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Relationship Between Sarcopenia and Quality of Life in Self-Valid and Level Dependent Chilean Elderly People from Two Cities in Southern Chile

Relación entre sarcopenia y calidad de vida en personas mayores chilenas autovalentes y dependientes leves de dos ciudades del sur de Chile

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ABSTRACT

Introduction: Sarcopenia is the muscle disease linked to the aging process and associated with decreased quality of life and functionality in the elderly.

Objective: To determine the association between sarcopenia and quality of life in self-sufficient and mildly dependent elderly people in two cities in southern Chile.

Methodology: The study had a non-experimental, analytical and cross-sectional design. The sample consisted of 80 elderly people (30 men); non-probabilistic convenience sampling was used. To determine quality of life, the SF-36 quality of life survey was used, and to determine sarcopenia, the European Working Group on Sarcopenia in Older Persons flow chart was used, which evaluates muscle strength (dynamometry), appendicular muscle mass and physical performance (walking speed).

Results: The prevalence of sarcopenia in the elderly reached 23.8%. There was no association between sarcopenia and quality of life. When analyzing the parameters to evaluate sarcopenia separately, an association between walking speed and quality of life dimensions (physical function; p=0.000, physical role; p=0.005 and social function; p=0.010) was evidenced.

Conclusion: Lower walking speed was associated with poor quality of life. Future sarcopenia assessment and monitoring programs should consider quality of life as a variable associated with physical performance in the elderly.

Keywords: sarcopenia, elderly, quality of life, Chile [DECs].

RESUMEN

Introducción: La sarcopenia es la enfermedad muscular vinculada al proceso de envejecimiento y que se asocia a una disminución de la calidad de vida y la funcionalidad en las personas mayores.

Objetivo: Determinar la asociación entre la sarcopenia y la calidad de vida de personas mayores autovalentes y dependientes leves de dos ciudades del sur de Chile.

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Metodología: El estudio tuvo un diseño no experimental, analítico y de temporalidad transversal. La muestra estuvo constituida por 80 personas mayores (30 hombres); se utilizó un muestreo no probabilístico por conveniencia. Para determinar la calidad de vida se aplicó la encuesta de calidad de vida SF-36, y para determinar sarcopenia se aplicó el flujograma del Grupo de Trabajo Europeo sobre Sarcopenia en Personas Mayores, que evalúa la fuerza muscular (dinamometría), masa muscular apendicular y rendimiento físico (velocidad de marcha).

Resultados: La prevalencia de sarcopenia en las personas mayores alcanzó un 23,8 %. No se evidenció asociación entre la sarcopenia y calidad de vida. Al analizar los parámetros para evaluar la sarcopenia por separado, se evidenció una asociación entre la velocidad de marcha y las dimensiones de calidad de vida (función física; p=0,000, rol físico; p=0,005 y función social; p=0,010).

Conclusión: Una menor velocidad de marcha se relacionó con una baja calidad de vida. Futuros programas de evaluación y control de la sarcopenia deberían considerar la calidad vida como una variable asociada al rendimiento físico de las personas mayores.

Palabras clave: sarcopenia, anciano, calidad de vida, Chile [DECs].

INTRODUCTION

Sarcopenia is an age-related syndrome characterized by progressive and generalized loss of skeletal muscle mass and strength; is a major contributor to the risk of physical frailty, functional decline in the elderly (PM) (1), poor health-related quality of life (HRQoL)(2) , premature death(3), incidence of disability, increased risk of all-cause mortality, cardiovascular disease and cardiovascular mortality (3), and increased days and cost of hospitalizations (4). The increase in the population over 60 years of age is a worldwide demographic trend. Data show that this population will increase from 530 million in 2010 to 2000 million in 2050, with approximately 1 in 6 people expected to be 65 years of age or older (5), so sarcopenia and its consequences will be very common in this age group. Mobility, movement and good cognition are fundamental to a good quality of life in the elderly. These capabilities deteriorate over the years due to the natural aging process, coupled with various chronic diseases that afflict this age group. Strength and power decline from the age of 30 onwards by 3 to 8% per decade, and this loss accelerates from the age of 60 onwards. The functional capacity and mobility of PM is highly related to strength and power, in turn with sarcopenia; this is one of the reasons why sarcopenia is related to the loss of functionality in PM.

One of the alternatives that exist internationally for the identification and diagnosis of sarcopenia, in a massive and low-cost way, is the use of the Elderly Working Group on Sarcopenia in Older Persons (EWGSOP2) flowchart, which uses low muscle strength as the main parameter of sarcopenia, as well as the detection of low muscle strength as the main parameter of sarcopenia physical performance predicts adverse outcomes, so such measures are used to identify the severity of sarcopenia. In clinical settings, EWGSOP2 may have a cost-effective advantage because DEXA measurements are not needed to establish a case of sarcopenia (6). In general terms, sarcopenia, according to EWGSOP2, is likely when low muscle strength is detected. A diagnosis of sarcopenia is confirmed by the presence of low muscle quantity or quality. When low muscle strength, low muscle quantity/quality and low physical performance are detected, sarcopenia is considered severe (8).

Currently, the use of the EWGSOP2 flowchart for the detection of sarcopenia has become widespread; despite this, there is little evidence of its use in Latin American studies, and this study is considered a pioneer in Chile in PC living in the community. Recent international evidence has associated the diagnosis of sarcopenia with greater functional deterioration (1) and lower quality of life (2). However, most of this evidence has been generated in developed countries and there is no extensive evidence in developing countries, such as Chile. Additionally, the prevalence of sarcopenia in the population > 60 years is widespread, depending on age, sex, health condition and the criteria used to detect it. This phenomenon is presented in a meta-analysis focused on the population > 60 years, which indicates that in Brazil the prevalence of sarcopenia was 17 % (20 % in women and 12 % in men) (9), in Mexico a sarcopenia prevalence of 14 % was identified in persons between 65 and 69 years of age (greater than 50 % in > 80 years) (10) and in Mexico a sarcopenia prevalence of 14 % was identified in persons between 65 and 69 years of age (greater than 50 % in > 80 years) (10). 80 years) (10) and in Chile, the prevalence of sarcopenia reached 19.1 % in >60 years (and reached 39.6 % in >80 years) (11). Despite the high prevalence of sarcopenia, the threat it poses to active aging, good quality of life and the large health expenditure it causes to the States due to the increased risk of falls, hospital admissions and institutionalization, updated information on its prevalence and its association with health markers is not extensive in Latin American countries. Local studies could be useful to recognize the population at risk early and subsequently implement prevention programs with the aim of maintaining or increasing protective factors, such as physical capacity or the level of physical activity.

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The objective of this study was to determine the association between sarcopenia and quality of life in self-sufficient and mildly dependent elderly people in two cities in southern Chile.

METHODS

Design

The study had a non-experimental, analytical and cross-sectional design.

Sample

Older men and women aged ≥60 years from two cities in southern Chile (in 2020) were invited to participate. Considering a sample of 80 PM between both cities (n= 40 self-supporting and n= 40 mildly dependent). The invitation was made through visits to the senior centers and through informative meetings at their premises. The study was conducted between March and May 2020. The sample was balanced by sex and age. A non-probabilistic sampling by convenience of quota type was done. The population was selected in a non-randomized way according to the following criteria: inclusion criteria, being over 60 years of age, being enrolled in one of the centers included in this research, being self-sufficient or mildly dependent according to Barthel, and exclusion criteria: person with cognitive impairment, institutionalized, moderately or severely dependent according to Barthel or having medical restriction to practice physical exercise.

Study variables

Sarcopenia: The EWGSOP2 flow chart was used to diagnose and classify the severity of sarcopenia, which consists of the evaluation of a) muscle strength, b) appendicular muscle mass and c) walking speed.

- *Muscular strength*: grip strength was evaluated with the use of a JAMAR® brand hand-held dynamometer. The cohort points used for this research were <27 kg for men and <16 kg for women (12).

- *Appendicular muscle mass*: muscle mass was evaluated according to the formula described by L. Lera (13). The cohort points used for this research were those used by Studenski (14) for males < 20 kg and for females < 15kg.

- *Gait Speed*: A commonly used gait speed test, called the 4-meter gait speed test, was performed. The cutoff point of ≤ 0.8 m/s is recommended by EWGSOP2 as an indicator of severe sarcopenia.

Quality of life: The self-report quality of life questionnaire SF- 36 Spanish version was used. This scale has 36 questions, divided into 11 items. The 36 items of the instrument cover the following scales: Physical Function, Physical Role, Bodily Pain, General Health, Vitality, Social Function, Emotional Role and Mental Health. Additionally, the SF-36 includes a transition item that asks about the change in general health status from the previous year. The questionnaire is intended for persons aged ≥ 14 years and should preferably be self-administered, although administration by personnel or telephone interview is also acceptable.

Sociodemographic characteristics and lifestyles: We used a sociodemographic and health survey of our own construction, based on the National Health Survey (ENS 2016-2017), which is a tool used by the Chilean Ministry of Health to have information on diseases and treatments, for people over 15 years old living in the country.

Statistical analysis: The analysis of the results will be done with the IBM® SPSS® version 19 program. The description of the qualitative variables was presented as frequency and percentage and the quantitative variables as mean and standard deviation. To determine differences between high quality of life and low quality of life groups in the SF-36 quality of life subscales (Physical Function, Physical Role, Bodily Pain, General Health, Vitality, Social Function, Emotional Role and Men's Health) for the sarcopenia markers, an independent samples T-test or Mann Whitney U test was performed according to the normal distribution of the variables studied through a normality test. To categorize these values, the arithmetic mean of the participants was calculated for each of the 8 dimensions of quality of life evaluated, and based on this measure, the data were dichotomized into "high quality of life" and "low quality of life". This categorization procedure has been used in previous quality of life studies (15). Additionally, to determine the correlation between sarcopenia markers and the SF-36 quality of life subscales, the Pearson correlation coefficient or the Spearman correlation coefficient was used according to the normal distribution of the variables studied through a normality test. A significance level of $\alpha=0.05$ was considered and p-values < 0.05 were considered significant differences.

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This research respected the ethical principles for medical research on human subjects in accordance with the Declaration of Helsinki updated in Fortaleza (Brazil, 2013). This thesis study was reviewed and approved by the Scientific Ethics Committee (CEC) of the south-central macrozone of the University of Santo Tomás (code n.° 160-2019).

RESULTS

The age of the sample was 74.0 ± 6.0. It was found that the sample was mostly composed of women (62.5 %), had an urban place of residence (97.5 %), had incomplete basic education (56.3 %) and the average BMI of the sample was 28.9 kg/m2, categorized as overweight. Regarding smoking habits, 45.0 % had never smoked, while 8.8 % consumed one or more cigarettes per day. In relation to alcohol consumption, 100 % of the samples presented a low risk, according to the AUDIT index. In addition, 73.8 % did not present sarcopenia, and the percentage with some degree of sarcopenia reached 26.2 %, representing probable sarcopenia, confirmed sarcopenia and severe sarcopenia.

Table 1. Sociodemographic, nutritional status, health, sarcopenia and lifestyle characteristics of the elderly assessed

Variables	Total	
Partner demographics		
Age (years)	74,0	±6,0
Sex (%)		
Men	30	(37,5)
Women	50	(62,5)
Place of residence (%)		
Urban	78	(97,5)
Rural	2	(2,5)
Level of functionality (%)		
Self-validating	40	(50,0)
Slightly dependent	40	(50,0)
Level of education attained (%)		
Completed higher education	3	(3,8)
Full stocking	8	(10,0)

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Incomplete stocking	6	(7,5)
Basic complete	8	(10,0)
Basic incomplete	45	(56,3)
No education	10	(12,5)
Nutritional, health and sarcopenia status		
Weight (kg)	72,2	±14,9
Size (m	1,58	±0,12
BMI (kg/m2)	28,9	±4,7
Knee height (cm)	40,4	±9,7
Calf circumference (cm)	34,2	±5,6
Hip circumference (cm)	94,1	±21,6
Appendicular muscle mass (kg)	14,7	±4,8
Running speed (m/s)	0,8	±0,3
Dynamometry (kg)	23,1	±7,7
Sarcopenia category (%)		
No sarcopenia	59 (73,8)	
Probable sarcopenia		2 (2,5)
Sarcopenia confirmed		6 (7,5)
Severe sarcopenia	13 (16,3)	
Lifestyle		
Sleeping time (h)	6,7	±2,1
Tobacco consumption (%)		
No, I have never smoked	36	(45,0)
No, I have quit smoking	26	(32,4)
Yes, occasionally (less than one cigarette per day)	11	(13,8)
Yes, one or more cigarettes per day	7	(8,8)
Alcohol consumption, AUDIT score (%)		
0 - 7 Points: Low risk	80	(100,0)
8 - 15 Points: Medium risk	0	(0,0)
16 - 19 Points: High risk	0	(0,0)
20 - 40 Points: Probable addiction	0	(0,0)

Qualitative data are presented as frequency and percentage and quantitative data as mean ± standard deviation. n=80.

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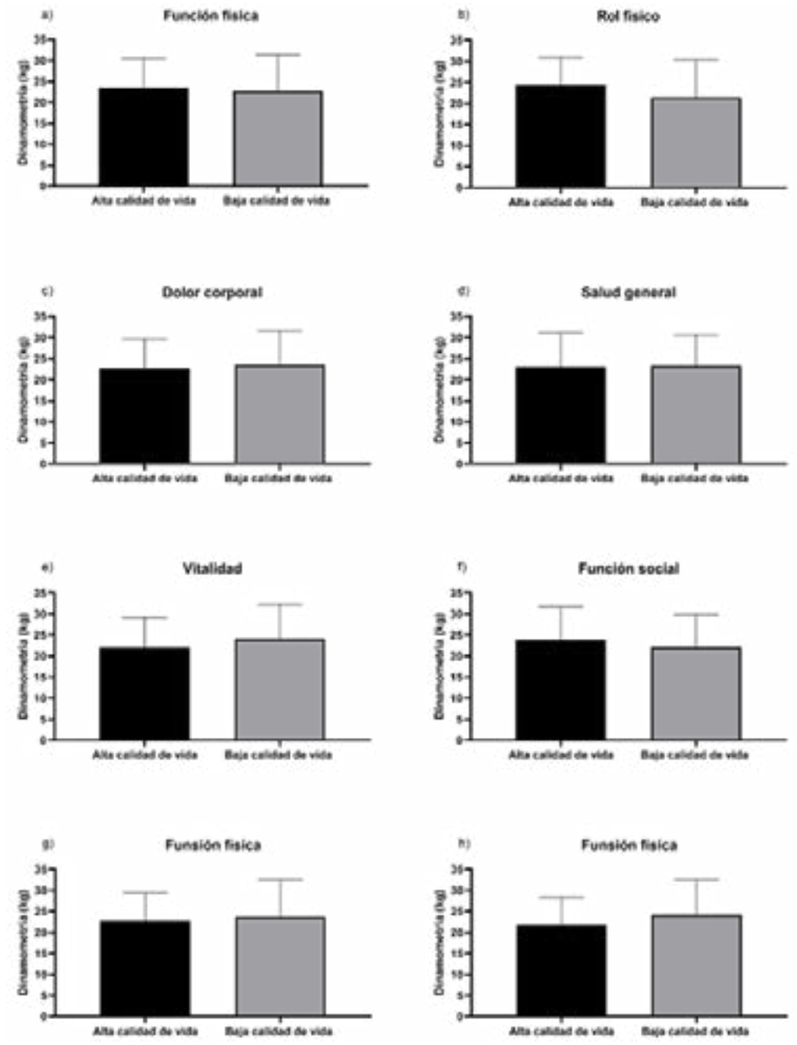
Table 2 shows the health-related quality of life measured with the SF-36 in the PCs evaluated. The lowest scores were evidenced in the dimensions Physical role, with 47.2; General health, with 44.1; Vitality, with 45.2 and Mental health with 45.8.

Table 2. Health-related quality of life of the study sample

Health-related quality of life variables	Total	
Physical function	57,8	±21,8
Physical role	47,2	±34,7
Body pain	56,7	±23,4
General health	44,1	±16,2
Vitality	45,2	±14,9
Social function	58,9	±23,2
Emotional role	68,8	±38,4
Mental health	45,8	±14,5

Data are presented as mean ± standard deviation. n=80.

The parameters of the EWGSOP2 algorithm for the diagnosis of sarcopenia were analyzed independently. It was evident that when comparing muscle strength, measured with dynamometry, between the groups with good quality of life and poor quality of life, no significant differences were found in any of the dimensions of the SF-36 (Figure 1).



Data are presented as mean ± standard deviation. *Differences are significant at a p-value <0.05.

Figure 1. Dynamometry in elderly people with high and low quality of life

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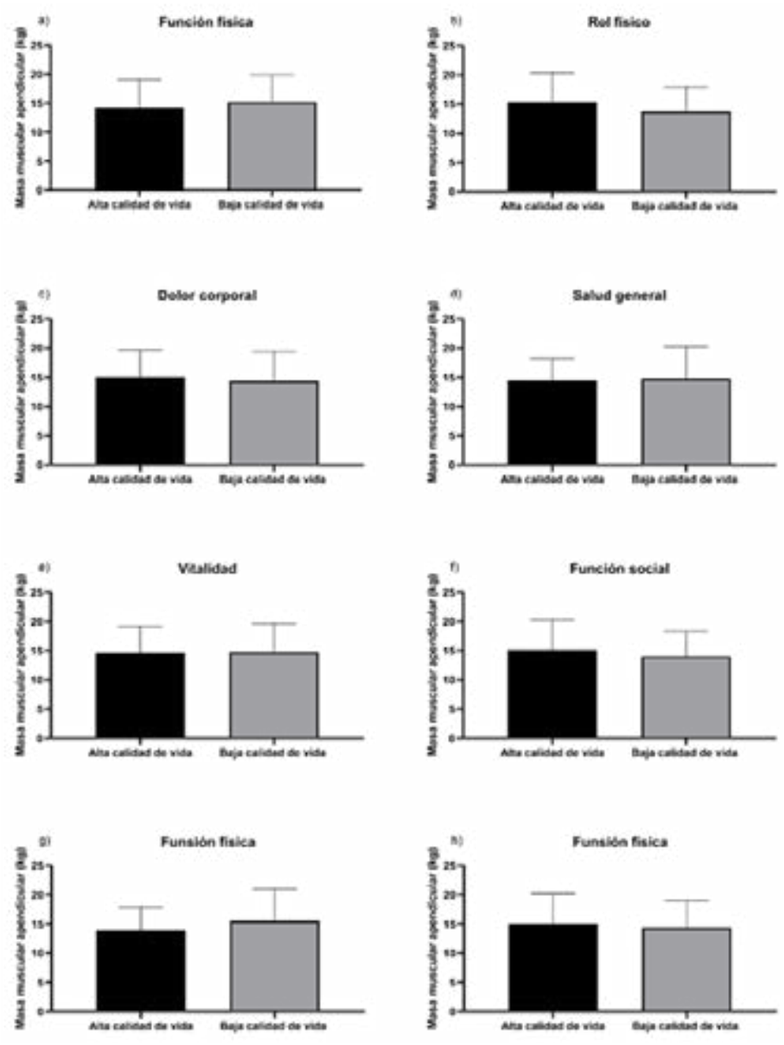

Data are presented as mean ± standard deviation. *Differences are significant at a p-value <0.05.

Figure 2. Appendicular muscle mass in elderly people with high and low quality of life

Figure 2 shows the appendicular mass according to the level of quality of life. When comparing appendicular muscle mass between the groups with good quality of life and poor quality of life, no significant differences were found in any of the dimensions of the SF-36 (Figure 2).

On the other hand, Figure 3 shows the walking speed of the elderly according to the level of quality of life. When comparing the walking speed between the groups with good quality of life and poor quality of life, it was found that the PM who had a good quality of life in Physical Function (09±0.3 m/s versus 0.7±0.2 m/s, p=0.000), in Physical Role (0.9±0.3 m/s versus 0.7±0.3 m/s, p=0.007) and in Social Function (0.9±0.3 m/s versus 0.7±0.3 m/s, p=0.040) had significantly higher walking speed compared to PM who had poor quality of life (Figure 3).

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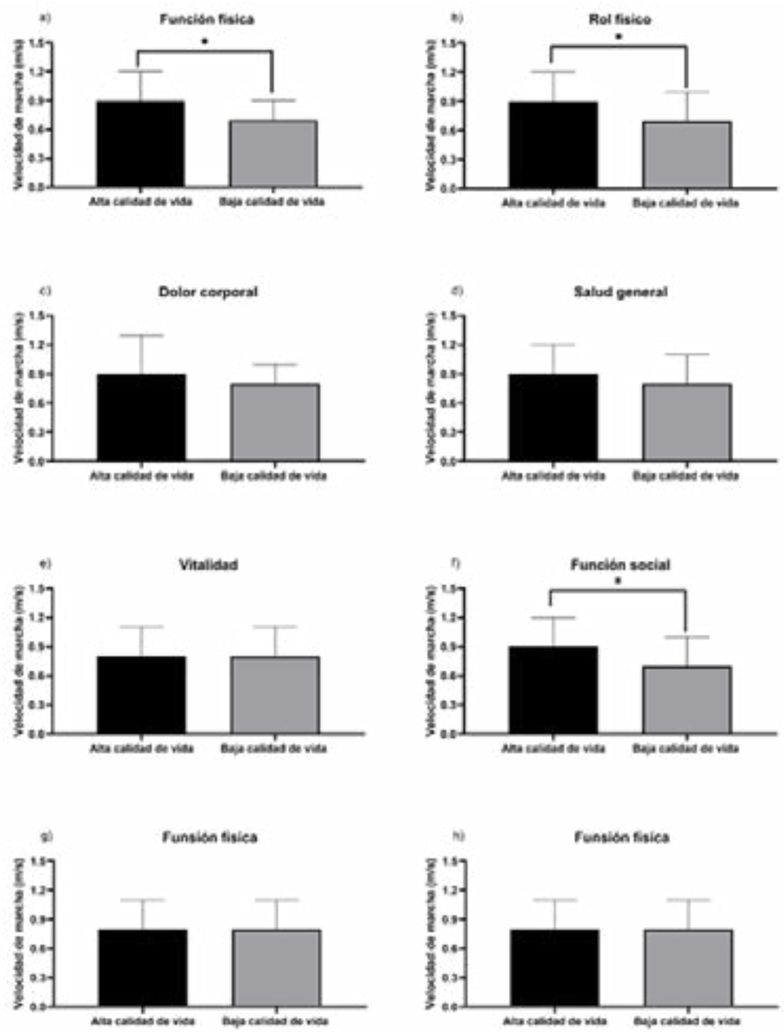

Data are presented as mean ± standard deviation. *Differences are significant at a p-value <0.05.

Figure 3. Gait speed in elderly people with high and low quality of life

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These differences in physical performance between the participants with high and low quality of life were corroborated in the Pearson correlation analysis. It was observed that walking speed presented a weak and positive correlation with the Physical Function, Physical Role and Social Function dimensions of the SF-36, which implies that as the PM increased their walking speed, their scores in Physical Function (p=0.000), Physical Role (p=0.005) and Social Function (p=0.010) increased at the same time (Table 3).

Table 3. Association between sarcopenia markers and health-related quality of life

Variables	Physical function	Physical role	Body pain	General health	Vitality	Social function	Emotional role	Mental health
DIN	0,146	0,173	-0,100	-0,051	-0,051	-0,032	0,111	-0,107
	0,195	0,125	0,379	0,651	0,656	0,780	0,326	0,346
MMA	-0,036	0,219	0,034	-0,021	0,069	0,061	-0,177	0,025
	0,751	0,051	0,764	0,853	0,545	0,589	0,116	0,826
VM	,485*	,314*	0,193	0,203	0,166	,288*	0,106	0,125
	0,000	0,005	0,086	0,071	0,141	0,010	0,350	0,269

DIN= dynamometry, MMA= appendicular muscle mass and VM= walking speed. Data are presented with Pearson's R coefficient. *There is a significant association with a p-value <0.05.

DISCUSSION

This study allowed us to determine the relationship between sarcopenia and HRQOL in 80 older adults in two cities in southern Chile. Although no relationship was found between the diagnosis of sarcopenia and quality of life in all its dimensions in MP aged 65 years and older, when the variables that allow its diagnosis were analyzed, such as: dynamometry, appendicular mass and MV, an association was observed between MV and physical function, physical role and social function. This suggests that the MP with lower quality of life in the variables physical function, physical role and social function had lower MV. This coincides with current evidence indicating that the greatest impact on the life of the MP with Sarcopenia is Physical Functioning and Social Role (16), which increases with age (17). It seems that MV is a sensitive parameter to changes in the functionality of the MP (18).

This study is used for the diagnosis of sarcopenia the currently most cited definition, which is the one proposed by the European Working Group on Sarcopenia in the Elderly.

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(EWGSOP), which was updated as EWGSOP2 in January 2019 (8). Considering the importance of timely diagnosis due to its high prevalence, mortality and disability, in PM (19), and its legal support by institutions such as the Ministry of Health of Chile (MINSAL), who recommends the use of this tool for the diagnosis of sarcopenia. The prevalence of sarcopenia in PM reached 23.8 %, being similar to studies of sarcopenia prevalence carried out in Spain, where the prevalence of sarcopenia for women is 33 % and for men 10 % (20, 21) or studies in which the prevalence was 18 % (21), although somewhat distant from other results of sarcopenia prevalence, in which it is between 6 and 8 % (22) and 40 % (23).

% (23). This can be explained by the different methods of detection and diagnosis of sarcopenia that currently exist. In this study there was no significant difference between men (23.3%) and women (24%), unlike other studies in which the prevalence in women is higher, reaching 33% (18) and others in which the prevalence in men was higher (21).

Additionally, according to the age range, this research shows that there is a tendency that the older the age group, the greater the probability of having sarcopenia; although it was not statistically significant, this tendency has been proven in other studies (22, 24).

On the other hand, no association was found between the diagnosis of sarcopenia and HRQOL, unlike other studies in which sarcopenia was very prevalent in patients with recently diagnosed incurable cancer, and it was concluded that the associations of sarcopenia with worse HRQOL and symptoms of depression highlight the need to address the problem of sarcopenia in the early stages of the disease (25). Multiple studies relate that the higher the degree of sarcopenia, the lower the HRQOL, and the greater the risk of dependence (26, 27) and the higher the risk of premature death in sarcopenic PM (3). In this study, we only found an association between dimensions of overall quality of life and walking speed, which makes sense considering that walking speed training has been associated with improvements in HRQOL, BMI and grip strength (28, 29). Specifically, a correlation was found between MV and the dimensions, Physical Function, Physical Role and Social Function of the SF-36, suggesting that PM who showed low HRQoL in these dimensions had significantly slower walking speed. In this context, the use of the gait speed test has been proposed as a screening tool in community-dwelling elderly population because of its sensitivity to the diagnosis of sarcopenia (30) and could be an important predictor of health and

functionality in PW with sarcopenia (31, 32), and its improvement may reduce sarcopenia in PW in the community.

community (33,34). As an example, the European Sarcopenia Consensus uses MV as a unique screening tool to identify patients at increased risk of frailty and sarcopenia, considering that PM with gait speed below 0.8 m/s are at increased risk of sarcopenia and subsequent functional complications (8).

What were the contributions of this study?

This study is a pioneer in Chile in the use of the sarcopenia diagnostic flowchart recently designed by EWGSOP2 (2019), which greatly reduces the costs associated with the diagnosis of this muscular disease in the elderly population. In addition, it provides new evidence at national and Latin American level regarding the relationship between sarcopenia and HRQoL.

Limitations and strengths

Among the limitations we can comment on the sample size and type of sampling, which do not allow us to generalize the results. The use of the EWGSOP2 algorithm to measure sarcopenia and the use of the SF-36 to measure quality of life stand out as strengths, since both instruments are widely used and validated. In the case of the SF-36, the literature indicates that its extension is difficult in cognitively impaired and institutionalized PM (35), but it is good for community PM, as was the case in our sample.

CONCLUSION

A slower walking speed was related to a lower quality of life in the dimensions Physical Functioning, Physical Role and Social Functioning. Thus, older people with lower physical performance could become compromised in their perception of their physical and social function. This study encourages other researchers to increase research on sarcopenia because of its high prevalence and association with functionality in the elderly. It also highlights the importance of early detection of sarcopenia as a preventive strategy for its onset in the elderly.

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