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Research article

The prevalence of sarcopenia in older adults living in Western Slovenian nursing homes

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Abstract

Sarcopenia is a common disease among older adults and is related to muscle failure. Considering the adverse health consequences of sarcopenia, early detection of the disease is crucial. This study aimed to assess the prevalence of sarcopenia and the levels of severe sarcopenia among older adults living in nursing homes in Western Slovenia by using the newly proposed EWGSOP2 criteria. One-hundred-and-twenty-one (121) older adults (mean age 83.8±7.6 years, 69% women) were included in the study. The obtained results indicate that the prevalence of sarcopenia is 25.0%, with a higher prevalence among men (35.1%) compared to women (24.1%). Interestingly, 90.3% of the sarcopenic cases were identified as severe. The results demonstrate a high prevalence of severe sarcopenia among older adults with the disease. Therefore, the regular and systematic assessment of sarcopenia among Slovenian older adults is suggested in order to identify the disease in an early stage. Interventions focusing on the prevention and alleviation of the disease are warranted.

KEYWORDS: sarcopenia, prevalence, nursing home

Introduction

Sarcopenia, a muscle failure common among older adults, is now recognized as a disease encoded in the ICD-10-CM (M62.84) (Anker et al., 2016). It is expected that a redefinition of sarcopenia will appeal to an increased interest in diagnosing the disease (Anker et al., 2016; Cruz-Jentoft et al., 2019). Although healthcare professionals are aware of the negative consequences of sarcopenia, the diagnostic algorithms have not yet been successfully applied to clinical practice (Cruz-Jentoft et al., 2019). A survey of Dutch healthcare professionals demonstrates there is a lack of knowledge about sarcopenia, as barely 21.4% of healthcare professionals indicated they know how to diagnose it (Reijnierse et al., 2017). Aiming to increase awareness about sarcopenia and its risks, the European Working Group on Sarcopenia in Older People (EWGSOP) (Cruz-Jentoft et al., 2019) collected the latest scientific findings to update the existing recommendations for disease diagnostic tools (EWGSOP1) (Cruz-Jentoft et al., 2010). The new sarcopenia diagnostic algorithm EWGSOP2 identifies low muscle strength as the main indication of sarcopenia, low muscle quantity or quality to confirm the diagnosis, and the level of physical performance to determine the severity of sarcopenia. The majority of the studies on sarcopenia have been made following the EWGSOP1 criteria; however, further studies might be planned according to the EWGSOP2 criteria (Cruz-Jentoft et al., 2019).

Sarcopenia is a progressive and generalized disease highly associated with negative health outcomes, including falls, fractures, physical disability, loss of independence and mortality (Goodpaster et al., 2008; Topinkova, 2008; Cruz-Jentoft et al., 2010). Due to the population aging, the prevalence of sarcopenia is expected to grow. A projection model for 28 European countries revealed a dramatic increase in sarcopenia cases in the next 30 years. With an increase in the number of cases of 72.4% from 2016 until 2045, sarcopenia will become one of the major clinical problems in the public health of older adults in the EU (Ethgen et al., 2017). There is a trend toward an economic burden of sarcopenia (Bruyere et al., 2018), as sarcopenia increases the risk for hospitalization and consequently hospitalization costs up to 58.5% per patient (Sousa et al., 2016). Sarcopenia affects 9.9% to 40.4% of community-dwelling older adults aged 60 years and more (Mayhew et al., 2019). The prevalence of sarcopenia in the long-term care population is even higher (14%–33%) than in community-dwelling populations (1–29.0%) (Cruz-Jentoft et al. 2014). EWGSOP states that sarcopenia affects 41.0% of institutionalized older people (Shen et al., 2019). A similar prevalence (38.1%) was found in the SENIOR cohort study (Buckinx et al., 2017) and in the sample of older adults from Slovenian nursing homes (38.7%) (Urzi et al., 2017). As the prevalence of sarcopenia is growing in the EU, increasing demand for services in residential facilities of up to 3.5% per year until 2030 is antic-

ipated (Dantuma, 2019). As there are two main services in Slovenia, institutional care and social home care (Hlebec et al., 2014), a greater number of sarcopenic older adults can be expected in both types of care services.

EWGSOP encourages additional studies in order to explore how to prevent or delay sarcopenia. Following the aim to increase awareness about sarcopenia and due to the lack of studies in nursing homes assessing the prevalence of the disease, the purpose of the present study was to assess the prevalence of sarcopenia and severe sarcopenia in a sample of older residents from Western Slovenian nursing homes. As a sarcopenia diagnostic tool, the most recent EWGSOP2 guidelines were used, which have not previously been used in Slovenia to the best of our knowledge.

Methods

Sample

From June to October 2019, mobile older adults from six (6) western Slovenian nursing homes were invited to participate in the study. Nursing home residents were included in the study if they met the following criteria: (1) aged 65 or above, (2) able to stand and walk (walking aids permitted), (3) Mini-Mental State Examination score above 18. The residents did not receive any compensation for participating in the study. Written consent was obtained from 128 candidates. The data on hand grip strength (HGS) were missing from a few participants (n = 7). Finally, a sample of 121 residents (mean age 83.8 ±7.6 years, 69% women) was included in the EWGSOP2 assessment protocol for sarcopenia. After HGS measurements, we had to remove (n = 8) participants enrolled in the group with probable sarcopenia. Due to having heart pacemakers, they did not perform the Bioelectrical Impedance Analysis (BIA). The study was conducted in accordance with the Declaration of Helsinki and was approved by the National Medical Ethics Committee, the Republic of Slovenia (No. 0120-321/2017-4).

Measurements

This cross-sectional study assessed the prevalence of sarcopenia and severe sarcopenia according to the EWGSOP2 guidelines. All the objective measurements were performed in nursing home facilities by trained personnel. For each participant, all measurements were collected on the same day.

Prior to physical testing, the participants' blood pressure (BP) was checked. If it exceeded 140/90 mmHg, the measurements were postponed until BP normalization. The fol-

lowing physical parameters were evaluated: (1) Muscle strength was measured via hand grip strength with a handheld hydraulic dynamometer SH5001 (SAEHAN Corporation, Changwon, Korea) performed two times for each hand, and the best score (kg) was used for evaluation (Roberts et al., 2011); (2) Muscle quantity was calculated as skeletal muscle mass (SMM) from row resistance data obtained with the Bioelectrical Impedance Analysis (MC-980MA, 50 kHz, Tanita Corporation, Tokyo, Japan) and by using a predictive equation of Janssen et al. (Janssen et al., 2000); SMM was adjusted for body size and skeletal muscle index (SMI) was calculated as SMM (kg) divided by height (m) squared and expressed in kg/m² (Janssen et al., 2000); (3) Physical performance was assessed using walking gait speed (walking aids allowed) on the 4-m marked walking course with manually measured walking time; the fastest time of two trials was considered and expressed in m/s (Maggio et al. 2016); (4) Body mass (kg) was measured with a BIA analyzer during the estimation of muscle quantity. Standing height (cm) was measured barefoot using a fixed stadiometer with the head in the Frankfurt plane (Lohman et al.,1988).

Sarcopenia (regardless of primary or secondary type) was assessed using the EWGSOP2 pathway (Cruz-Jentoft et al. 2019) starting at the 'Assess' level by determining muscle strength. Based on the presumption of the high prevalence of muscle weakness in older nursing home residents, the 'Find' SARC-F questionnaire for self-reporting of the signs of sarcopenia was excluded. Firstly, probable sarcopenia was recognized by assessing HGS values. The threshold criteria for low HGS were <27 kg in men and <16 kg in women. Secondly, sarcopenia was confirmed by evaluating muscle quantity values. Low muscle mass was proclaimed as a skeletal muscle index lower than 7.0 kg/m² in men and 5.5 kg/m² in women. Thirdly, confirmed sarcopenia cases were determined as severe if their gait speed was 0.8 m/s or lower (Cruz-Jentoft et al., 2019).

Data analysis

The IBM SPSS Statistics 22 software (SPSS Inc., Chicago, IL) was used for descriptive statistics analysis. The normality of the variables was tested with the Shapiro-Wilk test and reported as mean (M) with standard deviation (SD) for normally distributed variables. Categorical variables are presented in numbers and percentages. The results were analyzed separately for males and females.

Results

A total of 121 participants (mean age 83.8 ±7.6 years, 69% women) were included in the study. All of them were residents in nursing homes in western Slovenia. Participants' characteristics and descriptive statistics are presented in Table 1.

Table 1: Characteristics and descriptive statistics of study participants

Characteristics	Men (n=37)	Women (n=84)	Total (n=121)
		M(SD)/n (%)	
Age (years)	82.5 (8.1)	82.6 (7.9)	83.8 (7.6)
Body height (cm)	167.3 (7.8)	154.6 (7.6)	158.5 (9.7)
Body mass (kg)	77.3 (12.9)	66.7 (12.5)	70.1(13.5)
Skeletal muscle mass (kg)	16.9 (3.5)	16.0 (2.4)	16.4 (3.2)
Skeletal muscle index (kg/m²)	6.6 (0.7)	6.5 (1.0)	6.5 (0.8)
No sarcopenia	20 (54.0)	55 (62.5)	75 (61.9)
Suspected sarcopenia	17 (45.9)	29 (34.5)	46 (38,1)
Sarcopenia [A]	13 (35.1)	18 (21.4)	31 (25.0)
Severe sarcopenia[B] within sarcopenia	13 (100.0)	15 (83.3)	28 (90.3)

Legend:
M=mean, SD=standard deviation, n=number/count; 1-5 M(SD); 6-9 n (%)
[A] low hand grip strength (<27 kg in men and <16 kg in women) and low skeletal muscle index (<7.0 kg/m² in men and <5.5 kg/m² in women)
[B] low hand grip strength (<27 kg in men and <16 kg in women) and low skeletal muscle index (<7.0 kg/m² in men and <5.5 kg/m²in women) and reduced gait speed (<0.8 m/s²)

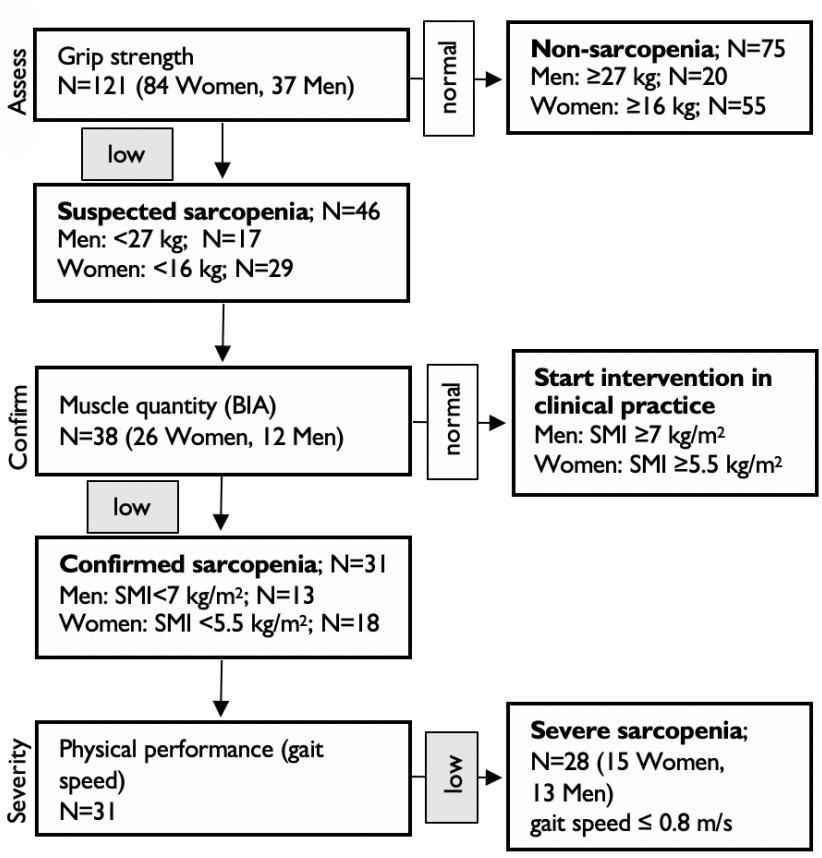

Figure 1: Number of participants with sarcopenia and severe sarcopenia using EWGSOP2 flow-chart (Cruz-Jentoft 2019)

The results of the sarcopenia tests revealed that 61.9% of participants included in the study were non-sarcopenic. Therefore, due to low hand-grip strength, the rest (38.1%) became suspected of having sarcopenia and their skeletal muscle mass was subsequently evaluated (Table 1). After testing positive for low muscle mass, sarcopenia was confirmed in 25.0% of participants (35.1% men; 21.4% women). All of the recognized cases showed both low muscle strength (hand grip <27 kg in men and <16 kg in women) and low muscle mass (skeletal muscle index <7.0 kg/m² in men and <5.5 kg/m² in women). The prevalence of severe sarcopenia (additionally performance limitation) as gait speed ≤0.8 m/s) among sarcopenic cases was 90.3% (100.0% in men, 83.3% in women) (Table 1, Figure 1).

Discussion

The objective of our study was to assess the prevalence of sarcopenia and severe sarcopenia in a sample of older residents of western Slovenian nursing homes using the revised EWGSOP2 guidelines (Cruz-Jentoft et al., 2019). The new EWGSOP2 definition better reflects the clinical outcomes and the adverse events of sarcopenia, addressing the disconnect between low muscle mass and outcomes (Phu et al., 2019). As muscle strength is associated with functional decline and accelerated dependency in everyday activities (Rantanen, 2003; Taekema et al., 2010), the EWGSOP2 algorithm suggests low muscle strength as a primary indicator of sarcopenia (Cruz-Jentoft et al., 2019). To our knowledge, this study is the first to report on the prevalence of sarcopenia in an older population of Slovenian nursing homes using muscle strength as a primary indicator of sarcopenic muscle failure.

We found that 61.9% of participants in our study were non-sarcopenic. According to EWGSOP2 recommendations (Cruz-Jentoft et al., 2019), they should be rescreened for sarcopenia later. A total of 38.1% of participants showed reduced muscle strength (suspected of sarcopenia); in two thirds of such cases, sarcopenia was confirmed. Our findings indicate that the prevalence of confirmed sarcopenia among included residents is 25.0%. It is important to stress that almost all (90.3%) of sarcopenia cases were recognized as severe.

The data on EWGSPO2-defined sarcopenia among older adults in European residential facilities are scarce. We could not find comparable studies addressing the prevalence of sarcopenia using the EWGSOP2 criteria in Slovenia. Urzi et al. (2017) assessed sarcopenia in a sample of residents of Slovenian nursing homes with the use of the EWGSOP1

diagnostic tool. Compared to our study, they diagnosed a higher percentage (38.7%) of sarcopenic cases.

The main outcome of our study is a very high prevalence of severe sarcopenia (90.3%) among participants with recognized sarcopenia. A similar prevalence of severe sarcopenia was derived from a Spanish study on older adults from long-term care homes (Ridriguez-Rejon et al., 2019). The authors identified 95.0% of diagnosed sarcopenia cases as severe. According to Bravo-Jose et al. (2018), the prevalence of severe sarcopenia in Spain was almost 70.0% among institutionalized older adults with identified sarcopenia.

Severe sarcopenia is an aggravated status with the addition of performance limitation (Cruz-Jentoft et al., 2019). Low scores on the short physical performance battery and gait speed have been shown to be associated with the worsening of everyday activities and the increasing dependency of older adults (Wang et al., 2020). Sarcopenia is highly associated with negative health outcomes, including falls, fractures, physical disability, loss of independence, and mortality (Goodpaster et al., 2008, Topinkova, 2008; Cruz-Jentoft et al., 2010). Therefore, a suitable diagnostic approach is important for implementing appropriate interventions. The EWGSOP2 protocol is suggested as being more sensitive than EWGSOP1 for predicting the incidence of falls or hospitalization due to sarcopenia (Yang et al., 2019). Combined training, including strength, balance and flexibility exercises, are effective in reducing the risk of falls, the consequences of which can significantly hinder daily life activities in old age (Zerbo-Šporin, 2019). To maintain the physical health of residents in homes for the elderly, Novak and Vute (2013) suggest implementing forms of physical activities that also motivate elderly people to exercise.

When diagnosed, sarcopenia should be treated according to the leading causes. If sarcopenia is detected in an early phase, resistance training is suggested (Morley, 2018). Additionally, the use of proteoanabolic dietary supplements is advised (Topinkova, 2018). Both nutritional interventions and resistance training produce significant benefits in muscle parameters and may reverse frailty and sarcopenia (Damanti et al., 2019).

According to our findings in older residents from Western Slovenian nursing homes, when sarcopenia was diagnosed, most of the cases (especially in men) were in an aggravated stage. Therefore, to detect the disease in an early stage, we suggest frequently screening the nursing home residents for sarcopenia using friendly, simple, and sensitive tools such as the EWGSOP2 protocol. Moreover, interventions to delay the development of the disease should be immediately implemented.

Conclusion

The new sarcopenia diagnostic algorithm EWGSOP2 has been suggested to be used in identifying sarcopenia based on muscle strength, muscle quantity or quality, and the level of physical performance. Most of the studies detecting sarcopenia thus far have used the EWGSOP1 criteria. Therefore, our study aimed to assess the prevalence of sarcopenia among Slovenian older adults living in nursing homes using the EWGSOP2 criteria. Our results indicate a very high prevalence of severe sarcopenia among included participants with sarcopenia. To reduce the incidence of sarcopenia in nursing homes, it is important to identify pre-sarcopenia and sarcopenia cases. We suggest that healthcare professionals regularly check for sarcopenia in community-dwelling older adults as well as in nursing home residents. Those identified as pre-sarcopenic should be included in appropriate interventions to prevent the development of sarcopenia and severe sarcopenia, which are highly associated with decreased independence and frailty in older adults. Moreover, preventive strategies in adulthood should be promoted to reduce the incidence of sarcopenia later in life.

Study limitations

This study has potential limitations. The results should not be generalized due to a convenient and small sample size, which included older adults living in nursing homes in Western Slovenia. The results obtained might not reflect the prevalence of sarcopenia among all Slovenian older adults living in nursing homes. Moreover, we only included participants if they met certain inclusion criteria. This study is strengthened using the EWGSOP2 guidelines and criteria to assess the prevalence of sarcopenia. For further research, we suggest regular, systematic, and objective testing of older adults living in nursing homes in Slovenia for sarcopenia to identify sarcopenia in an early stage and plan for intervention studies to delay and reduce the negative consequences of sarcopenia.

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Povzetek

Sarkopenija je s staranjem povezana bolezen skeletnih mišic, za katero je značilna izguba mišične mase in delovanja. Sarkopenija pri bolniku poveča tveganje za padce, zlome, hospitalizacijo, potrebo po trajni oskrbi in zgodnejšo smrt. S staranjem populacije se pričakuje porast sarkopenije in njenih posledic, s tem pa tudi večje družbeno in finančno breme. Namen raziskave je ovrednotiti razširjenosti sarkopenije in hude sarkopenije v domovih starejših občanov zahodne Slovenije s ciljem povečanja prepoznavnosti bolezni in spodbujanja k njenemu širšemu in zgodnejšemu diagnosticiranju. V raziskavo je bilo vključenih 121 oskrbovancev (83.8±7.6 let, 69% žensk). Sarkopenija in huda sarkopenija sta bili potrjeni s pomočjo EWGSOP2 diagnostičnega algoritma. Sarkopenija je bila diagnosticirana pri 25,0 % preiskovancev. Bolezen je pogostejša pri moških (35,1 %) kot pri ženskah (24,1 %). Zaskrbljujoč je podatek, da ima velika večina preiskovancev z diagnosticirano sarkopenijo (90,3 %) že izraženo hudo obliko bolezni, kar nakazuje na smiselnost širokega in rednega testiranja starostnikov. Posameznike s prepoznanim povečanim tveganjem za sarkopenijo je priporočljivo vključiti v prehransko in vadbeno intervencijo z namenom zmanjšanja tveganja za pojav bolezni, že sarkopenične posameznike pa v terapevtske programe s katerimi se zmanjša verjetnost za razvoj hude oblike bolezni.

KLJUČNE BESEDE: sarkopenija, razširjenost, domovi starejših občanov

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