

# Functional capacity assessment of long-lived older adults from Amazonas

*Avaliação da capacidade funcional de idosos longevos amazônidas*  
*Evaluación de la capacidad funcional de ancianos longevos amazónicos*

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## ABSTRACT

**Objective:** To evaluate the functional capacity of long-lived older adults from Amazonas. **Method:** A cross-sectional epidemiological study was carried out with 116 older adults aged 80 years or older, registered in a primary health care unit in Belém, in the state of Pará, Brazil. The Functional Independence Measure (FIM) was used for functional capacity assessment and the Mini-Mental State Examination (MMSE) for cognitive screening. Univariate and bivariate analyses were carried out, in addition to the Pearson's chi-square test. **Results:** The older adults presented modified independence in the self-care, sphincter control and locomotion dimensions, and needed supervision for mobility/transfers. In mobility, men presented complete independence. Modified independence was found in the 80-89 age group. It was observed that, the lower the education level, the worse the cognitive performance. **Conclusion:** In spite of their advanced age, long-lived older adults still present functional capacity for activities of daily living, even though they required supervision for high energy expenditure tasks, such as mobility and transfers.

**Descriptors:** Aged, 80 and Over; Activities of Daily Living; Public Health; Health of the Elderly; Nursing.

## RESUMO

**Objetivo:** Avaliar a capacidade funcional de idosos longevos amazônidas. **Método:** Estudo epidemiológico, transversal, realizado com 116 idosos com idade igual ou superior a 80 anos, cadastrados em uma Unidade Municipal de Saúde em Belém-Pará, Brasil. Para avaliação da capacidade funcional, utilizou-se a Medida de Independência Funcional (MIF) e, para rastreamento cognitivo, o Mini-Exame do Estado Mental. Realizou-se a análise univariada e bivariada, além do teste Qui-Quadrado de Pearson. **Resultados:** Os idosos apresentaram independência modificada nos domínios autocuidado, controle de esfínteres, locomoção e supervisão na mobilidade/transferência. Na mobilidade, os homens apresentaram independência total. Na faixa etária de 80 a 89 anos, observou-se independência modificada. Notou-se que quanto menor a escolaridade, pior o desempenho cognitivo. **Conclusão:** Apesar da idade avançada, os longevos ainda apresentaram capacidade funcional para o cotidiano, mesmo que necessitassem de supervisão para as tarefas de maior gasto energético como a mobilidade e transferência. **Descritores:** Idoso de 80 Anos ou Mais; Atividades Cotidianas; Saúde Pública; Saúde do Idoso; Enfermagem.

## RESUMEN

**Objetivo:** Evaluar la capacidad funcional de ancianos longevos amazónicos. **Método:** Estudio epidemiológico, transversal, realizado con 116 ancianos de edad igual o mayor a 80 años, registrados en una Unidad Municipal de Salud de Belém-Pará, Brasil. Para evaluar la capacidad funcional se utilizó la Medida de Independencia Funcional (MIF), y para la evaluación cognitiva, el Miniexamen del Estado Mental. Se aplicó análisis univariado y bivariado, además del test de Chi-cuadrado de Pearson. **Resultados:** Los ancianos mostraron independencia modificada en los dominios autocuidado, control de esfínteres, locomoción y supervisión de la movilidad/transferencia. En la movilidad, los hombres demostraron independencia total. En la faja etaria de 80-89 años se observó independencia modificada. Se notó que los menos escolarizados tenían peor desempeño cognitivo. **Conclusión:** A pesar de su edad, los longevos presentan aún capacidad funcional para su día a día, precisando supervisión para las tareas de mayor gasto energético, como movilidad y transferencia.

**Descriptores:** Anciano de 80 o Más Años; Actividades Cotidianas; Salud Pública; Salud del Anciano; Enfermería.

## INTRODUCTION

Older adults aged 80 years or older represent an increasing age group within the population<sup>(1-2)</sup>. In this profile, it is estimated that, in 2050, long-lived older adults will be responsible for one-fifth of the elderly in the world<sup>(3-4)</sup>. In Brazil, this group represented 1.7% of the population in 2011, which corresponds to more than 3 million older adults<sup>(5)</sup>.

One of the concerns is that the increase in longevity will be followed by higher levels of disease, which means disability and dependence, thus increasing demands for healthcare services and welfare<sup>(1)</sup>. Because the aging process occurs in a heterogeneous way, individuals from the same age group may present different functional capacity from each other<sup>(6-7)</sup>. Functional capacity has been mostly understood in terms of physical and mental abilities, as well as independence to perform specific basic and instrumental activities of daily living<sup>(8)</sup>. In addition, this term is characterized by the presence of individual capacity for decision and command on actions, establishing and following its own rules, as well as capacity for undertaking something with its own means.

Studies emphasize the need for functional capacity assessment of older adults, because it may indicate future health-related complications, such as physical disability, frailty, institutionalization, and early mortality<sup>(9-12)</sup>.

The increase in the number of older adults worldwide arouses concerns for governments, because this situation may lead to a greater demand for healthcare systems due to the increase in longevity and emergence of chronic non-communicable diseases, which represent a major challenge<sup>(9,13)</sup>. Long-lived older adults, due to the aging process, tend to present more comorbidities<sup>(14-15)</sup>.

It is worth mentioning that long-lived older adults have been poorly represented in aging-related studies<sup>(1-2,4,16-17)</sup>, and data on this theme are often based on relatively small samples<sup>(1)</sup>. There is a gap when considering specifically long-lived older adults from Amazonas, a state in Brazil.

Octogenarians are those aged 80 years or older and may also receive the following denominations: older adults, very old adults, advanced older adults, and long-lived older adults<sup>(17)</sup>.

The present study may bring contributions to science, especially to geriatric nursing, thus promoting the undertaking of further studies on the theme, whose results may contribute to care actions provided for this population.

This study originated after daily care observations, which led to the need for researching the functional capacity of older adults, specifically long-lived ones, due to specificities presented during their care, thus aiming at future interventions for this population, with the purpose of promoting aging with quality of life.

## OBJECTIVE

To assess the functional capacity of long-lived older adults from Amazonas registered in a primary health care unit of the Brazilian Unified Health System in Belém, a city in the state of Pará.

## METHOD

### Ethical aspects

The present study met the ethical aspects of resolution 466/12 of the Brazilian National Health Council, and was approved by the research ethics committee of the University of the State of Pará.

### Study design, setting, and period

This was a cross-sectional study with an observational and analytical approach. It was carried out in a primary health care unit of the district of Guamá in Belém, Pará. The district chosen has one of the greatest populations of people aged 80 years or older. The present study was carried out in 2015.

### Study population and inclusion and exclusion criteria

From a reference population of older adults (N=187), the initial sample (N=127) was obtained after sample calculation. The final sample was made up of long-lived older adults (N=116), with a loss of 11 (8.6%) participants due to their refusal in participating in the study. The inclusion criteria adopted for the sample in this study were being older adults aged 80 years or older from both genders, registered in the primary health care unit of the city.

### Study protocol

For data collection, a structured form including the variables of interest for the study was prepared, such as sociodemographic and economic characteristics (age, gender, origin, marital status, years of study, monthly income, job, cohabitation, and number of children).

The Mini-Mental State Examination (MEEM) was used for cognitive function screening. The following cut-off scores were suggested for this study: illiterate=19; 1-3 years of education=23; 4-7 years of education=24; > 7 years of education=28<sup>(18)</sup>. Functional capacity was assessed using the Functional Independence Measure (FIM), which was translated and adapted to Brazil in 2000<sup>(19)</sup>. It originated in the 1980s and was developed in the United States for assessment of individuals undergoing rehabilitation<sup>(20)</sup>.

The FIM assesses functional performance (functional independence) of an older person based on the undertaking of a set of 18 tasks (motor and cognitive skills), which refer to subscales or dimensions denominated as self-care, sphincter control, transfers, locomotion, communication, and social cognition. This allows objectively quantifying the older person's need for assistance or independence, thus contributing to the planning of specific treatments. In the tasks assessed by the FIM, each item may be classified in a 7-level dependence scale, in which 1 corresponds to total dependence and 7 to complete independence, that is, normality in the undertaking of tasks in an independent way. Therefore, the TOTAL FIM score (motor and cognitive part) may range from 18 (completely dependent) to 126 (completely independent)<sup>(17)</sup>.

Only the motor FIM was assessed in the present study, by means of the self-care, sphincter control, transfers, and locomotion

dimensions. This instrument is part of the functional capacity assessment measures' list recommended by the Brazilian Ministry of Health, and is included in the Aging and Health of the Elderly booklet<sup>(18)</sup>, whose use is recommended in primary health care. Still regarding the FIM, it is worth mentioning that the motor function evaluation dimension receives a score that may range from 13 to 91 points<sup>(21-22)</sup>.

### Analysis of the results and statistics

A database organized in the SPSS (Statistical Package for the Social Sciences) software for Windows 20.0 was created for data analysis. For treatment of socioeconomic and demographic data (quantitative variables), descriptive analyses were carried out with position and dispersion measures, and the Pearson's chi-square test was applied for nominal, categorical, or ordinal variables.

## RESULTS

According to the data shown in Table 1, the greatest proportion of long-lived older adults were women, in comparison with men of the sample analyzed. The prevalent age group was 80-89 years, and most of the older adults were widowed, had children, lived with their families, came from the countryside of the state of Pará, had a monthly income of up to one minimum wage, did not have a paid job, and presented a low education level.

It is worth mentioning that, in this study, the application of the Mini-Mental State Examination (MMSE) associated with education level in years of study was carried out. It was observed that 72.2% of the illiterate long-lived older adults presented a cognitive evaluation score below 19 points, showing that the lower the education level, the lower the score in the MMSE.

Table 2 presents the performance of older adults according to the motor FIM dimensions. The four motor FIM dimensions correspond to self-care (eating, grooming, bathing, dressing - upper, dressing - lower, and toileting), sphincter control (bladder and bowel), mobility (bed, chair or wheelchair, toilet, tub or shower), and locomotion (walking or wheelchair, and stairs).

According to the participants' reports, most of them already presented modified independence for self-care activities, as well as sphincter control for 40%, and locomotion for 54.3%. Regarding mobility, most of the older adults required supervision.

According to the reports of the participants in the study regarding the relationship between FIM and gender, no difference was found in self-care and sphincter control performance (p-value  $\geq 0.05$ ). However, for sphincter control, the proportion of men with complete independence was greater compared to women, who already presented modified independence. Regarding mobility (transfers), men presented complete independence, whereas women required supervision, with p-value  $\leq 0.05$ . However, in locomotion, a greater proportion of men presented modified independence compared to women, with p-value  $\leq 0.05$ .

Table 3 shows that functional independence for self-care and sphincter control activities were presented by more independent older adults, mostly in the 80-89 age group, with a p-value ( $\leq 0.05$ ). Regarding performance for transfers and locomotion, approximately 60% of the older adults in the 80-89 age group still

maintained modified independence; however, more than 75% of the older adults in more advanced age groups already required some type of assistance, according to the dimensions evaluated.

**Table 1** – Sociodemographic profile of the long-lived older adults who participated in the study, Belém, Pará, Brazil, 2015 (N=116)

Variables	f	%
Gender		
Female	75	64.7
Male	41	35.3
Age (mean=85.1; SD=4.703±)		
80-89	100	86.2
90-99	14	12.1
100 or +	2	1.7
Marital status		
Widowed	56	48.3
Married or living with a partner	41	35.3
Divorced	6	5.2
Single	13	11.2
Children		
Yes	113	97.4
No	3	2.6
Living arrangement		
With the family	104	89.7
Alone	9	7.8
Other	3	2.6
Origin		
Countryside	76	65.6
Belém	32	27.6
Another state	7	6.0
Another country	1	0.9
Monthly income (MW)		
Up to one MW	107	92.2
Two MW	8	6.9
> Three to four MW	1	0.9
Paid job		
No	107	92.2
Yes	9	7.8
Education level		
Illiterate/None	42	36.2
< One year of study	14	12.1
One to three years of study	39	33.6
Four to eight years of study	17	14.7
More than eight years of study	4	3.4

Note: Measures in frequency and proportion.

**Table 2** - Distribution of the long-lived older adults' performance according to the motor Functional Independence Measure dimensions, Belém, Pará, Brazil, 2015 (N=116)

Dimensions of the motor FIM	Functional independence levels (%)							
	7	6	5	4	3	2	1	
Self-care	1.7	86.2	0.0	6.9	0.9	2.6	1.7	100
Sphincter control	38.8	44.8	0.0	6.0	5.2	0.9	4.3	100
Mobility (Transfers)	25.0	19.8	38.8	7.8	3.4	0.0	5.2	100
Locomotion	9.5	54.3	3.4	9.5	10.3	6.9	6.0	100

Note: I (Complete Independence=7); MI (Modified Independence=6); S (Supervision=5); MiA (Minimal Assistance=4); MoD (Moderate Assistance=3); MaA (Maximal Assistance=2); TA (Total Assistance=1); FIM = Functional Independence Measure.

**Table 3** – Distribution of the level of independence of the long-lived older adults who participated in the study according to age group, Belém, Pará, Brazil, 2015 (N=116)

Dimension	Variables	Age group				P*
		80 - 89		90+		
		n	%	n	%	
Self-care	Total assistance	0	0.0	2	12.5	<0.000
	Maximal assistance	1	1.0	2	12.5	
	Moderate assistance	1	1.0	0	0.0	
	Minimal assistance	4	4.0	4	25.0	
	Supervision	0	0.0	0	0.0	
	Modified independence	92	92.0	8	50.0	
	Complete independence	2	2.0	0	0.0	
Sphincter control	Total assistance	1	1.0	4	25.0	<0.000
	Maximal assistance	1	1.0	0	0.0	
	Moderate assistance	6	6.0	0	0.0	
	Minimal assistance	3	3.0	4	25.0	
	Supervision		0.0		0.0	
	Modified independence	47	47.0	5	31.3	
	Complete independence	42	42.0	3	18.8	
Mobility	Total assistance	2	2.0	4	25.0	<0.000
	Maximal assistance		0.0		0.0	
	Moderate assistance	1	1.0	3	18.8	
	Minimal assistance	7	7.0	2	12.5	
	Supervision	41	41.0	4	25.0	
	Modified independence	21	21.0	2	12.5	
	Complete independence	28	28.0	1	6.3	
Locomotion	Total assistance	3	3.0	4	25.0	0.001
	Maximal assistance	6	6.0	2	12.5	
	Moderate assistance	8	8.0	4	25.0	
	Minimal assistance	8	8.0	3	18.8	
	Supervision	4	4.0	0	0.0	
	Modified independence	59	59.0	3	18.8	
	Complete independence	12	12.0	0	0.0	

Note: Measures in frequency and proportion; Pearson's chi-square test (p) \*P-value (≤0.05).

## DISCUSSION

Feminization is a well-known phenomenon in old age. Longevity is greater among women when compared to men<sup>(9,23-24)</sup>. Studies carried out with long-lived older adults emphasize the prevalence of women<sup>(1,17,25-34)</sup>.

Widowhood is the most prevalent marital status, especially among women. The feminization process is associated with the widowhood process. With an increase in life expectancy, the proportion of widows has followed this process, with a reduction in the number of married widows. Some factors are associated with this fact, such as greater longevity among women and the cultural prevalence of men remarrying younger women<sup>(35-36)</sup>.

More than half of the elderly in the study reported coming from the countryside of the state. Older adults from countryside regions may present a better functional capacity, which may be due to healthier life habits<sup>(17)</sup>.

Most participants in the study had a monthly income of one minimum wage, mainly coming from retirement. Older people with restricted financial income have limited access to nutritional and social care, emphasizing health and education, which are significant influencing factors for quality of life. Socioeconomic factors affect the health of older adults<sup>(26,37)</sup>.

Illiteracy was the education level with the highest percentage among the participants in the study. The historical context of the 20th century, which is associated with the period of birth and childhood of the long-lived older adults, presented an access

limitation to the public school network. Those who lived in the countryside area experienced this difficulty due to the lack of available schools, the difficulty of locomotion due to geographic space, and other reasons<sup>(38)</sup>. Low education levels are prevalent among the elderly<sup>(9,23)</sup> and also stands out among long-lived older adults<sup>(29,39)</sup>.

Low education levels and illiteracy are factors directly associated with the impairment of older adults' understanding level, thus contributing to a limitation in access to information<sup>(40)</sup>. The present study showed that, the lower the education level, the lower the performance in cognitive assessment, which was corroborated by other studies<sup>(25,41)</sup>.

Low cognitive performance may interfere with long-lived older adults' survival, and routine cognitive assessment of the elderly is a necessary practice, because cognitive impairment may impact the functional performance of long-lived older adults<sup>(34)</sup>.

Identification of functional performance is an important health indicator for older adults from all age groups. This is influenced by multifactorial conditions and associated with the interaction of demographic, social, economic, epidemiological, and behavioral factors. It is worth mentioning that the aging process is natural and associated with a gradual decrease in functional capacity<sup>(5)</sup>.

Evaluation of mobility directs visibility for assessment of functional decline, which is considered essential for studying the relationship between functional capacity and sociodemographic characteristics, chronic conditions<sup>(42)</sup>, and health-related events, because these situations may directly interfere with activities of daily living<sup>(22)</sup>.

A study carried out in Criciúma, a city in the state of Santa Catarina, to research the functional capacity of 20 institutionalized long-lived older adults using the FIM observed that they presented modified independence in the self-care (33%), sphincter control (50%), and locomotion (27.2%) dimensions, whereas in mobility/transfers (25%), they presented modified dependence of the supervision type<sup>(20)</sup>, which was similar to the results found in the present study.

Women presented worse functional performance than men. The feminization phenomenon may explain this fact, which is a process previously evidenced demographically, and, although presenting greater life expectancy, this group consequently presents greater functional loss. Some hypotheses may explain this, such as higher prevalence of non-lethal disabling conditions among them (osteoporosis and depression, for example) and the fact that women present a higher number of health conditions, when compared to men in the same age group<sup>(43)</sup>. One study carried out in Brazil that evaluated frailty in 511 non-institutionalized older adults showed that women were more frail<sup>(9)</sup>.

Similarly, loneliness maximized by widowhood may affect functional impairment with a tendency for widowed people to take less care of their health<sup>(43)</sup>. Studies carried out with long-lived older adults showed a prevalence of greater functional loss in women<sup>(1,13,27,29,32,44)</sup>.

In the relationship between the motor FIM and age group, octogenarians presented modified independence in the self-care, sphincter control, and locomotion dimensions, whereas nonagenarians and centenarians ranged between modified independence and dependence, which showed that, the higher the age group, the worse the functional capacity, and that this condition may be expected in the population due to functional losses associated with physiological aging.

Functional impairment increases with age. The greatest proportion of older adults with some type of dependence belongs to the 80 years or older age group<sup>(1)</sup>. Some studies associate a decline in functional capacity with aging process<sup>(30,43-46)</sup>.

The human aging process influences some determinants, such as reduction in physical fitness, resulting in a gradual decrease in daily living activities, which will affect older adults' quality of life. Older adults, when reaching 80 years healthily and maintaining themselves functionally active, may characterize younger functional age when compared to inactive 60 years old adults<sup>(38)</sup>.

Detecting older adults' level of dependence by observing several constituents of physical fitness is of utmost importance for direction and selection of individual or group interventions, with the aim of improving or maintaining functional capacity, especially those associated with activities of daily living, which should be encouraged<sup>(47)</sup>.

Because the aging process is heterogeneous, there are long-lived older adults at advanced ages with a good functional performance. Older adults, in at least some countries, are more independent than those from previous generations. This situation suggests a slightly more optimistic future for long-lived older adults and challenges the idea that increase in longevity and life expectancy of successive generations of older adults must be always dealt with concern<sup>(1)</sup>.

Functional capacity is directly associated with older adults' potential to independently decide and act in their activities of daily living. Assessments on functional capacity allow learning the profile of older adults, which will contribute to the establishment of practices to delay or prevent disabilities<sup>(38)</sup>.

One cohort study carried out in Denmark with nonagenarians born in 1905 and 1915 suggests that long-lived older adults may live up to more advanced ages with a good overall functioning<sup>(25)</sup>.

Individuals with good education levels are less likely to be exposed to health-related risk factors and submitted to poor work

conditions. A high education level contributes to the access to information, health-related changes in life style, especially with regard to its promotion and following of guidelines for better quality of life<sup>(45)</sup>. This positively affects functional capacity.

### Study limitations

This cross-sectional study presented limitations, such as data obtained from a specific period of time and sample size, not allowing generalizations for this population; however, it allowed the promotion of reflections on future practices.

### Contributions to the nursing, healthcare, or public policy areas

The present study presented as contributions the promotion of a discussion on the functional capacity of long-lived older adults, specifically those from Amazonas, since this is a pioneering study on the theme in this region and may support further studies, thus allowing a particular approach and care for the older adults of the region.

### CONCLUSION

The worldwide and Brazilian aging process leads to the emergence of several challenges to provide comprehensive care for the elderly. Therefore, identifying health conditions of the long-lived older adults, which is an age group that stands out in old age, is of utmost importance for interventions directed to meet the demands of this population and promote a better confrontation of physical-functional losses in this age group.

The results of the present study also showed the prevalence of modified independence, in spite of the advanced age of the elderly in the sample, which suggests that reflection on the adoption of health promotion and disability prevention measures in the future may be a strategy for improving quality of life, as well as reducing costs for the Brazilian Unified Health System, older adults, and families who are directly involved by dependence.

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