Original article

Disability related to basic and instrumental activities of daily living: a population-based study with elderly in Pelotas, Rio Grande do Sul, 2014*

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Abstract

Objective: to estimate the prevalence of disability related to basic and instrumental activities of daily living and its association with socioeconomic, demographic, behavioral and health characteristics in the elderly. **Methods**: population-based cross-sectional study in Pelotas, Brazil, in 2014; Katz and Lawton scales were used to assess the outcomes using Poisson regression. **Results**: the study included 1.451 elderly individuals; the prevalence of disability for basic and instrumental activities was 36.1% and 34.0%, respectively, and 18.1% in both; higher prevalence of functional disability were observed in individuals ≥80 years (PR=3.01; 95%CI 2.17;4.18), not working (PR=2.02; 95%CI 1.13;3.60) and those with multiple morbidities (PR=3.28; 95%CI 1.38;7.79); and lower in individuals with ≥12 years of schooling (PR=0.40; 95%CI 0.24;0.66), and that were physically active (PR=0.42; 95%CI 0.21;0.82). **Conclusion**: functional disability was associated to individuals older than 80, with less schooling years and affected by multiple morbidities.

Keywords: Aged; Activities of Daily Living; Disabled Persons; Cross-Sectional Studies.

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Introduction

Since the decade of 1940, the low- and middle-income countries have presented a progressive decline in mortality rates and, since the decade of 1960, in fertility rates.[1] These two factors, associated, promote the demographic basis for the aging population, similar to what occurs, albeit on a smaller scale, in high-income countries.[1] Parallel to this process, there is an increase in the prevalence and incidence of functional disability in the elderly.[2,3,4]

The functional disability is defined by the individual's difficulty or need of help for performing basic or more complex tasks in their day-to-day, essential for an independent life.[5] In its research, functional abilities of the individual are verified, by means of the basic activities of daily living (ADLs) or instrumental activities of daily living (IADLs). In the Basic ADLs, are evaluated the basic behaviors and usual care, such as the ability to feed, bathe and dress themselves, while on the IADLs, more complex tasks and related to autonomy and social participation, such as the ability to make purchases, answering the telephone and using means of transport, are evaluated.[5]

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Some of the consequences of functional disability include limiting the autonomy of the elderly in the performance of daily activities, reduced quality of life and increased risk of dependence, institutionalization, and even premature death.[6] Individual factors have been identified as being responsible for this process, and previous studies show that functional decline is related to demographic factors, such as age, sex, skin color and marital status, or socioeconomic factors, such as education and income, as well as to the adverse conditions of health, mainly the chronic morbidities.[2,3,4] Despite the emerging amount of studies on the subject, the continuous monitoring of the prevalence of functional disability in the elderly and their determinants becomes more important as, with the aging of the population, this condition and its complications tend to increase, as long as the demand for health care services.[7]

The objective of this study was to estimate the prevalence of disability relating to basic and instrumental activities of daily living and its association with socioeconomic, demographic, behavioral and health characteristics.

Methods

This is a population-based cross-sectional study, with data collected from the Masters Consortium for Valuation of Elderly Care - "COMO VAI?" (How are you?) study , whose participants were individuals with 60 years of age or older, not institutionalized, residing in the urban area of the municipality of Pelotas, Rio Grande do Sul, Brazil, in 2014.

The sampling process was performed in double stage: census tracts (i) and (ii) households. The primary sampling unit consisted of census tracts of the municipality. Initially, were identified 488 urban sectors of Pelotas according to the Population Census of 2010, conducted by the Brazilian Institute of Geography and Statistics (IBGE).[8] Among their data were identified 113,023 occupied households in the urban area of the municipality and has a population of 46,099 individuals aged 60 years or more. Thus, we expected to find 0.4 elderly per household, 12 per census tracts, implying the inclusion of 133 sectors. The 488 sectors were listed according to their average income and 133 systematically selected. Then, it was performed a systematic selection of households. All individuals with 60 or more years of age, residents in the selected households, were eligible to participate in this study.

The number of elderly people required to meet the objectives of the study was estimated at 1,340. This calculation of sample size, we used a prevalence of 30% for instrumental activities and design effect of 1.36, as found in the study by Del Duca et al ,[4] with a confidence level of 95%, precision of 3 percentage points and increase of 10% for losses and refusals. In addition to the sample size calculation, power calculation was performed for all investigated associations, a posteriori. With the exception of the variable economic class, all variables have reached a minimum power of 80% for the associations have been investigated.

The study was conducted by students of the Masters in Epidemiology of the Federal University of Pelotas (UFPel).

The interviews were conducted in the residence of the elderly, by previously trained interviewers. It was applied an instrument with questions about socioeconomic, demographic, behavioral and health characteristics. The questionnaire could be answered with the help, or totally by the caregiver or responsible when the elderly presented difficulty to respond. The elderly were weighed using Tanita® scale, model UM-080, with a maximum capacity of 150 kilograms and precision of 100 grams; the height was estimated from predictive equations proposed by Chumlea and Gulo,[9] using the knee height, measured with child anthropometer in wood of the Indaiá® brand, with a range of 100 centimeters, and graduation in millimeters numbered every centimeter. This form of measure is considered more appropriate for this population.[10]

The functional disability,the dependent variable in this study was assessed with reference to two scales: (i) Katz scale[11] was used to evaluate the inability to Basic ADLs (bathing, dressing, going to the bathroom, lying down and getting out of bed/chair, eating, urinating and/ or evacuating); and (ii) scale of Lawton,[12] inability to IADLs (using phone, using means of transportation, purchasing, tidying the house, washing clothes, taking care of the money and taking medications). In each of the two areas, 'functional disability' was defined as the need (partial or total) for help to perform at least one activity. The inability to both activities was defined as the need for help in at least one Basic ADLs and IADLs.

The independent variables were:

- sex (male, female);
- age (in years: 60-69; 70-79; 80 or more);
- marital status (married, single, divorced, widowed);
- economic classification, according to the Brazilian Association of Research Companies - ABEP for the year 2010[13] (A/B, C, D/E);
- current job (yes, no);
- education level (in complete years: none; 1-3; 4-7; 8-11; 12 or more);
- self-reported consumption of any dose of alcohol in the last 30 days (yes, no); and
- physical activity in leisure-time, as measured by the International Physical Activity Questionnaire (IPAQ)[14] (inactive; active - considered active elderly who performed 150 minutes or more of activities per week);
- body mass index (BMI), calculated by the ratio between weight and squared height (underweight <18.5kg/m²; appropriate weight: 18.5 to 24,9Kg/m²; and overweight: >24,9Kg/m²);[10]
- presence of self-reported morbidities, including hypertension, diabetes mellitus, heart problems, heart failure, emphysema, ischemia or stroke, arthritis or rheumatism, Parkinson disease, loss of function of the kidneys, epilepsy or seizures, osteoporosis, glaucoma and cancer (none; 1; 2 or more).

The analyzes were performed using Stata software version 12.1 (Stata Corp, College Station, TX, USA), using the command survey, due the complex process of sampling of the study. Initially, it was described the prevalence of functional disability to Basic ADLs and IADLs and other characteristics of the sample. Then, it was described the prevalence of independence and the need for partial and total assistance for each basic and instrumental activity that composes the scales of Katz[11] and Lawton.[12] In order to assess the association between functional disability and the exposure variables, crude and adjusted analysis for confounding factors, by means of Poisson regression were performed. It was used a conceptual model of analysis by levels,[15] being that on the 1st level were included the socioeconomic and demographic variables, on the 2nd level the variable referring to the current job, at 3rd level behavioral variables and on the 4th level health variables. The variables were kept in the model independently of the p-value obtained in the crude analysis. The statistical association was assessed by Wald tests for heterogeneity and linear trend. A significance level of 5% was adopted.

The study "COMO VAI?" was approved by the Research Ethics Committee of the Faculty of Health Sciences, of the UFPel under the Opinion No. 472,357 - Certificate of presentation for Ethics Appreciation (CAAE) No. 24538513.1.0000.5317 - on 28 November 2013. The consent of the participants or their guardians has been obtained in writing, upon signature.

Results

Of the 1,844 elderly individuals identified to participate in the study, 1,451 were interviewed, with 78.7% of response rate. The losses and refusals were higher in females (61.0%), although consistent with the distribution of sex in the sample (63.0%; 95%CI; 60.9;65.1) and in the age range from 60 to 69 years (59.0%), with difference in relation to the sample

(52.3%; 95%CI; 49.1;55.4). For the scale of disability in basic activities, complete information was obtained for 1,440, 1,269 elderly people to instrumental activities and 1,268 for both activities.

The majority of the sample was composed of women (63.0%), aged between 60 and 69 years (52.3%), married (52.7%), belonging to the economic class C (52.5%), with four to seven years of study (31.0%) and who were not working (80.4%). More than half of elderly people (71.8%) were overweight, 66.2% were affected by two or more morbidities, 81.5% were insufficiently active and 21.2% had consumed alcoholic beverages in the last 30 days (Table 1).

The prevalence of disability to Basic ADLs and IADLs was 36.1% (95%CI; 33.5;38.8) and 34.0% (95%CI; 30.8;37.2), respectively, being that 18.1% (95%CI; 15.9;20.4) showed an inability to both activities (Table 1). In relation to basic activities, the higher frequency of dependence was for, urination and/or evacuation (32.4%), followed by dressing up (8.8%) and taking a bath (7.0%), while for the instrumental activities the largest proportion was to make purchases (20.7%), tidying the house (18.7%) and using means of transport (16.7%) (Table 2).

After adjustment, women (PR=1.43; 95% CI; 1.21;1.69), individuals of 80 years or more (PR=1.73; 95% CI; 1.44;2.07) and with two or more morbidities (PR=2.24; 95% CI; 1.48;3.40) had a higher prevalence of Basic ADLs, while elderly individuals with 12 or more years of study (PR=0.53; 95% CI; 0.40;0.70) and active in leisure (PR=0.68; 95% CI; 0.52;0.90) had lower prevalence of disability (Table 3).

As regards the IADLs, after adjustment for possible confounding factors, the elderly with 80 years or more (PR=2.39; 95% CI; 1.95;2.93), widowed (PR=1.61; 95% CI; 1.32;1.97), those that were not working (PR=1.42; 95% CI;1.07;1.88) and with two or more morbidities (PR=2.04; 95% CI; 1.30;3.20) showed higher prevalence of disability. Those with 12 or more years of study had lower prevalence of inability to IADLs (PR=0.42; 95% CI; 0.31;0.59), compared to those with no schooling (Table 4).

Considering the presence of disability to basic and instrumental activities simultaneously, after adjustment, the women (PR=1.46; 95% CI; 1.06;1.99), elderly people with 80 years or more (PR=3.01; 95% CI; 2.17;4.18), widowed (PR=1.52; 95% CI; 1.13;2.04), those that were not working (PR=2.02; 95% CI; 1.13;3.60) and with two or more morbidities (PR=3.28; 95% CI; 1.38;7.79) presented the highest prevalence. Elderly individuals with 12 or more years of schooling (PR=0.40; 95% CI; 0.24;0.66) and active in leisure (PR=0.42; 95% CI; 0.21;0.82) had the lowest prevalence (Table 5).

Discussion

Among elderly residents in the urban area of the municipality of Pelotas, RS, approximately one-third presented inability to Basic ADLs or IADLs, being this condition more frequent in women, those over the age of 80 years, with less schooling years and with higher number of morbidities.

The prevalence of functional disability in elderly people in Brazil, according to a meta-analysis of studies conducted in all regions of the country published in 2016, ranged from 12.3 to 94.1% for men and 14.9 to 84.6% for women.[16] The comparability of the findings of this study with others is limited, mainly due to the fact of multiple instruments for assessing the functional capacity in elderly patients and, in some situations, even for one and the same instrument, different cutoff points.[5] Furthermore, the lack of standardization in the classification of dependence may also complicate the interpretation and comparison of studies.

The same outcome was investigated in a study that included the same instrument and also conducted in the same municipality of Pelotas, in the biennium 2007-2008;[4] however, lower prevalence were observed: 26.8% (95% CI; 23.0%;30.8%) to Basic ADLs, 28.8% (95% CI; 24.5%;33.1%) to IADLs and 16.0% for both areas. In view of the fact that the studies were performed at the same municipality and that have very similar sample characteristics, these results suggest an increase in the prevalence of functional disability to basic ADLs among the elderly of Pelotas, while for the instrumental domain, the confidence intervals overlap. The prevalence of total aid for activities was higher in the previous study, with the exception of urination activity and/or evacuation.[4] Although the samples were similar regarding demographic variables, including age and socioeconomic variables, the study cited[4] did not asses the presence of morbidities in elderly people, so that the differences found may be a reflection of a more sick sample in that study.[17]

Table 1 – Description of the sample of elderly (N=1,448) in accordance with the outcome and exposure variables, Pelotas, Rio Grande do Sul, 2014

Variables	N	%[a]	95% CI[b]
1° Level			
Sex			
Male	536	37.0	34.9;39.1
Female	912	63.0	60.9;65.1
Age (in full years)			
60-69	755	52.3	49.1;55.4
70-79	459	31.8	29.2;34.4
≥80	230	15.9	13.8;18.0
Marital status			
Married	762	52.7	49.4;56.0
Single	91	6.3	4.8;7.7
Separated	134	9.3	7.8;10.7
Widowed	458	31.7	29.1;34.3
Economic class (ABEP)			
A/ B	482	35.2	30.3;40.1
C	719	52.5	47.9;57.1
D-E	168	12.3	10.1;14.6
Schooling (in full years)			
None	194	13.6	11.2;16.0
1-3	337	23.4	20.7;26.2
4-7	445	31.0	28.0;34.0
8-11	143	10.0	8.3;11.6
≥12	316	22.0	17.5;26.5
2° Level			
Current Job			
No	1,083	80.4	78.2;82.7
Yes	263	19.6	17.3;21.8
3° Level			
Alcohol consumption			
No	1,138	78.8	76.3;81.2
Yes	307	21.2	18.8;26.7
Physical activity in leisure (IPAQ)[c]			
Inactive	823	81.5	79.3;83.6
Active (≥150 minutes/week)	547	18.5	16.4;20.7
4° Level			
Nutritional status (kg/m²)			
Underweight	25	1.8	1.1;2.5
Appropriate weight	360	26.4	24.0;29.0
Overweight or obesity	979	71.8	69.3;74.2

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Table 1 – Description of the sample of elderly (n=1,448) in accordance with the outcome and exposure variables, of Pelotas, Rio Grande do Sul, 2014

Variables	N	%[a]	95% CI[b]
Morbidities (multimorbities)			
None	155	10.7	9.2;12.2
1	332	23.1	20.7;25.4
≥2	952	66.2	63.7;68.7
Outcomes			
Inability to Basic ADLs[d]			
No	920	63.9	61.4;66.5
Yes	520	36.1	33.5;38.8
Inability to IADLs[e]			
No	837	66.0	62.8;69.2
Yes	432	34.0	30.8;37.2
Inability to Basic ADLs[d] and IADLs[e]			
No	1,038	81.9	79.6;84.1
Yes	230	18.1	15.9;20.4

a) Adjusted for the effect of experimental.
b) 95%CI: 95% confidence interval.
c) IPAQ: International Physical Activity Questionnaire.
d) Basic ADLs: basic activities of daily living.
e) IADLs: instrumental activities of daily living.

Table 2 – Description of the degree of dependence of the elderly to basic and instrumental activities of daily living, Pelotas, Rio Grande do Sul, 2014

Activity	Independents		Partial Assistance		Total aid	
	n	%	n	%	N	%
Basic ADLs[a] (n=1,440)						
Bathing	1,339	93.0	84	5.8	17	1.2
Dressing up	1,314	91.2	80	5.6	46	3.2
Going to the bathroom	1,378	95.7	52	3.6	10	0.7
Lying down and getting out of bed/ chair	1,377	95.6	48	3.3	15	1.0
Eating	1,407	97.7	24	1.7	9	0.6
Urinating/ evacuating[b]	974	67.6	412	28.6	54	3.8
IADLs[c] (n=1,269)						
Using the phone	1,165	91.8	68	5.4	36	2.8
Using means of transportation	1,057	83.3	169	13.3	43	3.4
Purchasing	1,006	79.3	205	16.2	58	4.6
Tidying the house	1,032	81.3	143	11.3	94	7.4
Washing clothes	1,105	87.1	139	11.0	25	2.0
Taking care of money	1,148	90.5	100	7.9	21	1.6
Taking medications	1,130	89.0	91	7.2	48	3.8

a) Basic ADLs: basic activities of daily living.
b) Urinate/evacuate: independent – secure, feces and urine; partial – not holding one of the two; total – not holding the two.
c) IADLs: instrumental activities of daily living.

The highest prevalence of disability for the basic activity of urination and/or evacuation and instrumental activity of purchasing, found in the present study are similar to those described in the 2009 study cited above, also conducted in Pelotas.[4] Especially regarding the disability for the basic activity of urinating and/or evacuating, the finding is worrying: can lead the elderly to social isolation, in addition leading to changes in their self-esteem and self-image, reducing their quality of life.[18]

The prevalence of disability relating to basic activities was greater among women, while for the instrumental activities, no prevalence differences between the sexes were found. A study that analyzed data from 57 countries of the World Health Survey, carried out by the World Health Organization (WHO) between 2002 and 2004, revealed a higher prevalence of debilitating conditions among women, among them the functional disability.[19] One possible explanation for this finding could be related to the fact that, women show higher prevalence of non-fatal debilitating conditions (for example, a higher prevalence of osteoporosis, arthritis and depression) and therefore have wider survival, becoming more vulnerable to the outcomes in question.[20] Or even the fact that, women, in general, are more inactive than men,[21] restricted mainly to domestic activities and practices with a focus on health, while men are more encouraged to practice sports at leisure and with a focus on strength exercises.[22] Elderly women in this study showed a higher prevalence of physical inactivity when compared to men (data not shown), while being active was associated with a lower prevalence of functional disability.

The increase in age is related to higher levels of functional disability,[4] confirms this study, which showed a higher prevalence of functional disability as age advances, both for basic activities and for instrumental activities. The physiological changes resulting from the aging process, such as the decline of the aerobic capacity and the skeletal musculature, related to the decline of functional capacity, accentuate with advancing age.[23] Moreover, the higher prevalence of chronic conditions among the elderly can contribute to an increase in the disability in this population.[17,23] In the case of cross-sectional design, we cannot discard the possibility of reverse causality bias. The presence of multimorbities may hinder the achievement of Basic ADLs and IADLs, as well as elderly, while disabled, are more prone to develop some diseases. In this study, schooling was determinant of functional disability, observing that to increase the years of study, decreased the prevalence of outcomes in any of the domains evaluated, which is consistent with the literature.[2,3,24] According to WHO (2005), low educational level is associated with a higher risk of disability and death,[25] mainly because learning opportunities can help people to develop skills, confidence to adapt and try a more healthy aging process.

Regarding marital status, the widowed presented higher prevalence of functional disability to instrumental activities and for both disabilities simultaneously. The widowhood, for the elderly, can lead to a situation of isolation and less concern with health, with possible negative influence in their functional capacity.[26] Furthermore, Pereira et al[24] suggest that the higher prevalence of functional disability in widowers could be related to the fact that, the situation of widowhood tends to be higher in women and older people, precisely the two groups with higher prevalence of disability. This was also demonstrated in the present study.

Elderly people who were working had lower prevalence of disability for instrumental activities, which involve the more complex ones, and functional disability in general (considering both areas simultaneously). This finding is consistent with the observed in other studies,[3,27] because the labor activity implies daily challenges that keep the worker active, contributing to the maintenance of their functional capacity.[27] However, it is important to point out that the elderly might not be working on grounds of their disability. Similarly, elderly people active in leisure time also showed lower prevalence of disability in basic activities and in both areas simultaneously. The reduction of the level of physical activity combined with the higher occurrence of chronic diseases, common situations in this age range, may explain the higher prevalence of disability in the elderly group.[28] However, it is worth noting that this relationship is subject to reverse causality bias: both the functional disability increases the risk of disability, such as those who have more disabilities, will consequently, have higher levels of physical inactivity.

The association between chronic diseases and functional disability found in this study was also observed in previous studies.[3,4] The presence of chronic diseases is related to aging[25] and can, in turn, make the elderly more incapable in carrying out their daily activities.

Table 3 – Crude and adjusted analysis of functional disability for basic activities of daily living according to exposure variables, Pelotas, Rio Grande do Sul, 2014

Exposure Variables	Inability to Basic ADLs [a]	Crude analysis		Adjusted analysis [b]	
	N (%)	PR[c] (95%CI)[d]	p-value [e]	PR[c] (95%CI)[d]	p-value [e]
1° Level					
Sex			<0.001		<0.001
Male	150 (28.1)	1.00		1.00	
Female	370 (40.8)	1.45 (1.25;1.67)		1.43 (1.21;1.69)	
Age (in full years)			0.001[f]		0.001[f]
60-69	210 (27.9)	1.00		1.00	
70-79	182 (39.8)	1.43 (1.22;1.67)		1.34 (1.13;1.58)	
≥80	128 (56.1)	2.01 (1.71;2.36)		1.73 (1.44;2.07)	
Marital status			<0.001		0.308
Married	242 (31.8)	1.00		1.00	
Single	28 (31.1)	0.98 (0.71;1.35)		0.91 (0.65;1.27)	
Separated	36 (27.1)	0.85 (0.61;1.18)		0.81 (0.57;1.15)	
Widowed	214 (47.1)	1.48 (1.28;1.70)		1.06 (0.90;1.25)	
Economic classification (ABEP)			0.044[f]		0.147[f]
A/ B	156 (32.5)	1.00		1.00	
C	273 (38.1)	1.17 (0.99;1.39)		0.91 (0.77;1.08)	
D-E	65 (38.5)	1.18 (0.96;1.46)		0.83 (0.67;1.02)	
Schooling (in full years)			0.001[f]		0.001[f]
None	92 (47.2)	1.00		1.00	
1-3	141 (42.1)	0.89 (0.74;1.08)		1.02 (0.84;1.24)	
4-7	167 (37.9)	0.80 (0.67;0.96)		0.91 (0.76;1.10)	
8-11	50 (35.0)	0.74 (0.58;0.95)		0.89 (0.69;1.15)	
≥12	67 (21.3)	0.45 (0.35;0.59)		0.53 (0.40;0.70)	
2° Level					
Current Job			<0.001		0.057
No	425 (39.4)	1.74 (1.34;2.24)		1.29 (0.99;1.67)	
Yes	59 (22.7)	1.00		1.00	
3° Level					
Alcohol consumption			<0.001		0.200
No	443 (39.2)	1.00		1.00	
Yes	76 (24.8)	0.63 (0.52;0.77)		0.87 (0.70;1.08)	
Physical activity in leisure (IPAQ)			<0.001		0.006
Inactive	424 (37.6)	1.00		1.00	
Active (≥150 min/week)	52 (20.3)	0.54 (0.42;0.70)		0.68 (0.52;0.90)	
4° Level					
Nutritional status (kg/m²)			0.978[f]		0.920[f]
Underweight	13 (52.0)	1.51 (1.05;2.18)		1.26 (0.81;1.97)	
Appropriate weight	113 (31.4)	0.92 (0.77;1.08)		0.96 (0.82;1.13)	
Overweight or obesity	335 (34.3)	1.00		1.00	

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Table 3 – Crude and adjusted analysis of functional disability for basic activities of daily living according to exposure variables, Pelotas, Rio Grande do Sul, 2014

Exposure Variables	Inability to Basic ADLs [a]	Crude analysis		Adjusted analysis[b]	
	N (%)	PR[c] (95%CI)[d]	p-value[e]	PR[c] (95%CI)[d]	p-value[e]
Morbidity			<0.001[f]		<0.001[f]
None	27 (17.5)	1.00		1.00	
1	69 (20.9)	1.19 (0.79;1.78)		1.28 (0.79;2.07)	
≥2	417 (44.1)	2.51 (1.78;3.55)		2.24 (1.48;3.40)	

a) Basic ADLs: basic activities of daily living.
b) Adjusted by the Poisson regression according to the hierarchical levels: 1° level (sex, age, marital status, ABEP, education level); 2° (previous + current job); 3° (previous + level of alcohol consumption and IPAQ); and level 4° (previous + nutritional status and morbidity).
c) PR: prevalence ratio.
d) 95% CI: 95% confidence interval.
e) p-value: Wald test for heterogeneity.
f) p-value: the Wald test for linear trend.

Some limitations of the present study must be mentioned. In function on the cross-sectional design, the main limitation of the study is the possible reverse causality bias in some associations, as has already been commented. It is worth remembering that the objective of the study was to identify associated factors and not establishing causal relationships. A possible selection bias, due to the differential loss of elderly from the younger age groups in the sample, is another limitation to quote, since the prevalence of functional disability in elderly persons in the age range from 60 to 69 years may be underestimated. However, this limitation would have little impact on the results, because, as has already been said, the prevalence of functional disability tends to increase with advancing age. And there is still the possibility of survival bias, since the elderly more dependent - and consequently, with worse health conditions - possibly already died or could be hospitalized, which would underestimate the prevalences of the outcomes studied. Among the intervied elderly, 171 had information to Basic ADLs and not to IADLs. The prevalence of disability to Basic ADLs among these elderly patients was 50.0% (95% CI; 42.5%; 57.5%). It is believed that the prevalence of inability to IADLs may be underestimated, since between the losses to Basic ADLs prevalence was higher than that estimated for the general sample.

With the aging of the population to accelerate in middle-income countries, such as Brazil, the agenda of social policies have sought to adjust to the new reality with the elaboration of policies and programs focused on the health of the elderly.[29] The National Health Policy of the Elderly Person[30] determines the priority attention to the health of the elderly in a situation of functional dependence. It is recommended the insertion of the assessment of the functional capacity in the routine care of the elderly, by means of validated screening instruments, that are of easy application, seeeking to identify, at an early stage, elderly men and women at risk of disability; instruments like the scales of Katz[11] and Lawton,[12] if they were implemented in the routine of health care services for the elderly. Finally, the authors of this evaluation believe to be necessary that the risk groups identified here - women, older individuals, with low schooling and those with chronic diseases - are prioritized in this assessment.

Authors' contributions

Farías-Antúnez S, Lima NP, Bierhals IO, Gomes AP, Vieira LS and Tomasi E participated in the conception and design of the study. Farías-Antúnez S, Lima NP and Gomes AP contributed in the analysis and to interpret the data. Farías-Antúnez S, Lima NP, Bierhals IO, Gomes AP and Vieira LS drafted the first version of the manuscript. Farías-Antúnez S, Lima NP, Bierhals IO, Gomes AP, Vieira LS and Tomasi E reviewed critically the manuscript. All authors approved the final version and are responsible for all aspects of the study, ensuring its accuracy and integrity.

Table 4 – Crude and adjusted analysis of functional disability for instrumental activities of daily living according to exposure variables, Pelotas, Rio Grande do Sul, 2014

Exposure Variables	Inability to Basic ADLs[a]	Crude analysis		Adjusted analysis[b]	
	n (%)	PR[c] (95%CI[d])	p-value[e]	PR[c] (95%CI[d])	p-value[e]
1° Level					
Sex			<0.001		0.476
Male	119 (27.7)	1.00		1.00	
Female	313 (37.3)	1.34 (1.13;1.60)		1.07 (0.89;1.28)	
Age (in full years)			<0.001[f]		<0.001[f]
60-69	149 (21.5)	1.00		1.00	
70-79	161 (39.9)	1.85 (1.52;2.26)		1.59 (1.30;1.94)	
≥80	121 (71.6)	3.33 (2.78;3.99)		2.39 (1.95;2.93)	
Marital status			<0.001		<0.001
Married	160 (24.0)	1.00		1.00	
Single	22 (27.5)	1.15 (0.76;1.73)		1.18 (0.79;1.76)	
Separated	37 (30.8)	1.29 (0.96;1.73)		1.45 (1.08;1.94)	
Widowed	212 (53.0)	2.21 (1.84;2.66)		1.61 (1.32;1.97)	
Economic classification (ABEP)			<0.001[f]		0.463[f]
A/ B	103 (25.4)	1.00		1.00	
C	229 (35.6)	1.40 (1.14;1.72)		1.02 (0.84;1.26)	
D-E	75 (50.3)	1.98 (1.56;2.52)		1.11 (0.87;1.41)	
Schooling (in full years)			<0.001[f]		<0.001[f]
None	106 (61.1)	1.00		1.00	
1-3	104 (36.0)	0.57 (0.47;0.69)		0.69 (0.58;0.82)	
4-7	135 (34.9)	0.55 (0.46;0.66)		0.72 (0.60;0.86)	
8-11	33 (25.6)	0.41 (0.29;0.56)		0.62 (0.46;0.83)	
≥12	50 (17.7)	0.28 (0.21;0.38)		0.42 (0.31;0.59)	
2° Level					
Current Job			<0.001		<0.008
No	358 (37.9)	2.25 (1.69;3.00)		1.42 (1.07;1.88)	
Yes	40 (16.8)	1.00		1.00	
3° Level					
Alcohol consumption			<0.146		0.484
No	368 (37.0)	1.00		1.00	
Yes	62 (23.0)	0.62 (0.48;0.81)		0.91 (0.70;1.19)	
Physical activity in leisure (IPAQ)			<0.001		0.168
Inactive	352 (35.3)	1.00		1.00	
Active (≥150 min/week)	49 (21.5)	0.61 (0.47;0.79)		0.83 (0.63;1.08)	
4° Level					
Nutritional status (kg/m²)			0.049[f]		0.493[f]
Underweight	9 (47.4)	1.57 (0.99;2.48)		1.00 (0.63;1.57)	
Appropriate weight	108 (35.1)	1.16 (0.24;1.43)		1.08 (0.89;1.31)	
Overweight or obesity	267 (30.2)	1.00		1.00	

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Table 4 – Crude and adjusted analysis of functional disability for instrumental activities of daily living according to exposure variables, Pelotas, Rio Grande do Sul, 2014

Exposure Variables	Inability to Basic ADLs[a]	Crude analysis		Adjusted analysis[b]	
	n (%)	PR[c] (95%CI[d])	p-value[e]	PR[c] (95%CI[d])	p-value[e]
Morbidity			<0.001[f]		<0.001[f]
None	23 (16.9)	1.00		1.00	
1	64 (21.5)	1.27 (0.80;2.03)		1.20 (0.75;1.94)	
≥2	339 (41.1)	2.43 (1.61;3.68)		2.04 (1.30;3.20)	

a) IADLs: instrumental activities of daily living.
b) Adjusted by the Poisson regression according to the hierarchical levels: 1° level (sex, age, marital status, ABEP, education level); 2° (previous + current job); 3° (previous + level of alcohol consumption and IPAQ); and level 4° (previous + nutritional status and morbidity).
c) PR: prevalence ratio.
d) 95% CI: 95% confidence interval.
e) p-value: Wald test for heterogeneity.
f) p-value: the Wald test for linear trend.

Table 5 – Crude and adjusted analysis of functional disability for both activities of daily living according to exposure variables, Pelotas, Rio Grande do Sul, 2014

Exposure Variables	Inability to both activities	Crude analysis		Adjusted analysis	
	n (%)	PR[c] (95%CI[d])	p-value[e]	PR[c] (95%CI[d])	p-value[e]
1° Level					
Sex			<0.001		0.020
Male	52 (12.2)	1.00		1.00	
Female	178 (21.2)	1.74 (1.31;2.31)		1.46 (1.06;1.99)	
Age (in full years)			<0.001[e]		<0.001[e]
60-69	67 (9.7)	1.00		1.00	
70-79	92 (22.8)	2.36 (1.74;3.18)		1.92 (1.40;2.63)	
≥80	71 (42.0)	4.35 (3.27;5.77)		3.01 (2.17;4.18)	
Marital status			<0.001		0.027
Married	83 (12.4)	1.00		1.00	
Single	12 (15.0)	1.21 (0.67;2.16)		1.14 (0.61;2.14)	
Separated	14 (11.7)	0.93 (0.56;1.56)		1.00 (0.57;1.75)	
Widowed	121 (30.3)	2.44 (1.89;3.14)		1.52 (1.13;2.04)	
Economic classification (ABEP)			0.005[e]		0.453[e]
A/ B	58 (14.4)	1.00		1.00	
C	120 (18.7)	1.30 (0.98;1.71)		0.88 (0.64;1.20)	
D-E	36 (24.2)	1.68 (1.16;2.44)		0.86 (0.59;1.26)	
Schooling (in full years)			<0.00[e]		<0.001[e]
None	54 (32.1)	1.00		1.00	
1-3	66 (22.8)	0.71 (0.55;0.91)		0.93 (0.72;1.21)	
4-7	68 (17.6)	0.55 (0.41;0.73)		0.76 (0.58;0.99)	
8-11	17 (13.2)	0.41 (0.25;0.69)		0.68 (0.41;1.15)	
≥12	23 (8.1)	0.25 (0.16;0.41)		0.40 (0.24;0.66)	

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Table 5 – Crude and adjusted analysis of functional disability for both activities of daily living according to exposure variables, Pelotas, Rio Grande do Sul, 2014

Exposure Variables	Inability to both activities	Crude analysis		Adjusted analysis	
	n (%)	PR[c] (95%CI[d])	p-value[e]	PR[c] (95%CI[d])	p-value[e]
2° Level					
Current Job			<0.001		0.018
No	201 (21.3)	3.62 (2.03;6.45)		2.02 (1.13;3.60)	
Yes	14 (5.9)	1.00		1.00	
3° Level					
Alcohol consumption			0.893		0.227
No	207 (20.8)	1.00		1.00	
Yes	23 (8.5)	0.41 (0.27;0.61)		0.78 (0.51;1.17)	
Physical activity in leisure (IPAQ)			<0.001		0.011
Inactive	188 (18.9)	1.00		1.00	
Active (> 150 min/week)	12 (5.3)	0.28 (0.15;0.51)		0.42 (0.21;0.82)	
4° Level					
Nutritional status (kg/m²)			0.778[e]		0.829[e]
Underweight	5 (26.3)	1.67 (0.80;3.49)		1.01 (0.45;2.26)	
Appropriate weight	46 (14.9)	0.95 (0.71;1.27)		1.04 (0.78;1.39)	
Overweight or obesity	139 (15.7)	1.00		1.00	
Morbidity			<0.001[e]		<0.001[e]
None	10 (7.4)	1.00		1.00	
1	23 (7.7)	1.05 (0.52;2.14)		1.07 (0.40;2.85)	
≥2	191 (21.2)	3.15 (1.72;5.78)		3.28 (1.38;7.79)	

b) Adjusted by the Poisson regression according to the hierarchical levels: 1° level (sex, age, marital status, ABEP, education level); 2° (previous + current job); 3° (previous + level of alcohol consumption and IPAQ); and level 4° (previous + nutritional status and morbidity).
c) PR: prevalence ratio.
d) 95% CI: 95% confidence interval.
e) p-value: Wald test for heterogeneity.
f) p-value: the Wald test for linear trend.

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