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Functional capacity and associated factors among longevous senior individuals living in community: a population study in Northeastern Brazil

Capacidade funcional e fatores associados em idosos longevos residentes em comunidade: estudo populacional no Nordeste do Brasil

Capacidad funcional y factores asociados en longevos residentes en una comunidad: estudio de población en el Noreste de Brasil

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ABSTRACT | The objective of this study was to determine the prevalence of impaired functional capacity and the associated factors in longevous elderly individuals from a city in the countryside of Northeastern Brazil. This is a cross-sectional, population- and community-based study. The research population consisted of senior citizens aged ≥ 80 years old, residents of the urban area of Lafaiete Coutinho, Bahia, Brazil. Data were collected in the households through a questionnaire with information on functional, socioeconomic, and demographic aspects and health/behavioral factors. Data analysis was performed using multinomial logistic regression at a significance level of 5%. A total of 94 senior citizens, whose average age was 86.1 years old (± 6.39), whereof 59.6% were female, were interviewed. Among the longevous senior individuals, 19.1% were considered independent to instrumental and basic activities of daily living, whereas 56.2% were considered as dependent to instrumental activities of daily living, and 24.7% to both basic and instrumental activities of daily living. There has been an association between impaired functional capacity, both for basic and instrumental activities of daily living, and the variables referring to sex and drug use; another one was between race/color and instrumental activities of daily living dependence. We got to the conclusion that there was high prevalence (80.9%) of longevous senior citizens who

depend on instrumental and basic activities of daily living. Also, the impairment of functional capacity on longevous senior citizens was associated with female sex, non-white race/color, and use of one or more drugs.

Keywords | Activities of Daily Living; Aged 80 and Over; Health of Elderly.

RESUMO | O objetivo deste estudo foi determinar a prevalência do comprometimento da capacidade funcional e os fatores associados em idosos longevos de um município do interior do Nordeste brasileiro. Trata-se de um estudo com delineamento transversal, de base populacional e comunitária. A população foi composta por idosos com idades ≥ 80 anos, moradores da zona urbana de Lafaiete Coutinho, na Bahia. A coleta de dados foi domiciliar por meio de questionário com informações da capacidade funcional, socioeconômicas e demográficas e condições de saúde/fatores comportamentais. A análise dos dados foi realizada a partir da regressão logística multinomial, adotando-se nível de significância de 5%. Foram entrevistados 94 idosos com média de 86,1 anos ($\pm 6,39$), sendo 59,6% do sexo feminino. Dos idosos longevos, 19,1% foram considerados independentes para atividades instrumentais e básicas da vida diária, 56,2% dependentes apenas nas atividades instrumentais da vida diária e 24,7% dependentes em atividades básicas e

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instrumentais da vida diária. Verificou-se associação entre comprometimento da capacidade funcional, tanto para atividades básicas da vida diária quanto para as instrumentais, e as variáveis sexo e uso de medicamentos; e entre a variável raça/cor e dependência para atividades instrumentais da vida diária. Foi possível concluir que houve alta prevalência (80,9%) de idosos longevos dependentes para as atividades instrumentais e/ou básicas da vida diária, e que o comprometimento da capacidade funcional em idosos longevos associou-se ao sexo feminino, à raça/cor não branca e ao uso de um ou mais medicamentos.

Descritores | Atividades Cotidianas; Idoso de 80 Anos ou mais; Saúde do Idoso.

RESUMEN | El objetivo de ese estudio fue determinar la prevalencia del comprometimiento de la capacidad funcional y los factores asociados en ancianos longevos de una municipalidad del interior del Noreste brasileño. Es un estudio con diseño transversal, de base poblacional y comunitaria. La población incluyó ancianos con edades ≥ 80 años, los cuales viven en la región urbana de Lafaiete Coutinho, Bahia, Brasil. La recolección de datos fue domiciliar por medio de cuestionario con informaciones cuanto al capacidad funcional o socioeconómica y

demográfica y las condiciones de salud o factores comportamentales. El análisis de datos fue realizado desde la regresión logística multinomial, con un nivel de significancia del 5%. Se entrevistaron 94 ancianos con media de 86,1 años ($\pm 6,39$), un 56,9% como género femenino. De los ancianos longevos, el 19,1% fueron considerados independientes para actividades instrumentales y básicas de vida cotidiana, un 56,2% eran dependientes solo en las actividades instrumentales de vida cotidiana y el 24,7% eran dependientes en actividades básicas e instrumentales de vida cotidiana. Se verificó una asociación entre comprometimiento de la capacidad funcional para las actividades básicas de vida cotidiana y para las instrumentales, y las variables género y uso de medicamentos; y entre la variable raza/color y dependencia para actividades instrumentales de vida cotidiana. Por lo tanto, se concluyó que hubo alta prevalencia (un 80,9%) de ancianos longevos dependientes para las actividades instrumentales y/o básicas de vida cotidiana y que el comprometimiento de la capacidad funcional en ancianos longevos se asoció al género femenino, a la raza/color no blanca y al uso de uno o más medicamentos.

Palabras clave | Actividades Cotidianas; Anciano de 80 o más Años; Salud del Anciano.

INTRODUCTION

The rapid growth of the elderly population in Brazil and the consequent change in the demographic and epidemiological profile of the country have generated social and economic challenges and raised the need for studies and research in the field of aging.

It is worth noting the significant increase in the number and percentage of longevous seniors, that is, individuals that have equal to or greater than 80 years of age. Although they represent about 1.3% of the world population, this age group is the population segment that is growing faster¹. In Brazil, while the annual geometric average growth rate of the general elderly population is approximately 3.3%, between older seniors is about 5.4%, one of the highest in the world².

Functional capacity is one of the most important indicators of the health status of the elderly population and, therefore, emerges as a new paradigm of health³. Healthy aging, in this new light, becomes the result of the multi-dimensional interaction between physical health, mental health, independence in daily living, social integration, family support and economic independence^{4,5}.

Assessment of functional capacity is a challenge to be faced, in view of the heterogeneity of the aging process and the influences of different factors to which families, seniors and society may be subject. In Brazil, few

studies address the functional capacity and its determinants in the population of the longevous seniors living in community^{5,6}.

Ageing does not occur homogeneously and may vary according to socioeconomic status, access to information and education, culture and the region where the elderly reside⁷. Thus, the situation and the location of the individual can influence the process of aging and dictate how this individual will experience health in this stage of life. From this perspective, the objective of this study was to determine the prevalence of impaired functional capacity and associated factors among the elderly seniors in a city in the Brazilian Northeast.

METHODOLOGY

It is a cross-sectional study using data of the “*Estado nutricional, comportamentos de risco e condições de saúde dos idosos de Lafaiete Coutinho-BA*” (Nutritional status, risk behaviors and health conditions of the elderly in Lafaiete Coutinho-BA) population and community basis survey. The municipality of Lafaiete Coutinho had, during the period of data collection, a population of 4,162 inhabitants, 2.4% of these (n=100) corresponding to the number of longevous seniors.

Were excluded from analysis subjects who, at the time of the interview, did not have an informant if they were unable to understand the instructions due to cognitive problems, assessed using the Mini Mental State Examination (MMSE)⁸.

A census was conducted in January 2011, from the listing of elderly enrolled in the *Estratégia de Saúde da Família* (Family Health Strategy), which covers 100% of the population, to identify the elderly seniors, non-institutionalized and living in the city. Of the 100 individuals identified, four refused to participate and two were not located at home. Thus, the survey consisted of 94 (94%) longevous seniors.

It was created and used a form, excerpt from the *Pesquisa Saúde, Bem-estar e Envelhecimento* (SABE – Health, Welfare and Aging Research) questionnaire⁹ increased by the International Physical Activity Questionnaire (IPAQ) long form, the Brazilian version¹⁰. The following information was used: functional capacity (dependent variable), measured from the basic activities of daily living (BADL)¹¹ and instrumental activities of daily living (IADL)¹²; socio-economic and demographic characteristics, health status, and behavioral factors (independent variables).

The elderly were classified as independent when they did not report the need of help to perform any BADL and IADL, and dependents when reported needing assistance in at least one dimension of each activity. As proposed by Hoyemans et al.¹³, a range of hierarchical functional disability was built distinguishing three categories: independent (reference category); dependent in IADL; dependent in BADL and IADL.

For the health and behavioral factors, the categorization of variables was measured using the following criteria: depression symptoms, assessed by the Geriatric Depression Scale (GDS) short form of 15 items (score <6 points determines the absence of symptoms and ≥6 determining the presence of symptoms)¹⁴; weight status through the body mass index (BMI < 22 kg/m²=underweight, 22 kg/m² ≤ BMI ≤ 27 kg/m²=adequate and BMI > 27 kg/m²=overweight)¹⁵ and physical activity, considering 'insufficiently active' who performed less than 150 minutes per week in moderate or vigorous physical activity and 'active' who performed 150 minutes or more¹⁶.

It was proceeded to the descriptive analysis of the variables, and then, as a measure of association, it was estimated the *Odds Ratio* (OR) and confidence intervals from multinomial logistic regression. In all analyzes, the significance level was 5% ($\alpha=0.05$). The data were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows, version 15.0.

RESULTS

The characterization of the elderly according to socioeconomic and demographic variables, the health conditions and behavioral factors are presented in Table 1. The mean age was 86.1 years (standard deviation – SD=6.39), age maximum of 105 years. Functional capacity was assessed

Table 1. Descriptive characteristics of the study population. Lafaiete Coutinho, Bahia, Brazil. 2011

Variable	% of responses	n	%
Sex	100		
Female		56	59.6
Male		38	40.4
Can read and write	100		
Yes		20	21.3
No		74	78.7
Marital status	100		
With union		42	44.7
No union		52	55.3
Race/Color	91.5		
White		15	17.4
Not white		71	82.6
Per capita income (R\$)	93.6		
≤255.00		39	44.3
255.00–510.00		37	42.0
>510.00		12	13.6
Participation in religious activity	97.9		
Yes		87	94.6
No		5	5.4
Physical activity	97.9		
Active		24	26.1
Insufficiently active		68	73.9
Body Mass Index	91.5		
Normal weight		40	46.5
Underweight		32	37.2
Overweight		14	16.3
Self-perceived health	92.5		
Positive		34	39.0
Negative		53	51.0
Health compared	87.2		
Better		51	62.2
Equal		15	18.3
Worse		16	19.5
Hospitalization	98.9		
None		64	68.8
More than one		29	31.2
Number of chronic diseases	98.9		
No		15	16.1
One		30	32.3
Two or more		48	51.6
Falls	100		
No		68	72.3
Yes		26	27.7
Depression symptoms	85.1		
No symptoms		57	71.3
With symptoms		23	28.7
Functional capacity	94.6		
Independent		17	19.1
Dependent for IADL		50	56.2
Dependent for BADL		22	24.7

IADL: instrumental activities of daily living; BADL: basic activities of daily living

in 94.6% (n=89) of the study participants, with a higher prevalence of elderly dependent for IADL.

The prevalence of independence, dependence on BADL and dependence in BADL and IADL as exposure to socioeconomic and demographic variables are presented in Table 2. It was found that the elderly women have 4.65 times higher chance of addiction to BADL and 4.20 times higher for IADL compared to men. Also, it was noticed a 4.69 times greater chance of dependence for IADL among nonwhites compared with those who reported they were white (Table 2).

As described in Table 3, among the health conditions and behavioral aspects, only the use of drugs was associated with impaired functional capacity, both in dependence for IADL, as well as for IADL and BADL.

DISCUSSION

The municipality of Lafaiete Coutinho has low health indicators and quality of life (4,487^o position in the national ranking, Municipal Human Development Index – longevity)¹⁷, and has peculiar characteristics, some typically rural, although this research has been conducted with the elderly of the urban area.

From the age of 80, even with healthy aging, we expect some degree of physiological impairment in functional capacity of the elderly. However, the frequency and intensity of this impairment are varied¹⁸. Nusselder, Looman and Mackenbach¹⁹ reported that the functional dependence, observed mainly in older individuals is associated

with sociodemographic factors, such as educational level and income; behavioral, such as physical inactivity, obesity and alcohol consumption; and psychosocial problems, such as loss of autonomy and depression symptoms.

Among the socioeconomic factors studied, women showed stronger association with impairment of functional capacity. Corroborating these data, a study conducted in 22 provinces of China, based on a study with 8,805 elderly people between the ages of 80 and 105 years, found that women of 80 years or more were seriously disadvantaged in functional capacity when compared to men of the same age²⁰.

The greater impairment in functional capacity in older women may be related to differences in health status and lifestyle between sexes. In general, the life expectancy of women is higher than men. However, this does not mean longer survival for women to have better health, since they have a higher prevalence of non-fatal disabling conditions, such as osteoporosis, osteoarthritis and depression²¹. To that, it can be added the fact that women have greater loss of muscle mass with aging, characterized as a potential factor responsible for the decreased functional capacity²².

The race/color variable was associated with impaired functional capacity, with higher prevalence of dependence for IADL (75%) of non-white compared to white. In line with these findings, a population-based cross-sectional study, conducted by Duca et al.²³ on 598 individuals that have more than or equal to 60 years of the urban area of Pelotas, Rio Grande do Sul, Brazil, found association of functional disability in basic activities with the skin colors of brown, black, among others.

Table 2. Association between socioeconomic and demographic variables and functional capacity. Lafaiete Coutinho, Bahia, Brazil, 2011

Variables	Functional capacity					p-value
	Independent	Dependent IADL		Dependent BADL		
	%	%	OR _{adjusted} (95%CI)	%	OR _{adjusted} (95%CI)	
Sex						0.026
Female	70.6	34.0	1.0	36.3	1.0	
Male	29.4	76.0	4.65 (1.40-15.40)	63.7	4.20 (1.08-16.32)	
Can read and write						0.092
Yes	35.3	14.0	1.0	31.8	1.0	
No	64.7	86.0	3.35 (0.93-12.00)	68.2	1.16 (0.30-4.46)	
Marital status						0.756
With union	52.9	46.0	1.0	40.9	1.0	
No union	47.1	54.0	1.32 (0.43-3.97)	59.1	1.62 (0.45-5.82)	
Race/Color						0.063
White	35.3	10.4	1.0	16.7	1.0	
Not white	64.7	89.6	4.69 (1.20-18.25)	83.3	2.72 (0.55-13.36)	
Per capita income (R\$)						0.066
>510.00	13.3	10.4	1.0	19.0	1.0	
255.00-510.00	73.4	37.5	0.65 (0.10-3.97)	33.3	0.32 (0.04-2.22)	
≤255.00	13.3	52.1	4.90 (0.56-44.34)	47.7	2.5 (0.25-24.37)	

IADL: instrumental activities of daily living; BADL: basic activities of daily living; p-value for the Pearson χ^2 test; Odds ratio adjusted for other categories of functional capacity

This way, it becomes important to interpret the association of functional capacity with race/color carefully. Face of social inequalities in Brazil, which is a developing country, and the Northeast in particular, exposures throughout life may be influenced by ethnic differences. Thus, race/color can be directly linked to the socioeconomic status of the elderly.

The elderly population, by registering greater likelihood of frailty and health problems, frequently use health services and medications. The use of one or more drugs showed a two-fold higher prevalence of dependence in BADL and IADL and 72% higher for dependence only in IADL when compared to those seniors who do not use them. A similar association was found in cross-sectional and population based study conducted with 397 elderly residents in the urban area of Ubá, Minas Gerais, Brazil, by Nunes et al.²⁴.

The relation between impaired functional capacity and use of medications may be influenced by other factors, such as presence of chronic diseases²⁵ that, despite not having been associated with impaired functional capacity

in this study, had a high prevalence given that 83.9% of the elderly seniors suffer from one or more chronic diseases. The culture of medicalization becomes worrisome given the pronounced adverse reactions in this group, the possibility of iatrogenic and misuse of drugs, requiring the family and health professionals with special attention to the elderly of more advanced age.

The results presented in this study were derived from cross-sectional, inadequate to grasp temporal evolutionary relations of the functional disability and, thereby, to make direct measurements of risk. This way, the type of analysis applied did not aim to determine the etiologic nature of disability in longevous seniors, but to explore an aspect of unreleased analysis in the context of the reality of the Northeast of Brazil.

Functional capacity is an important marker of successful aging and quality of life for seniors. The difficulty or inability of the elderly is associated with the prediction of fragility, dependency, institutionalization, death and mobility problems, causing complications over time and generating long-term care and high cost²⁶.

Table 3. Association between health and biological variables and functional ability in the elderly seniors. Lafaiete Coutinho, Bahia, Brazil, 2011

Variables	Functional capacity					p-value
	Independent	Dependent IADL		Dependent BADL		
	%	%	OR _{adjusted} (95%CI)	%	OR _{adjusted} (95%CI)	
Body Mass Index						0.256
Normal weight	64.7	39.5	1.0	42.1	1.0	
Underweight	29.4	37.5	2.00 (0.60-7.18)	47.4	2.47 (0.59-10.26)	
Overweight	5.8	23.0	6.36 (0.72-56.20)	10.5	2.75 (0.21-35.83)	
Physical activity						0.107
Active	47.0	24.5	1.0	18.2	1.0	
Insufficiently active	53.0	75.5	2.74 (0.86-8.68)	81.8	4.00 (0.94-16.92)	
Number of chronic diseases						0.987
No	18.7	14.0	1.0	18.2	1.0	
One	31.3	32.0	1.37 (0.25-7.39)	31.8	1.05 (0.15-6.92)	
Two or more	50.0	54.0	1.44 (0.30-6.92)	50.0	1.03 (0.17-5.94)	
Use of medications						0.036
Do not use	61.5	20.5	1.0	22.2	1.0	
Uses (one or more)	38.5	79.5	2.71 (1.29-5.69)	77.8	2.17 (0.95-4.95)	
Hospitalization						0.686
None	76.5	70.0	1.0	63.6	1.0	
More than one	23.5	30.0	1.39 (0.39-4.97)	36.4	1.85 (0.45-7.66)	
Self-perceived health						0.206
Positive	52.9	36.7	1.0	23.5	1.0	
Negative	47.1	63.3	1.93 (0.63-5.91)	76.5	3.65 (0.84-15.91)	
Compared health						0.427
Better	66.6	65.9	1.0	41.2	1.0	
Equal	20.0	14.9	0.75 (0.16-3.47)	29.4	2.38 (0.42-13.38)	
Worse	13.4	19.2	1.45 (0.26-7.86)	29.4	3.57 (0.53-23.95)	
Falls						0.085
No	70.6	80.0	1.0	54.5	1.0	
Yes	29.4	20.0	0.60 (0.17-2.09)	45.5	2.00 (0.52-7.63)	
Depression symptoms						0.186
No symptoms	88.2	70.5	1.0	60.0	1.0	
With symptoms	11.8	29.5	3.14 (0.62-15.75)	40.0	5.00 (0.82-30.28)	

IADL: instrumental activities of daily living; BADL: basic activities of daily living; p-value for the Pearson χ^2 test; Odds ratio adjusted for other categories of functional capacity

Therefore, the goal in health care becomes not only to prolong life, but primarily to maintain the functional capacity of the individual, so that those will remain autonomous and independent by the largest possible period. For this to occur, maintaining the health of the elderly should be based on the principles of the Sistema Único de Saúde (SUS – Unified Health System) with the goal of universal access and comprehensive care through strategies, and not punctual programs, tailored to the needs of this population group.

CONCLUSION

Based on these results, we concluded that there is a high prevalence (80.9%) of elderly seniors dependent for IADL and/or BADL and their impaired functional capacity is associated with female sex, to race/color non-white and the use of one or more drugs.

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