The influence of sociodemographic and epidemiological characteristics on the functional capacity of elderly residents in the city of Ubá, Minas Gerais

Influência das características sociodemográficas e epidemiológicas na capacidade funcional de idosos residentes em Ubá, Minas Gerais

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Abstract

Objective: The aim of this study was to identify the functional capacity of elderly individuals and its determinants. **Methods:** A cross-sectional, population-based study was conducted with a sample of 397 elderly residents in the urban area of the city of Ubá, Minas Gerais. A semi-structured, pre-tested questionnaire was applied as an interview in order to assess the sociodemographic, economic and health characteristics of elderly individuals. The functional capacity was assessed by means of the scale of basic and instrumental activities of daily living. The associations between functional capacity and socioeconomic, demographic and epidemiological characteristics were investigated. Data were analyzed with the softwares Epi Info version 6.0 and SigmaStat. A significance level of 0.05 was considered. For statistical analysis, frequency distribution and measures of association (odds ratio) were performed between the functional capacity and the socioeconomic, demographic and epidemiological variables. Multiple logistic regression analysis was conducted. **Results:** The impaired functional capacity was related to self-referred deteriorated health conditions, falls, female gender, widowhood, more advanced age, low educational level and income, and retirement from the job market. **Conclusion:** The lack of integral health care for the elderly, especially those without financial resources, can contribute negatively to worsened health conditions, especially functional capacity.

Key words: Functional capacity; elderly; health; chronic illness.

Resumo

Objetivo: O objetivo deste trabalho foi conhecer a capacidade funcional de idosos e seus determinantes. **Métodos:** Foi realizado um estudo transversal de base populacional com amostra de 397 idosos residentes na zona urbana da cidade de Ubá, Minas Gerais. Foi aplicado um questionário semiestruturado e pré-testado em forma de entrevista para avaliar as características sociodemográficas, econômicas e de saúde dos idosos. A capacidade funcional foi avaliada por meio da escala de atividades de vida diária básica e instrumental. Investigou-se a associação entre a capacidade funcional e as características socioeconômicas, demográficas e epidemiológicas. Os dados foram analisados nos programas Epi info, Versão 6.0 e Sigma. Considerou-se o nível de significância de 0,05. Para análise estatística, realizou-se a distribuição de frequência, medidas de associação (*Odds Ratio*) entre a capacidade funcional e as variáveis socioeconômicas, demográficas e epidemiológicas e análise de regressão logística múltipla. **Resultados:** O comprometimento da capacidade funcional está relacionado a piores condições de saúde autorreferidas, às quedas, ao sexo feminino, à viúvez, a idosos mais velhos, à baixa escolaridade e à baixa renda e a não estar ativo no mercado de trabalho. **Conclusão:** Ações de atenção integral à saúde do idoso precisam ser efetivadas, aliando o incentivo à pesquisa às ações planejadas e direcionadas para melhorar as condições de saúde e qualidade de vida deste grupo.

Palavras-chave: capacidade funcional; idoso; saúde; doenças crônicas.

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Introduction ∷∷

The rapid change in Brazil's demographic and epidemiological profiles has created the need for studies on the health of the elderly population. According to the data from the Instituto Brasileiro de Geografia e Estatística (IBGE)[1], Brazil stands out in demographic terms because of the high growth rates of the elderly population, which is projected to reach almost 30 million individuals by 2025. Consequently, the total prevalence of chronic diseases will increase as they are more frequent in this age group[2].

The aging process causes changes and weakening that gradually deteriorate functional capacity. The onset, manifestation and progression of these changes vary from one individual to another[3]. Functional capacity can be defined as the potential that elderly individuals have to make decisions and act independently in everyday life[4]. In contrast, functional disability is usually measured through the report of difficulty or need of help in performing activities of daily living (ADLs)[5]. The basic activities of daily living (BADLs) are essential activities for self-care, and the instrumental activities of daily living (IADLs) are more complex activities which are necessary for independent adaptation to the environment[6].

In this context, the information generated by the assessment of functional capacity reveals the profile of elderly individuals with the use of a simple and helpful instrument that can aid the selection of health promotion strategies to retard and prevent disabilities[7,8], adding years of life with quality and dignity to this group. From the public health point of view, functional capacity emerges as a new and more adequate concept to operationalize the elderly health care. In this sense, prevention, care and rehabilitation for the improvement or, at least, maintenance of functional capacity are crucial to the quality of life of the elderly individuals[9,10]. Therefore, the purpose of the present study was to understand the functional capacity of elderly individuals and its relation to the socioeconomic and demographic characteristics and self-referred health conditions.

Methods ∷∷

A cross-sectional, population-based study was developed, involving elderly individuals aged 60 or above from the urban area of the city of Ubá, Minas Gerais. The sample size was calculated according to the number of elderly individuals in the city, the prevalence of functional disability of 30, error equal to 5%, and confidence interval of 95%. The final sample was composed of 397 elderly individuals.

The selection of the participants was done by draw and systematized through a list of names of elderly individuals vaccinated in the last National Vaccination Campaign, held on April 30th 2004, which reached 95% of the city. The interviews were set up over the phone (of the elderly individuals, caregivers, relatives) using the number on the previously cited list. If the drawn individual did not consent to take part in the study, the next number on the list was contacted, and if the individual agreed to participate, a home appointment was arranged. It is worth noting that the data collection at the participant's place of residence brings more reliability to the information.

A semi-structured, pre-tested questionnaire was applied as an interview to assess the sociodemographic, economic and health characteristics of the elderly individuals. It consisted of the following variables: age in years; gender; marital status; level of schooling; type of residence (own or other); living arrangements (multigenerational, living with spouse, living with children only, living with other relatives); income in minimum wages; profession (current or retired); occupational status (retired/pensioner, employed, other). The self-referred health status was also assessed through the following indicators: health perception (excellent, good, fair or poor) and health compared to peers (better, same and worse); report of illness; visual and hearing acuity (excellent, good, poor or very poor); hospitalization and medical appointment in the last three months; falls in the last three months; use of medication; practice of physical activity and health insurance.

None of the elderly individuals were excluded from the present study. When one of them was unable to answer the interview questions, the information was provided by the caregiver. Thus, other respondents were used if the relatives and/or caregivers reported hearing and cognitive impairments and aphasia.

To assess functional capacity, a self-perception scale of ADL performance was used. This instrument was developed by Andreotti and Okuma[11] and consists of 40 items involving BADLs and IADLs. Scores range from 0 to 160, with 0 to 31 being considered "very low"; from 32 to 64, "low"; from 65 to 97, "medium"; from 98 to 130, "high" and from 131 to 160, "very high". After calculating the sum of the points for each item, it is possible to classify the level of functional capacity.

The collected data were analyzed on Epi info version 6.0 and Sigma. The significance level was set at 0.05. For the statistical analysis, the frequency distribution and measures of association (odds ratio) were performed to verify the association between the functional capacity and the socioeconomic, demographic and epidemiological variables. For the continuous variables, the median and quartile were used for the application of the referred test). The variables that showed a statistically

Table 1. Sociodemographic characteristics of elderly residents in Ubá. Minas Gerais. 2005

Variables	n	%
Age groups		
60-69	166	41.9
70-79	163	41.0
80 +	68	17.1
Gender		
Female	237	59.7
Male	160	40.3
Marital status		
Married	237	59.7
Widower/widow	128	32.2
Separated/divorced	14	3.5
Single	18	4.6
Level of schooling		
Illiterate	95	24.0
1-4 years	272	68.5
5-8 years	14	3.5
9-11 years	11	2.8
12 +	5	1.2
Living arrangements		
Multi-generational	127	32.0
Living with spouse	84	21.2
Living alone	36	9.1
Living with a child	133	33.5
Living with other relatives	17	4.2
Per capita income		
0 ⊣ 250	195	49.0
250 ⊣ 500	170	42.8
500 ⊣ 750	21	5.2
750 ⊣ 1000	6	1.6
1000 +	5	1.4

significant association with the functional capacity (p=0.20) were included in the subsequent multivariate analysis and in the multiple logistic regression analysis.

Before the start of the study, an informed consent form containing the ethical aspects of the research was given and explained to the elderly participants or his/her caregiver. The present study was approved by the Human Research Ethics Committee of Universidade Federal de Viçosa (UFV) on November 12th, 2004.

Results ∷∴

The studied population was aged 60 to 99 years (SD=8.8), with 71.5 and 70 years being the mean and the median, respectively, with a predominance of the female gender (59.7%). Most of the participants were married (59.7%), had less than four years of schooling (92.5%) and lived with their children or other relatives (Table 1). Regarding the occupational status,

most of the participants were retirees and pensioners (89.5%) and, among these, 11.2% were men working in the informal (untaxed) sector and only 4.6% of the women were working.

Concerning the self-referred health conditions, it was observed that 33.5% of the participants perceived their health to be "good", and 66.5%, fair and poor. When asked to compare their health to the health of their peers, 53.0% considered it equal. Impaired visual acuity was reported by 64.4% of the participants, and 23.2% reported impairment in hearing acuity. Because of health conditions reported by the family, a respondent was required for 12.8% of the sample. Among the elderly individuals, 17.1% reported a fall in the last three months, and 62.0% were sedentary. High blood pressure was the most prevalent morbidity (62.7%), followed by back problems (40.3%) and cardiovascular disease (32.3%). Ninety percent of the sample displayed at least one chronic illness, and 100% used medication.

The analysis of the scores in the self-perception scale of ADL performance showed that 20.2% of the participants were in the first three levels of classification (very low, low and medium) and were dependent in at least one ADL (Table 2). Classification as high and very high was observed in 79.8% of the participants. Some type of functional limitation was observed in 44.6% of the participants, and total disability in 2.0% (n=8) of them.

In the quartile classification of the functional capacity of the elderly participants, by gender, 30% of the women and 16% of the men were below the Q_1 (<106 points). The men received higher scores, with 36.2% above the Q_4 and scores equal to or greater than 146 points (Table 3). When the measures of association were calculated, it was observed that the women aged above the median, widowed, illiterate, living alone, with low income, sedentary and retired from the job market were the most like to have impaired functional capacity (Table 4). When the association was considered according to age group, it was observed that functional capacity impairment increases with age. The elderly individuals aged 70 to 79 years were 7.3 times more likely (95% CI: 3.6-14.9) to have functional impairment (OR:7.3; 95% CI: 3.6-14.9) compared to the elderly individuals aged 60 to 69 years, and the elderly individuals aged 80 years or more were 3.5 times more likely (95% CI: 3.5-14.6) to have functional impairment than those aged 70 to 79 years.

Regarding health indicators, the report of falls, the use of medication, and deteriorated self-referred chronic conditions had a statistically significant relationship with the impairment of functional capacity (Table 5). After adjusting the OR, the variables sedentary lifestyle, sequelae from stroke, retirement from the job market and a previous history of falls maintained the statistically significant association with the decrease in functional capacity (Table 6).

Table 2 - Level of functional capacity* according to age group in elderly residents of Ubá, MG. 2004

Age Group	Very low		Low		Medium		High		Very high		Total	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
60-69	4	2.4	4	2.4	14	8.4	33	19.8	111	67.0	166	41.8
70-79	2	1.2	3	1.8	17	10.4	52	32.0	89	54.6	163	41.1
80 +	2	3.0	14	20.5	20	29.4	16	23.5	16	23.5	68	17.1
Total	8	2.0	21	5.2	51	13.0	101	25.4	216	54.4	397	100

* Andreotti and Okuma, 1999 classification.

Table 3. Classification of functional capacity in elderly residents of Ubá, MG, 2004

Score	Gender		Total n (%)
	Female* n (%)	Male** n (%)	
106	71 (30.0)	26 (16.2)	97 (24.4)
106-136	58 (24.4)	38 (24.0)	96 (24.2)
136-146	62 (6.1)	38 (24.0)	100 (25.2)
>=146	46 (19.4)	58 (36.2)	104 (26.2)
Total	237 (59.7)	160 (40.3)	397 (100)

*n=237; **n=160.

Discussion ⣀

The results from the present study suggest that functional capacity is a multifactorial condition. It relates to an inter-action of demographic, social, economical, epidemiological and behavioral factors. The functional capacity of elderly individuals has been described by other authors who found results[5,11-13] akin to those from the present study. For example, a study conducted in southern Brazil[13] with a similar sample found a prevalence of 52.3% for total independence in ADL performance. In São Paulo, a population-based study found that 53% of the elderly individuals reported total autonomy in ADLs[5]. Another population-based study, developed in the urban area of Belo Horizonte, found a higher prevalence of independence when compared to the previously cited studies[14]. However, the latter assessed only the BADLs, which are less complex and easier to perform by most elderly individuals. It is important to consider the limitations when comparing studies with similar results because of the different proto-cols that were used and the social and cultural differences between the studied groups. A more systematic and detailed description of the instruments used to evaluate elderly indi-viduals will be helpful for decision-making on the assessment of functional capacity[2].

The association between poor functional capacity and the female gender, found in the present study, corroborates the findings of other studies[13-15]. Women represent the majority of elderly individuals and have a higher life expectancy, but also more impairments or a greater loss of functional capacity. Some hypotheses have been suggested to explain this difference: the

Table 4 - Sociodemographic and economic characteristics associated with impairment of functional capacity in elderly residents of Ubá, MG, 2004

Characteristics	Odds Ratio 95% CI	Value of p
Female Gender	2.5 (1.4-4.2)	<0.0001
Age > 70 years	2.8 (1.7-4.6)	<0.0001
Deceased spouse	1.9 (1.2- 3.1)	<0.05
Illiteracy	2.8 (1.7-4.8)	<0.0001
Living alone	0.3 (0.1-0.9)	<0.005
Per capita income < 250.00	2.7 (1.3-5.5)	<0.05
Retirement	3.8 (1.7-9.0)	<0.05

OR=Odds ratio.

Table 5 - Health indicators associated with impaired functional capacity in elderly residents of Ubá, MG, 2004

	Odds Ratio (95% CI)	p value
Falls (in the last three months)	3.3 (1.9-6.0)	<0.0001
Use of medication	2.2 (1.34-3.8)	<0.05
Diseases		
High blood pressure	2.4 (1.4-4.2)	<0.05
Cardiovascular disease	2.6 (1.6-4.3)	<0.0001
Sequelae from stroke	10.3 (4.8-22.5)	<0.0001
Self-referred health		
Poor or very poor self-referred health condition	10.8 (6.0-23.1)	<0.0001
Deteriorated health condition	5.5 (3.3-8.9)	<0.0001
Poor vision or blindness	2.9 (1.5-5.6)	<0.0001

Table 6 - Odds ratio (OR) for functional capacity adjusted by the variables sedentary lifestyle, stroke, work and falls, Ubá, Minas Gerais, 2004

Variables	N	Crude OR 95% CI	Adjusted OR	Adjusted OR 95% CI
Sedentary	214	17.6	19.5	6.64-57.71
Stroke	42	10.3	15.3	5.76-40.47
Work*	29	3.8	2.6	1.14-6.23
Falls	69	3.3	2.2	1.17-4.31

*Retirement from the job market.

higher prevalence of debilitating, non-fatal conditions among women, e.g. osteoporosis, osteoarthritis and depression, and a better ability in women to report a greater number of health conditions compared to men of the same age group[16].

Some studies have shown a strong association between functional capacity and age[13,14,16]. A study conducted with elderly individuals aged 65 years or more found that the best functional capacity was associated with younger age and better socioeconomic level[16]. Other studies have shown that, among elderly individuals, functional disability increases progressively with age[13-17]. Illiterate elderly individuals and those with a per capita income below 250 reais were more likely to have a poorer functional capacity. Thus, the socioeconomic level of this group seems to have a strong influence on health conditions, especially functional capacity. Brazilian studies based on the data from the National Household Sample Survey (PNAD), have shown that the functional capacity of elderly individuals is strongly influenced by the per-capita household income[14]. In 2002, 43% of the elderly population had a family income below the minimum wage[18].

When the marital status was considered, it was observed that widowhood had an influence on the decline of functional capacity. Widowhood, for the elderly individuals, may lead to isolation and less concern about health and may have a negative impact on functional capacity. The loss of a relative may negatively affect health as will leaving the job market due to retirement or illness[17].

The variable "living alone" was a protection factor for the impairment of functional capacity, showing that an elderly individual that is able to live alone is independent and autonomous. Living alone is not a problem in and of itself, as it can be an option or possible condition. It can be a consequence of better functional capacity and of a lesser need for familiar supervision. However, living alone does bring risks and can be the cause of some health problems, especially due the lack of family supervision.

In the studied population, living with children and other generations was frequent, however there was no statistically significant association with the reduction in functional capacity. This situation can represent a protective factor for the elderly individual. Given the cross-sectional design of this study, it was not possible to determine whether these living arrangements occur because the elderly individual needs help or because the children depend on the parent financially[19]. According to IBGE data, in 2002, 12.1% of Brazilian elderly individuals lived alone, 24.8% lived with their children or other relatives, 24.9% lived with their spouse only, and 37.9% lived with their spouse and children or other relatives[20]. A study developed in Viçosa, Minas Gerais, found that 68.9% of the elderly individuals lived in multigenerational households (23% with three generations and 45.9% with two generations) and 10.9% lived alone[21].

The results showed a greater participation of male elderly individuals in the job market. Most of them still held a prominent role in the family, whether by contributing to household expenses or providing other kinds of support. In 2002, 77.7% of Brazilians were retirees or pensioners, 21% of which still had a paid profession (mostly informal), 62.4% were the head of the household and the spouses represented about 22%[20]. More than a social and cultural option, these conditions were a survival strategy.

Regarding self-referred health, there was an association between the more pessimistic answers and functional decline, corroborating the findings of other studies[22,23]. The self-perception of health status is a predictor of functional disability[22] and reflects an integrated perception of the individual, which includes the biological, social and psychosocial dimensions[24]. The present study did not include a mental or psychological assessment to evaluate the individual's ability to answer the questionnaires. When the families or caregivers reported the presence of aphasia, hearing or cognitive impairments, another respondent was used. The analysis of the results of the 1998 and 2003 National Household Sample Survey (PNAD) showed that the use of other respondents did not modify the distribution of health perception among the elderly individuals[25].

Reports of "poor" or "very poor" vision were found in 23.5% and 9% of the studied individuals, respectively, and was associated to a decrease in functional capacity. These impairments have been cited by other studies on elderly individuals[12,26]. A full and effective geriatric assessment is imperative because it guides the aid services and allows more adequate clinical intervention. Hearing and visual impairments are often considered normal conditions among elderly individuals and do not receive adequate attention. The elderly population displays greater frailty and a greater likelihood of health complications and, consequently, it is proportionally the most frequent user of health services and medication[9]. However, there is growing concern about the medicalization of society, especially among elderly individuals, because the adverse effects of medications are greater in this group[27].

The report of falls in the last three months was an indicator of poorer functional capacity, being more frequent among women. Falls, which are present in near 70% of the accidents involving elderly individuals, can mean a significant loss of functional capacity[28]. A study on the causes and consequences of falls in elderly residents of Ribeirão Preto, São Paulo, found a higher frequency of falls among women, and deteriorated functional capacity was cited as a consequence of these falls. The same authors suggest that loss of bone and muscle mass may be the factors responsible for the decline in functional capacity, which shall be investigated in future studies[29].

Sequelae from stroke had a strong association with decline in functional capacity. A population-based study involving elderly individuals from the metropolitan area of Belo Horizonte confirms these findings: stroke was the health condition most

strongly associated with severe functional disability. The association between sequelae and the presence of functional incapacity was already expected because having sequelae from any pathology or accident is closely related to functional disability[23].

Some of the factors that were associated with the decline in functional capacity can be modified, e.g. a sedentary lifestyle because the presence of a chronic disease often does not prevent the practice of physical exercise or the adoption of a more active lifestyle. The lack of public spaces and policies that encourage physical activity for elderly individuals is a reality in Brazil. Regular physical activity is considered a method of maintaining physical fitness in elderly individuals and has been cited in the literature as a resource to mitigate and reverse loss of muscle mass[29].

The multiple logistic regression suggests that the variables "fall" and "work (retirement from the job market)" acted as independent risk factors for the impairment of functional capacity. These data should be interpreted with caution as this is a prevalence study in which cause and consequence are unclear. The variables stroke and sedentary lifestyle acted as confounders after the multiple logistic regression. Stroke patients have greater impairment of movement and are often unable to exercise. The presence of chronic conditions associated with other factors, such as low socioeconomic and educational level, were common variables in the study, and may influence the results. The lack of access to gyms or adequate spaces for the practice of exercise is a reality in Brazil, making the sedentary lifestyle even more frequent in the studied group.

Concerning the report of morbidities, the decline in functional capacity was associated with high blood pressure, cardiovascular disease and sequelae from stroke. The major cause of death in this group was cardiovascular disease. The prevalence of high blood pressure among elderly individuals is even higher, reaching 65% and 80% in women above 75 years of age. The tendency for increased blood pressure with age, above the normal values, cannot be considered physiological or natural and must receive treatment[30].

The assessment of the functional capacity of elderly individuals is a fundamental tool to obtain a full clinical assessment in the area of rehabilitation and gerontology, with the aim of prevention, more adequate treatment of the various diseases or complications, functional recovery and the definition of strategies for elderly care.

Conclusions :::.

The present study suggests that the decline in functional capacity is related to an interaction of multidimensional factors, which include aspects related to physical and mental health, behavioral aspects and social health determinants, i.e. income, schooling, occupation, work, etc. Thus, the focus of elderly care must be on the overall improvement of health conditions and quality of life. Integral health care actions for the elderly must be implemented, combining research incentives and programs aimed at improving the health conditions and quality of life of this age group.

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