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ARTICLE

Does Locomotive Syndrome, Associated with Sarcopenia or otherwise, Influence Quality of Life in Individuals Aged over 80 years? Third Wave of the LOCOMOV Project

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ABSTRACT

Introduction: Locomotion is a determinant of intrinsic capacity of older people and can be limited by dysfunction in locomotory organs, characterizing Locomotive Syndrome (LoS). Knowledge on locomotive problems and sarcopenia, and their interface with quality of life, in the oldest old in the literature is scarce.

Objective: To evaluate the correlation between LoS and sarcopenia and their influence on quality of life in oldest old.

Methods: A cross-sectional study of an observational, descriptive and analytical epidemiological survey in independent older adults aged 80 and over from São Paulo, Brazil and who participated in the third wave of the LOCOMOV Project, was carried out. Sociodemographic data, comorbidities, functioning in activities of daily living, physical functioning, quality of life, and presence of sarcopenia and LoS were assessed. The statistical analyses included the Test-for-Comparing-Two-Proportions, Pearson's Correlation Coefficient, the chi-Square test and Student´s *t*-test.

Results: Thirty oldest old with a mean age of 89.1 years were evaluated. The prevalence of LoS was high (53.3%) and correlated significantly with chronic pain (p-value 0.024), worse performance on the SPPB and Gait speed (p-value <0.001). Sarcopenia was not correlated with LoS, but worse quality of life on the physical domain was significantly associated with LoS (p-value <0.001) regardless of the presence of sarcopenia.

Conclusions: LoS was highly prevalent among the oldest old studied and negatively impacted their quality of life, regardless of the presence of sarcopenia.

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1. Introduction

According to the 2015 Aging and Health Report by the World Health Organization (WHO), for the first time in history, the majority of the population can expect to live to 60 years or older [1]. However, these extra years of life are highly heterogeneous due to factors such as genetics and the physical and social environments to which the older person is exposed. Functional capacity represents a combination of an individual´s intrinsic capacity and their relationship and interaction with the environment [1].

In 2019, Beard et al. outlined five determinants that define an individual's intrinsic capacity: cognition, locomotion, sensory and psychological determinants and vitality. Since then, an assessment model that correlates these factors has been proposed as an alternative to the fragmented view of independent factors. Mobility is associated with vitality and both are, therefore, closely related to healthy aging and quality of life in older people [2].

Thus, identifying the factors that influence locomotory independence in older individuals is an essential element of health care and promotion. The concept of Locomotive Syndrome (LoS) was first proposed in 2007 by the Japanese, and can be defined as reduced mobility due to dysfunction of locomotory organs, such as bones, muscles, joints, tendons or nerves, and its consequent risk of dependence for locomotion. Musculoskeletal pathologies that can lead to this condition including osteoarthritis, osteoporosis, fractures, spinal canal stenosis and sarcopenia [3,4]. A Japanese study carried out in 2011 estimated that 21.5% of patients who were dependent on others for basic activities of daily living had locomotory dysfunction as the main cause of dependence [5]. In order to identify these patients and help diagnose LoS, a questionnaire called the 25-Question Geriatric Locomotive Function Scale (GLFS-25) was developed in 2008 [6]. The instrument was later translated, cross-culturally adapted and validated for use in the Brazilian population (GLFS-25P) [7,8].

Sarcopenia is another major cause of dependence for locomotion in older people and the syndrome assessment algorithm was recently updated by the European Working Group on Sarcopenia in Older People (EWGSOP). The SARC-F questionnaire is designed for initial screening of cases [9,10]. During its Brazilian validation, the questionnaire, when used in association with Calf Circumference (CC) measurement, proved more sensitive for detecting patients diagnosed with sarcopenia [11].

Quality of life reflects personal opinions and conceptions, based on beliefs, experiences and sensations. These perceptions and feelings should be evaluated multidimensionally, including physical, psychological and social domains, level of dependence, environmental influences and aspects of spirituality and religiosity [12]. The term quality of life includes, but is not limited to, health status and medical interventions [13], highlighting the relevance of a comprehensive view of the patient that encompasses their personal, socioeconomic, educational and cultural background. In order to provide this multidimensional approach, several quality of life questionnaires are used in the literature.

The older population, especially the oldest old, often exhibit comorbidities that lead to functional decline. Thus, strategies for screening and controlling comorbidities are vital, starting with the recognition of possible causes of functional deficits and their consequent impact on quality of life. For this purpose, simple screening methods are available, such as questionnaires and tests of functioning [14].

Currently, knowledge about quality of life and its correlations with locomotion problems in the literature is scarce. The aim of the present study was to assess the influence of LoS and sarcopenia on quality of life in independent oldest old living in the community.

2. Materials and Methods

A cross-sectional study of the 2016 observational, longitudinal survey, called the LOCOMOV Project, which included independent older people aged 80 years or over living in the community in the city of São Paulo, Brazil [8] was conducted. This study was approved by the Research Ethics Committee of the Federal University of São Paulo (CAAE permit no. 42336720.1.0000.5505).

2.1 Sample

Individuals participating in the third wave of the LOCOMOV Project were assessed in the period spanning from February 2020 to February 2021. Exclusion criteria included presence of dementia syndrome, severe acute or decompensated chronic illness, limiting sensory deficit, and fracture in the last six months [15].

2.2 Data Collection

Sociodemographic data and disease history were collected and functioning scales applied. Participants then answered the GLFS-25P, SARC-F and WHOQOL-Bref questionnaires. Finally, physical tests were carried out to assess strength, gait, balance and physical performance. The questionnaires applied, although designed to be self-administered, were completed by the interviewer in the presence of the participant while heeding the recommendations to refrain from providing additional explanations about the questions, considering age and

possible visual, motor and educational limitations of the study participants. For comorbidity data, a personal history of chronic pain, nutritional status (malnutrition or obesity), osteoarthritis, falls in the last year and use of walking device were checked. Chronic pain was defined as pain lasting more than six months. Regarding nutritional status, the classification of World Health Organization (WHO) and Pan American Health Organization (PAHO) was used according to BMI, with score <23 classed as malnutrition and ≥ 30 as obesity [16,17]. The diagnosis of osteoarthritis was made by reviewing the medical record. Participants were probed directly about use of walking devices and number of falls in the last year.

2.3 Assessment Instruments

Functioning in daily life

The Katz and Lawton scales were applied, measuring the ability to perform basic Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs), respectively. The Katz scale is widely used among health professionals for the assessment of functional independence and the performance of six functions - bathing, dressing, going to the bathroom, transferring, continence and the ability to feed. For each item, the individual is considered independent if he or she can perform the activity without help [18]. The Lawton scale assesses the ability to perform instrumental activities such as using a telephone, doing laundry, and handling finances. The scale measures nine domains, each rated from 1 to 3 (1 denoting unable, 2 need assistance, and 3 independent). The score ranges from 9 to 27 where the higher the score, the greater the person's abilities [19,20,14].

GLFS-25P

Comprising 25 questions with answers scored from 0 to 4 points.. Total score ranges from 0 to 100 points, where the higher the score, the greater the locomotive limitation of the patient [6]. The cutoff point of ≥19 was established for the diagnosis of LoS in the Brazilian population, with 86% sensitivity and 67% specificity [8].

SARC-F + CC

Five questions are asked about the ability to carry weight, walk unassisted, transfer from chair or bed, climb stairs, and number of falls in the last year. Each item is scored from 0 to 2, with 0 denoting no difficulty, 1 some difficulty and 2 failure. The scores on the 5 questions are added to the measure of calf circumference (CC) and, if this is abnormal (> 33cm for women and >34cm for men), the individual receives 10 more points. The total score ranges from 0 to 20, with values >11 indicating risk of sarcopenia [21].

Quality of life

Defined by the WHO as an individual´s "perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns", serves to help understand the influence of these limitations on every aspect of life. This information is essential in the decision-making process aimed at well-being and healthy aging. The WHOQOL-Bref is a tool devised by the WHO for assessing quality of life in adults. This is a 26-item reduced version of the World Health Organization Quality of Life Instrument 100 (WHOQOL-100), comprising 2 general questions and 24 representing each of the 24 facets that make up the original instrument. The WHOQOL-Bref is composed of the domains physical capacity (PHYS), psychological well-being (PSYCH), social relationships (SOCIAL) and the environment (ENVIR) of the individual. Each domain comprises questions with answers ranging from 1 to 5 evaluated separately [22,23].

Physical Functioning Assessment

Hand Grip (HG): Muscle strength was measured in the study by HG. The individual is asked to remain in a sitting position with shoulders adducted in neutral rotation, without supporting arms on any surface. The subject is then asked to flex the elbow at 90°, with the forearm in a neutral position and the wrist ranging from 0 to 30° of extension. Three measurements of the dominant arm, with an interval of one minute between them, are taken using the Jamar dynamometer instrument, selecting the highest value obtained [24]. Values <16 kg for women and <27 kg for men were considered impaired, according to cutoff values stipulated in the 2019 sarcopenia algorithm update [9].

Five Times Sit-to-Stand Test (5xSST): For this test, a pre-test is first performed in which the individual is asked to cross their arms across their chest and get up from a chair. If the patient is able to get up from the chair safely and thinks he or she is capable of performing the test, it is continued, whereas if the individual does not perform the pre-test correctly and safely, the test is ended. For older people aged 80 years or more, the cutoff of 14.8 seconds is used where those who perform the test in ≥ 14.9 seconds have worse performance and greater impairment in lower limb mobility, and more susceptible to falls and morbidity. If the individual is not able to get up five times from the chair, no score is given [25,26].

Gait Speed (GS): For this test, the individual is asked to walk in a straight line at their usual gait speed. The time the individual takes to walk 4 meters is measured, with total distance increased in order to allow the initial and final periods of deceleration/acceleration to be disregarded. The test is considered abnormal for GS < 0.8 m/s [27].

Short Physical Performance Battery (SPPB): The test initially assesses balance in three different positions: patient in orthostasis, without any support point (including walking devices), initially with feet positioned side by side, later in semi-tandem and finally in tandem position. In each of the positions, the patient is expected to be able to remain still for 10 seconds. The first two positions score 1 if the individual manages to hold for 10 seconds and 0 if they do not. In the tandem position, the individual receives 2 points for maintaining 10 seconds, 1 point for managing to remain in the position for 3-9 seconds, and 0 for <3 seconds. Gait speed is then evaluated, as described in the specific item. The score for this step ranges from 0 to 4 points (0 if unable; 1 for time > 8.70 seconds; 2 for6.21-8.69 seconds; 3 for4.82-6.20 seconds; and 4 for < 4.82 seconds). Finally, the 5xSST test, outlined above is evaluated with score ranging from 0 to 4 (0 if unable; 1 for time > 16.70 seconds; 2 for 13.70-16.69 seconds; 3 for 11.20-13.69 seconds; and 4 points for ≤ 11.19 seconds). The final score on the battery ranges from 0 to 12 and a cutoff point of ≤8 was established for patients with poor physical performance, according to the updated 2019 sarcopenia algorithm [28,9].

2.4 Statistical Analysis

The data obtained was double keyed into the Excel Office 2010 program and then treated using the Statistical Package for Social Sciences - SPSS for Windows (SPSS V20) and Minitab 16. Initially, a complete descriptive analysis of the quantitative variables was performed, expressed as mean, median, quartiles (Q1, Q3), minimum, maximum, standard deviation, coefficient of variation (CV) and confidence interval (CI), representing the variation of the mean according to statistical probability. To characterize the distribution of the relative frequency of qualitative covariates, the Equality of Two Proportions Test was used. Subsequently, Pearson's Correlation Coefficient was used for quantitative bivariate analyses. The qualitative analysis of the instruments was performed using the chi-square test, expressed as absolute values and their percentages. Finally, the comparison of means for two or more groups was performed using Student´s *t*-test. A significance level of 0.05 (5%) was defined, with confidence intervals constructed with 95% statistical confidence.

3. Results

The initial sample of the LOCOMOV Project comprised 102 older adults with several losses thereafter. Regarding losses in the third wave of the study in 2020, there were 16 deaths, exclusion of 12 participants due to dementia diagnosis, 2 for decompensated chronic disease and 41 because of irregular follow-up (due to coronavirus pandemic, and others). Thus, a final sample of only 30 participants was assessed (Figure 1).

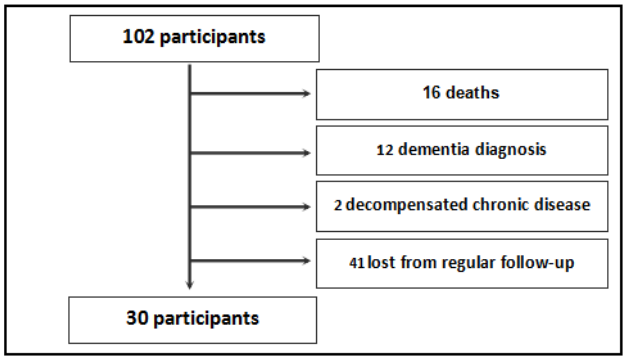

Figure 1. Study Flowchart

Regarding the sample, most participants were female (80%) and widowed (80%). The mean age of participants was of 89.1 ± 1.5 years and mean education was 3.48 years. For tests of functioning, most participants performed well, i.e. above the cutoff (Table 1).

The percentage of participants reporting chronic pain (76.7%) and LoS (53.3%) was high, while the rate of sarcopenia (26.7%) was lower (Table 2).

LoS was statistically significantly correlated with quality of life according to physical (r=-0.598, p <0.001) and environmental (r = -0.370, p 0.044) domains, and exhibited a tendency towards significance for the psychological domain (r= - 0.335, p 0.071). Los also correlated positively with sarcopenia (r= 0.563, p <0.001) and negatively with physical performance as measured by the SPPB (r= -0.752, p<0.001), muscle strength (r= -0.450, p 0.013) and gait speed (r= -0.707, p <0.001).

For qualitative variables, there was no statistically significant association between LoS and sarcopenia (p = 0.272). LoS showed a positive statistically significant association with the presence of chronic pain (93.8%; p = 0.024) (Table 4).

Individuals diagnosed with LoS had a mean of 48.4 on the physical domain of quality of life compared to 69.4 for those without LoS (p-value = 0.002) (Table 5). In individuals with LoS, the physical domain of quality of life did not differ significantly for presence or absence of sarcopenia (p 0.452) (Table 6).

Table 1. Sample characteristics according to quantitative variables

		Mean	Median	Standard Deviation	CV	Q1	Q3	Min	Max	N	CI
Age		89.1	88	4.3	5%	86	92	83	101	30	1.5
Education (years)		3.48	4	3.28	94%	1	4	0	11	29	1.19
Falls (nº)		0.37	0	0.61	168%	0	1	0	2	30	0.22
Physical Tests	HG	21.9	22	7.1	32%	19	24	2	38	30	2.5
	GS	0.73	0.75	0.29	40%	0.49	0.96	0.02	1.33	30	0.10
	5xSST	12.5	11	5.1	41%	9	13	8	31	25	2.0
	SPPB	8.40	9	3.29	39%	6	12	1	12	30	1.18
LoS	GLFS-25P	23.3	20	18.6	80%	10	33	2	81	30	6.6
Sarcopenia	SARC-F + CC	6.20	5	5.59	90%	1	11	0	17	30	2.00
WHOQOL- Bref	PHYS	58.2	61	19.6	34%	54	71	14	100	30	7.0
	PSYCH	67.2	67	16.0	24%	55	79	29	88	30	5.7
	SOCIAL	79.9	83	15.9	20%	75	92	33	100	30	5.7
	ENVIR	70.2	72	15.6	22%	63	80	22	94	30	5.6

Table 2. Sample characteristics according to qualitative variables

			N	%	P-value
Comorbidities	Malnutrition	No	26	86.7%	<0.001
		Yes	4	13.3%	
	Chronic pain	No	7	23.3%	<0.001
		Yes	23	76.7%	
	Osteoarthritis	No	25	83.3%	<0.001
		Yes	5	16.7%	
	Osteoarthritis	No	6	20.0%	<0.001
		Yes	24	80.0%	
Demography	Civil status	Married	4	13.3%	<0.001
		Divorced	1	3.3%	<0.001
		Single	1	3.3%	<0.001
		Widowed	24	80.0%	Ref.
	Gender	Female	24	80.0%	<0.001
		Male	6	20.0%	
Functioning	ADL	Independence	28	93.3%	<0.001
		Part. Dependence	2	6.7%	
	IADL	Independence	11	36.7%	Ref.
		Mild dependence	10	33.3%	0.787
		Moderate dependence	6	20.0%	0.152
		Severe dependence	2	6.7%	0.005
		Total dependence	1	3.3%	0.001
Walking device		No	17	56.7%	0.302
		Yes	13	43.3%	
LoS	GLFS-25P	Yes	16	53.3%	0.606
		No	14	46.7%	
Strength	HG	Normal	23	76.7%	<0.001
		Impaired	7	23.3%	
Sarcopenia	SARC-F + CC	Yes	8	26.7%	<0.001
		No	22	73.3%	
Physical tests	5xSST	< 14.8s	20	66.7%	<0.001
		≥14.8s	5	16.7%	
	SPPB	Impaired	13	43.3%	0.302
		Normal	17	56.7%	
	GS	<0.8m/s	17	56.7%	0.302
		≥0.8m/s	13	43.3%	

Table 3. Correlation of Quantitative Variable

		Age	Education (years)	Falls	HG	GS	5xSST	SPPB	GLFS 25-P	SARC-F + CC	PHYS	PSYCH	SOCIAL
Education (years)	Corr (r)	-0.275											
	P-value	0.141											
Falls	Corr (r)	0.330	-0.195										
	P-value	0.075	0.301										
HG	Corr (r)	-0.154	0.092	-0.112									
	P-value	0.417	0.630	0.554									
GS	Corr (r)	-0.424	0.047	0.039	0.291								
	P-value	0.020	0.806	0.836	0.119								
5xSST	Corr (r)	0.309	-0.051	-0.165	-0.108	-0.433							
	P-value	0.133	0.809	0.431	0.607	0.031							
SPPB	Corr (r)	-0.420	0.049	0.078	0.348	0.857	-0.645						
	P-value	0.021	0.797	0.680	0.059	<0.001	0.001						
GLFS-25P	Corr (r)	0.236	0.001	0.091	-0.450	-0.707	0.052	-0.752					
	P-value	0.210	0.995	0.633	0.013	<0.001	0.807	<0.001					
SARC-F + CC	Corr (r)	0.199	0.117	0.179	-0.466	-0.327	-0.164	-0.446	0.563				
	P-value	0.291	0.537	0.345	0.009	0.078	0.435	0.014	0.001				
PHYS	Corr (r)	0.021	-0.259	0.117	0.081	0.369	-0.050	0.325	-0.598	-0.205			
	P-value	0.913	0.167	0.537	0.672	0.045	0.814	0.080	<0.001	0.278			
PSYCH	Corr (r)	0.123	-0.415	-0.167	0.092	0.160	0.129	0.261	-0.335	-0.405	0.376		
	P-value	0.516	0.023	0.377	0.629	0.398	0.537	0.164	0.071	0.026	0.040		
SOCIAL	Corr (r)	0.327	-0.370	0.061	-0.299	-0.038	-0.030	-0.011	-0.031	-0.087	0.320	0.701	
	P-value	0.077	0.044	0.749	0.109	0.843	0.889	0.953	0.872	0.648	0.085	<0.001	
ENVIR	Corr (r)	0.208	-0.473	-0.091	0.168	0.120	0.052	0.218	-0.370	-0.408	0.497	0.842	0.674
	P-value	0.271	0.008	0.633	0.374	0.529	0.805	0.248	0.044	0.025	0.005	<0.001	<0.001

Table 4. Association between LoS and others covariates

		Normal		Impaired		Total		P-value
		N	%	N	%	N	%	
ADLs	Independence	14	87.5%	14	100%	28	93.3%	0.276
	Part. Dependence	2	12.5%	0	0.0%	2	6.7%	
IADLs	Independence	3	18.8%	8	57.1%	11	36.7%	0.149
	Mild dependence	7	43.8%	3	21.4%	10	33.3%	
	Moderate dependence	3	18.8%	3	21.4%	6	20.0%	
	Severe dependence	2	12.5%	0	0.0%	2	6.7%	
	Total dependence	1	6.3%	0	0.0%	1	3.3%	
Civil Status	Married	2	12.5%	2	14.3%	4	13.3%	0.564
	Divorced	0	0.0%	1	7.1%	1	3.3%	
	Single	1	6.3%	0	0.0%	1	3.3%	
	Widowed	13	81.3%	11	78.6%	24	80.0%	
Gender	Female	14	87.5%	10	71.4%	24	80.0%	0.202
	Male	2	12.5%	4	28.6%	6	20.0%	
Malnutrition	No	15	93.8%	11	78.6%	26	86.7%	0.213
	Yes	1	6.3%	3	21.4%	4	13.3%	
Walking device	No	7	43.8%	10	71.4%	17	56.7%	0.096
	Yes	9	56.3%	4	28.6%	13	43.3%	
Chronic pain	No	1	6.3%	6	42.9%	7	23.3%	0.024
	Yes	15	93.8%	8	57.1%	23	76.7%	
Obesity	No	12	75.0%	13	92.9%	25	83.3%	0.179
	Yes	4	25.0%	1	7.1%	5	16.7%	
Osteoarthritis	No	3	18.8%	3	21.4%	6	20.0%	0.343
	Yes	13	81.3%	11	78.6%	24	80.0%	
HG	Normal	13	81.3%	10	71.4%	23	76.7%	0.275
	Impaired	3	18.8%	4	28.6%	7	23.3%	
5xSST	< 14.8seg	8	72.7%	12	85.7%	20	80.0%	0.283
	≥14.8seg	3	27.3%	2	14.3%	5	20.0%	
SPPB	Inappropriate	9	56.3%	4	28.6%	13	43.3%	0.096
	Appropriate	7	43.8%	10	71.4%	17	56.7%	
GS	<0.8m/s	11	68.8%	6	42.9%	17	56.7%	0.110
	≥0.8m/s	5	31.3%	8	57.1%	13	43.3%	

Table 5. Association between LoS and quality of life

WHOQOL-Bref	LoS	Mean	Median	Standard Deviation	CV	Min	Max	N	CI	P-value
PHYS	Yes	48.4	53.6	19.0	39%	14.3	75.0	16	9.3	0.002
	No	69.4	67.9	13.8	20%	53.6	100.0	14	7.2	
PSYCH	Yes	64.1	62.5	17.3	27%	29.2	87.5	16	8.5	0.254
	No	70.8	79.2	14.2	20%	45.8	87.5	14	7.4	
SOCIAL	Yes	77.9	79.2	14.0	18%	41.7	100.0	16	6.9	0.472
	No	82.1	87.5	18.2	22%	33.3	100.0	14	9.5	
ENVIR	Yes	67.2	67.2	17.0	25%	21.9	93.8	16	8.3	0.264
	No	73.7	78.1	13.6	19%	46.9	90.6	14	7.1	

Table 6. Association between LoS, in presence or absence of sarcopenia, and physical domain of quality of life

WHOQOL-Bref	Sarcopenia	Mean	Median	Standard Deviation	CV	Min	Max	N	CI	P-value
PHYS	Yes	42.9	39.3	26.4	62%	14.3	75.0	5	23.1	0.452
	No	50.9	53.6	15.4	30%	25.0	75.0	11	9.1	

4. Discussion

In the present study, mean age was 89.1 years in the clinically compensated individuals with no cognitive impairments impacting functioning. In the oldest old assessed, many variables had high coefficients of variation, such as education, number of falls in the last year, and LoS and sarcopenia screening questionnaires, revealing heterogeneity among the participants.

Regarding LoS, 53.3% of the sample had an established diagnosis according to the GLFS-25P. A statistically significant relationship between LoS and chronic pain was found. This data is essential to draw attention to a diagnosis that is often neglected in health care. Appropriate treatment of chronic pain can improve performance and intrinsic capacity of older individuals.

The study results confirmed a correlation between LoS and worse performance on the short physical performance battery (SPPB) and in gait speed (GS), an expected finding, given the impact of LoS on patient functioning and independence for locomotion, as previously described in the literature [5].

There are few studies investigating the impact of this syndrome on the perception of quality of life. In the second wave of the Locomov project, conducted by Arbex et al. in 2020, LoS was correlated with worse scores in physical, psychological and environmental domains of quality of life on the WHOQOL-Bref [8]. Although the present study was based on the initial sample of the second wave, there was a regular correlation between LoS and the physical domain only. However, this difference might be explained by the reduced current sample population, in that the patients who remained in the project were probably those with better physical performance and less locomotive limitations in the previous study.

The association between LoS and worse quality of life scores implies that physical limitation has a deleterious effect on the quality of aging of the oldest old studied. Preserved ability to move around, climb stairs and carry weight, i.e., maintain some locomotive independence, is associated with better perceived quality of life by older adults [8].

Sarcopenia was present in only 26.7% of the sample and was not associated with LoS. This lack of association may have occurred due to the low prevalence of sarcopenia and small sample size. LoS was associated with worse quality of life regardless of the presence of sarcopenia.

Promoting musculoskeletal health during aging is believed to be beneficial by ensuring longer functional independence, control of comorbidities that impact locomotion such as chronic pain, and consequently better intrinsic capacity of the individual and enhanced quality of life.

Study limitations

The high rate of death and other outcomes, such as dementia syndrome, observed in the longitudinal LOCOMOV Project led to a small sample size. Another factor further limiting the sample size was the COVID-19 pandemic. The older population is a risk group for the virus and, from the outset of the pandemic, recommendations emphasize that this group avoids unnecessary exposure and remain in contact only with family members they live with. Thus, many patients failed to attend routine geriatric appointments, largely justifying the follow-up losses observed in the study, since data collection was concomitant with outpatient consultations and started a month prior to the pandemic restrictions in Brazil.

5. Conclusions

Despite the small sample, the present study suggested a statistically significant association between LoS and chronic pain and also worse performance by participants with LoS on test of functioning such as gait speed and physical performance. LoS was associated with worse health-related quality of life regardless of the presence of sarcopenia. Recognizing the characteristics of the oldest old in relation to their musculoskeletal limitations is important to guide effective prevention and rehabilitation actions for functional dependence, contributing to the quality of life and healthy aging of this population.

Author Contributions

All authors were involved in the data collection, results evaluation and article writing of the study.

Conflict of Interest

The authors declare they have no relationships/conditions/circumstances that present a potential conflict of interest.

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