



Geriatrics, Gerontology and Aging

ISSN: 2447-2115

ISSN: 2447-2123

Sociedade Brasileira de Geriatria e Gerontologia, SBGG

Klahr, Patrícia da Silva; Ferreira, Luis Fernando; Souza, Cislaine Machado de; Rosa, Luis Henrique Telles da
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European Consensus on Sarcopenia: a cross-sectional study
Geriatrics, Gerontology and Aging, vol. 17, e0000018, 2023
Sociedade Brasileira de Geriatria e Gerontologia, SBGG

DOI: https://doi.org/10.53886/gga.e0000018_EN

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Comparison of diagnosis frequency between versions of the European Consensus on Sarcopenia: a cross-sectional study

Comparação da frequência de diagnóstico entre as versões do Consenso Europeu sobre Sarcopenia: um estudo transversal

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Received on: 05/16/2023.

Accepted on: 10/30/2023.

Associate Editor in Charge: Einstein Francisco Camargos

How to cite this article: Klahr PS, Ferreira LF, Souza CM, Rosa LHT. Comparison of diagnosis frequency between versions of the European Consensus on Sarcopenia: a cross-sectional study. *Geriatr Gerontol Aging*. 2023;17:e0000018. https://doi.org/10.53886/gga.e0000018_EN

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Abstract

Objective: To compare sarcopenia diagnosis according to 2 versions of the European Consensus on Sarcopenia (EWGSOP and EWGSOP2) in a sample of older adults. **Method:** This cross-sectional study included 82 community-dwelling older people from Porto Alegre, Brazil. The patients were assessed by trained professionals and were classified according to the criteria of the 2 versions of the consensus to show the differences between the classification models.

Results: The participants performed the Timed Up and Go test in < 7.21 seconds. On average, their performance on the 6-meter walk test was above the predicted value. Only 3 patients had a gait speed < 0.8 m/s. Handgrip strength was, on average, the predicted percentage. In the Short Physical Performance Battery, the scores of a few were intermediate but most were high. According to EWGSOP criteria, 92.18% were non-sarcopenic and 7.81% had severe sarcopenia, while according to EWGSOP2 criteria, 98.43% were non-sarcopenic, 1.56% were sarcopenic, and none had severe sarcopenia. The rate of sarcopenia diagnosis, which was 8.53% according to EWGSOP criteria, reduced to 3.65% according to EWGSOP2 criteria and the new cut-off points ($p = 0.034$). **Conclusion:** Although our sample was small, the reduction was significant, indicating that the change in criteria, even with lower cut-off points, reduced the probability of early diagnosis.

Keywords: aging; sarcopenia; diagnoses.

Resumo

Objetivo: Comparar a aplicação dos critérios e orientações das duas versões do Consenso Europeu sobre Sarcopenia (EWGSOP e EWGSOP2) para o diagnóstico e classificação, numa amostra de idosos residentes na comunidade. **Metodologia:** Estudo transversal, com 82 idosos residentes na comunidade da cidade de Porto Alegre. Os pacientes foram avaliados por profissionais treinados e classificados segundo os critérios dos dois consensos para mostrar as diferenças entre os dois modelos de classificação. **Resultados:** Em testes físicos como o *timed up and go*, a amostra realizou o teste em menos de 7,21 segundos. Em média, os idosos conseguiram caminhar no teste de caminhada de 6 metros mais do que a percentagem prevista para esse público. Apenas três pacientes apresentaram velocidade de caminhada inferior a 0,8 m/s. Na avaliação de força, os idosos conseguiram atingir, em média, o percentual previsto. No *Short Physical Performance Battery*, poucos tiveram desempenho intermediário. A maioria teve desempenho alto. Quando avaliados pelo EWGSOP, 92,18% eram não sarcopênicos, enquanto 7,81% eram sarcopênicos severos; e, quando avaliados pelo EWGSOP2, 98,43% eram não sarcopênicos, 1,56% sarcopênico e nenhum sarcopênico severo. A aplicação dos critérios EWGSOP2 e novos pontos de corte reduziram a capacidade de diagnóstico de sarcopenia na amostra de 8,53 para 3,65% ($p = 0,034$). **Conclusão:** Embora a amostra seja pequena, a redução é significativa e expressa que a mudança de critério, mesmo utilizando pontos de corte mais baixos para a amostra em análise, trouxe impacto no sentido de não diagnosticar precocemente.

Palavras-chave: envelhecimento; sarcopenia; diagnóstico.

INTRODUCTION

Sarcopenia, a syndrome characterized by a progressive loss of skeletal muscle mass and function due to aging, has gained significant attention in recent years. Although initially defined as the loss of skeletal muscle mass (SMM),¹ various consensus definitions have emerged, including those of the European Working Group on Sarcopenia in Older People (EWGSOP),^{2,3} the Asian Working Group for Sarcopenia,⁴ the International Working Group on Sarcopenia,⁵ and the Limited Mobility consensus.⁶ Sarcopenia is currently recognized in the ICD-10 as ICD-10M62.84.⁷

The EWGSOP, a pioneering authority in sarcopenia research, introduced an initial definition in 2010, which focused on low skeletal muscle mass as the primary criterion, followed by low muscle strength and impaired physical performance as secondary considerations.² In 2019, the revised EWGSOP2 consensus placed greater emphasis on low muscle strength as the principal diagnostic criterion, with SMM considered a secondary factor.³ Physical performance remained integral for sarcopenia severity assessment.^{2,3}

The evolution of the EWGSOP consensus between 2010 and 2019 led to debate about the relative importance of morphology vs functional aspects in sarcopenia diagnosis. During this period, numerous studies were conducted based on the 2010 criteria, which influenced the outcome of systematic reviews. Consequently, these differences in understanding have had a lasting impact on the interpretation of research findings on sarcopenia. Using both versions of the EWGSOP consensus, along with modifications made between the first and second versions, has significantly affected clinical practice, given that the classification of sarcopenia and the associated cut-off points for each indicator have undergone changes.

This study aimed to compare the diagnostic accuracy of the 2 versions of the European Sarcopenia Consensus in a sample of older adults, thereby contributing to a better understanding of their clinical utility for diagnosing sarcopenia.

METHODS

This cross-sectional study, designed according to Strengthening the Reporting of Observational Studies in Epidemiology criteria, was approved by the Universidade Federal de Ciências da Saúde de Porto Alegre Research Ethics Committee (decision 2.137.840/2017). All participants provided written informed consent.

The convenience sample included people aged ≥ 60 years, sampled non-probabilistically. Participants were required to have unimpaired cognitive function according to Mini Mental State Examination results.

We excluded individuals with untreated physical, cognitive, or metabolic disabilities, such as diabetes and coronary or neurologic diseases, that could compromise or introduce bias into the evaluations. Those in postoperative recovery or undergoing physical therapy were excluded.

Sample size was calculated using WinPepi software following Cruz-Jentoft et al.² Considering a sarcopenia prevalence of 5%, a 5% acceptable difference in the estimate, a 95% confidence level, and a significance level of 5% ($p \leq 0.05$), at least 73 participants were required.

All volunteers were assessed by the same evaluator according to a previously validated protocol.

Handgrip strength was assessed using a Jamar hydraulic hand dynamometer (Sammons Preston Rolyan, Bolingbrook, IL, USA), with the data presented in kg. The test procedures were performed according to American Society of Hand Therapy recommendations.⁸

SMM was assessed by bioimpedance analysis using a Maltron BF-906 Body Fat Analyzer (Maltron International Ltd, Essex, UK). Patient preparation and positioning followed European Society for Clinical Nutrition and Metabolism recommendations.⁹ Impedance resistance data were collected, and SMM was calculated using the formula of Janssen et al.¹⁰

Physical performance was assessed by (1) usual gait speed, which was determined using the 6-minute walk test according to Enright's recommendations,¹¹ dividing the meters walked in 360 seconds (6 minutes); (2) the Timed Up and Go test, which was applied as recommended by Podsiadlo et al.,¹² with the data presented as seconds until finishing the test; and (3) scores on the Brazilian version of the Short Physical Performance Battery¹³.

The EWGSOP² and EWGSOP2.³ tests and cut-off points were used.

The Kolmogorov-Smirnov test was used to verify the normality of continuous data. In descriptive analysis, continuous numerical data were expressed as mean (SD). Qualitative variables were expressed as absolute and relative frequency. The χ^2 test with Yates correction was used to compare the frequency distribution of sarcopenic and non-sarcopenic patients between EWGSOP and EWGSOP2. All analyses were performed in IBM SPSS Statistics 21 (IBM, Armonk, NY, USA) with a 5% significance level.

RESULTS

A total of 82 participants were analyzed. Using the EWGSOP and EWGSOP2 cut-off points, the sample was classified according to EWGSOP algorithms. First, the algorithmic

TABLE 1. Sample characteristics, sarcopenia tests results, and difference in sarcopenia diagnosis between EWGSOP and EWGSOP2.

Variables	Women (n = 64)	Men (n = 18)				
	(mean + SD)	(mean + SD)				
Age (years)	67.48 ± 5.82	69.19 ± 2.06				
Height (m)	1.58 ± 0.07	1.73 ± 0.06				
Weight (kg)	72.89 ± 12.33	84.01 ± 9.73				
Body Mass Index (kg/m²)	29.26 ± 4.57	28.02 ± 3.35				
Sarcopenia assessments						
ASM by BIA	14.55 ± 2.8	18.51 ± 1.83				
ASM relative (ASM/height²) by BIA	6.15 ± 0.54	6.89 ± 0.47				
Short Physical Performance Battery	10.83 ± 1.83	11.32 ± 2.02				
Timed Up and Go (seconds)	7.02 ± 1.36	5.86 ± 1.15				
Usual Gait Speed (m/s)	1275 ± 0.206	1535 ± 0.244				
Handgrip strength (kg)	28.41 ± 5.4	42 ± 12.14				
Diagnosis – n (%)	EWGSOP 2010			EWGSOP2 2019		
	Women (n = 64)	Men (n = 18)	Total	Women (n = 64)	Men (n = 18)	Total
Non-sarcopenic	59 (91.18)	16 (88.88)	75 (91.46)	63 (98.43)	16 (88.88)	79 (96.34)
Sarcopenic	5 (7.81)	2 (11.11)	7 (8.53)	1 (1.56)	2 (11.11)	3 (3.65)
Sarcopenia	-	-	-	1 (1.56)	2 (11.11)	3 (3.65)
Severe sarcopenia	5 (8.53)	2 (11.11)	7 (8.53)	-	-	-

ASM: appendicular skeletal muscle mass; BIA: Bioimpedance analysis; EWGSOP: consensus of the European Working Group on Sarcopenia in Older People; m/s: meters per second.

sequence and criteria of the EWGSOP were followed. Afterwards, the same sample was analyzed according to the new EWGSOP2 algorithm and cut-off points.

Table 1 shows the difference in sarcopenia diagnosis according to the criteria of each consensus: the 8.53% rate according to the EWGSOP was reduced to 3.65% according to EWGSOP2 criteria. This 4.88% difference was statistically significant ($p = 0.034$), meaning that 4 patients were no longer diagnosed according to the new criteria.

DISCUSSION

Several critical issues come to light when examining the dissimilar sarcopenia diagnosis rates between EWGSOP² and the EWGSOP2 criteria,³ as well as those found with other consensus definitions. First, primary studies, including cross-sectional investigations and clinical trials, have often overlooked the existence of these consensus guidelines. Second, the algorithm used to define and assess sarcopenia underwent substantial changes between 2010 and 2019, and

the persistent variations across different consensus definitions have affected population-based prevalence studies. Finally, the cut-off point changes between 2010 and 2019 have significant implications for individual assessment, clinical trials, and our overall understanding of the global prevalence and impact of sarcopenia.

The ongoing debate surrounding the existence of multiple consensus definitions in the literature has been a focal point of recent research. For instance, a review by Coletta & Phillips¹⁴ stresses the lack of a comprehensive, universally accepted consensus for sarcopenia diagnosis, which could hamper progress in the field. Stuck et al.¹⁵ provided objective support for this idea through a comparative analysis of 12 consensus definitions in a sample of 1495 patients. Their findings reveal a striking variation in sarcopenia prevalence, ranging from 0.7% ($n = 11$) to 16.8% ($n = 251$), depending on the diagnostic method. This substantial variation implies that, depending on the approach, up to 240 patients in their sample could have been misclassified or gone undiagnosed.

Primary studies still ignore the existence of consensus criteria for the definition and diagnosis of sarcopenia

Furthermore, it is concerning that some primary studies continue to disregard the existence of consensus guidelines for defining and diagnosing sarcopenia. Despite the presence and dissemination of multiple consensus guidelines, in a systematic review of systematic reviews, Ferreira et al.¹⁶ observed a persistent disregard for the state of the art in the field. Some primary studies either used outdated references or argued that there is no universally accepted gold standard for assessing physical performance in older adults at risk of sarcopenia. This lack of adherence to consensus guidelines complicates data normalization for meta-analyses and restricts the generation of high-quality scientific insight. Consequently, this complicates clinical assessment and decision-making for patients with sarcopenia.

Changing the importance of diagnostic criteria for sarcopenia.

The shift of emphasis in sarcopenia diagnostic criteria should also be considered. The EWGSOP² initially placed primary importance on SMM, with muscle strength and physical performance considered secondary criteria. However, this approach led to discrepancies, since obese individuals with functional deficits were not classified as sarcopenic, while patients with comorbidities that affected their functionality had compromised strength and performance despite normal SMM.

In 2019, EWGSOP2³ modified the definition and diagnosis of sarcopenia by introducing preliminary screening with the Strength, Assistance walking, Rise from a chair, Climb stairs, and Falls questionnaire to assess independence in activities of daily living. Subsequent strength assessment was then used to characterize individuals as non-sarcopenic or to further deepen the assessment, which was followed by SMM evaluation. Performance continued to be integral in determining the severity of the syndrome. While other algorithms, such as the Asian Working Group for Sarcopenia,⁴ exist, they can introduce variation into diagnosis and treatment, as studies comparing different consensus definitions have highlighted significant differences, raising concerns about potential misdiagnosis. Therefore, leading experts in the field must agree on a standard evaluation algorithm that facilitates data normalization in secondary studies, such as systematic reviews, and ensures consistent diagnosis across primary studies.

The impact of modified assessments and cut-off points on the literature

The modification of assessments and cut-off points has also affected the literature significantly. These modifications include the removal of certain tests, such as isokinetic dynamometry, and the inclusion of the sit-to-stand test to assess strength. Additionally, anthropometry was discontinued in SMM assessment, and the Stair Climb Power Test was replaced with the 400-meter walk test to evaluate performance. The assessment of physical performance underwent the least change: gait speed remained the primary variable, with a fixed cut-off point of 0.8 m/s.^{2,3} Conversely, changes in strength assessment may have substantial consequences, with the elimination of the gold standard (isokinetic dynamometry) and inclusion of the sit-to-stand test, although it is unclear whether the test truly assesses strength or better evaluates performance and functionality. Handgrip strength has emerged as a reliable alternative for assessing strength,^{17,18} which explains the exclusion of isokinetic dynamometry. However, the revised cut-off points (16 kg for women and 27 kg for men) could lead to under- or overdiagnosis, requiring updated research to align with the new standards.

The EWGSOP2's decision to no longer recommend anthropometry for SMM, despite its widespread use in clinical practice,¹⁹ raises concern. Aging can affect the accuracy of skinfold measurement as a predictor of skeletal muscle mass.²⁰ Therefore, it is essential to explore techniques, such as dual energy x-ray absorptiometry or other imaging methods, for more precise assessments, rather than merely remove a common test from the list. The new EWGSOP2 cut-off points are a challenge for previous studies and systematic reviews, rendering them outdated, which could affect clinical practice. The previous variability in cut-off points and thresholds for different tests, such as bioimpedance analysis and dual energy x-ray absorptiometry, has been replaced by a clear cut-off point, which calls for new research.^{2,3}

The evolution of consensus definitions for sarcopenia has brought about profound changes in the field. Primary studies must consider existing consensus guidelines, and published articles may need updating to align with the latest standards. The central question raised by this study is whether differences between the EWGSOP and EWGSOP2 definitions can adversely affect clinical treatment. Regrettably, this answer remains elusive and can only be determined through rigorous research and expert discussion.

Our study design precludes attributing causation, only a comparison of different evaluation criteria. The sample size and characteristics also limit external validity.

We recommend that future studies consider the new guidelines for sarcopenia assessment and that systematic reviews of older data attempt to normalize their findings according to current parameters.

CONCLUSIONS

Applying the updated European Consensus on Sarcopenia (EWGSOP2) criteria and cut-off points resulted in a significantly lower rate of sarcopenia diagnosis in this sample (from 8.5% to 3.7%). This indicates that the change in criteria, despite using lower cut-off points, affected early diagnosis by reducing the ability to identify cases.

Conflict of interest

The authors declare no conflicts of interest.

Funding

This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (number 88887.801531/2023-00).

Author contributions

PSK: conceptualization, data curation, formal analysis, methodology, resources, validation, visualization, writing – original draft. LFF: conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, validation, visualization, writing – original draft, writing – review & editing. CMS: conceptualization, data curation, investigation, methodology, writing – original draft. LHTR: conceptualization, data curation, formal analysis, funding acquisition, methodology, supervision, validation, visualization, writing – original draft, writing – review & editing.

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