Elderly victims of trauma: analysis of the risk factors[*]

IDOSOS VÍTIMAS DE TRAUMA: ANÁLISE DE FATORES DE RISCO

ANCIANOS VÍCTIMAS DE TRAUMA: ANÁLISIS DE FACTORES DE RIESGO

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ABSTRACT

The objective of this study was to identify the risk factors for trauma among the elderly, using a quantitative, cross-sectional approach, as well as logistical regression analysis. This study was performed at the emergency rooms of two hospitals in Curitiba. Interviews were performed with 261 elderly individuals, 56.7% of whom were women, and 43.3% men. Their ages ranged between 60 and 103 years, with most being younger than 70 years (44.8%). The most frequent trauma mechanisms were: falls (75.9%), being run over (9.6%), direct trauma (5.4%) and motor vehicle accident (3.8%). The multivariate analysis permitted the authors to affirm that the female gender, the presence of a caregiver, the utilization of continuous-use medication, and the presence of hearing impairment significantly increased the risk of trauma due to falls. Individuals having vision problems (without the use of glasses) and aged individuals with a monthly income of less than three minimum salaries tend to have a higher risk of suffering trauma due to falls. If the factors that greatly influence trauma among the elderly are evaluated during nursing appointments, it is possible to promote health interventions that favor their prevention.

DESCRIPTORS
Aged
Accidental falls
Wounds and injuries
Risk factors
Geriatric nursing

RESUMO

O objetivo deste estudo foi identificar fatores de risco para o trauma em idosos a partir de abordagem quantitativa e transversal, utilizando análise de regressão logística. Foi realizado no pronto-socorro de dois hospitais da cidade de Curitiba-PR. Foram entrevistados 261 idosos, sendo 56,7% mulheres e 43,3% homens. A idade variou de 60 a 103 anos, com maior concentração em idosos menores de 70 anos (44,8%). Os mecanismos de trauma mais frequentes foram: queda (75,9%), atropelamento (9,6%), trauma direto (5,4%) e acidente automobilístico (3,8%). A análise multivariada permitiu afirmar que, o gênero feminino, a presença de cuidador, medicação de uso contínuo e problemas auditivos aumentam significativamente a probabilidade de trauma por queda. Problemas de visão sem uso de óculos e idosos com renda de até três salários mínimos tendem a ter maior probabilidade de trauma por queda. Os fatores que mais interferem no trauma em idosos podem, se avaliados durante a consulta de enfermagem, possibilitar ações de saúde para a sua prevenção.

DESCRITORES
Idoso
Acidentes por quedas
Ferimentos e lesões
Fatores de risco
Enfermagem geriátrica

RESUMEN

Se objetivó identificar factores de riesgo para trauma en ancianos. Estudio cuantitativo, transversal, utilizando análisis de regresión logística. Realizado en sectores de Emergencias de dos hospitales de Curitiba. Fueron entrevistados 261 ancianos, 56,7% mujeres y 43,3% hombres. La edad varió entre 60 y 103 años, mayor concentración de menores de 70 años (44,8%). Los mecanismos traumáticos más frecuentes fueron: caída (75,9%), atropello (9,6%), trama directo (5,4%) y accidente automovilístico (3,8%). El análisis multivariado permitió afirmar que: el sexo femenino, la presencia de cuidador, medicación continua y presencia de problemas auditivos aumentan significativamente la probabilidad de trauma por caída. Los problemas visuales sin uso de gafas y ancianos con renta de hasta tres salarios mínimos tienden a una mayor probabilidad de trauma por caída. Los factores de mayor injerencia para trauma en ancianos pueden posibilitar acciones de salud preventivas, si se evalúan durante la consulta de enfermería.

DESCRIPTORES
Anciano
Accidentes por caídas
Heridas y traumatismos
Factores de riesgo
Enfermería geriátrica

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INTRODUCTION

Brazil is increasingly becoming a country with *gray hair*, and this aging of the population is affecting Brazilian society. An increase in the age of the population requires a new urban organization and the creation of more suitable health services to meet the unique needs of the elderly. In Brazil, aging is an urban event resulting from the immigration of the population during the 1960s to meet the needs of the country's industrialization demand[1].

Due to this change in the population's profile and increased trauma in old age, the need for interventions to prevent these injuries stand out. Problems in providing care for the aged involve issues such as the need for more frequent hospital admittances, longer hospital stays and high healthcare and rehabilitation costs. All these factors have drawn interest in investigating a relationship between the risk factors associated with trauma and the aged victim of trauma.

A study of external causes of trauma in aged Brazilians demonstrated that deaths related to these causes are much more frequent in the elderly compared to victims in the adolescent and young adults age brackets; therefore, there is a need to prevent external causes of trauma in the elderly population, not only due to the growth in numbers in this population, but also because they are of great importance to the Brazilian economy.

Moreover, the elderly are more physically vulnerable to trauma, have diminished recovery capacity and stay longer periods of time in the hospital as a result of trauma [3]. Elderly patients gradually lose their recovery capacity in maintaining homeostasis, and aging at a cellular level is reflected in functional and anatomic changes. Traumatized elderly people die due to the same reasons as other, younger patients; however, due to pre-existing conditions, less severe injuries result in death more commonly than in young adults[4].

Despite the increase in trauma in old age, few studies seek to identify risk factors so that trauma, complications of trauma and mortality can be prevented in this age bracket. The role of the nurse is highlighted as an important social actor able to assist in preventing or mitigating these issues, especially regarding the prevention of these injuries in such a susceptible population. Thus, the answer to this guiding question was sought: What are the main risk factors that can be prevented regarding trauma in the elderly population?

METHOD

A quantitative cross-sectional research approach was used, performed in the Emergency Room (ER) of two hospitals in the city of Curitiba. Subjects were elderly individuals admitted to these hospital units. Inclusion criteria were: patients aged 60 years or older, both male and female genders, trauma victims who agreed to participate in this research and, in case of hearing and/or cognitive deficit, were accompanied by a caretaker and/or family member. The sample was non-probable (per convenience).

A data collection instrument was created, containing closed questions regarding socio-demographic characteristics and data related to the mechanism of trauma, featuring the aged individuals' lifestyle, time and day of the accident, how they arrived at the emergency room, comorbidities, continuous use medications and the medications used on the day of the accident. The instrument was submitted to a pilot test and evaluated by a statistics professional who adjusted it for the study.

Data collection was performed during the elderly person's stay in the ER, throughout the months of September of 2009 and July of 2010, during the morning, afternoon and evening periods. In order to reach the necessary sample size, we counted on the collaboration of nursing professionals who were previously selected and trained. Ethical aspects were considered according to Resolution No 196 of October 1996, and the study was approved under the Ethics Appreciation Presentation Certificate (CAAE in Brazilian acronyms), No. 0017.0. 084.196-10.

Data were organized in an Excel spreadsheet and analyzed using the Statistical Package for Social Sciences – SPSS version 15.0 software. Results were described in frequencies and percentages. In order to evaluate and associate two qualitative variables, the Chi-Square test or the Fisher's exact test were utilized. In order to evaluate factors associated with mechanisms of trauma (falls or other events), a logistics regression model was adjusted (*stepwise backward*). The Wald test was used to evaluate the importance of each variable in the model. As for the adjustment, odds ratio values were estimated with respective confidence intervals of 95%.

RESULTS

We interviewed 261 elderly patients who were victims of trauma. Females represented the largest portion of the sample, numbering 148 (56.7%). Age varied between 60 and 103 years and the mean was 72.6 ± 9.3 years.

Considering that all patients included in the study sustained trauma, this study evaluated the association among many factors and trauma mechanisms (falls or other types of trauma such as automobile accidents, being run over, and etcetera). Initially, a bivariate analysis was performed considering each one of the following factors:

> Traumatized elderly people die due to the same reasons as other, younger patients; however, due to pre-existing conditions, less severe injuries result in death more commonly than in young adults.

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age, gender, marital status, education, race, type of work (if any), retirement status, income, housing condition, the presence of a caretaker, physical activity and daily routine.

The elderly age bracket is significantly associated with the probability of suffering a fall. Patients aged less than 70 years have a lower risk of suffering trauma due to fall than any other events, when compared to those aged between 70 and 79 years and those aged 80 years or older (p=0.001).

Of all men included in this study, 63.7% suffered trauma due to a fall, versus 85.1% of women (p<0.001). Active working patients have a higher risk of trauma from other events and lower risk of falls than those individuals who are not active (p<0.001). An income of up to 3 minimum wages is associated with a higher possibility of trauma by fall (77.5%;p=0.036).

Regarding the presence of a caretaker, they were present 31.8% of the time, evenly distributed within both genders (33.8% for females and 29.2% for males), and most individuals were above 80 years of age.

Among patients with a caretaker, 91.5% of the trauma cases were due to a fall and only 8.4% were due to other events. Yet among those without a caretaker, the percentage of trauma due to falls was 68.5% and 31.5% by other events. These results demonstrate that a caretaker can be a protective factor for the occurrence of other events (p<0.001).

A bivariate analysis of factors describing ambulation ability indicate elderly patients who use an aid to ambulate (cane, crutches) are more susceptible to falls than patients who do not walk or walk with no assistance (p=0.008).

Sight problems and wearing glasses, as well as hearing problems, result in a higher probability of falls (p=0.019 and p=0.034, respectively).

Regarding comorbidities, results from the bivariate analysis demonstrate that high blood pressure and cardiac diseases are risk factors that significantly affect the probability of falls for elderly patients (p<0.05). Joint diseases and osteoporosis are implicated in a higher probability of falls; however, results were not statistically significance (p=0.118 and p=0.053).

Elderly patients who continuously use medications are at higher risk for falls (p<0.001). The use of antihypertensive drugs is also associated with falls (p=0.007). The use of medication acting on the central nervous system (CNS), hypoglycemia agents and diuretics do not affect the risk of falling (p>0.05).

In order to evaluate factors associated with mechanisms of trauma (falls or other events), a stepwise logistic regression model was adjusted (backwards). While selecting the variables included in this model, an association between the continuous use of medications and comorbidities was observed.

Due to this fact, regarding the adjustment of the multivariate model, the variable *continuous use of medication* was included, along with age, gender, profession, income, the presence of a caretaker, ambulation ability, sight problems without the use of glasses, and hearing problems because they presented a value of p<0.05 in the univariate analysis. Following the adjustment, the significance of the factors which were kept in the model were evaluated and odds ratio (OR) values were estimated according to the respective confidence intervals of 95%.

Results in the multivariate analysis allowed for confirmation that, despite other variables included in the model, being female, the presence of a caretaker, continuous use of medication and the presence of hearing problems significantly increased the probability of trauma due to falls. On the other hand, it may also mean that being male, the absence of a caretaker, the lack of continuous use of medication, and the absence of hearing problems increases the probability of trauma due to other events (Table 1).

Elderly patients with sight problems who wear no glasses and had an income of up to 3 minimum wages tended to have a higher risk of trauma due to falls (Table 1).

Table 1 – Results of the associated factors to the elderly and falls multivariate analysis – Curitiba, 2010

Factor	Higher risk of falls classification	P* Value	OR	CI 95%
Gender	Female	0.008	2.65	1.29 – 5.43
Caretaker	Present	0.001	4.73	1.83 – 12.23
Continuous use of medication	Present	0.025	2.29	1.11 – 4.74
Hearing problems	Present	0.041	4.04	1.06 – 15.41
Sight problems	Present and use of glasses	0.057	3.57	0.97 – 13.23
Income	Up to 3 minimum wages	0.098	2.73	0.83 – 8.99

DISCUSSION

This study differs from most studies performed with aged victims of trauma, since all trauma mechanisms in this study (such as being run over and automobile accidents) were analyzed as a whole. In addition, there is a scarcity of literature regarding the theme, since most research is aimed solely at falls. Therefore, falls are high-

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lighted since they represent 198 cases (75.9%) of all incidents analyzed during the study period.

The logistic regression analysis proposed by this study identified six variables that, despite other variables included in the model, allow confirmation that being female, the presence of a caretaker, continuous use of medication and the presence of hearing problems significantly increase the probability of trauma due to falls. Sight problems without the compensation of glasses and an income of up to three minimum wages represent a higher risk of trauma due to falls.

These results are similar to the national and international scientific literature, not only due to the association of two or three variables according to the features of each investigated population, but also in regards to the differences among the regions in the studies. A previous history of falls, living alone, taking four different types of medication per day and being a female were statistically significant variables in a study with 999 elderly people[5].

Being females, the use of medication and sight deficiency were also, in the same way, shown to be risk factors contributing to falls[6]. In regards to other external causes of trauma, all age brackets presented a higher risk of trauma for males[7]. However, in our study with aged individuals, women experienced more falls compared to other events (other external causes). Therefore, a higher risk of trauma in women due to falls was proved (p=0.008).

In agreement with these data, when men and women are compared, women demonstrated a 1.55 times higher risk of requiring care due to falls than due to other causes[8]. Studies performed in France which utilized a clinical scale to explain the risk of falls in the aged population older than 65 years concluded in the final model, among other variables, that females are strongly at risk of falling and that these events can be prevented[5-9]. In Brazil, elderly female individuals and personal and environmental factors related to women contribute to the risk of falls, demonstrating that female aged individuals fall more often than males (p=0.035)[6].

The presence of a caretaker was significantly associated with the risk of trauma due to falls when compared to other events (p=0.001). For this variable, it is important to demonstrate that these results also mean that the presence of a caretaker can be a protective factor against the occurrence of other events. In other words, the absence of a caretaker increases the probability of trauma by other events. Thus, the importance of a caretaker is highlighted, since in the multivariate analysis of risk factors having a caretaker is associated with the risk of falls; however, having a caretaker present is a protective factor in terms of all other mechanisms of trauma. This study included both formal and informal caretakers.

Training caretakers is necessary, and it is the responsibility of the Family Health Team to provide support to families[10]. Caretakers' cultural and social education is a determining factor in the perceptions and decision-making that will help to prevent falls in the elderly population. In the same way, a lack of interaction between health professionals and caretakers demonstrates a lack of planning and of instituting health promotion and fall prevention programs[11].

Regarding the taking of continuous use medications, this variable was demonstrated to be significantly associated with trauma due to falls when compared to other events (p=0.025). Among these, the use of anti-hypertensive medications is highlighted (p=0.007). Therefore, drugs that affect patients' concentration, motor responses and blood pressure deserve special attention[12].

The evaluation and prevalence of falls associated with the use of medication in aged women in Rio de Janeiro demonstrated that anti-hypertensive medications (β-blockers) were not significantly associated with experiencing one or more falls per year. In the analysis of re-occurring falls (two or more per year) there was a strong association with the use of psychoactive medications, and also a possible relationship with the use of β-blockers (anti-hypertensive medication)[13].

Another study demonstrates that the use of benzodiazepines, antidepressants, nitroglycerin, beta-blockers and diuretics was not significantly related to falls. However, the increase in the risk of falls associated with medication use was significant for three drugs: zolpidem (p=0.02), meprobamate (p=0.01) and calcium channel blockers, a class of anti-hypertensive medication (p=0.02)[14]. Thiazides, another class of anti-hypertensive medications, were associated with an increased risk of falls, and the risk was higher in the first three weeks after beginning therapy. For other anti-hypertensive medication classes, there was no evidence of an increased risk of falls[15].

In light of these research results regarding the use of medication as a risk factor for falls, the need to observe the difference in classes of medications becomes apparent. Since there are a broad variety of drugs on the market, it is quite difficult to list them individually in terms of risk factors. In addition, in the basic health network, medication prescriptions are generically standardized, so that many follow guidelines and obtain prescriptions outside the network.

Seldom do studies approach the relationship of medication use with fractures due to falls, or to the association of the use of polypharmacy with falls[12-16], a fact that was not investigated in this present study.

In this investigation, sight problems in the elderly not corrected by the use of glasses presented a trend towards a higher probability of trauma due to falls (p=0.057). Literature demonstrates that poor sight is associated with the probability of falls (p=0.046), since old age people with poor sight are generally older, have more serious sight

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conditions, suffer from depression, have poor balance (p=0.003) and a higher number of compromised activities (p=0.009)[17]. Another study shows that women without prior fracture incidents, with four or more compromised physical activities, poor subjective perception and poor sight (p=0.005) were more likely to experience a fall[18].

In Australia, a study sought to determine the association between falls and sight and/or hearing deficiency in 2340 men and 3014 women. Compromised vision was more frequent in women, while hearing deficiency was more prevalent in men. Poor hearing and sight were associated with an increased risk of falls, but there was no difference between genders in regards to the association between the results and hearing and sight problems [19]. However, hearing difficulties were not significantly statistically associated (p=0.105) in the study that indentified risk factors associated with falls[6]. Also, females (p=0.035), the use of medication (p=0.047) and poor sight (p=0.029) were factors determined by the authors that corroborated the data in this study.

In the multivariate analysis, an income of up to 3 minimum wages was associated with a higher risk of trauma due to falls (p=0.098). This variable is analyzed in research involving victims of trauma. Low socio-economic status (p=0.01) and level of education (p=0.00) were associated with women who were moderately of highly dependent on others regarding instrumental activities of daily living (IADLs). A study demonstrated that the higher the level of education, the less chance an individual has of having limitations in performing IADLs[20].

In light of these results, six variables that, independent of other variables, significantly increased the risk of trauma due to falls were identified. They are the following: female gender, the presence of a caretaker, continuous use of medication and hearing problems.

The importance of studies in this area are crucial, since trauma in the elderly population affects collective scopes with high economic costs. There is a need for studies with larger samples in order to repeat and enhance these results.

It is important to encourage discussion on this theme within academic and political circles so that, on a medium and long-term basis, strategies that can reduce the incidence of trauma in the elderly population can be implemented, approaching this problem in the public health sector [21].

CONCLUSION

This research sought to investigate all types of trauma that affect aged people admitted to reference emergency rooms in the city of Curitiba.

Data demonstrate that in this population of 261 aged individuals, women are more vulnerable to trauma (56.7%). Ages varied between 60 and 103 years, and there was a higher concentration of people aged less than 70 years (44.8%). Women were distributed equally among all age brackets; however, men were concentrated in the age bracket of younger than 70 years of age (53.9%).

Regarding the presence of a caretaker, they were present 31.8% of the time, evenly distributed within both genders, and caretakers were more frequent with individuals above 80 years old.

Falls were the most frequent mechanism of of trauma (75.9%), higher in women (85.1%) than men (63.7%).

Regarding the variables that were statistically significant, the multivariate analysis allowed the affirmation that being female, the presence of a caretaker, continuous use of medication and the presence of hearing problems significantly increased the probability of trauma due to falls (p<0.05). Sight problems not corrected by the use of glasses and elderly age people with an income lower than 3 minimum wages presented a higher tendency to suffer trauma due to falls.

New studies are needed due to the importance of this theme, since it is a subject of concern, not only due to the rapid growth of the elderly population but also due to the difficulty in creating effective proposals that can prevent trauma in aged individuals. Integrated actions among different levels of healthcare must be added to the objective of favoring cooperation among professionals.

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