RESEARCH

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Functional disability and socioeconomic and demographic factors in elderly

Incapacidade funcional e fatores socioeconômicos e demográficos associados em idosos

Incapacidad funcional y factores socioeconómicos y demográficos asociados en ancianos

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ABSTRACT

Objective: to verify the prevalence of functional disability and associated socioeconomic and demographic factors in elderly patients of Campina Grande/PB. **Method:** cross-sectional study with elderly patients of both genders. The variables associated with functional disability were assessed using Poisson regression. **Results:** A total of 420 elderly patients were included (68.1% women). The highest prevalence of functional disability were found among females aged 80 or older, white, widowed, of economic classes D/E , who lived alone, with frequency of contacts of up to 224 people and diversity of contacts of up to 14 people. After multivariate analysis, statistically significant association was observed between functional disability, gender and age group. **Conclusion:** the association between functional disability gender and age group is shown to be an important guidance for health interventions since it will allow health services to plan actions aiming to improve, maintain or restore the functional capacity of the elderly population.
Key words: Aged; Frail Elderly; Socioeconomic Factors.

RESUMO

Objetivo: verificar a incapacidade funcional e os fatores socioeconômicos e demográficos associados entre idosos de Campina Grande (PB). **Método:** estudo domiciliar, transversal, realizado com idosos de ambos os sexos. As variáveis associadas à incapacidade funcional foram verificadas por meio de regressão de Poisson. **Resultados:** participaram 420 idosos (68,1% mulheres). As maiores prevalências de incapacidade funcional foram verificadas entre idosos do sexo feminino, com 80 anos ou mais, de cor branca, viúvos, pertencentes às classes D/E, que moravam sozinhos, com frequência de contatos de até 224 pessoas, com diversidade de contatos de até 14 pessoas. Observou-se associação estatisticamente significativa, após análise multivariada, entre incapacidade funcional e sexo e grupo etário. **Conclusão:** a associação entre incapacidade funcional, sexo e grupo etário mostra-se como um importante norteador de ações em saúde, uma vez que possibilitará que os serviços de saúde tracem ações que visem aprimorar, manter ou recuperar a capacidade funcional do idoso.
Descritores Idoso; Idoso Fragilizado; Fatores Socioeconômicos.

RESUMEN

Objetivo: verificar la incapacidad funcional (IF) y los factores socioeconómicos y demográficos asociados entre ancianos de Campina Grande/PB. **Método:** estudio domiciliario, transversal, realizado con ancianos de ambos sexos. Las variables asociadas a la IF fueron verificadas por medio de regresión de Poisson. **Resultados:** participaron 420 ancianos (68,1% mujeres). Las mayores prevalencias de IF fueron verificadas entre ancianos de sexo femenino, con 80 años o más, de color blanco, viudos, pertenecientes a las clases D/E, que vivian solos, con frecuencia de contactos de hasta 224 personas, con diversidad de contactos de hasta 14 personas. Se observó asociación estadísticamente significativa, después del análisis multivariado, entre IF y sexo y grupo etario. **Conclusión:** la asociación entre IF y sexo y grupo etario se muestra como un importante norteador de acciones en salud, ya que posibilitará que los servicios de salud tracen acciones que apunten mejorar, mantener o recuperar la capacidad funcional del anciano.
Palabras clave: Anciano; Anciano Frágil; Factores Socioeconómicos.

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INTRODUCTION

Population aging has been observed both in developed countries and also in developing countries, given the growth in the number and proportion of elderly[1], due to the decline in fertility and mortality rates[2]. In Brazil, it is possible to observe that in a short period of time, there was a rapid increase in the number and proportion of elderly. In 1991 the elderly population was 10.7 million (7.3% of the population) and in 2010 exceeded 20 million people (10.7% of the population)[3].

This increase causes several changes that affect the individual[4], family, society[5] and the health system[6], because aging causes biopsychosocial transformations in the elderly[7]. In the biological field, these changes are related to the progressive physiological decline, which affects the major systems and organs of the senses[4]. Moreover, during aging there is decreased muscle strength, flexibility and balance[8].

These physiological changes, along with non-communicable diseases have been identified as the main cause of functional disabilities[9], whose prevalence has been shown to be high among the elderly. Population study conducted in the metropolitan region of Belo Horizonte, Minas Gerais state, found that 16.2% of the elderly had some activity that could not be performed independently, thus, revealing some degree of functional disability[9]. In another study, conducted in the city of Campina Grande, Paraiba state, it was observed that 34% of the elderly had mild degree of disability and 8% severe degree of disability for Basic Activities of Daily Living[10].

This is alarming, considering that disability has significant influence on the quality of life of the elderly. In addition, it also presents as major consequences: hospitalization and increased mortality of the elderly[11]. Therefore, the assessment of functional disability, prevention and recovery and the preservation of functional capacity, are goals of the National Health Policy for the Elderly, which suggests conducting a comprehensive evaluation to ensure the quality of care to elderly[12].

Given its importance, studies have been conducted aiming to determine the prevalence and factors associated with functional disability among the elderly. These studies have shown that female elderly[13-14], with advanced age[9,11,14-15], white[14], widowed[16], with low education and income[14-15] and living with others[16] are more likely to develop disabilities over time, confirming the existence of a strong association between demographic and socioeconomic factors and functional disability[14,17].

Whereas some of these variables are modifiable risk factors for disabilities, it is necessary to understand what are the strength of these associations in order to delineate a prevention plan. Thus, the aim of this study was to evaluate the functional disability and socioeconomic and demographic factors associated with the elderly in Campina Grande, Paraiba.

METHOD

This is a cross-sectional study, domicile based, with primary data collection. The study included individuals registered in the Family Health Program in Campina Grande, aged 60 or more, of both genders. The elderly who had severe clinical weakness without therapeutic possibilities were excluded. Those who were absent from Campina Grande for longer than the duration of the field research in the coverage area of the Family Health Unit (FHU) in which they were registered were also excluded.

The sample was calculated by estimating a prevalence of outcomes of at least 25% with 95% confidence limit, assuming a 6% error. The sample was proportional to each Sanitary District of the city, composed of 420 elderly. In each FHU drawn, there was a survey of the number of registered elderly and proceeded to proportion randomly selection of elderly. A list with the names of all the elderly enrolled in each of the FHU was prepared. The number of elderly to be skipped to get to the next elderly in the list to be interviewed was defined as the ratio between the total number of registered elderly and the number of elderly to be interviewed in the FHU, thereby generating the number 5. Thus, after each selected elderly, four others were skipped on the list. The fifth elderly was selected, and so on, in order to obtain better distribution and ensuring that the entire list was contemplated.

Data collection was conducted from August 2009 to May 2010, in the elderly home for three pairs of interviewers, students of health care undergraduate courses trained by the coordinating professor of the research and by collaborating professors. A pilot study was conducted with 42 elderly (10% of the elderly to be interviewed), for possible methodological adjustments.

The socioeconomic and demographic data includes information about: gender (male, female), age group (60-69 years 70-79 years 80 and over), skin color (white, non-white), marital status (single, married, widowed, divorced), socioeconomic class (A/B, C, D/E), number of residents per household (single, 2, 3-5, 6 or more), contact frequency (> 224; up to 224) and diversity contacts (> 14; up to 14).

The socioeconomic status of each elderly was verified by using a questionnaire consisting of an "Economic Classification Criterion" the ABA/ANEP/ABIPEME, which consists of data on education level of the elderly and family possession items. Each information relates to a number of points that are summed generating a score, which in economic stratification scale corresponds to the class to which the elderly belongs. According to score the elderly were classified as belonging to class A/B (17 to 34 points), C (11 to 16 points) and D/E (0 to 10 points).

The contacts frequency of the elderly has been identified through contact frequency index (CFI) corresponding to the number of monthly contacts and aims to evaluate the degree to which the elderly are socially connected with others. This index was constructed based on questions related to the frequency of contact with children, siblings, other relatives and friends. The values were dichotomized in lower tertile and others.

Regarding the contacts diversity of the elderly the contacts diversity index (CPI), was used, which aims to assess the extent of social network and it was built from the same questions of the previous index, considering, however, the number of contacts with children, siblings, other relatives and friends. The values were dichotomized in lower tertile and others.

The dependent variable was functional disability assessed by the Barthel index, which consists in assessing the following basic activities of daily living: feeding, dressing, personal hygiene, putting orthopedic device (if applicable), sphincters control, use

of toilet, mobility (if wheelchair, use of the wheelchair), climbing stairs. For each activity there are three possible answers; I can do it alone, I can do it with someone's help, I cannot do it at all. Each answer has a specific score, which when added it is possible to reach a total value from 0 to 100 points, which corresponds to total dependence or total independence, respectively.

From the score the following classification was used[18]: independent (100 points), mild dependence (91-99 points), moderate dependence (61-90 points), severe dependence (21-60 points) and total dependence (0-20 points). For statistical purposes the elderly were classified as follows: functional disability (yes, no). They were considered functional disabled by the Barthel index with mild, moderate, severe dependence and those classified as independent were not considered disabled.

Statistical information were obtained using statistical application R (The R Foundation for Statistical Computing, Vienna, Austria). First, to verify the statistical association between the dependent variable and the independent variables using a bivariate analyses through the chi-square test, using the level of significance $\propto < 5\%$, with Yates correction when necessary. Next, we calculated the prevalence ratio (PR) with confidence intervals (95% CI) using Poisson regression with logarithmic link function, via Generalized Linear Models (GLM).

After bivariate analyses, all variables were included in the multivariate model. From the first model that included all variables, regardless of the value of p, the variables were removed one by one, considering the higher presented p value, until only the variables with p lower than 0.05 were left in the model.

RESULTS

The sample consists of 420 elderly (68.1% women). The elderly ages ranged between 60 and 104 years, mean 71.6 years (SD = 9.19).

Table 1 - Bivariate analyses regarding functional disability and socioeconomic and demographic factors associated, Campina Grande, Paraíba, Brazil, 2009-2010

Variables	n	Prevalence of functional disability (95% CI)	p value	PR (95% CI)
Gender			0.0004998	
Male	28	20.6 (19.6-60.7)		1
Female	116	40.8 (38.2-42.5)		1.50 (1.35-2.72)
Age group			0.0004998	
60-69 years	38	18.6 (17.4-19.1)		1
70-79 years	54	39.7 (37.6-41.2)		2.47 (1.33-3.67)
80 years or more	52	65.0 (64.7-66.1)		1.29 (1.21 – 2.40)
Skin color			0.1314	
White	79	38.3 (36.9-39.2)		1
Non-white	66	30.8 (28.3-32.1)		1.24 (0.95- 1.61)
Marital status			0.0004998	
Married	61	25.5 (24.1-26.8)		1
Single	09	33.3 (31.4-35.7)		1.77(1.43-2.36)
Widowed	68	52.3 (50.9-51.4)		1.49 (1.37-2.64)
Separated	06	25.0 (24.2-26.8)		1.02 (0.49-2.11)
Socioeconomic class			0.0009995	
A/B	47	26.6 (25.3-28.1)		1
C	71	37.0 (36.4-38.7)		2.72 (1.53-4.98)
D/E	27	52.9 (51.4-54.6)		0.50 (0.17-0.61)
Number of residents per household			0.3608	
Two	29	28.2 (26.8-29.3)		1
One	10	41.7 (39.1-42.7)		1.68 (1.38-3.19)
3-5	74	34.7 (33.2-35.7)		1.81 (1.57-3.16)
6 or more	31	39.2 (38.1-41.6)		0.72 (0.47-1.08)
Contacts frequency			0.02599	
> 224	85	30.6 (29.3-31.8)		1
Until 224	59	41.5 (40.2-42.9)		1.74 (1.57-3.96)
Contacts diversity			0.05548	
> 14	84	31.2 (29.8-32.5)		1
Until 14	62	41.1 (40.1-42.6)		0.76 (0.59-0.99)

Table 2 - Poisson regression models of variables associated with functional disability in the elderly, Campina Grande, Paraíba, Brazil, 2009-2010

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Skin color	0.987955						
Marital status	0.928269	0.91264					
Number of residents in the household	0.828393	0.81239	0.87754				
Contacts diversity	0.582110	0.57625	0.53659	0.61022			
Socioeconomic class	0.567217	0.58801	0.56355	0.59283	0.62658		
Contacts frequency	0.183135	0.16065	0.12942	0.26678	0.32408	0.293806	
Age group	0.003494	0.00292	0.00237	0.00383	0.00415	0.002271	0.001899
Gender	0.006062	0.00522	0.00171	0.00180	0.00202	0.000903	0.000864

Table 3 - Final result for functional disability and socioeconomic and demographic factors associated, Campina Grande, Paraíba, Brazil, 2009-2010

Variables	n	Crude PR	95% CI	Adjusted PR	95% CI
Gender					
Male	28	1		1	1
Female	116	1.95	1.30-2.93	1.99	1.33-2.99
Age group					
60-69 years	38	1		1	
70-79 years	54	1.88	1.26-2.81	1.89	1.26-2.82
80 years and over	52	3.14	2.10-4.70	3.19	2.13-4.77

Table 1 shows the values of the bivariate analyses of the association between functional disability and socioeconomic and demographic factors studied. It is observed a higher disability prevalence among female elderly (40.8%) who were 80 years or older (65.0%), white (38.3%), widowed (52 3%), belonging to socioeconomic class D/E (52.9%), living alone (41.7%) who presented contacts frequency of up to 224 people (41.5%) and contacts diversity up to 14 people (41.1%). Of the variables studied, gender (p=0.0004998), age group (p=0.0004998), marital status (p=0.0004998), socioeconomic status (p=0.0009995) and contacts frequency (p=0.02599) were significantly associated with functional disability.

Regarding gender, women had a prevalence of disability 1.5 times higher when compared to men. Elderly who were 70 to 79 years old showed prevalence of disability 2.47 times higher compared to elderly aged 60 to 69 years (Table 1).

Single elderly (PR=1.77, 95% CI 1.43 to 2.36) and widowed (PR=1.49, 95% CI 1.37 to 2.64) showed high prevalence of disabilities when compared to married. Regarding socioeconomic level, it was found that elderly belonging to the class C had higher prevalence (PR = 2.72, 95% CI 1.53 to 4.98) of disabilities when compared to the class A/B elderly (Table 1).

Regarding social support network, it was observed that elderly who had contact frequency up to 224 showed 1.74 increasing prevalence of presenting functional disability compared to elderly who often had contacts greater than 224 (Table 1).

Table 2 presents the results of the Poisson regression, in which, after multivariate analysis, only the variables gender and age group remained associated with functional disability.

Table 3 shows the final result, after adjustment of the variables associated with functional disability in the elderly. It is observed that in relation to gender, female subjects presented prevalence 1.99 times higher for disability when compared to males. Regarding age group, those aged 80 or older had a prevalence 3.19 times higher for disability when compared to the 60 to 69 years age group.

DISCUSSION

Functional disability is a major health problem in the elderly, as among its consequences is the inability to perform daily activities, significantly interfering in their quality of life[11].

Studies have been conducted in different countries aiming to determine the prevalence of disability among elderly[10-11,13,15,17,19].

It has been observed high prevalence of disability in the population, ranging from 20.1%[19] to 92.0%[15]. This prevalence is alarming because elderly who have functional disability are at increased risk for institutionalization, hospitalization and death[11].

In addition to verify the distribution in the population, studies have aimed to determine what are the factors associated with functional disability[11,14,20]. The relationship between functional disability and socioeconomic and demographic factors has been discussed by researchers in order to know the influence of these factors on the elderly functional disability[14,16,20].

In this study, the variables skin color, number of residents per household, contacts diversity were not statistically significant with functional disability. However, a study pointed to the association between disability for the variables skin color[14], number of residents per household[14,16] and social contact network[19].

Despite the lack of statistical significance in this study for these variables, it must be considered the high prevalence of disability among the elderly who live alone and who had diversity of up to 14 contacts, in view of the characteristic of being modifiable factor, therefore, interventions are possible.

Studies show that living alone can mean greater independence and health[14,16]. However, in this study, the highest prevalence of disability was found among the elderly who lived alone. It is possible that personal preferences or family absence[21] lead the elderly to live in single person households, even when they have disabilities.

Identifying the factors that led functionally disable elderly to live alone is of utmost importance, because from this, it is possible to draw a plan of care to protect the future of undesirable complications related to functional disability and the fact of living alone.

Regarding the contact diversity, the elderly of this study with diversity of up to 14 contacts had a higher prevalence of functional disability compared to those with greater diversity of contacts greater than 14. The contacts diversity is an important tool in assessing the extent of the elderly social network. A longitudinal study, conducted in Sao Paulo city, found that elderly who interact socially is protected against functional loss, however, it could not verify how this interaction influences the maintenance of functional capacity[22].

One way to maintain social interaction is the participation in elderly groups, where the elderly can build social and emotional relationships[23]. For this reason, these spaces should be valued and the elderly should be encouraged to attend them.

In this study, the highest functional disability were verified among women, which corroborates the findings from other studies with elderly[14,16,20]. A study conducted in the state of Minas Gerais found that 24.0% of women presented worse performance in activities of daily living, while men presented 4.7%[16].

The high prevalence of functional disability observed among women can be due to higher life expectancy than men[20] and increased incidence of non-fatal disabling conditions such as depression, fractures and osteoporosis[14,16]. These aspects contribute to greater female demand for health services. In addition, the fact that women present lower socioeconomic status than men could predispose them to a higher risk of functional disability[17]. Thus, specific interventions aimed for this group become necessary to ensure improvements in education and income of this population.

The prevalence of functional disability was higher among the elderly belonging to older age groups, which has also been observed in other studies with elderly[16-17]. A study conducted with data from the National Survey of Households Sample (PNAD) conducted in 2003 found that both men as women show prevalence of functional disability in the age group 80 years or more (30.2% and 48.4 %, respectively) it was higher than in age group of 70 to 79 years (20.9% and 35.3%, respectively)[17].

With advancing age, various physiological systems decline gradually, including the nervous and musculoskeletal systems, essential for carrying out certain activities[24]. Studies have shown that elderly individuals are more likely to limitations in Basic Activities of Daily Living (BADL)[13,16]. This fact has important implications for public health, since estimates that the elderly population will remain in growth and, in 2050, will represent 28.0% of the population[25]. The increasing proportion of elderly in all age groups will cause considerable impact on health services, especially if these elderly present functional disability[6].

Widowhood was, in this study, the category of marital status with the highest prevalence of functional disability, information that corroborates a study conducted in Mexico, where the authors found that 43.8% of elderly widows were functionally unable to perform BADL[13]. In Brazil, a study found similar results[16]. It is possible that the absence of partner lead to isolation and consequently lack of concern with health, which can increase the risk of functional disability[16].

Therefore, widowed elderly should receive specific attention in order to reduce the negative consequences that widowhood can produce. A study of elderly pointed out some mechanisms that can help those in widowhood, such as social inclusion, visiting neighbours and family members, participating in groups and religious devotion[26].

The elderly of this study belongs to the socioeconomic class D/E, showing higher prevalence of functional disability. Similar findings were observed in a study conducted with elderly in Santa Catarina[27]. These data draw attention, as the socioeconomic classes seems to have significant influence on health conditions, especially functional capacity[16]. Elderly with high socioeconomic class generally have better access to prevention, treatment and health rehabilitation services, implying lower prevalence of functional disability among them[27].

The association between low socioeconomic level and functional disability is worrisome because most people (43.8%) of the Brazilian elderly population present low financial conditions, living with up to one minimum wage per month[1]. This condition leads the elderly to rely on the public health service, as observed, in Brazil 79.2% of elderly rely exclusively on this

1 The minimum wage per month in Brazil corresponds to R$ 788,00 reais or U$ 245,36 American dollars according to the Central Bank of Brazil on July 22nd, 2015.

service.[28] Despite this demand, it has been observed that public health services are not prepared to meet the needs of the elderly, given the precariousness of investments to meet the specific needs of this population, the lack of adequate facilities and trained human resources[29].

Despite the existence of expansion policies in all health care levels, one can observe, among elderly, income-related inequalities in access to and use of health services. A study conducted in Sao Paulo found that elderly who had private health insurances, that is, they could pay for health care, used 57.0% more health services compared to elderly who did not have a private health insurance[30].

The elderly in this study who reported contact frequency of up to 224 people showed high prevalence of functional disability. The frequency of contacts relates to the social dynamics of the individual. Studies with elderly have found through other indicators, the association between social dynamics and functional disability[20,22]. A longitudinal study conducted in Sao Paulo found that the social dynamics resulting from the monthly relationship with friends protects functional loss[22].

Considering the importance of social dynamics for the prevention of functional disability in the elderly, evaluations are necessary. In the cases where this dynamic are poor or absent, it becomes important to identify the causes and, from there, plan actions to integrate the elderly in activities that could restore this social contact.

In this study, after modelling, the variables that remained significantly associated with functional disability were gender and age group. These variables are not modifiable, which makes the construction of preventive measures to ensure a free aging functional disability difficult. Given the difficulty of preventing disability among some of these elderly, the implementation of existing policies in order to extend the installation of disability is necessary, in order to reduce the degree of disability, if present, and prevent its progression.

Prevention strategies at all levels, need to be guided in monitoring the health conditions of the population and the factors associated with these conditions[6]. For this reason, it is suggested that the evaluation of functional disability become routine in elderly care, aiming at early diagnosis and identification of risk factors. Moreover, public policies should focus on reducing social inequality, education and income, and ensuring access to health services at all levels of care for men and women.

The present study has limitations related to the discussion of the results, given the difficulty of comparison with the findings of other studies, because of the variety of existing instruments and tests used to measure functional disability. In addition, in the literature there are no studies that used the variables frequency and diversity of contacts in association with functional disability.

CONCLUSION

The presence of functional disability in the elderly has become an important public health problem, given the impact they have on the life of the individual, the family and health services. Thus, health professionals should be able to identify functional disabilities as early as possible, as well as factors associated with them. The overall assessment of the elderly should be routine in health care, from primary care to the most complex levels of care.

The association between functional disability, gender and age group verified in this study is shown as an important guide for health actions that must be addressed mainly to elderly women and the oldest old, who are potentially more likely to develop disabilities. Moreover, it is necessary to identify the factors associated with these groups in order to provide elements for building measures aiming to improve, maintain or restore the functional capacity of the elderly as long as possible.

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