairs and falls in the last year were the components of the SARC-F frequently most reported by younger older adults (69–70 years old) [22].

In the prospective UK Biobank study, they found an 8% prevalence of probable sarcopenia using only low grip strength in participants aged 60–70 years [19]. In another study that also used the EWSGOP2 definitions to assess probable sarcopenia, they reported similar data in regards to the prevalence of low grip strength (7%) [22]. In the present study, which evaluated adults > 70 years or older, the prevalence of decreased grip strength was 33.7%. These different results may be related to the present sample being older (mean age was 80.3), which reinforces previous findings revealing that muscle strength decreases with increasing age and is related to sarcopenia [36]. Another relevant characteristic of our sample that may explain this higher prevalence of low grip strength is a low frequency of participants who report healthy behaviors (< 30%) and the presence of multimorbidity (67.3%), suggesting the potential influence of secondary contributors to sarcopenia.

Few other studies have investigated the prevalence of probable sarcopenia according to the EWGSOP2 definition. Probable sarcopenia, according to this definition, was present in 10.4% of our sample. A cross-sectional study with seniors between 70 and 84-years old from the Korean Frailty and Aging Cohort Study (KFACS) used the EWGSOP2 definitions and found a prevalence of 2.2% of probable sarcopenia, 1.4% of definitive sarcopenia, and 0.8% of severe sarcopenia. This study also demonstrated a high specificity for the SARC-F screening tool, suggesting it may be useful for efficiently ruling out sarcopenia in clinical settings [25].

The present study showed a higher prevalence of at least one IADL disability in individuals with probable sarcopenia based on the definitions of the EWGSOP2 and SARC-F (≥ 4 points). Sarcopenia comprises one of the early stages of physical disability in later life and it can be used to identify those who are at risk of developing IADL and BADL disabilities [12]. Studies have shown that older adults with sarcopenia have a greater probability of having IADL disability than those without sarcopenia [37]. In a previous meta-analysis that examined the association between sarcopenia and all-cause mortality, as well as functional decline, sarcopenia was clearly associated with functional decline (OR = 2.58, 95% CI, 1.33–4.99) [38].

Falls are common events among older adults and falling is the main cause of serious traumatic injuries. Sarcopenia and falls can present a bidirectional association [9]. In the present study, we found a higher prevalence of falls in older adults with probable sarcopenia based on the definitions of the EWGSOP2 and SARC-F. Yeung and colleagues [9] conducted a meta-analysis of 33 studies and reported a significantly higher risk of falls among sarcopenic individuals (cross-sectional studies: OR, 1.60; 95% CI, 1.37–1.86; prospective studies: OR, 1.89; 95% CI, 1.33–2.68) compared to their non-sarcopenic counterparts. This result was independent of the type of study, population, sex, sarcopenia definition used, continent, and quality of the study [9]. Falls have an impact on the quality of life of among older adults and can lead to fractures, a fear of falling, social isolation, changes in lifestyle, and immobility. Sarcopenia combined with the occurrence of falls increases the risk of physical-functional impairment and complications of diseases, leading to an increased risk of institutionalization, hospitalization, and death [9,39].

The present research did not observe any significant association between handgrip strength alone and IADL disability or falls. Low handgrip strength is associated with muscle weakness and it is important to establish a plan of action to decrease the negative consequences of the muscle strength reduction in older adults. Older people with low strength show a decrease in their activities of daily living and they activate protection strategies, such as the decrease in the frequency of activities to reduce risk of falls [3]. These findings draws attention to the need to conduct new studies with larger sample sizes and with prospective design regarding low grip strength and sarcopenia.

Strong points of this study are the participation of a well-characterized sample of community-dwelling older adults and the combination of the SARC-F questionnaire and grip strength measure, which are easy, inexpensive methods that may contribute to a fast diagnosis of probable sarcopenia in clinical practice [21]. The present study highlights the importance of measures that have a broader and low-cost approach in clinical practice, with the objective of screening and caring for the older adults in primary health care. In this sense, the measures and the instruments used aimed to contribute to the clinical practice of general health professionals, in the collection of information that are associated with negative outcomes.

Future studies could employ path analysis as a way to characterize mediating variables in the process of developing sarcopenia among older people. Moreover, further longitudinal studies are needed to determine which health conditions place older adults at greater risk of sarcopenia. Despite its contributions, the present study has limitations that should be considered. Some of our findings may be the result of survivor bias, as older adults with more impairment regarding the analyzed variables of interest had an increased risk of negative outcomes, such as institutionalization and death. Therefore, the possibility to generalize our results to other populations may be limited, in view of the characteristics of this sample. Besides, no gold standard exams, such as DXA, computed tomography and magnetic resonance imaging were performed. In addition, the cross-sectional analyses impedes the establishment of causal relationships among the variables.

5. Conclusions

In the present study, probable sarcopenia, defined according to a SARC-F ≥ 4 points and based on the definitions of the EWGSOP2, was associated with higher prevalence of least one IADL disability and falls in the previous 12 months. Using screening strategies to identify criteria for probable sarcopenia (EWGSOP2) should be implemented in clinical practice to facilitate the diagnosis of sarcopenia and develop early interventions that can prevent functional decline and falls in this population.

CRediT author statement

Juliana Carvalho Segato Marincolo: Conceptualization, Investigation, Data curation, Writing – original draft, Writing – review & editing. **Ivan Aprahamian**: Data curation, Writing – review & editing. **Ligiana Pires Corona**: Validation, Formal analysis, Writing – review & editing. **Anita Liberalesso Neri**: Validation, Formal analysis, Writing – review & editing. **Mônica Sanches Yassuda**: Methodology, Writing – review & editing. **Flávia Silva Arbex Borim**: Conceptualization, Formal analysis, Writing – review & editing.

Conflicts of interest

The authors declare no competing interests.

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