



Frailty syndrome related to disability in the elderly*

Síndrome de fragilidade relacionada à incapacidade funcional no idoso

Síndrome de fragilidad relacionada a la incapacidad funcional em el anciano

Jack Roberto Silva Fhon¹, Marina Aleixo Diniz², Kizie Conrado Leonardo³, Luciana Kusumota⁴, Vanderlei José Haas⁵, Rosalina Aparecida Partezani Rodrigues⁶

ABSTRACT

Objectives: To characterize the sociodemographic profile of the elderly, verify the level of fragility according to gender, functional independence and instrumental activities of daily living, and to correlate the dimensions of the *Functional Independence Measure* and *Instrumental Activities of Daily Living* with age, education, frailty and morbidities. **Methods:** A cross-sectional and observational study using a sample of 240 elderly living in Ribeirão Preto, São Paulo (Brazil). The collection period was November/2010 and February/2011. The questionnaires used were: sociodemographic, *Edmonton Frail Scale*, *Functional Independence Measure* and the *Instrumental Activities of Daily Living Scale* of Lawton and Brody. For analysis, we used descriptive statistics and the Student's t-test and Pearson's correlation. **Results:** Mean age was 73.5 years (± 8.4), 57.5% were married, 39.1% had some level of frailty. Among the frail elderly, 29.8% had minimal dependence/supervision, and 81.9% had partial dependence for instrumental activities of daily living. **Conclusion:** There was a greater dependence in activities for the frail elderly, and females had a higher prevalence of frailty.

Keywords: Health of the elderly; Geriatric nursing; Frail elderly

RESUMO

Objetivos: Caracterizar o perfil sociodemográfico de idosos, verificar os níveis de fragilidade segundo sexo, independência funcional e atividades instrumentais da vida diária e correlacionar as dimensões da Medida da Independência Funcional e Atividades Instrumentais da Vida Diária com idade, escolaridade, fragilidade e morbididades. **Métodos:** Estudo de natureza observacional e transversal utilizando amostra de 240 idosos que residiam em Ribeirão Preto, São Paulo. O período de coleta foi de novembro/2010 e fevereiro/2011. Os questionários: perfil sociodemográfico, Escala de Fragilidade de Edmonton, Medida da Independência Funcional e Escala de Lawton e Brody foram utilizados. Para análise, foram empregados a estatística descritiva e o teste t-student e Pearson. **Resultados:** A média de idade foi de 73,5 anos ($\pm 8,4$), 57,5% eram casados, 39,1% apresentaram algum nível de fragilidade. Entre os idosos frágeis, 29,8% tinham dependência mínima/supervisão, e 81,9% dependência parcial para as atividades instrumentais da vida diária. **Conclusão:** Evidenciou-se maior dependência para as atividades nos idosos frágeis, sendo o sexo feminino com maior prevalência de fragilidade.

Descritores: Saúde do idoso; Enfermagem geriátrica; Idoso fragilizado

RESUMEN

Objetivos: Caracterizar el perfil sociodemográfico de ancianos, verificar los niveles de fragilidad según sexo, independencia funcional y actividades instrumentales de la vida diaria y correlacionar las dimensiones de la Medida de la Independencia Funcional y Actividades Instrumentales de la Vida Diaria con edad, escolaridad, fragilidad y morbilidades. **Métodos:** Estudio de naturaleza observacional y transversal realizado con una muestra constituida por 240 ancianos que residían en Ribeirão Preto, Sao Paulo. El período de recolección de datos fue de noviembre/2010 y febrero/2011. Fueron utilizados los cuestionarios: perfil sociodemográfico, Escala de Fragilidad de Edmonton, Medida de la Independencia Funcional y Escala de Lawton y Brody. Para El análisis, fueron empleados la estadística descriptiva y la prueba t-student y Pearson. **Resultados:** El promedio de edad fue de 73,5 años ($\pm 8,4$), 57,5% eran casados, 39,1% presentaron algún nivel de fragilidad. Entre los ancianos frágiles, 29,8% tenían dependencia mínima/supervisión, y el 81,9% dependencia parcial para las actividades instrumentales de la vida diaria. **Conclusión:** Se evidenció mayor dependencia para las actividades en los ancianos frágiles, siendo el sexo femenino con mayor prevalencia de fragilidad.

Descriptorios: Salud del anciano; Enfermería geriátrica; Anciano frágil

*Article extracted from the master's dissertation "A prevalência de quedas em idosos e a sua relação com a fragilidade e a capacidade funcional" (Prevalence of falling among the elderly and its relationship with frailty and functional capacity) for the Post-Graduation Program in Fundamental Nursing of the School of Nursing, Ribeirão Preto, University of São Paulo – USP – Ribeirão Preto (SP), Brazil.

¹ Post-graduate (Master's) Student. Post-Graduation Program in Fundamental Nursing of the School of Nursing, Ribeirão Preto, University of São Paulo – USP – Ribeirão Preto (SP), Brazil.

² Post-graduate Student (Doctoral). Post-Graduation Program in Fundamental Nursing of the School of Nursing, Ribeirão Preto, University of São Paulo – USP – Ribeirão Preto (SP), Brazil.

³ Academic Staff member of the School of Nursing in Ribeirão Preto, University of São Paulo – USP – Ribeirão Preto (SP), Brazil.

⁴ Doctor. Professor of the Department of General and Specialized Nursing, School of Nursing in Ribeirão Preto, University of São Paulo – USP – Ribeirão Preto (SP), Brazil.

⁵ Doctor. Professor of the "University Federal do Triângulo Mineiro" – Uberaba (MG), Brazil.

⁶ Full Professor. Department of General and Specialized Nursing, School of Nursing in Ribeirão Preto, University of São Paulo – USP – Ribeirão Preto (SP), Brazil.

INTRODUCTION

The World Health Organization conceptualizes an individual's aging as "a physiological process that begins with conception and causes changes, characteristic of the species, throughout the entire life cycle", in addition to considering elderly, those aged 60 years or older in developing countries, and 65 years or older in developed countries⁽¹⁾.

In view of this, some concepts for evaluating aging are fundamental, among them frailty and functional incapacity. Frailty is considered an inevitable consequence of aging, which is related to the different processes of non transmittable chronic diseases, thus characterizing a multidimensional syndrome that increases the elderly person's vulnerability, resulting in the reduction of physiological reserves and increase in functional decline associated with multiple physical changes⁽²⁻⁶⁾.

There are two groups of international investigations that have developed the research proposal on frailty, one of them developed in the United States of America, which points out the numerous markers that have been proposed for physical frailty. These include measurement of mobility and incapacity, and the phenotype operationalized by five indicators, among them: Weight loss, exhaustion, reduced grip force of the dominant hand; low level of physical activity, slow down measured walking speed indicated in seconds⁽⁷⁾.

The research Group in Canada, *Canadian Initiative on Frailty and Aging* (CIF-A), acting in collaboration with European, countries, Israel and Japan in 2002, conducted researches establishing the following domains: histories, concepts and definitions; biologic bases; social bases; prevalence; natural history and risk factors; impact; identification; prevention and therapeutic conduct; environment and technology^(8,9).

Another concept to be evaluated in the elderly is functional capacity, which may be defined as the physical and mental skills necessary for living an independent and autonomous life in order to develop daily life activities ranging from the basic through to the more complex type, without requiring help, thus providing better quality of life⁽¹⁰⁻¹³⁾. When this condition is not developed, then functional incapacity arises.

Considering that when the increase in longevity is associated with frailty and functional incapacity in the elderly, they are more exposed to risks, thus one understands the need to investigate the subject, so that health actions may be planned, and offer the frail elderly a space to live under better conditions of life.

Based on the foregoing, the aims of this study were to characterize the sociodemographic profile of the elderly, verify the levels of frailty, according to gender, functional independence and instrumental daily life

activities and correlate the dimensions of the Functional Independence Measure (FIM) and Instrumental Activities of Daily Living (IADL) with age, schooling, frailty and self-reported morbidities.

METHODS

This is a research of an observational, cross-sectional nature, conducted with elderly persons, resident in the municipality of Ribeirão Preto – São Paulo, which has 539 sectors, and the Bonfim Paulista Sector with 11, totaling 650 sectors used by the IBGE to determine the censor sectors of the city.

Participants in the study were elderly persons residing in the municipality of Ribeirão Preto-SP, who were 60 years of age or older, of both genders.

The sample was obtained by two stage conglomerate sampling; in the first stage the censor sector was considered the sampling unit, and in the second stage, the individual of over 60 years of age. Thus, the decision was to obtain a sample of 240 elderly persons, which guaranteed a maximum error of 6.3% with 95% of probability. To arrive at a sample of 240, the plan was to draw 20 from the 650 existent censor sectors by lottery.

In the second stage, going through the streets on the basis of a random start, homes were visited until 12 elderly persons were found, who met the criteria for inclusion in the sample.

Data were collected between November 2010 and February 2011, and the team of interviewers consisted of a coordinator and two researcher teams, composed of post- and undergraduate students who had been previously trained. Duration of the interview was a mean of 40 minutes, with use of the following questionnaires:

For information on the sociodemographic profile of the elderly, the following variables were selected: gender, age, marital status, family income, scholarity, and family arrangement.

Frailty was measured with the Edmonton Frail Scale (EFS) validated for the Portuguese language, and was composed of nine domains, distributed into 11 items with scores from 0 to 17 points; categorizing the elderly into no frailty, apparently vulnerable, slight frailty, moderate frailty, and severe frailty. The higher the score, the higher was the level of frailty⁽¹⁴⁾.

In the functional independence evaluation, the questionnaires of the Functional Independence Measure (FIM) and Lawton and Brody Scale were used. A FIM was validated for the Portuguese language; evaluating the performance in carrying out 18 tasks; each of these activities received a score from 0 (complete dependence) to 7 (complete independence); the minimum score of 18 points was equivalent to complete dependence, 19-60 points maximum/moderate dependence, 61-103 points

minimum dependence and supervision, and 104-126 points changed or complete independence⁽¹⁵⁾.

The Lawton and Brody Scale, which evaluates the Instrumental Activities of Daily Living (IADL) was adapted to the Brazilian context; with a minimum score of 5 points for the highest level of dependence, to 21 which corresponds to complete independence⁽¹⁶⁾.

For data analysis an electronic spreadsheet was constructed in the software program *EXCEL*[®], in which the data were organized in double digitization and validated by comparison of the digitizations. After validation, the spreadsheet was imported to the *SPSS*[®] 11.5 application, in which the statistical analyses were performed.

For analyses of the quantitative variables, the central tendency measures (mean, median) and dispersion (standard deviation) were used; for the categorical variables, the comparison of means test (Student's-*t* Test) and Pearson's correlation test were used, at a level of significance of 0.05.

The research project was approved by the Research Ethics Committee of the School of Nursing, Ribeirão Preto-USP (Process No. 1169/2010); in accordance with the National Health Council Resolution No.196/96, which determines the guidelines and regulatory rules for research involving human beings.

The Term of Free and Informed Consent was signed by the elderly who participated in the study.

RESULTS

Of the 240 elderly persons interviewed, the majority were women, 25% were in the 80 years or over age group, with a mean age of 73.5 years and age-range from 60 to 94 years. As regards marital status, the majority were married (57.5%) and 48.8% had from 1 to 4 years of schooling. With respect to home arrangement, 29.8% lived with their spouse (Table 1).

Table 1. Sociodemographic Profile of the elderly, Ribeirão Preto-SP, 2011

Profile of the elderly	Male		Female		Total	
	No.	%	No.	%	No.	%
Mean 73.5 (± 8.4) Minimum age: 60; Maximum age: 94						
Age Group (years)						
60 – 64	9	10.1	34	22.5	43	17.9
65 – 69	22	24.7	22	14.6	44	18.3
70 – 74	16	18.0	31	20.5	31	19.6
75 – 79	17	19.1	29	19.2	46	19.2
80 or older	25	28.1	35	23.2	60	25.0
Marital Status						
Single	2	2.2	12	7.9	14	5.8
Married	71	79.8	67	44.4	138	57.5
Divorced	2	2.2	8	5.3	10	4.2
Separated			2	1.3	2	0.8
Widowed	13	14.6	62	41.1	75	31.3
Educational level (years)						
illiterate	12	13.5	23	15.2	35	14.6
1 to 4	44	49.4	73	48.3	117	48.8
5 to 8	12	13.5	30	19.9	42	17.5
9 to 11	8	9.0	11	7.3	19	7.9
12 or more	13	14.6	14	9.3	27	11.3
Home Arrangements						
Alone	6	6.7	27	17.9	33	13.8
Only with spouse	37	41.6	33	21.8	70	29.2
Spouse and children	18	20.2	19	12.6	37	15.4
Spouse, children, son-in-law or daughter-in-law	1	1.2	4	2.6	5	2.1
Only with children	3	3.4	11	7.3	14	5.8
Trigenerational Arrangements	4	4.4	17	11.3	21	8.8
Only with grandchildren	1	1.2	2	1.3	3	1.3
Others	19	21.3	38	25.2	57	23.8

When verifying the prevalence of frailty among the elderly, according to the EFS of the CIF-A⁽¹⁴⁾, 36.3% did not present frailty; 24.6% were apparently vulnerable; and 39.1% had different levels of frailty, with 18.3% presenting mild frailty; 11.3% moderate frailty and 9.6% severe frailty. In addition it was found that elderly women presented higher levels of slight frailty (70.5%), moderate (66.7%) and severe (65.2%), according to the data shown in Table 2.

Table 2. Frailty in the elderly who live at home, according to gender. Ribeirão Preto-SP, 2011

Frailty	Male		Female		Total	
	No.	%	No.	%	No.	%
Not frail	33	37.9	54	62.1	87	36.3
Apparently vulnerable	26	44.1	33	55.9	59	24.6
Mild Frailty	13	29.5	31	70.5	44	18.3
Moderate Frailty	9	33.3	18	66.7	27	11.3
Severe Frailty	8	34.8	15	65.2	23	9.6

For functional capacity evaluation using FIM and the Lawton and Brody Scale (IADL), it must be pointed out that the frailty stages (mild, moderate and severe) were grouped into a category, namely frailty.

According to the results obtained by means of the FIM, it was observed that among the elderly who presented frailty, 3.2% were completely dependent; 5.3% presented maximum/moderate dependence and 29.8% minimum dependence/supervision. Among the elderly that presented no frailty, 98.9% were considered changed/completely independent, according to the data shown in Table 3.

When verifying the levels of frailty and IADL, 81.9% of the frail elderly presented partial dependence; and 64.4% of those who did not present frailty, were considered independent (Table 4).

It was observed that the lowest scores for Overall FIM and IADL showed negative coefficients of correlation; that is to say, the higher the age, frailty score and number of morbidities, the lower would be the overall FIM and IADL scores would be ($p < 0.01$), according to the data shown in Table 5.

Table 3. Classification of frailty according to the Functional Independence Measure of the elderly. Ribeirão Preto-SP, 2011

Frailty	Complete Dependence		Maximum/moderate Dependence		Minimum Dependence / supervision		Changed / complete Independence	
	No.	%	No.	%	No.	%	No.	%
Do not present frailty	0	0	0	0	1	1.1	86	98.9
Apparently vulnerable	0	0	0	0	5	8.5	54	91.5
Frailty	3	3.2	5	5.3	28	29.8	58	61.7

Table 4. Classification of frailty according to the Instrumental Activities of Daily Living of the elderly. Ribeirão Preto, 2011

Frailty	Complete Dependence		Partial Dependence		Independence	
	No.	%	No.	%	No.	%
Do not present frailty					31	64.4
Apparently vulnerable					40	32.2
Frailty	6	6.4	77	81.9	11	11.7

Table 5. Coefficient of correlation of the Functional Independence of Measure and IADL Scale according to age, schooling, frailty and morbidities of the elderly. Ribeirão Preto-SP, 2011

Coefficient of Correlation	Cognitive MFI	Motor MFI	Overall MFI	IDLA
Age	-0.419*	-0.460*	-0.473*	-0.523*
Schooling	0.224	0.165	0.192	0.212
Frailty	-0.504*	-0.590*	-0.495*	-0.669*
Morbidities	-0.094*	-0.223*	-0.160*	-0.116*

* $p < 0,01$

DISCUSSION

It was observed that there was a predominance of women and of the age group of 80 years or older, data similar to those of different international researches⁽³⁾ and in Brazil⁽¹⁷⁻¹⁹⁾.

At the beginning of the twentieth century, both children and youngsters, particularly women, did not have access to basic education, because of the formation of heterogeneous classes as regards age and gender, since they had to work on the land and care for the home.⁽²⁰⁾

At present, in Brazil there are few studies about the frailty; in many cases due to the absence of appropriate tools and professionals qualified to identify the frail elderly person.

Aging with frailty is characterized by vulnerability and low capacity to bear stress factors, resulting in high susceptibility and greater degree of frailty, probability of becoming ill, and consequently an elevated number of hospitalizations that lead to greater dependence^(21,22).

The research conducted used the EFS instrument with the aim of analyzing elderly persons' access to the health services offered by the Family Health Strategy in Embu das Artes -SP and the relationship between functional capacity and frailty in 128 elderly persons aged 60 years and over, and found that 30.1% of the elderly were frail⁽¹⁹⁾.

Studies using the phenotype of frailty⁽⁷⁾ identified 20% of frail and 46.7% pre-frail elderly persons, concluding that the frail elderly presented greater incapacity to perform routine activities and prevalence of the fear of falling⁽²³⁾.

Frailty is related to the female gender rather than the male, as can be observed in other researches in Peru⁽³⁾ and Brazil⁽¹⁴⁾. In a North American study, the authors identified a prevalence of 6.9% frailty in the elderly, with the majority being women (68.5%)⁽⁷⁾.

The Pan American Health Organization estimates that 10% of the world population suffer from and have deficiencies, in addition to the fact that half of these persons present physical and/or functional difficulties⁽²⁴⁾.

In research conducted in the United States of America, the authors identified 59.7% of frail elderly persons with difficulty in performing the IADL and 27% in basic daily life activities, a result showing higher values than the data found in this research with regard to IADL. The researchers suggested that the onset of the frailty, it affects the more complex activities and a lower proportion of the simpler routine activities⁽⁷⁾.

Moreover, it should be pointed out that women presented two times higher dependence when compared with men⁽²⁵⁻²⁶⁾.

An international research with the aim of associating frailty with the incidence of functional capacity, reported that 4.3% of frail and 45.7% of pre-frail elderly were found in a sample of 1645 elderly persons in a community in a period of 10 years. The authors concluded that the frailty leads to impairment of elderly persons' ability to perform routine activities, making them dependent⁽⁶⁾.

In a study with elderly persons resident in Peru, the authors described the frequency of the frailty in 246 elderly persons aged 60 years and over; reporting 7.7% with frailty and 64.6% pre-frail persons. They concluded that there was significant association between frailty and increase in age, which is greater in the female gender⁽³⁾.

CONCLUSION

Among the elderly researched, the predominance of frail elderly was evident, and the majority were women, with a higher level of dependence shown by the FIM and IADL. In addition it was observed that the higher the levels of frailty, age and number of morbidities, the higher would be the level of dependence of the elderly.

At present, there is no consensus about the definition of frailty, which makes it difficult to identify frail persons, however, it is known that the impact on the elderly person's life affects his/her quality of life, functional independence and autonomy itself.

At present, to evaluate and identify the frailty and functional incapacity in an elderly person is a problem for health professionals who work in the implementation of specific programs with the purpose of minimizing the effects of frailty and its consequences.

REFERENCES

1. Organização Mundial da Saúde. Planificación y organización de los servicios geriátricos. Informe de un comité de expertos. Ginebra: OMS; 1974 (Serie de Informes Técnicos, 548).
2. Bonardi G, Souza VB, Moraes JF. Incapacidade funcional e idosos: um desafio para os profissionais de saúde. *Sci Med*. 2007;17(3):138-9.
3. Varela-Pinedo L, Ortiz-Saavedra PJ. Síndrome de fragilidad en adultos mayores de la comunidad de Lima Metropolitana. *Rev Soc Peru Med Interna*. 2008; 21(1):11-5.
4. Fairhall N, Aggar C, Kurlle SE, Sherrington C, Lord S, Lockwood K, et al. Frailty Intervention Trial (FIT). *BMC Geriatr*. 2008;8:27.
5. Nowak A, Hubbard RE. Falls and frailty: lessons from complex systems. *J R Soc Med*. 2009;102(3):98-102.
6. Al Snih S, Graham JE, Ray LA, Samper-Ternent R, Markides KS, Ottenbacher KJ. Frailty and incidence of activities of daily living disability among older Mexican Americans. *J Rehabil Med*. 2009; 41(11): 892-7.
7. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, et al. Frailty in older adults: evidence for a phenotype. *J Gerontol A Biol Sci Med Sci*. 2001;56 (3):M146-56.
8. Rolfson DB, Majumdar SR, Tsuyuki RT, Tahir A, Rockwood K. Validity and reliability of the Edmonton Frail Scale. *Age*

- Ageing. 2006; 35(5):526-9.
9. Bergman H, Béland F, Karunanathan S, Hummel S, Hogan D, Wolfson C. Développement d'un cadre de travail pour comprendre et étudier la fragilité. *Gerontol Soc.* 2004;109:15-29.
 10. Farinasso AL, Marques S, Rodrigues RA, Haas VJ. Capacidade funcional e morbidades referidas de idosos em uma área de abrangência do PSF. *Rev Gaúch Enferm.* 2006; 27(1):45-52.
 11. Alves LC, Leimann BC, Vasconcelos ME, Carvalho MS, Vasconcelos AG, da Fonseca TC, et al. [The effect of chronic diseases on functional status of the elderly living in the city of São Paulo, Brazil]. *Cad Saude Publica.* 2007; 23(8): 1924-30. Portuguese
 12. Pelegrin AK, Araújo JA, Costa LC, Cyrillo RM, Rosset I. Idosos em uma instituição de longa permanência de Ribeirão Preto: níveis de capacidade funcional. *Arq Ciênc Saúde.* 2008; 15(4):182-8.
 13. Camara FM, Gerez AG, Miranda ML, Velardi M. [Elderly functional capacity: types of assessment and trends]. *Acta Fisiátrica.* 2008; 15 (4): 249-56. Portuguese
 14. Fabrício-Wehbe SC, Schiaveto FV, Vendrusculo TR, Haas VJ, Dantas RA, Rodrigues RA. Cross-cultural adaptation and validity of the "Edmonton Frail Scale – EFS" in a Brazilian elderly sample. *Rev Latinoam Enferm.* 2009;17(6):1043-9.
 15. Riberto M, Miyazaki MH, Jucá SS, Sakamoto H, Pinto PP, Battistella LR. [Validation of the Brazilian version of Functional Independence Measure]. *Acta Fisiatr.* 2004; 11(2):72-6. Portuguese
 16. dos Santos RL, Virtuoso Júnior JS. Confiabilidade da versão brasileira da escala de atividades instrumentais da vida diária. *Rev Bras Promoç Saúde.* 2008; 21(4):290–6.
 17. Rodrigues RA, Scudeller PG, Pedrazzi EC, Schiavetto FV, Lange C. Morbidity and interference in seniors functional ability. *Acta Paul Enferm.* 2008; 21(4): 643-8.
 18. Nunes MC, Ribeiro RC, Rosado LE, Franceschini SC. The influence of sociodemographic and epidemiological characteristics on the functional capacity of elderly residents in the city of Ubá, Minas Gerais. *Rev Bras Fisioter.* 2009;13(5):376-82.
 19. Fernandes HC. O acesso de saúde e sua relação com a capacidade funcional e a fragilidade em idosos atendidos pela estratégia saúde da família [dissertação]. São Paulo: Universidade de São Paulo, Escola de Enfermagem; 2010.
 20. Barretto ES, Mitrulis E. Trajetória e desafios dos ciclos escolares no país. *Estud Av.* 2001; 15 (42):103-40.
 21. Carvalhais Neto N. Envelhecimento bem-sucedido e envelhecimento com fragilidade. In: Ramos LR, Toniolo Neto J. *Guias de medicina ambulatorial e hospitalar: UNIFESP – Escola Paulista de Medicina.* São Paulo: Manole; 2005. p. 9-25.
 22. Veras RP, Caldas CP, Coelho FD, Sanchez MA. Promovendo a saúde e prevenindo a dependência: identificando indicadores de fragilidade em idosos independentes. *Rev Bras Geriatr Gerontol.* 2007; 10(3):355:70.
 23. Silva SL, Vieira RA, Arantes P, Dias RC. Avaliação de fragilidade, funcionalidade e medo de cair em idosos atendidos em um serviço ambulatorial de geriatria e gerontologia. *Fisioter Pesqui.* 2009; 16 (2):120-5.
 24. Organização Panamericana De La Salud. Informe de la reunión bienal de la red Carmen, Nassau [Internet]. 2007 [cited 2011 Feb 21]. Available from: www.paho.org/Spanish/AD/DPC/NC/cmn-mtg-2007.pdf
 25. Rosa TE, Benicio MH, Latorre MR, Ramos LR. [Determinant factors of functional status among the elderly]. *Rev Saude Publica.* 2003; 37(1): 40-8.
 26. Santos KA, Koszuoski R, Dias-da-Costa JS, Pattusi MP. [Factors associated with functional incapacity among the elderly in Guatambu, Santa Catarina State, Brazil]. *Cad Saude Publica.* 2007; 23(11):2781-8. Portuguese.