



Comparing the risk of falls between rural and urban elderly

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ABSTRACT. The aim of this study was to compare the risk of falls and characterize them in the urban and rural elderly. Observational study with elderly from urban and rural areas in the interior of the State of Rio Grande do Sul, evaluated by the Fall Risk Score and further criteria for the evaluation and characterization of the last fall within 12 months. A total of 125 elderly, 89 urban and 36 rural was evaluated. There was a high prevalence of medication use (93.6%), impaired vision (35.2%) and previous falls (81.6%) in the total sample of individuals as well as the risk of falls (76.8%) without differences between the groups. The variables of statistical significance were impaired hearing ($p = 0.009$) and impairment of the lower limbs ($p = 0.04$). Both the elderly living in rural areas and in urban areas showed high risk for falls in the group studied, with no significant difference between them. Thus, it is worth highlighting the importance of making a health work for guidance on falls.

Keywords: elderly, accidental falls, rural zone, urban zone.

Comparação do risco de quedas entre idosos do meio rural e urbano

RESUMO. O objetivo deste estudo foi comparar o risco de quedas e caracterizá-las, em idosos do meio urbano e rural. Estudo observacional realizado com idosos do meio urbano e rural de uma cidade do interior do Rio Grande do Sul, avaliados por meio do Fall Risk Score e critérios complementares para a avaliação e caracterização da última queda no período de 12 meses. Foram avaliados 125 idosos, 89 do meio urbano e 36 do meio rural. Foi alta a prevalência de uso de medicação (93,6%), visão prejudicada (35,2%) e quedas anteriores (81,6%) na amostra total de indivíduos, bem como o risco de quedas (76,8%), sem diferenças entre os grupos. As variáveis de maior significância estatística foram audição prejudicada ($p=0,009$) e comprometimento de membros inferiores ($p=0,04$). Tanto os idosos residentes em áreas rurais quanto no meio urbano apresentaram risco elevado para quedas no grupo pesquisado, sem diferença estatisticamente significativa entre eles. Desse modo, é válido destacar a importância de se fazer um trabalho em saúde para orientação sobre quedas.

Palavras-chave: idosos, acidentes por quedas, zona rural, zona urbana.

Introduction

The world is in a period of demographic transition. The elderly population has grown a lot in recent years, and this increase requires that new knowledge and investments be made so that this age group maintains its quality of life (Anjos et al., 2015).

The elderly are more prone to falls and their rate increases progressively with age. With aging, strength and muscle mass decrease, leading to reduced mobility and physical performance. In addition to representing serious risks to health and life in this group, falls may be related to the loss of the postural balance of the elderly, often due to the sudden insufficiency of the neural and osteoarticular mechanisms involved in maintaining the posture (Granacher, Gollhofer, Hortobágyi, Kressig, & Muehlbauer, 2013).

The elderly organism also undergoes functional modifications that reduce vitality and can generate some diseases, and the most common include cardiovascular and bone diseases, diabetes and sensory changes. Aging can also compromise the function of the central nervous system and impair vestibular and visual signals responsible for body balance (Vieira, Aprile, & Paulino, 2014).

In addition to leading to fractures and trauma, falls may interfere with the quality of life of the elderly, and fear of falling again prevents them from performing daily, social and recreational activities (Santos, Valente, Carvalho, Galvão, & Kasse, 2013).

Aging is a biopsychosocial process influenced by the environment in which the person is

inserted, whether rural or urban (Pereira et al., 2006).

Often the rural environment contributes to greater social relations among individuals. On the other hand, in urban areas, life is busier (Ferretti, Rinaldi, Rinaldi, Ribeiro, & Zoletti, 2013) and houses have a smaller space, which may contribute to an increase in the risk of falls (Creutzberg, Gonçalves, Sobottka, & Ojeda, 2007).

Elderly people who suffer from falls in urban areas tend to be more anxious to fall again than those who fall in rural areas. This may be related to the number of walks that the urban individual does in the neighborhood, in contrast to the elderly living in the rural zone, who does less walks near his/her residence (Nyman, Ballinger, Phillips, & Newton, 2013).

Physiotherapy plays an important role in preventing falls. Some psychomotor exercises and oriented physical activities can improve the elderly's balance, as well as health promotion and prevention measures can reduce the risk of falls (Anjos et al., 2015).

Thus, in an attempt to identify the factors and comorbidities associated with falls in the elderly, this study aimed to compare the risk of falls, as well as to characterize them, in the urban and rural elderly.

Material and methods

This is an observational, quantitative and cross-sectional study. The project was approved by the Research Ethics Committee of the Federal University of Santa Maria under the opinion 1.029.550.

The population was composed of elderly people of both sexes from the urban and rural environment of a municipality in the interior of the State of Rio Grande do Sul. The invitation was made to the elderly participating in coexistence groups. The study included elderly over 60 years of age living in the studied municipality, who agreed to participate in the study and signed the Informed Consent (IC). The exclusion was only for incomplete questionnaires.

In order to assess the risk of falls, we used the Downton Fall Risk Score (Meyer, Köpke, Bender, & Mühlhauser, 2005), an instrument translated and validated for Brazil (Schiaveto, 2008), based on five criteria: previous falls, medication used, presence of sensory deficit, mental state and evaluation of gait aid. The evaluation of the criteria of the instrument was by self-report, with the exception of the mental state assessment. This item was evaluated through

the application of the Mini Mental State Examination (MMSE).

The MMSE has scores for specific categories on the individual's cognitive status. The score of this instrument ranges from zero (minimum), corresponding to the highest level of cognitive impairment, to 30 points (maximum), corresponding to the best cognitive capacity (Folstein, Folstein, & McHugh, 1975). In this study, we used the cut-off point of Schiaveto (2008) for the Fall Risk Score.

This instrument presents an association between the score obtained with the risk of falls. The score ranges from zero to eleven, with scores equal to or greater than three indicating that the elderly person has a high risk of falling.

In addition to the Fall Risk Score, complementary criteria were applied for the evaluation and characterization of the last fall in the 12-month period, among them: number of falls, place of fall, ingestion of alcoholic beverages in a period prior to the fall, cause, location and consequence of the fall, if there was fracture, fracture site and outcome of the consequence generated by the fall. In this session, more than one alternative could be marked for the characterization of the last fall; that is, the elderly could report that they fell from their own height and due to slippery floors, for example (Schiaveto, 2008).

Descriptive statistics were used to represent the research groups. For the hypothesis tests, the Kolmogorov-Smirnov normality test was used. For testing the differences between groups, for symmetric continuous variables, paired t-test was applied and, for the asymmetric continuous tests, the Mann-Whitney U-test was used. For categorical variables, Fisher's exact test was used. The level of significance adopted was 5% for all tests and the software used was SPSS 14.0 for Windows.

Results

For eligibility, 125 elderly individuals ranging from 60 to 96 years (72.22 ± 6.92) were evaluated. They were grouped into G1 (urban, $n = 89$) and G2 (rural, $n = 36$), as presented in Table 1. The mean and standard deviation of the ages of the G1 and G2 groups were, respectively, 72.69 ± 7.18 and 71.08 ± 6.15 years.

Table 1. Characterization of the elderly according to the urban and rural groups, regarding the variables investigated.

Characteristics	Total N (%)	G1 - urban N (%)	G2 - rural N (%)
Sex			
Female	95 (76)	72 (80.9)	23 (63.88)
Male	30 (24)	17 (19.1)	13 (36.12)
Medication	117 (93.6)	85 (95.5)	32 (88.88)
Impaired vision	114 (91.2)	83 (93.25)	31 (86.11)
Impaired hearing	44 (35.2)	25 (28.08)	19 (52.77)*
Impairment of the LL	24 (19.2)	13 (14.6)	11 (30.55)*
Mental state (O)	121 (96.8)	87 (97.75)	34 (94.44)
Previous falls	102 (81.6)	69 (77.52)	33 (91.66)
Risk of falls	96 (76.8)	66 (74.15)	30 (83.33)

O = oriented; LL = lower limbs; * = significant difference

There was a high prevalence of use of medication (93.6%), impaired vision (35.2%) and previous falls (81.6%) in the total sample, as well as the risk of falls (76.8%).

The variables of greatest statistical significance between the two groups were impaired hearing ($p = 0.009$) and impairment of LL ($p = 0.04$). The rural elderly had a higher prevalence of impaired hearing than those in the urban environment. On the other hand, the elderly of the urban environment had greater impairments of LL.

Among the elderly people who fell in the last 12 months ($n = 61$; 48.8%), regardless of the housing environment, 49 (80.32%) fell from their own height and/or 15 (24.59%) said they had fallen due to slippery or wet floors. Of the most related consequences of the last fall, 21 (34.42%) suffered sprain and luxation and 14 (22.95%) had excoriations, according to Table 2. Still, of the total of elderly people who suffered from some fall in the last 12 months, 36 (59.01%) lived in urban areas and 25 (40.99%) lived in rural areas.

Regarding these variables, there was no significant statistical difference between the groups.

In the present study, there was a predominance of women (76%) among the total number of elderly. This data agrees with other findings (Gomes, Marques, Leal, & Barros, 2014) in an integrative review that aimed to identify factors associated with the risk of falls in institutionalized elderly. Of the 19 articles included, there was a prevalence of elderly women, which corresponds to the current reality, identifying a “feminization of old age”, a result of higher male mortality (Pinho et al., 2012).

Discussion

The percentage of the total number of elderly people using medication (93.6%) was high. In a systematic review (Bennett et al., 2014), there were found 53 studies that related the use of drugs with the occurrence of falls. Medications used to treat aging disorders present adverse reactions that may

lead to falls in the elderly, and when associated with other factors such as the use of ancillary devices, visual changes and an inadequate environment, the risk of falls in this age group becomes greater (Mubashir, Shao, & Seed, 2013). Moreover, there are no studies in which drug use and the risk of falls in the elderly are compared between urban and rural residents. Also, in the present study, there was no statistically significant difference in such comparison.

Table 2. Distribution of the elderly who suffered from fall, of the urban and rural groups, regarding the most important characteristics of the last fall ($n = 61$).

Characteristics	Total N (%)	G1 - urban N (%)	G2 - rural N (%)
Fall in the last 12 months	61 (48.8)	36 (59.01)	25 (40.99)
Fell from:			
Chair	4 (6.55)	2 (5.55)	2 (8)
Own height	49 (80.32)	31 (86.11)	18 (72)
Cause of fall:			
Balance disorder	24 (39.34)	27 (75)	11 (44)
Uneven floors or with holes	10 (16.39)	32 (88.88)	19 (76)
Slippery or wet floors	15 (24.59)	30 (83.33)	16 (64)
Consequence of the fall:			
Excoriations	14 (22.95)	29 (80.55)	4 (16)
Sprain and luxation	21 (34.42)	30 (83.33)	10 (40)

In the literature review cited previously (Gomes et al., 2014), four studies were identified in which visual deficit, increased susceptibility to light and instability in fixation of the look are related to loss of balance. This is because aging leads to physiological changes that affect visual performance, which, in turn, increase the risk of falls (Wagg et al., 2015). In the present study, the prevalence of individuals with impaired vision was high (91.2%), as well as the occurrence of previous falls (81.6%). However, no significant differences were detected for these factors between the groups.

The percentage of elderly with hearing deficit in the total sample was low (35.2%). However, when analyzing this variable between the groups, there was a statistically significant difference. The rural group had a prevalence of 52.77% with impaired hearing compared to urban group (28.08%). This is confirmed by a study (Camarinha, Frota, Pacheco-Ferreira, & Lima, 2011), which concluded that workers living in the rural area exposed to organophosphorus, a pesticide component, presented impaired auditory performance, since exposure to these substances can cause damage to the peripheral and central nervous system, which leads to cognitive and affective disorders (Pacheco-Ferreira, 2008).

Besides visual and auditory deficits, non-integrity of the limbs due to amputation, stroke, neuropathy, among other factors, impairs the postural balance and may lead to an increased risk of falls (Melzer, Damry, Landau, & Yagev, 2011; Richardson, Thies, Demott, & Ashton-Miller, 2005; Kuo & Donelan, 2010; Vaugoyeau, Viel, Amblard, Azulay, & Assaïante, 2008; Kleiner, Schlittler, & Sánchez-Ariaz, 2011). Comparing G1 and G2, there was a significant difference between the groups ($p = 0.04$). The rural group had a greater predominance of elderly with problems in the limbs. No studies were found comparing the two areas regarding limb integrity.

When analyzing the high risk of falls between groups, the rural group had a higher percentage (83.33%), compared to urban group. Among the variables for the determination of the high risk of falls, the use of medication, impaired hearing, impairment of lower limbs and previous falls were more prevalent in rural areas. No studies were found that related the high risk of falls to the rural environment. It is suggested that they are related to the work activity developed throughout the life in the rural environment, with physical characteristics that can often be associated to the impairment of function and functionality of the lower limbs.

Regarding the previous falls, 81.6% of the elderly reported having fallen one or more times previously. Older people who suffered from previous falls are 1.80 times more likely to fall again, thus becoming a risk factor for another fall. In urban and rural environments, there was no association for comparison (Siqueira & Fachinni, 2007).

It is known that falls can lead to fractures, functional decline, hospitalization and even death. In the present study, sprains, luxations and excoriations were the most reported injuries resulting from the falls among the elderly who ever fell in the last twelve months prior to the interview. This result corroborates other findings (Lima & Campos, 2011; Meschial et al., 2014), which observed the predominance of these lesions after the falls. Nevertheless, many studies (Lopes, Violon, Lavagnoli, & Marcon, 2007; Lopes, Costa, Santos, Castro, & Bastone, 2009; Lima, Cruz, Morais, Torres, & Freitas, 2013) report as consequence the high number of fracture, due to the fact of the fracture preceding hospitalization.

Conclusion

The results of this study allow us to conclude that both the elderly living in rural areas and the elderly living in urban areas presented a high risk of

falls, with no significant difference between the groups. Impaired hearing and problem in the limbs were the determinants of the high risk of falls, which presented statistical significance. Further, the percentage of medication use and the occurrence of previous falls was higher among the rural elderly. In this way, it is worth mentioning the importance of conducting health work for guidance on falls, especially in rural areas.

It is also possible to observe limitation in the discussion of the obtained data. This is due to the scarcity of studies that evaluate factors related to falls in the elderly in rural and urban environments. For this, more studies should be carried out on the subject, in order to identify the factors associated with the occurrence of falls in these areas.

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