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Factors associated with fall prevention practices in older adults[a]

Fatores associados às práticas preventivas de quedas em idosos

Factores asociados a las prácticas preventivas de caídas en ancianos

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Abstract

Objective: To analyze the prevalence of fall prevention practices in older adults and the associated factors. **Methods:** A cross-sectional, analytical study with 557 older adults that were attending family health units. Data were collected using structured interviews. The dependent variable was the fall prevention practice. The associations were estimated through Poisson regression with robust variation. **Results:** The prevalence of fall prevention practices was 35.7%. After adjustments, the variables associated with the outcome were: gender (p = 0.003), very good/good self-assessment of health (p = 0.035), regular self-assessment of health (p = 0.012) and education (p = 0.039). **Conclusion:** The prevalence of fall prevention practices found was higher among older adult men with self-reported very good/good and regular health and with 5 or more years of study. This study contributes to assist the nurse in the planning of interventions to prevent falls in older adults.

Keywords: Accidental Falls; Accident Prevention; Disease Prevention; Patient Acceptance of Health Care.

Resumo

Objetivo: Analisar a prevalência de práticas preventivas de quedas em idosos e os fatores associados. **Métodos:** Estudo transversal com 557 idosos atendidos nas unidades de saúde da família. A amostragem foi probabilística estratificada proporcional. Os dados foram coletados por meio de entrevista estruturada. A variável dependente é a prática preventiva de queda. As associações foram esti madas por meio da regressão de *Poisson* com variância robusta. **Resultados:** A prevalência de práticas preventivas de quedas foi de 35,7%. Após os ajustes as variáveis que se associaram ao desfecho foram: sexo (p = 0,003), autoavaliação de saúde ótima/boa (p = 0,035), regular (p = 0,012) e escolaridade (p = 0,039). **Conclusão:** A prevalência de práticas preventivas encontrada foi maior entre os idosos do sexo masculino, com autoavaliação de saúde ótima/boa e regular e com 5 anos ou mais de estudo. Esta pesquisa contribui para auxiliar o enfermeiro no planejamento de intervenções para prevenção de quedas em idosos.

Palavras-chave: Acidentes por quedas; Prevenção de acidentes; Prevenção de doenças; Aceitação pelo paciente de cuidados de saúde.

Resumen

Objetivo: Analizar la prevalencia de prácticas preventivas de caídas en ancianos, y los factores asociados. **Métodos:** Estudio transversal con 557 ancianos atendidos en las Unidades de Salud de la Familia. El muestreo fue probabilística estratificada proporcional. Los datos fueron colectados por medio de entrevista. La variable dependiente es la práctica preventiva de caída. Las asociaciones fueron estimadas por medio de la regresión de *Poisson* con variancia robusta. **Resultados:** La prevalencia de prácticas preventivas de caídas fue del 35,7%. Después de los ajustes, las variables que se asociaron al término fueron: género (p = 0,003); autoevaluación de salud excelente/buena (p = 0,035), regular (p = 0,012); y escolaridad (p = 0,039). **Conclusión:** La prevalencia de prácticas preventivas encontradas fue mayor entre los ancianos del sexo masculino, con autoevaluación de salud excelente/buena y regular, y con cinco años de estudio o más. Esta investigación contribuye en la planificación de intervenciones del enfermero para la prevención de caídas en los ancianos.

Palabras clave: Accidentes por caídas; Prevención de Accidentes; Prevención de enfermedades; Acceptación de la atención de salud.

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INTRODUCTION

The fall is considered a geriatric syndrome due to its high prevalence in older adults, its promotion of changes in overall functionality and its high rates of mortality and institutionalization.[1] Furthermore, it is the main cause of accidental death in people over 65 years of age.[1] According to the World Health Organization (WHO), 30% of older adults suffer falls each year. This prevalence increases to 40% in older adults aged 80 years or more and 50% for those institutionalized.[1,2] In addition to affecting the physical health of the older adult, falls can cause depression and social isolation, provoke changes in the family structure, due to the need for a caregiver or the requirement for hospitalization or institutionalization, and lead to a significant impact on the health services.[2,3]

Studies show that some practices have the potential to reduce the prevalence of falls in older adults, such as performing physical exercise, the use of vitamin D supplements and organization of the home.[4,5] Other studies highlight changes in behavior and ways of life of older adults, for example, avoiding going up and down stairs, walking slowly, using orthotic support when necessary, correctly using medications, not drinking alcohol, crossing the street at pedestrian crossing points and wearing corrective lenses.[2,6]

Studies in developed countries have advanced in the production of knowledge on fall prevention practices among older adults and have investigated the adherence and engagement of these people in fall prevention programs.[6-8]

A systematic review, which investigated the adherence of older adults to fall prevention interventions, found that their participation varied according to the type of activity. A proportion of ≥ 80% adhered to the use of calcium and vitamin D supplements, ≥ 70% to collective physical exercise, 52% to individual exercises, 60% to 70% to nutritional therapy and interventions to improve knowledge and 58% to 59% to changes in the environment. In the multifactorial interventions, adherence was ≥ 75%.[7]

Studies have, however, also shown that, after the implementation of these interventions, the adherence of the older adults to the fall prevention practices reduces over time. After 12 months, on average, only half of the participants of the studies continue adhering to the preventive interventions.[7] Other studies have also shown low participation of older adults in fall prevention exercises.[8,9]

Some factors have been associated with fall prevention practices by older adults, such as age, gender, education, socioeconomic status, living arrangements, health status, cognitive impairment, mobility, presence of depressed mood, prior experience of falls and knowledge about falls.[8,10-12]

Considering that there is a need to expand the investigations regarding the participation of older adults in fall prevention practices and that, before proposing preventive interventions, the factors that are associated with these practices should be identified, this study aimed to analyze the prevalence of fall prevention practices in older adults and the associated sociodemographic and health factors.

METHODS

This cross-sectional study was conducted in the city of Tangará da Serra, located in the southwest of the state of Mato Grosso (MT). The study sample of 557 older adults, calculated through stratified probabilistic sampling, from the population of 5,096 older adults attending ten Family Health Units (FHUs) registered with the National Council of Health Facilities (CNES). In the sample calculation, the formula for a finite population sample was considered, with a confidence level of 95%, sampling error of 4% and phenomenon frequency of 50%. The strata were composed by the FHUs.

The selection of the participants in each stratum was random, through a draw, according to the proportion of the total population of older adult patients in each FHU. Older adults without cognitive impairments, assessed by applying the Mini Mental State Examination (MMSE), and without changes in speech and language were included in the study, while institutionalized older adults were excluded. Older adults who were not found after three search attempts and those that had died were replaced by performing a new draw.

Data collection was conducted from February to May 2015, after a pilot test, through interviews with the older adults in their homes, after signing of the consent form. A structured questionnaire with open and closed questions covering the sociodemographic characteristics and health status of participants and fall prevention practices was used. For the preparation of this questionnaire, the Global Report of the World Health Organization on Fall Prevention in Older Age[2] was used as a reference.

The dependent variable was fall prevention practices, considered as a group of prevention activities described in the Global Report of the World Health Organization on Fall Prevention in Older Age[2] and a systematic review of multicomponent interventions that prevent falls in older adults.[5] Fall prevention practices were determined by questions about actions taken by the older adults to prevent falls, requiring the older adult to confirm the performance of a set of three types of concurrent activities, however, involving at least one corresponding action in each of the three different and specific domains, i.e.: physical activity (walking, gymnastics, Pilates, exercises, etc.), correction of risk behaviors (use of non-slip shoes, vitamin D supplements, avoiding going up/down stairs, not using alcohol, being cautious when walking, use the pedestrian crossing) and care in the home environment (not using carpets in the rooms, using a non-slip mat in the bathrooms, installing grab bars in bathrooms, avoiding wet floors, not waxing the floor, organizing objects in the environment, keeping the room well-lit).

The independent variables were: sociodemographic factors (gender - male/female, age group - 60 to 69 years/70 to 79 years, 80 years or more; marital status - married or stable union/widowed/separated/single; years of study - did not study/1 to 3 years of study/4 years or more of study; family arrangement - alone/family and others/spouse or partner; occupational situation - retired/working/retired and working/not working; individual

income - no income/up to 1 minimum wage (MW)/1 to 3 MW/3 or more MW; family income - no income/up to 1 MW/1 to 3 MW/3 or more MW); health status (self-assessment of health) - very good/good/regular/poor/very poor, smoker - yes/no; consumption of alcoholic beverages - yes/no; number of self-reported health problems - none/one/two or more; self-reported vision impairment - yes/no; self-reported hearing impairment - yes/no; self-reported use of medication - yes/no; functional dependence - yes/no; fear of falling - yes/no; nutritional status - low weight/normal/overweight. The variable depressive mood was assessed through the application of the Abbreviated Geriatric Depression Scale (GDS-15), an instrument that has 15 questions about how the older adult felt in the previous week. The classification of the mood of the older adults was: normal mood (0 to 5 points) and depressed mood (6 to 15 points).[13]

The functional dependence variable was assessed through the Barthel Index, designed to measure activities of daily living and the level of functionality of older adults (score 0 to 100 points). In this study, older adults who presented score of 100 points were classified as independent.[14]

The fear of falling variable was assessed using the Falls Efficacy Scale (FES-1), which has 16 questions about the concern of older adults with falling when performing activities in their daily lives (score from 16 to 64 points). Older adults that achieved the highest score 16 points were considered to be afraid of falling.[15]

The nutritional condition variable was obtained by calculating the Body Mass Index (BMI), after measuring the weight (using a digital scale) and height (tape measure) at the time of the interview. Participants were classified as underweight (BMI < 22), normal weight (BMI = 22-27) and overweight (BMI > 27).[1]

The data were organized in a database using a statistical program, with double entry to check for errors. Initially, descriptive analysis was performed through tables with relative and absolute values. For the bivariate analysis, Pearson's chi-squared test was used, with a 5% significance level, to identify association between the dependent and independent variables ($p < 0.05$). For the bivariate analysis, the sociodemographic variables (age, marital status, years of education, family arrangement, individual income and family income) and the health status variables (number of health problem and depressive symptoms) were dichotomized. The self-assessment of health variable was modified to three categories, very good/good, regular, poor/very poor self-assessment.

The prevalence, the crude and adjusted Prevalence Ratios (PR) and their confidence intervals (95%) of the fall prevention practices were estimated. To identify factors associated with fall prevention practices, the Poisson multiple regression model was used, with robust variance and the stepwise forward method. Only the variables that presented $p < 0.20$ in the bivariate analysis were considered for the construction of the final multiple model. The project was approved by the Research Ethics Committee under authorization number 921.129 on 17 December 2014. The study was conducted without funding.

RESULTS

The study participants were 557 older adult patients of the FHUs of the municipality of Tangará da Serra, MT. The majority of the older adults were women (61.8%), aged between 60 and 69 years (50.8%). They were married (54.2%), Catholic (57.6%) and illiterate (42.2%). The majority had an individual income of up to 1 minimum wage (64.6%) from their retirement (67.7%) and a family income of 1 to 3 minimum wages (65%). About 60% of the older adults lived with the family and/or another person.

Regarding the health conditions of the older adults, 39.5% said they had fallen in the last year and almost 44% rated their health as regular, 83.3% said they used some type of medication, 92.1% had two or more health problems, of which impaired vision (87.1%) was the most frequent. Approximately 10% said they smoked and 21.7% used alcohol.

The assessment of nutritional status, functionality, mood and fear of falling showed that 47% of the older adults were overweight, 75.6% were independent, 77.2% presented normal mood and 98.2% were afraid of falling.

In this study, the prevalence of fall prevention practices found was 35.7% (95% CI: 31.7-39.7). The results of the analysis of the association between fall prevention practices and sociodemographic variables (Table 1) identified significant associations with the variables: gender ($p = 0.004$), individual income ($p = 0.039$) and family income ($p = 0.035$).

The prevalence of fall prevention practices of male older adults was higher than in the females (PR = 1.38; 95% CI: 1.11-1.73). The prevalence of fall prevention practices among the older adults with family income greater than two MW was 34% higher than the prevalence among those with an income of up to two MW. A significant association was also found with the individual income of the older adults ($p = 0.039$) (Table 1).

Regarding the health status variables, a significant association was found between the dependent variable and the variables very good/good health self-assessment ($p = 0.018$), functional capacity ($p = 0.017$) and depressive mood ($p = 0.017$) (Table 2).

Regarding the health status, the older adults whose perception of health was "very good/good" showed a 77% higher prevalence of fall prevention practices when compared to those who evaluated their health as "poor/very poor". In those who perceived their health as "regular" the prevalence was 88% higher (Table 2).

The prevalence of fall prevention practices in the independent older adults was 1.41 times higher than the prevalence in the dependent older adults. Among the older adults with normal mood, the prevalence of fall prevention practices was 43% higher than the prevalence in the older adults with depressed mood (Table 2).

In the Poisson regression analysis, all variables with $p < 0.20$ were included in the following order: gender, depressive mood, functional capacity, health self-assessment, family income,

Table 1. Prevalence of fall prevention practices among older adults assisted in the Family Health Units according to the sociodemographic variables (n = 199). Tangara da Serra, Mato Grosso, 2015

Variables	n	Prevalence (%)	Crude PR (95% CI)	*p*-value*
Gender				
Female	107	31.1	1.00	0.004
Male	092	43.1	1.38 (1.11-1.73)	
Age group				
60-69 years	093	32.7	1.00	0.152
70 years and more	106	38.7	1.17 (0.94-1.47)	
Marital Status				
Widowed/single/separated	082	32.8	1.00	0.106
Married/stable union	117	38.7	1.20 (0.96-1.51)	
Education				
0 to 4 years of study	167	34.4	1.00	0.098
5 or more years of study	032	44.4	1.29 (0.96-1.72)	
Occupational status				
Retired	148	37.3	1.22 (0.87-1.69)	0.649
Did not work	029	30.5	1.00	
Worked	013	33.3	1.09 (0.63-1.87)	
Retired and worked	009	34.6	1.13 (0.61-2.08)	
Individual income				
Up to 1 MW	006	18.7	1.00	0.039
More than 1MW	193	36.8	1.96 (0.94-4.07)	
Family income				
Up to 2 MW	040	28.4	1.00	0.035
More than 2 MW	159	38.2	1.34 (1.00-1.80)	
Family arrangement				
Alone	029	34.5	1.00	0.803
Accompanied	170	36.0	1.04 (0.76-1.43)	

95% CI: 95% confidence interval; PR: prevalence ratio. * Chi-squared test of association.

individual income, use of tobacco, nutritional status, education, marital status, number of health problems and age. However, the variables: gender, health self-assessment, individual income, use of tobacco, education and age remained in the final model.

Table 3 presents the final multiple model with the following significant variables: gender, self-reported health and education, adjusted for income, use of tobacco and age. The goodness of fit test was performed, showing that the model was appropriate ($p = 0.921$).

The highest prevalence of fall prevention practices was among male older adults, who self-assessed their health as very good/good or regular and had studied for five or more years (Table 3).

The older adult men had a 38% higher prevalence of fall prevention practices when compared to the older adult women, independent of the other variables in the model. The prevalence of fall prevention practices among the older adults with very good/good and regular self-assessments of health were, respectively, 66% and 82% higher than that found in the older adults with poor/very poor self-assessments, independent of income, use of tobacco and age.

In the older adults who had studied for five or more years, the prevalence of fall prevention practices was 35% higher than in the older adults with up to four years of study, adjusted for income, use of tobacco, age and other variables of the regression model.

Table 2. Prevalence of fall prevention practices among older adults assisted in the Family Health Units according to the health status variables (n = 199). Tangara da Serra, Mato Grosso, 2015

Variables	N	Prevalence (%)	Crude PR (95% CI)	*p*-value*
Self-assessment of health				
Very good/good	087	35.4	1.77 (1.10-2.86)	0.018
Regular	098	40.0	1.88 (1.15-3.07)	
Poor/very poor	014	21.2	1.00	
Self-reported health problem				
Yes	195	35.4	1.00	0.234
No	004	57.1	1.61 (0.84-3.09)	
Number of health problems				
None/1 problem	009	24.3	1.00	0.145
2 or more problems	186	36.4	1.49 (0.83-2.65)	
Self-reported vision impairment				
Yes	177	36.5	0.84 (0.58-1.22)	0.326
No	022	30.5	1.00	
Self-reported hearing impairment				
Yes	047	37.6	0.93 (0.72-1.21)	0.620
No	152	35.2	1.00	
Use of medication				
Yes	169	36.4	0.88 (0.64-1.22)	0.444
No	030	32.3	1.00	
Fall in the last year				
Yes	083	37.7	0.91 (0.73-1.14)	0.426
No	116	34.4	1.00	
Fear of falling				
Yes	194	35.5	1.00	0.342
No	005	50.0	0.71 (0.38-1.33)	
Functional capacity				
Independent	162	38.5	1.41 (1.05-1.91)	0.017
Dependent	037	27.2	1.00	
Depressed mood				
Yes	034	26.8	1.00	0.017
No	165	38.4	1.43 (1.05-1.95)	
Nutritional status				
Low weight	015	24.6	1.00	0.080
Normal	093	39.7	1.61 (1.01-2.58)	
Overweight	091	34.7	1.41 (0.88-2.26)	
Smoker				
Yes	013	24.5	1.00	0.074
No	186	36.9	1.50 (0.92-2.44)	
Use of alcohol				
Yes	043	35.5	1.00	0.961
No	156	35.8	1.00 (0.77-1.32)	

95% CI: 95% confidence interval; PR: prevalence ratio. * Chi-squared test of association.

Table 3. Poisson multiple regression model: variables associated with fall prevention practices of older adults assisted in Family Health Units. Tangará da Serra, Mato Grosso, 2015

Variables and categories	Crude PR (95% CI)	Adjusted PR* (95% CI)	*p*-value
Gender			
Female	1.00	1.00	0.003
Male	1.38 (1.11-1.73)	1.38 (1.11-1.72)	
Self-assessment of health			
Very good/good	1.77 (1.10-2.86)	1.66 (1.03-2.66)	0.035
Regular	1.88 (1.15-3.07)	1.82 (1.14-2.90)	0.012
Poor/very poor	1.00	1.00	
Individual income			
Up to 1 MW	1.00	1.00	0.110
Greater than 1MW	1.96 (0.94-4.07)	1.81 (0.87-3.76)	
Smoker			
Yes	1.00	1.00	0.054
No	1.50 (0.92-2.44)	1.59 (0.99-2.56)	
Education			
0 to 4 years of study	1.00	1.00	0.039
5 or more years of study	1.29 (0.96-1.72)	1.35 (1.01-1.81)	
Age group			
60 to 69 years	1.00	1.00	0.198
70 years and more	1.17 (0.94-1.47)	1.16 (0.92-1.46)	

95% CI: 95% confidence interval; PR: prevalence ratio. * Adjusted for income, use of tobacco, age and other variables in the Table using the Poisson regression method.

DISCUSSION

The prevalence of fall prevention practices in the older adults (35.7%) is one of the main findings in this study. A direct comparison with the results of other similar studies is difficult, since investigations of the prevalence of fall prevention practices were only found in studies evaluating the participation of older adults in specific prevention interventions, such as physical exercise. Compared to these studies, it appears that the prevalence found in the present study was higher than the prevalence (3%) of one study[8] and lower than that of other studies[11,16,17] - 64%, 73.1% and 59.1%, respectively.

Probably the lower prevalence of fall prevention practices of this study occurred due to differences in the populations studied. In this study, the prevention practices depended solely on the initiative of the older adults. The studies where the prevalence was higher included the provision of a structured program of interventions, with monitoring and evaluation by professionals in the activities and, in some, there was interaction with other older adults. Studies have shown that potential benefits of the program, recommendations of health professionals, support of caregivers, friends and family and activities that provide social interaction and enjoyment are factors that affect the participation of older adults in fall prevention programs.[18,19]

The higher prevalence of fall prevention practices in the older adult men in this study, can probably be explained by the fact that the older adult men felt more vulnerable. This may mean that more men are interested in prevention activities, including those for falls.

Generally, women more often seek health services, including for the prevention of health problems.[20,21] Regarding falls, studies have shown that older adult women are more likely to seek medical care after a fall or to seek more information about preventing falls than men.[21,22] However, with advancing age, gender differences in the demand for health services decrease due to the emergence of chronic diseases in both genders, thereby increasing vulnerability.[23]

Corroborating the results of this study, some studies has shown that, regarding physical activities, one of the more important fall prevention practices, the proportion of older adult men who perform this is greater than that of older adult women.[24,25] During the aging process women tend to reduce the practice of physical activities that promote muscle growth.[2] In fall prevention programs, it has also been found that there is greater participation of older adult men compared to older adult women.[10,11]

The higher prevalence of preventive practices of falls in older adults whose self-assessed health was very good/good in this study is consistent with previous studies.[8,11] This result suggests

that the positive assessment that older adults make of their health motivates them to adopt healthy behaviors, such as carrying out fall prevention practices.

The self-assessment of health is an indicator used to check the health of populations. The majority of people over 60 self-assess their health as very good, good or regular.[25] When this is positive, it indicates that the older adult has preserved autonomy, mobility and functional capacity, as well as the desire to remain active and independent in their daily activities,[26] important conditions for the development of fall prevention practices.

The higher prevalence of fall prevention practices among the older adults with a self-assessment of regular health was similar to that found in another study[27] and may indicate that even the older adults that perceive their health as "unsatisfactory" worry about performing healthy behaviors. It may be that these people have the aim of improving or maintaining their health and autonomy to prevent falls.

On the other hand, older adults interpret the process of aging and illness differently. By considering themselves healthy, older adults with very good/good and regular health self-assessment do not perceive themselves at risk for falls and so do not adopt prevention behaviors.[28]

Similar to the findings of other studies,[8,11,27] the older adults with higher levels of education practiced more fall prevention activities in this study. This can be explained by the possibility that people with more education can acquire information and understand it better.

Education can be considered one of the social determinants of health and can influence the search for health and the life habits of people.[29] In individuals with more education, the acquisition of knowledge and the understanding of the professional guidance in caring for their health can become easier, leading them to adopt healthy behaviors.[30]

In the case of falls, studies show that knowledge of older adults about the event, its consequences and risk factors influence the performance of preventive practices.[12,18] Older adults with more education tend to seek care networks, as well as acquire information to help prevent falls.[2]

A limitation of this study is that the prevalence of fall prevention practices found was analyzed based on activities that older adults reported doing on a daily basis, however, they were not always applied with the aim of preventing falls. However, the activities were proven by studies to be effective for the prevention of falls in older adults.[4,5]

CONCLUSION

In this study, the prevalence of fall prevention practices found in older adults was 35.7%. The sociodemographic and health factors associated with fall prevention practices were gender, education and self-assessment of health. A higher prevalence of fall prevention practices were observed in older adult men, with higher levels of education and with very good/good and regular self-assessment of health. It is important to develop proposals for fall prevention interventions mainly for older adult females, with a self-assessment of poor/very poor health and low levels of education.

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