TEXTO & CONTEXTO ENFERMAGEM

PREVALENCE AND FACTORS ASSOCIATED WITH LOCOMOTIVE SYNDROME IN COMMUNITY-DWELLING OLDER ADULTS

Tereza Cristina Araújo da Silva[1]
Maria do Livramento Fortes Figueiredo[1]
Ana Clara dos Santos e Silva Costa[1]
Eukália Pereira da Rocha[1]
Luana Maria Costa Borges[1]
Juan José Tirado Darder[2]

[1]Universidade Federal do Piauí, Departamento de Enfermagem. Teresina, Piauí, Brasil.
[2]Universidad Europea de Valencia, Consejo de Enfermería de Valencia. Valencia, España.

ABSTRACT

Objective: to analyze prevalence and the factors associated with locomotive syndrome in community-dwelling older adults.

Method: a cross-sectional study, developed in a municipal center for the care of older adults in Teresina, Piauí, Brazil. The sample was for convenience and comprised 204 older adults aged 60 years or more, of both genders and with preserved cognitive capacity, according to parameters of the Mini Mental State Examination. Data collection occurred from March to November 2018, by applying a form for sociodemographic, clinical and falls occurrence characterization and the 25-item Geriatric Locomotive Function Scale. To measure the strength of the associations between the variables, odds ratios and 95% confidence intervals were adopted. The statistical significance level was set at 5% for the analyses.

Results: the prevalence of locomotive syndrome found was 37.2%. The factors associated with the presence of locomotive syndrome were individual monthly income (p=0.005); existence of one of the following comorbidities: systemic arterial hypertension (p=0.039), osteoporosis (p=0.016), arthrosis (p<0.001) or obesity (p=0.014); and history of hospitalization in the last year (p=0.007).

Conclusion: the prevalence of locomotive syndrome found in this study was low and presented higher levels in older adults, with an individual monthly income of two to three minimum wages; who reported having hypertension, osteoporosis, arthrosis or obesity; and with a history of hospitalization in the last year. The health condition investigated showed to be related to aging, with significant repercussions on functionality.

DESCRIPTORS: Older adult. Locomotion. Syndrome. Musculoskeletal diseases. Healthy aging. Geriatric Nursing.

PREVALÊNCIA E FATORES ASSOCIADOS À SÍNDROME LOCOMOTORA EM IDOSOS COMUNITÁRIOS

RESUMO

Objetivo: analisar a prevalência e os fatores associados à síndrome locomotora em idosos comunitários.
Método: estudo do tipo transversal, desenvolvido em núcleo de atenção ao idoso, em Teresina, Piauí, Brasil. A amostra foi por conveniência e constituída por 204 idosos com idade igual ou superior a 60 anos, de ambos os sexos, com capacidade cognitiva preservada, segundo parâmetros do Mini Exame do Estado Mental. A coleta de dados ocorreu de março a novembro de 2018, por meio da aplicação de um formulário para caracterização sociodemográfica, clínica e de ocorrência de quedas e da Escala Geriátrica da Função Locomotora de 25 itens. Para aferição da força das associações entre as variáveis, adotaram-se razão de chances e intervalos de confiança de 95%. Nível de significância estatística estabelecido de 5% para as análises.
Resultados: a prevalência da síndrome locomotora encontrada foi de 37,2%. Os fatores associados à presença da síndrome locomotora foram renda mensal individual (p=0,005); existência de uma das comorbidades: hipertensão arterial sistêmica (p=0,039), osteoporose (p=0,016), artrose (p<0,001) ou obesidade (p=0,014); e histórico de hospitalização, no último ano (p=0,007).
Conclusão: a prevalência da síndrome locomotora encontrada no presente estudo foi baixa e apresentou-se maior em idosos, com renda mensal individual de dois a três salários mínimos; que referiram ter hipertensão, osteoporose, artrose ou obesidade; e com histórico de hospitalização, no último ano. A condição de saúde investigada se mostrou relacionada ao envelhecimento, com repercussões significativas sobre a funcionalidade.

DESCRITORES: Idoso. Locomoção. Síndrome. Doenças musculoesqueléticas. Envelhecimento saudável. Enfermagem geriátrica.

PREVALENCIA Y FACTORES ASOCIADOS AL SÍNDROME LOCOMOTOR EN ADULTOS MAYORES DE LA COMUNIDAD

RESUMEN

Objetivo: analizar la prevalencia y los factores asociados al síndrome locomotor en adultos mayores de la comunidad.
Método: estudio de tipo transversal, desarrollado en un centro de atención para adultos mayores de Teresina, Piauí, Brasil. La muestra fue por conveniencia y estuvo compuesta por 204 adultos mayores de 60 o más años de edad, de ambos sexos y con capacidad cognitiva preservada, según parámetros del Mini Examen de Estado Mental. Los datos se recolectaron entre marzo y noviembre de 2018 aplicando un formulario para la caracterización sociodemográfica, clínica y de caídas y la Escala Geriátrica de la Función Locomotora de 25 ítems. Para medir la fuerza de las asociaciones entre las variables, se adoptaron *odds ratios* e intervalos de confianza del 95%. El nivel de significancia estadística se estableció en 5% para los análisis.
Resultados: la prevalencia del síndrome locomotor fue del 37,2%. Los factores asociados a la presencia del síndrome locomotor fueron los siguientes: ingreso mensual individual (p=0,005); presencia de una de las comorbilidades: hipertensión arterial sistémica (p=0,039), osteoporosis (p=0,016), artrosis (p<0,001) u obesidad (p=0,014); y antecedentes de internación en el último año (p=0,007).
Conclusión: la prevalencia del síndrome locomotor que se encontró en este estudio fue baja y demostró ser superior en adultos mayores, con ingresos mensuales individuales de de dos a tres salarios mínimos; que indicaron sufrir hipertensión, osteoporosis, artrosis u obesidad; y con antecedentes de internación en el último año. La condición de salud investigada demostró estar relacionada con el envejecimiento, con repercusiones significativas sobre la funcionalidad.

DESCRIPTORES: Adulto mayor. Locomoción. Síndrome. Enfermedades musculoesqueléticas. Envejecimiento saludable. Enfermería geriátrica.

INTRODUCTION

Non-communicable chronic diseases and health problems are among the main causes of morbidity and mortality in the general population, especially among older adults, potentially susceptible to progression with unfavorable outcomes, mainly regarding functional capacity[1].

Among the health problems of this age group that have been gaining prevalence are diseases of the locomotor system such as osteoporosis, osteoarthritis and spondyloarthrosis. These are musculoskeletal pathologies which often exert a negative repercussion on the performance of the Activities of Daily Living (ADLs), with the possibility of causing dependence and institutionalization among older adults, as well as significantly influencing self-perception of health and quality of life[2].

Secondary to these musculoskeletal diseases more prevalent among older adults is Locomotive Syndrome (LoS), a health condition which, since 2007, the year it was proposed by the Japanese Orthopaedic Association (JOA), has been widely investigated and discussed in Japan[3].

LoS is a condition characterized by dependence on care or risk of becoming dependent, resulting from a decline in mobility, caused by one or more disorders in locomotor organs such as bones, joints, muscles and nerves[4]. As some research studies have evidenced, it is a health condition that has been shown to be related to sarcopenia and frailty in older adults[5–6].

The clinical manifestations of this syndrome are strictly related to the involvement of the organs and structures of the musculoskeletal system, which commonly result in pain, limited range of motion of the joints or spine, muscle weakness and balance deficit[7].

Discussion and investigation about LoS in Brazil began in 2016, with a work of translation, adaptation and validation of an instrument to screen the health condition in aged Brazilians. Known as the 25-item Geriatric Locomotive Function Scale (GLFS-25-P), the instrument proved to be reliable and valid for LoS screening in the country[8].

The previous research study proved to be of great relevance, given that, in the Brazilian context, the prevalence of chronic Musculoskeletal Diseases (MSDs) can be considered high, as they are reported by one out of five adults, assuming a growing trend with advancing age, being up to 36% more frequent in older adults[9]. Therefore, it can be inferred that, on Brazilian soil, the presence of LoS among the aged population is possible.

Thus, given the negative impact exerted by LoS on the functionality of older adults and the relevance of research and discussion about it in the national territory, this study aimed at analyzing the prevalence and factors associated with the locomotive syndrome in community-dwelling older adults.

METHOD

A cross-sectional study carried out in center for the care of older adults located in a social center in Teresina, Piauí, Brazil. The study population consisted of the registered aged individuals who participated in the activities of the care center for older adults under study.

The type of sampling adopted was non-probabilistic for convenience, in which, to calculate sample size, a formula based on the finite population proposal (below 100,000) was used[10], considering a presumed prevalence of 30%, pointed out in a previous study[2]. A confidence level of 95% and a maximum tolerable error of 5% were adopted.

The sample size obtained in the calculation was 204 older adults. The individuals considered eligible for participation in this study were those aged 60 years old or more, of both genders, with preserved cognitive capacity according to the parameters of the Mini Mental State Examination (MMSE), and registered in the center for the care of older adults, research locus.

People with severe cardiovascular disease, pulmonary or renal disease, or with a history of fractures in the lower limbs and/or spine in the last six months were excluded, according to the older adults' self-reports.

The data were collected from April to November 2018, period during which the following instruments were applied: MMSE, in order to assess the older adult's cognitive function; a form for sociodemographic, clinical and falls occurrence characterization; and the 25-item Geriatric Locomotive Function Scale (GLFS-25-P).

The second instrument is a clipping from the script for the characterization of the sociodemographic and clinical profile, used in a follow-up study on falls and functional independence of older adults admitted to an emergency hospital[11]. Of the original form, only the excerpts of interest for this study were applied, according to the authors' permission. Thus, the variables obtained were the following: gender, age, marital status, ethnicity, schooling, individual monthly income, presence of any underlying pathology, occurrence of falls and/or hospitalization in the last year, alcoholism, smoking habit and regular physical activity.

The 25-item Geriatric Locomotive Function Scale (GLFS-25-P) consists of the version that was translated, cross-culturally adapted and validated for the national context from the original GLFS-25 version, developed in Japan in 2012 by the JOA, with the purpose of screening LoS[8].

Consisting of 25 items, like the original version, GLFS-25-P is composed by four questions about pain, three about the social functions and two about mental health status, related to the last month, and 16 questions about ADLs in the last month. For each question, there are four answers ranging from zero to four points. At the end, the points are added up, with a score of ≥ 16 points being considered as cutoff, indicative of LoS[12].

As it is an instrument not included in the public domain, one of the researchers responsible for the translation, cross-cultural adaptation and validation of the GLFS-25 Scale for Brazil was previously contacted, in order to obtain authorization to use the GLFS-25-P instrument in this research.

The data obtained were tabulated and coded in *Microsoft Excel* and later exported for analysis in the *Statistical Package for Social Sciences*, version 20. The results were described in absolute and percentage frequency tables.

The associations and odds ratio (OR) between the variables were obtained using Pearson's chi-square test or Fisher's exact test (when frequency was below 5) for the following variables: sociodemographic profile, clinical characteristics, falls occurrence and lifestyle. The estimates and 95% confidence intervals (95% CI) were accepted as statistically significant with a p-value<0.05.

The project was submitted for consideration and approval by the Research Ethics Committee of *Universidade Federal do Piauí*. The ethical aspects of research involving human beings were observed, in accordance with Resolution No. 466/2012 of the National Health Council.

RESULTS

The sociodemographic characterization of the 204 older adults participating in the study is presented in Table 1. It is noteworthy that 85.8% were female, with a mean age of 70.4 years old; 34.3% reported incomplete elementary education; and 93.6% had some source of individual income, with the majority (38.7%) stating having an individual monthly income lower than one minimum wage.

With regard to the clinical profile of the older adults (Table 2), referring to the presence of any underlying pathology, it was identified that 50.9% reported coexistence of two or more diseases. The most self-reported morbidities were as follows: systemic arterial hypertension (SAH), with 64.7%; followed by chronic pathologies related to the musculoskeletal system (65.8%), osteoporosis (36.8%) and arthrosis (29%).

In relation to falls occurrence in the last year, there were reports by 34.8% of the older adults. Regarding hospitalization history in the last year, only 22 (10.8%) participants reported an episode.

Table 1 – Sociodemographic characterization of the older adults participating in the study. Teresina, PI, Brazil, 2020. (n=204)

Variables	Minimum	Maximum	Mean	n (%)
Age (years old)	60	84	70.4	
60-70				110 (53.9)
≥71				94 (46.1)
Gender				
Male				29 (14.2)
Female				175 (85.8)
Marital status				
Single				21 (10.3)
Married/Stable union				95 (46.6)
Divorced/Separated				28 (13.7)
Widowed				60 (29.4)
Ethnicity*				
White				31 (15.2)
Brown				124 (60.8)
Asian				7 (3.4)
Black				41 (20.1)
Schooling				
Illiterate				35 (17.2)
Incomplete Elementary School				70 (34.3)
Complete Elementary School				18 (8.8)
Incomplete High School				11 (5.4)
Complete High School				47 (23)
Complete Higher Education				23 (11.3)
Has income				
Yes				191 (93.6)
No				13 (6.4)
Individual monthly income (minimum wage)[†]				
<1				79 (38.7)
1 - 2				71 (34.8)
2 - 3				28 (13.7)
>3				26 (12.8)

* missing; [†]Minimum wage = 954.00 reals

Regarding the characteristics related to the participants' lifestyle, also described in Table 2, it is pointed out that 88.7% reported not drinking alcoholic beverages; 98% reported not smoking at the present time; and all the participants reported practicing some physical activity regularly, with predominance of regular physical exercise four or more times a week (64.7%).

Table 2 – Clinical characterization, lifestyle and falls occurrence in the last year variables of the older adults participating in the study. Teresina, PI, Brazil, 2020. (n=204)

Variables	n (%)
Hypertension	
Yes	132 (64.7)
No	72 (35.3)
Diabetes	
Yes	52 (25.5)
No	152 (74.5)
Cataract	
Yes	29 (14.2)
No	175 (85.8)
Obesity	
Yes	9 (4.4)
No	195 (95.6)
Depression	
Yes	17 (8.3)
No	187 (91.7)
Osteoporosis	
Yes	75 (36.8)
No	129 (63.2)
Arthrosis	
Yes	59 (28.9)
No	145 (71.1)
Falls in the last year	
Yes	71 (34.8)
No	133 (65.2)
Hospitalization	
Yes	22 (10.8)
No	182 (89,2
Alcoholism	
Yes	22 (10.8)
No	182 (89.2)
Smokes	
Yes	3 (1.5)
No	201 (98.5)
Physical exercise (number of times per week)	
≤3	72 (35.3)
>4	132 (64.7)

Regarding the prevalence of LoS, it was verified that, among the 204 aged participants, 76 (37.2%) presented LoS, according to the GLFS-25-P scale score. Of the sociodemographic variables, as shown in Table 3, a statistically significant association was found between individual monthly income and presence of LoS (p=0.005), where the older adults with an individual monthly income from two to three minimum wages presented 4.31 times more chances of having LoS.

Table 3 – Association of the sociodemographic variables with the occurrence of locomotive syndrome. Teresina, PI, Brazil, 2020. (n=204)

Variables	Presence of Locomotive Syndrome		p-value	OR (95%CI)
	No n (%)	Yes n (%)		
Gender				
Male	18 (62.1)	11 (37.9)	0.935*	1.03 (0.46; 2.32)
Female	110 (62.9)	65 (37.1)		1
Age (years old)				
60-70	70 (63.6)	40 (36.4)	0.776*	0.92 (0.52; 1.62)
≥71	58 (61.7)	36 (38.3)		1
Marital status†				
Single	16 (76.2)	5 (23.8)		0.46 (0.15; 1.38)
Married/Stable union	57 (60.0)	38 (40.0)	0.575*	0.48 (0.13; 1.70)
Divorced/Separated	17 (60.7)	11 (39.3)		0.54 (0.17; 1.67)
Widowed	38 (63.3)	22 (36.7)		1
Ethnicity				
White	20 (64.5)	11 (35.5)		0.93 (0.41; 2.12)
Brown	78 (62.9)	46 (37.1)		0.22 (0.36; 1.32)
Asian	2 (28.6)	5 (71.4)	0.296‡	1.06 (0.39; 2.82)
Black	27 (65.9)	14 (34.1)		1
Schooling				
Illiterate	18 (51.4)	17 (48.6)		1.19 (0.53; 2.68)
Incomplete Elementary School	39 (55.7)	31 (44.3)		1.89 (0.58; 6.17)
Complete Elementary School	12 (66.7)	6 (33.3)	0.079‡	1.65 (0.41; 6.67)
Incomplete High School	7 (63.6)	4 (36.4)		2.01 (0.82; 4.98)
Complete High School	32 (68.1)	15 (31.9)		6.29 (1.58; 25.10)
Complete Higher Education	20 (87)	3 (13.0)		1
Has income				
Yes	119 (62.3)	72 (37.7)	0.771‡	1.36 (0.40; 4.58)
No	9 (69.2)	4 (30.8)		1
Individual monthly income (minimum wage)§				
<1	39 (49.4)	40 (50.6)		1.87 (0.98; 3.64)
1 - 2	46 (64.8)	25 (35.2)	**0.005†**	3.76 (1.38; 0.27)
2 - 3	22 (78.6)	6 (21.4)		4.31 (1.48; 2.57)
>3	21 (80.8)	5 (19.2)		1

*Chi-square test; †missing; ‡Fisher's exact test; §Minimum wage = 954.00 reals

The data regarding the association of the clinical, lifestyle and falls occurrence in the last year variables with the prevalence of LoS in older adults are shown in Table 4. A statistically significant association was obtained between the prevalence of LoS and the presence of the following morbidities: SAH (p=0.039), obesity (p=0.014), osteoporosis (p=0.016) and arthrosis (p<0.001).

It was identified that the older adults who self-reported a medical diagnosis of SAH, obesity, osteoporosis and arthrosis presented 1.91, 6.39, 2.05 and 3.01 times more chances of having locomotive syndrome, respectively.

A statistically significant association was also found between history of hospitalization in the last year with the occurrence of LoS, noticing that the older adults who needed hospitalization during this period were 3.39 times more likely to have it.

Table 4 – Association of the clinical, lifestyle and falls occurrence in the last year variables with the occurrence of locomotive syndrome. Teresina, PI, Brazil, 2020. (n=204)

Variables	Presence of Locomotive Syndrome		p-value	OR (95%CI)
	No n (%)	Yes n (%)		
Hypertension				
Yes	76 (57.6)	56 (42.4)	**0.039***	1.91 (1.03; 3.56)
No	52 (72.2)	20 (27.8)		1
Diabetes				
Yes	27 (51.9)	25 (48.1)	0.061*	1.83 (0.97; 3.48)
No	101 (66.4)	51 (33.6)		1
Cataract				
Yes	17 (58.6)	12 (41.4)	0.620*	1.22 (0.55; 2.72)
No	111 (63.4)	64 (36.6)		1
Obesity				
Yes	2 (22.2)	7 (77.8)	**0.014†**	6.39 (1.29; 31.61)
No	126 (64.6)	69 (35.4)		1
Depression				
Yes	7 (41.2)	10 (58.8)	0.055*	2.62 (0.95; 7.20)
No	121 (64.7)	66 (35.3)		1
Osteoporosis				
Yes	39 (52.0)	36 (48.0)	**0.016***	2.05 (1.14; 3.69)
No	89 (69.0)	40 (31.0)		1
Arthrosis				
Yes	26 (44.1)	33 (55.9)	**<0.001***	3.01 (1.61; 5.62)
No	102 (70.3)	43 (29.7)		1
Falls in the last year				
Yes	41 (57.7)	30 (42,3)	0.291*	1.38 (0.76; 2.50)
No	87 (65.4)	46 (34.6)		1
Hospitalization				
Yes	8 (36.4)	14 (63.6)	**0.007***	3.39 (1.35; 8.51)
No	120 (65.9)	62 (34.1)		1
Alcoholism				
Yes	22 (54.5)	10 (45.5)	0.485*	1.46 (0.60; 3.57)
No	116 (63.7)	66 (36.3)		1
Smokes				
Yes	1 (33.3)	2 (66.7)	0.557†	3.43 (0.31; 38.50)
No	127 (63.2)	74 (36.8)		1
Physical exercise (number of times/week)				
Up to 3	39 (54.2)	33 (45.8)	0.061*	1.75 (0.97; 3.15)
4 or more	89 (67.4)	43 (32.6)		1

*Chi-square test; †Fisher's exact test

DISCUSSION

The sociodemographic profile of the older adults participating in this research was characterized by predominance of females; greater number of aged individuals between 60 and 70 years old; with low schooling; and lower purchasing power. Following the same profile as the general sample, the sociodemographic characteristics of the 76 older adults who presented locomotive syndrome were obtained, according to the score in the GLFS-25-P scale.

The characteristics found are in consonance with the phenomenon of the feminization of aging, with the profile of the Brazilian aged population also comprising a significant number of young older adults, given that the aging process of the population in the country is considered recent; and with low schooling and purchasing power, reflections of the social inequalities in Brazil and the difficulties in access to schooling, arising from the education policies faced in the 1930s and 1940s[13–15].

Regarding the clinical profile of the older adults with LoS, it was identified that most of them presented some Chronic Non-Communicable Disease (CNCD). Among them, a significant percentage reported having more than one morbidity, with SAH, osteoporosis, arthrosis and diabetes mellitus among the main diseases self-reported by the older adults. Regarding the history of falls and hospitalizations in the last 12 months, the majority reported non-occurrence of those situations.

Regarding the lifestyle characteristics of the older adults with LoS, as well as of the sample in general, it was observed that the majority followed the adoption of habits considered healthy, with regard to smoking, alcoholism and regular physical activity.

These results can be attributed to the fact that the aged individuals treated in centers for the care of older adults are often sensitized about the negative effects of smoking, alcoholism and sedentary lifestyle, in the healthy aging process, with practice of physical exercise among the activities that are commonly offered in these spaces.

A 37.2% prevalence of LoS was found and, despite few studies carried out in the Brazilian context on the subject matter, predominance was considered low. The work of translation, adaptation and validation of the instrument for screening this health condition in older adults in Brazil found a prevalence rate of 63% in a sample of 100 aged individuals. Another study, in turn, found a rate of 55% among 102 aged participants[8–16].

It is inferred that the finding in question diverges from what was found in other studies carried out up to that date on LoS, due to the regular practice of physical activity by the older adults who made up the studied sample, since the studies developed up to the present day about LoS have referred to the regular practice of physical exercise as a protective factor for this condition, as well as one of the primary interventions to prevent progression, when installed[17–18].

Regarding the factors associated with the presence of this health condition in older adults, it was identified that aged people with an individual monthly income between two and three minimum wages and presenting one of the following morbidities: SAH, osteoporosis, arthrosis or obesity, or a hospitalization history in the last 12 months, presented more chances of having locomotive syndrome.

Concerning individual monthly income and its relationship with the presence of LoS, no studies were found that discussed this statistical association, which made it impossible to develop comparisons and possible explanations for this association.

Based on studies about the influence of socioeconomic factors on the older adults' health, it is stated that the finding in question diverges from what is commonly observed, given that the low economic level has often been shown to be related to unfavorable outcomes in aging, such as the occurrence of diseases with a significant impact on the older adults' functional capacity[19].

The association between osteoporosis, arthrosis and obesity with this health condition is in consonance with other research studies, which found greater chances of risk for locomotive syndrome

in older adults with one of the two aforementioned musculoskeletal disorders, thus corroborating the very etiology of LoS, regarding the secondary character of the MSDs[20–22].

Obesity, in turn, was identified as an important risk factor for LoS in another research study. This is especially due to the deleterious repercussions that excess weight generates on the musculoskeletal system, because of mechanical overload, direct degradation of the joints and inflammatory processes related to the presence of cytokines in the adipose tissues[23].

In addition to that, obesity is among the risk factors for osteoarthritis, one of the main MSDs involved in the etiology of LoS, as well as for the worsening of clinical manifestations[23].

Regarding the association identified between SAH and the prevalence of LoS, it was not possible to establish direct comparisons with other studies, given that, up to date, this relationship has not been investigated. However, a study evidenced that hypertensive older adults with LoS presented impaired blood pressure regulation, attributed to the physical and psychosocial stress caused by this health condition[24].

It was also observed that the prevalence of LoS was higher among older adults who reported a history of hospitalization in the last year. As this study has a cross-sectional design, it is not possible to reliably determine if this relationship found is characteristic of cause or effect.

However, LoS has been identified as one of the possible causes of frailty, a health condition that predisposes the person to mortality and to health complications such as dependence, disability, falls and hospitalization, among others[25–26].

The size and homogeneous characteristics of the sample, in addition to the non-probabilistic sampling technique adopted, induced limitations to the study. In addition to that, the existence of few national research studies on LoS made it difficult to compare and discuss the results in relation to the Brazilian scenario.

It is recommended to conduct studies with a longitudinal design on the subject matter investigated, in order to determine causal relationships. It is also necessary to develop research studies with a more heterogeneous sample, with a larger number and probabilistic, in order to elucidate aspects inherent to this health condition, in the national context.

CONCLUSION

The prevalence of LoS found in this study was associated with individual monthly income and to the following comorbidities: SAH, osteoporosis, arthrosis and obesity, as well as a to history of hospitalization in the last 12 months.

It is emphasized that LoS needs to be widely discussed and investigated at the national level, since it proved to be a health condition that is not inherent to the particular characteristics of the aged population in the country. The change in the health status investigated showed to be associated with aging, which can affect any older adult, regardless of nationality, and with significant repercussions on functionality.

REFERENCES

1. Veras RP, Oliveira M. Envelhecer no Brasil: a construção de um modelo de cuidado. Ciênc Saúde Coletiva [Internet]. 2018 [cited 2020 Apr 15];23(6):1929-36. Available from: https://doi.org/10.1590/1413-81232018236.04722018

2. Melo ACF, Nakatani AYK, Pereira LV, Menezes RL, Pagotto V. Prevalência de doenças musculoesqueléticas autorreferidas segundo variáveis demográficas e de saúde: estudo transversal de idosos de Goiânia/GO. Cad Saúde Colet [Internet]. 2017 [cited 2020 Apr 15];25(2):138-43. Available from: https://doi.org/10.1590/1414-462x201700010274

3. Yoshimura N, Muraki S, Lidaka T, Oka H, Horri C, Kawaguchi H, et al. Prevalence and co-existence of locomotive syndrome, sarcopenia, and frailty: the third survey of research on osteoarthritis/osteoporosis against disability (ROAD) study. J Bone Miner Metab [Internet]. 2019 [cited 2020 Apr 15];37(6):1058-66. Available from: https://doi.org/10.1007/s00774-019-01012-0

4. Nishimura T, Imai A, Fujimoto M, Kurihara T, Kagawa K, Nagata T, et al. Adverse effects of the coexistence of locomotive syndrome and sarcopenia on the walking ability and performance of activities of daily living in Japanese elderly females: a cross-sectional study. J Phys Ther Sci [Internet]. 2020 [cited 2020 Apr 15];32(3):227-32. Available from: https://doi.org/10.1589/jpts.32.227

5. Nakamura M, Hashizume H, Oka H, Okada H, Takakura R, Hisari A, et al. Physical performance measures associated with locomotive syndrome in middle-aged and older japanese women. J Geriatr Phys Ther [Internet]. 2015 [cited 2020 Apr 15];38(4):202-7. Available from: https://doi.org/10.1519/JPT.0000000000000033

6. Momoki C, Habu D, Ogura J, Tada A, Hasei A, Sakurai K, et al. Relationships between sarcopenia and household status and locomotive syndrome in a community-dwelling elderly women in Japan. Geriatr Gerontol Int [Internet]. 2017 [cited 2020 Apr 15];17(1):54-60. Available from: https://doi.org/10.1111/ggi.12674

7. Nakamura K, Ogata T. Locomotive Syndrome: Definition and Management. Clinic Rev Bone Miner Metab [Internet]. 2016 [cited 2020 Apr 15];14(2):56–67. Available from: https://doi.org/10.1007/s12018-016-9208-2

8. Santos FC, Tavares DRB. Síndrome locomotora em idosos: tradução, adaptação cultural e validação brasileira do instrumento 25-Question Geriatric Locomotive Function Scale. Rev Bras Reumatol [Internet]. 2017 [cited 2020 Apr 15];57(1): 56-63. Available from: https://doi.org/10.1016/j.rbre.2016.07.015

9. Bezerra MAM, Hellwing N, Pinheiro GRC, Lopes CS. Prevalence of chronic musculoskeletal conditions and associated factors in Brazilian adults – National Health Survey. BMC Public Health [Internet]. 2018 [cited 2020 Apr 15];18(1):287-96. Available from: https://doi.org/10.1186/s12889-018-5192-4.

10. Gil AC. Métodos e técnicas de pesquisa social. 6th ed. São Paulo, SP(BR): Atlas; 2008.

11. Sá GGM, Santos AMR. Independência funcional de idosos que sofreram queda: estudo de seguimento. Rev Bras Enferm [Internet]. 2019 [cited 2020 Apr 15];72(6): 1715-1722. Available from: https://doi.org/10.1590/0034-7167-2018-0845.

12. Santos FC, Tavares DRB. Locomotive syndrome: a important condition in the aging. MOJ Gerontol Ger. [Internet]. 2017 [cited 2020 Apr 15];1(4):90-1. Available from: https://doi.org/10.15406/mojgg.2017.01.00019.

13. Almeida AV, Mafra SCT, Silva EP, Kanso S. A feminização da velhice: em foco as características socioeconômicas, pessoais e familiares das idosas e o risco social. Textos & Contextos [Internet]. 2015 [cited 2020 Apr 15];14(1):115-31. Available from: http://doi.org/10.15448/1677-9509.2015.1.19830

14. Sudré MRS, Reiners AAO, Azevedo RCS, Floriano LA. Características socioeconômicas e de saúde de idosos assistidos pelas Equipes de Saúde da Família. Cienc Cuid Saúde [Internet] 2015 [cited 2020 Apr 15];14(1):933-40. Available from: https://doi.org/10.4025/cienccuidsaude.v14i1.19794

15. Silva PAB, Santos FC, Soares SM, Silva LB. Perfil sociodemográfico e clínico de idosos acompanhados por equipes de Saúde da Família sob a perspectiva do gênero. J Res Fundam Care [Internet] 2018 [cited 2020 Apr 15];10(1):97-105. Available from: http://doi.org/10.9789/2175-5361.rpcfo.v10.5987

16. Arbex MCFB, Okazaki JEF, Tavares DRB, Bersani ALF, Santos FC. Locomotive syndrome is associated with chronic pain and poor quality of life in Brazilian oldest old: LOCOMOV Project. J Orthop Sci [Internet]. 2020 [cited 2020 Apr 15];20(6):30057-9. Available from: https://doi.org/10.1016/j.jos.2020.02.007

17. Muramoto A, Imagama S, Ito Z, Hirano K, Ishiguro N, Hasegawa Y. Spinal sagittal balance substantially influences locomotive syndrome and physical performance in community-living middle-aged and elderly women. Women J Orthop Sci [Internet]. 2016 [cited 2020 Apr 15];21(2):216-21. Available from: https://doi.org/10.1016/j.jos.2015.12.016

18. Akahane M, Yoshira S, Maeyashiki A, Tanaka Y, Imamura T. Lifestyle factors are significantly associated with the locomotive syndrome: a cross-sectional study. BMC Geriatrics [Internet]. 2017 [citedo 2020 Apr 15];17(1):241-7. Available from: https://doi.org/10.1186/s12877-017-0630-1

19. Nunes JD, Saes MO, Nunes BP, Siqueira FCV, Soares DC, Fassa MEG, et al. Indicadores de incapacidade funcional e fatores associados em idosos: estudo de base populacional em Bagé, Rio Grande do Sul. Epidemiol Serv Saúde [Internet]. 2017 [cited 2020 Apr 15];26(2):295-304. Available from: https://doi.org/10.5123/s1679-49742017000200007

20. Nishimura A, Kato K, Fukuda A, Fujisawa k, Sudo A. The relationship between the 25-question Geriatric Locomotive Function Scale and osteoporosis, knee osteoarthritis, and physical performance. Sports Orthop Traumatol [Internet]. 2015 [cited 2020 Apr 15];31(3):195-9. Available from: https://doi.org/10.1016/j.orthtr.2015.06.005

21. Akay M, Doi T, Seichi A, Okuma Y, Ogata T, Ywaya T. Locomotive syndrome: operational definition based on a questionnaire, and exercise interventions on mobility dysfunction in elderly people. Clinic Rev Bone Miner Metab [Internet]. 2016 [cited 2020 Apr 15];4(2):119-30. Available from: https://doi.org/10.1007/s12018-016-9210-8

22. Matsumoto H, Hagino H, Osaki M, Tanishima S, Tanimura C, Matsuura A, et al. Gait variability analysed using an accelerometer is associated with locomotive syndrome among the general elderly population: The GAINA study. J Orthop Sci [Internet]. 2016 [cited 2020 Apr 15];21(3):354-60. Available from: https://doi.org/10.1016/j.jos.2016.02.003

23. Pacca DM, De-Campos GC, Zorzi AR, Chaim EA, De-Miranda JB. Prevalência de dor articular e osteoartrite na população obesa brasileira. ABCD Arq Bras Cir Dig [Internet]. 2018 [cited 2020 Apr 15];31(1):e1344. Available from: https://doi.org/10.1590/0102-672020180001e1344

24. Imaizumi Y, Eguchi K, Murakami T, Saito T, Hoshide S, Kario K. Locomotive syndrome is associated with large blood pressure variability in elderly hypertensives: the Japan Ambulatory Blood Pressure Prospective (JAMP) substudy. J Clin Hypertens [Internet]. 2016 [cited 2020 Apr 15];19(4):388-94. Available from: https://doi.org/10.1111/jch.12946

25. IwayaT, Doi T, Seichi A, Hoshino Y, Ogata T, Akai M. Relationship between physician-judged functioning level and self-reported disabilities in elderly people with locomotive disorders. Qual Life Res. Pública [Internet]. 2017 [cited 2020 Apr 15];26(1):35-43. Available from: https://doi.org/10.1007/s11136-016-1377-4

26. Fhon JRS, Rodrigues RAP, Santos JLF, Diniz MA, Santos EB, Almeida VC, et al. Fatores associados à fragilidade em idosos: estudo longitudinal. Rev Saúde Pública [Internet]. 2018 [cited 2020 Apr 15];52(1):52-74. Available from: https://doi.org/10.11606/s1518-8787.2018052000497

NOTES

CONTRIBUTION OF AUTHORITY
Study design: Figueiredo MLF, Silva TCA.
Data collection: Borges LMC, Costa ACSS, Rocha EP, Silva TCA.
Data analysis and interpretation: Silva TCA.
Discussion of the results: Costa ACSS, Rocha EP, Silva TCA.
Writing and/or critical review of the content: Figueiredo MLF, Darder JJT.
Review and final approval of the final version: Figueiredo MLF, Darder JJT.

APPROVAL OF RESEARCH ETHICS COMMITTEE
Approved by the Research Ethics Committee of *Universidade Federal do Piauí*, Opinion No.2,654,133 and CAAE 77365317.0.0000.5214.

CONFLICT OF INTEREST
There is no conflict of interest.

EDITORS
Associated Editors: Selma Regina de Andrade, Gisele Cristina Manfrini, Natália Gonçalves, Ana Izabel Jatobá de Souza.
Editor-in-chief: Roberta Costa.

CORRESPONDING AUTHOR
Tereza Cristina Araújo da Silva
terezacris19@yahoo.com.br