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Risk of falls and social determinants in the elderly living in a rural community

Riesgo de caídas y determinantes sociales en ancianos residentes en una comunidad rural

Risco de quedas e determinantes sociais em idosos residentes em uma comunidade rural

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Abstract

Objective: To evaluate the risk of falls and to identify the social determinants associated with them in the elderly living in a rural community. Methodology: Quantitative, cross-sectional, descriptive, and correlational study, performed in a probabilistic sample, randomly selected, with an estimated frequency of 50% and with an acceptable margin of error of 5% and a confidence level of 95%. Study carried out at the Primary Health Care level, in a Personalized Health Care Unit, of the Northern Region of Portugal. The randomly selected sample consisted of 321 people over the age of 65, with a mean age of 76.11 ± 6.79, living in the community, of whom 175 (54.5%) were female and 146 (45.5%) were male. Data collection was done through the straightforward filling out of an evaluation protocol, using the Morse scale. Results: The Morse scale allowed us to verify that 33.0% of the sample presented a low risk of falling and 7.2% a high risk. The risk of falls was associated with age, sex, the fact that the elderly lives with other relatives, the unmarried, those with the lowest incomes and those who receive support. Conclusion: Social determinants have an impact on the risk of falls and should be considered in fall prevention programs.

Descriptors: Falls; Risk; Elderly People; Social Determinants; Rural Community.

Resumén

Objetivo: Evaluar el riesgo de caídas e identificar los determinantes sociales asociados a ellos en los adultos mayores residentes en una comunidad rural. Metodología: Estudio cuantitativo, transversal, descriptivo y correlacional, realizado en una muestra probabilística, seleccionada al azar, con una frecuencia estimada del 50% y con un margen de error aceptable del 5% y un nivel de confianza del 95%. Estudio realizado en el nivel de Atención Primaria de Salud, en una Unidad de Atención Personalizada de la Región Norte de Portugal. La muestra seleccionada aleatoriamente estuvo constituida por 321 personas mayores de 65 años, con una edad media de 76,11 ± 6,79, residentes en la comunidad, de las cuales 175 (54,5%) eran mujeres y 146 (45,5%) hombres. La recopilación de datos se realizó mediante el llenado sencillo de un protocolo de evaluación, utilizando la escala Morse. Resultados: La escala de Morse nos permitió verificar que el 33,0% de la muestra presentó un riesgo bajo de caída y el 7,2% un riesgo alto. El riesgo de caídas se asoció con la edad, el sexo, el hecho de que el anciano conviva con otros familiares, los solteros, los de menores ingresos y quienes reciben apoyo. Conclusión: Los determinantes sociales tienen un impacto en el riesgo de caídas y deben ser considerados en los programas de prevención de caídas.

Descriptores: Caídas; Riesgo; Anciano; Determinantes Sociales; Comunidad Rural.

Resumo

Objetivo: Avaliar o risco de quedas e identificar os determinantes sociais a elas associados em idosos residentes em uma comunidade rural. Metodologia: Estudo quantitativo, transversal, descritivo e correlacional, realizado em amostra probabilística, selecionada aleatoriamente, com frequência estimada de 50% e com margem de erro aceitável de 5% e nível de confiança de 95%. Estudo realizado ao nível de Cuidados de Saúde Primários, numa Unidade de Saúde Personalizada, da Região Norte de Portugal. A amostra selecionada aleatoriamente foi composta por 321 pessoas maiores de 65 anos, com média de idade de 76,11 ± 6,79, residentes na comunidade, sendo 175 (54,5%) do sexo feminino e 146 (45,5%) do masculino. A coleta de dados foi realizada por meio do preenchimento simples de um protocolo de avaliação, utilizando a escala de Morse. Resultados: A escala de Morse permitiu verificar que 33,0% da amostra apresentou baixo risco de queda e 7,2% alto risco. O risco de quedas esteve associado à idade, ao sexo, ao fato de o idoso residir com outros parentes, aos solteiros, aos de menor renda e aos que recebem apoio. Conclusão: Os determinantes sociais têm impacto no risco de quedas e devem ser considerados em programas de prevenção de quedas.

Descritores: Quedas; Risco; Idosos; Determinantes Sociais; Comunidade Rural.

Introduction

The ageing of the population is transversal to all the countries of the European Union (EU28), in 2016 the ageing index was 123.9%, but in Portugal, this process is proceeding more rapidly, with values of 148.7%[1,2].

Although this process reaches the whole Portuguese territory, there is some heterogeneity, becoming more expressive in the interior of the country, in the municipality under study; in 2016 the ageing index reached 252.4%[3].

The ageing process has several associated risks, such as the risk of falls, fragility, urinary incontinence, delirium, and pressure ulcers, which may be considered as geriatric syndromes[4].

Recent Ageing European policies focus on the active and healthy ageing model. The European Commission has identified active and healthy ageing as a major social challenge, common to all European countries, creating partnerships (EIPAHA - *European Innovation Partnership on Active and Healthy Ageing*) whose objectives include prevention of falls in the elderly[5].

The identification of risk factors should be a priority to enhance the effectiveness of a fall prevention program. Risk factors associated with falls can be multifactorial and reflect the multiplicity of health determinants that directly or indirectly affect well-being, among which we highlight the social determinants; low education, lack of resources in the community, reduction of social interactions and difficulty in accessing health and social services[6].

Risk assessment should be individualized and allow stratification into "low-risk" and "high-risk" groups of falls[7]. Considering a risk-free class of falls, then low-risk participants were found to be three times more likely to fall and those at high-risk were seven times more likely to fall[8].

This prior evaluation allows a multifactorial set of interventions, proving to be the most effective method of reducing falls, especially in the elderly who do not have cognitive impairment and who live in the community[9-11].

In a primary prevention perspective, the main objective of the study is to evaluate the risk of falls in elderly residents in a rural community and to identify the social determinants that influence the risk of falls.

Methodology

Cross-sectional, descriptive and correlational study performed in a probabilistic sample.

From December 2016 to May 2017, 321 people over the age of 65 (mean age 76.11 ± 6.79 years), enrolled in a Personalized Health Care Unit (Primary Health Care) of the Northern Region of Portugal, participated in the study. Of the 4,988 users enrolled in this unit in September 2016, 1,441 were 65 years of age or older.

Sampling was defined in a simple random way, fulfilling the inclusion and exclusion criteria, in the selection of the elderly constituents of the sample. It was identified as inclusion criteria, age 65 or older, enrolled in the elderly health program and the elderly acceptance and authorization to participate in the study. As exclusion criteria, institutionalized elderly individuals with apparent cognitive-behavioral changes, criteria were based on clinical history.

Epi-Info Version 7 was used to calculate the sample size, at an estimated frequency of 50% and with an acceptable margin of error of 5% and a confidence level of 95%. To select the elderly, a list was made and later, using a table of random numbers, the participants were selected. In case of non-acceptance to participate in the study, withdrawal or exclusion criteria, other participants were randomly selected until the total sample was obtained. During the study, 323 elderly people were interviewed, 2 of whom died during the study, ending than with a total sample consisting of 321 elderly people.

The source of information was an evaluation protocol, filled out during an interview that occurred in one of the elderly nursing health consultations, at the health unit or at home. The evaluation protocol was structured covering the sociodemographic characterization and the scale of evaluation of the risk of falls. The *Morse* scale, validated for the Portuguese population by Costa-Dias, Ferreira and Oliveira[12] was used. According to the evaluation performed, the sum of the scores obtained in each of the six items results in a score indicating the risk of falling. This score varies from 0 to 125 points and people are discriminated according to the risk of falling: no risk (0-24), low risk (25-50) or high risk (≥ 51)[12]. The instrument shown good internal consistency, Cronbach's alpha of 0.783.

For the application of the evaluation protocol, an opinion was requested from the Ethics Committee for Health of the Regional Health Administration of the North and from the National Data Protection Commission to process the data.

The following tests were used; Mann-Whitney U test, Kruskal-Wallis test, Spearman's correlation coefficient significance test and Kolmogorov-Smirnov test as normality test. The option for non-parametric tests is mainly justified by the fact that the central variable of the study (risk of falls evaluated by the Morse scale scores) does not present a normal distribution. For all tests, a value of 0.050 was set as the limit of significance.

Results

The data and sociodemographic characterization of the sample (Table 1) show that half of the respondents had at least 76.00 years, with the highest age groups being those aged 75 to 79 (24.6%) and those aged 80 to 84 (23.1%). Most of the members of the total sample (68.8%) reported being married or living common-law, and 20.5% said they lived with other relatives. Regarding the time spent alone during the day, we found that the mean value was 5.60 ± 7.37 hours. The most mentioned monthly income amounts were between 259.36 euros and 419.21 euros and those over 628.83 euros, the percentages were 47.0% and 25.5%. The most frequent educational qualifications were those below 4 years of schooling and between 4 and 6 years of schooling, with percentages of 37.7% and 40.8%.

Table 1. Sociodemographic characterization. Northern Region, Portugal, 2016-2017

Sex / Variable	Male n	Male %	Female n	Female %	Total n	Total %
Age group						
65 – 69	34	23.3	33	18.9	67	20.9
70 – 74	28	19.2	39	22.3	67	20.9
75 – 79	36	24.7	43	24.6	79	24.6
80 – 84	35	24.0	39	22.3	74	23.1
85 – 89	11	7.5	14	8.0	25	7.8
≥ 90	2	1.4	7	4.0	9	2.8
Sex male: $\bar{x}$ = 75.76; Md = 76.00; s = 6.50; x_{min} = 65; x_{max} = 92; p=**0.001**						
Sex female: $\bar{x}$ = 76.40; Md = 76.00; s = 7.02; x_{min} = 65; x_{max} = 96; p=**0.060**						
Total sample: $\bar{x}$ = 76.11; Md = 76.00; s = 6.79; x_{min} = 65; x_{max} = 96; p<**0.001**						
Marital status						
Single	2	1.4	6	3.4	8	2.5
Married/Common-law	120	82.2	101	57.7	221	68.8
Divorced/Separated	1	0.7	-	0.0	1	0.3
Widower	23	15.8	68	38.9	91	28.3
With whom do you currently live?						
Alone	15	9.7	37	21.1	52	16.2
Accompanied by spouse	122	78.7	101	57.7	223	69.5
Accompanied by other relatives	18	11.6	47	26.8	65	20.2
Accompanied by other people	-	0.0	1	0.6	1	0.3
How much time do you spend alone in a 24-hour period?	62	42.5	68	38.8	130	40.5
0 hour	66	45.2	71	40.6	137	42.7
Less than 12 hours	18	12.3	36	20.6	54	16.8
12 or more hours						
Sex male: $\bar{x}$ = 4.71; Md = 2.50; s = 6.33; x_{min} = 0; x_{max} = 24; p<**0.001**						
Sex female: $\bar{x}$ = 6.34; Md = 3.00; s = 8.06; x_{min} = 0; x_{max} = 24; p<**0.001**						
Total sample: $\bar{x}$ = 5.60; Md = 3.00; s = 7.37; x_{min} = 0; x_{max} = 24; p<**0.001**						
Professional status						
Non active	140	95,9	173	98,9	313	97.5
Active	6	4.1	2	1.1	8	2.5
Monthly income						
Less than 106.12€	-	0.0	2	1.1	2	0.6
From 106.13€ to 259.35€	5	3.4	24	13.7	29	9.0
From 259.36€ to 419.21€	68	46.6	83	47.4	151	47.0
From 419.22€ to 628.82€	30	20.5	27	15.4	57	17.8
More than 628.83€	43	29.5	39	22.3	82	25.5
Educational qualifications						
Can not read or write	20	13.7	34	19.4	54	16.8
Less than 4 years of schooling	49	33.6	72	41.1	121	37.7
4 to 6 years of schooling	68	46.6	63	36.0	131	40.8
7 to 9 years of schooling	6	4.1	5	2.9	11	3.4
10 to 12 years of schooling	3	2.1	1	0.6	4	1.2
Higher education	-	0.0	-	0.0	-	0.0
Support in activities of daily living						
No	93	63.7	97	55.4	190	59.2
Yes	53	36.3	78	44.6	131	40.8
Who provides support in the activities?						
Family	40	75.5	58	74.4	98	74.8
Home care	17	32.1	17	21.8	34	26.0
Family and home care	8	15.1	6	7.7	14	10.7
Others	6	11.3	16	20.5	22	16.8
What kind of support do you receive?						
Laundry care	34	64.2	45	57.7	79	60.3
Housing hygiene	12	22.6	52	66.7	64	48.8
Food supply	38	71.7	48	61.5	86	65.6
Accompaniment outside	33	62.3	60	76.9	93	71.0
Medication preparation	16	30.2	39	50.0	55	42.0
Help in the transport of firewood	-	0.0	1	1.3	1	0.8
Personal hygiene	3	5.7	12	15.4	15	11.4

The majority (59.2%) of the sample reported that they did not receive support for the performance of the ADLs.

With the application of the Morse scale for the assessment of the risk of falls, and as can be seen in Table 2, 74.7% of the men did not show a risk of falling, as in 47.4% of the women. However, 43.4% of the female subjects showed a low risk of falling. In the total sample, 59.8% of the individuals showed no risk of falling, followed by 33% who showed low risk.

Table 2. Characterization of the risk of falls. Northern Region, Portugal, 2016-2017

Sex	Male		Female		Total	
Item	**n**	**%**	**n**	**%**	**n**	**%**
Fall risk						
Without risk	109	74.7	83	47.4	192	59.8
Low risk	30	20.5	75	43.4	106	33.0
High risk	7	4.8	16	9.1	23	7.2
Morse Scale						
Sex male: $\bar{x}$ = 21.75; Md = 15.00; s = 16.59; x_{min} = 0; x_{max} = 105; p<**0.001**						
Sex female: $\bar{x}$ = 29.83; Md = 25.00; s = 19.10; x_{min} = 0; x_{max} = 90; p<**0.001**						
Total sample: $\bar{x}$ = 26.15; Md = 15.00; s = 18.42; x_{min} = 0; x_{max} = 105; p<**0.001**						

The results that make up Table 3 were obtained by applying Spearman's correlation coefficient, as we can see, there are statistically significant relationships between the risk of falling and age (r_s=+0.35, p<0.001).

Table 3. Correlation of the risk of falling with age, the time spent alone in a 24-hour period, the BMI, the number of medications and the Barthel index. Northern Region, Portugal, 2016-2017

Variables	*Morse Scale*	
	r_s	*P*
Age	+0.35	< **0.001**
Time you spent alone in a 24-hour period	+0.06	0.311
Body mass index	+0.02	0.708

Using the Mann-Whitney U test or the Kruskal-Wallis test, we were able to compare the risk of falling, also evaluated by the scores resulting from the Morse scale, according to several variables, in Table 4, the results allow us to verify that there are statistically significant differences according to the sex of the individual (z=-4.678, p<0.001), their marital status (z=-4.948, p<0.001), the people with whom they currently live (χ^2=26.739, p<0.001), their monthly income (z=-2.456, p=0.014), educational qualifications (χ^2=16.257, p<0.001) and the fact of receiving some kind of support (z=-7.261, p<0.001).

Table 4. Comparison of the risk of falling according to sex, marital status, cohabitation, pet, income, literacy, support, physical activity, pain, to have fallen and the use of walking aids. Northern Region, Portugal, 2016-2017

Morse Scale	$\bar{x}_{ord}$	$\bar{x}$	Md	z ou χ^2	*P*
Sex					
Male	136.97	21.75	15.00	-4.678	< **0.001**
Female	181.05	29.93	25.00		
Marital status (grouped)					
Not married	195.53	32.80	30.00	-4.948	< **0.001**
Married/Common law	145.38	23.14	15.00		
With whom do you currently live (grouped)					
Alone	180.68	28.37	25.00	26.739	< **0.001**
With spouse	145.95	23.36	15.00		
With other relatives/people	211.73	37.17	40.00		
Monthly income (grouped)					
≤ 419,21€	171.07	28.71	15.00	-2.456	**0.014**
≥ 419,22€	147.81	22.81	15.00		

Educational qualifications (grouped)					
Can not read or write	202.63	36.30	40.00	16.257	< **0.001**
Up to grade 6	153.32	24.27	15.00		
From grade 7 to 9 or High school	140.20	21.33	15.00		
Receive some support					
No	132.71	19.89	15.00	-7.261	< **0.001**
Yes	202.04	35.23	40.00		

Discussion

In the sample, 9.1% of the women and 4.8% of the men showed a high risk of falls, presenting a seven times higher probability of falling compared to the elderly without risk of falls and, in turn, according to the same authors, 33.0% of the sample is three times more likely to fall[9]. Age and sex were determinant for the risk of falls, women[13] and older participants presented an increased risk of falls[7,14-16].

Considering other social determinants there were statistically significant results between the risk of falling and the unmarried elderly ($p<0.001$)[14], as well as those who lived with other relatives or other people. In other studies, the risk was associated with the fact that the elderly live alone[17,18].

A possible justification for this result can be found in the fact that a smaller percentage of the elderly live alone (16.2%), revealing a good network of informal caregivers. In rural areas, especially in villages, support is still possible among the various people in the community, in addition to evident family support, especially among the frailest elderly. This may also be a reflection of the time the elderly are alone in most cases, they spend 0 hour, or less than 12 hours alone (40.5% and 42.7%, respectively).

A low socioeconomic level was also considered a risk factor, the risk of falls is significantly higher for the elderly with low income ($p=0.014$)[14,19].

Another socioeconomic factor related to the risk of falls refers to literacy, in this study the risk of falls was significantly higher for the elderly who cannot read or write ($p<0.001$), which is in agreement with the data published by Molés Julio, Lavedán Santamaría and Maciá Soler[20].

The elderly who receive some type of support for the Daily Life Activities present an increased risk of falls ($p<0.001$). The need to support the elderly in ADL may reflect their greater fragility and vulnerability, and the risk of falls increases with the frailty associated with the ageing process[7].

Conclusion

The present study allowed us to characterize, in the selected sample, the individual risk of falls, as well as their social determinants, which made it possible to obtain knowledge that answers the research question.

In view of the ageing population and the health needs of the elderly population where this study was conducted, it is essential to assess the individual risk of falls and intervene through risk reduction measures to reduce the incidence and injuries of falls, resulting in individual, organizational, social and economic gains. The risk stratification allows the nurse to define interventions aimed at the people who can most benefit from them, according to the available resources, with priority being given to the elderly with a high risk of falls.

Interventions should be part of a fall prevention program or project, where social determinants must be present and involving the interdisciplinary team and the wider community through partnerships. Health education is a strategy that must be present to enable the elderly to develop skills that enable them to prevent falls through the management of potentially modifiable risk factors.

The main limitation of this study is the lack of a nationally validated scale for assessing the risk of falls in elderly people living in the community, wherefore the selection of the Morse scale, validated for use in a hospital context but adopted by the General Directorate of Health and in use in the primary health care information systems.

The evaluation of the cognitive-behavioral changes of the participants was not based on scales used for the effect, but in the clinical history.

For the continuity of the present study, it is suggested the construction and validation of a scale of the risk of falls in the elderly residents in the community, for the Portuguese population.

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