



Factors associated with the risk of falls in hospitalized adult patients*

Fatores associados ao risco de quedas em pacientes adultos hospitalizados

Factores asociados con el riesgo de caídas en pacientes adultos hospitalizados

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ABSTRACT

Objective: Analyzing factors related to the risk of falls in hospitalized adult patients. **Method:** A cross-sectional, analytical and quantitative study, developed in Clinical and Surgical Hospitalization Units from June to August 2015. Data collection instruments were sociodemographic and clinical forms, and the Morse Scale. Data were obtained with the patients and from medical records. Absolute and relative frequencies were used in the univariate statistical analysis, and chi-square test in the bivariate analysis. **Results:** 612 patients participated in the study. An association ($p < 0.001$) was found between the high risk of falls and clinical neurological hospitalization, surgical trauma (hospitalization) and comorbidities such as diabetes mellitus, systemic arterial hypertension, visual impairment, vertigo and fear of falling. **Conclusion:** An association between the risk of falls was found due to hospitalization, comorbidities and intrinsic factors. Regarding extrinsic factors, an association between mats/carpets and risk of falls was found. No association between the risk of falls with other extrinsic factors was found.

DESCRIPTORS

Accidental Falls; Inpatients; Patient Safety; Nursing Care.

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INTRODUCTION

In perceiving patient safety as a priority issue in 2004, the World Health Organization (WHO) launched the Global Patient Safety Alliance with the goal of raising awareness for improving health care safety⁽¹⁾. In this sense, the Ministry of Health instituted the National Patient Safety Program (*Programa Nacional de Segurança do Paciente – PNSP*) through Ordinance number 529 in 2013. This policy reinforced the importance of promoting patient safety in health institutions with a focus on qualifying health care⁽²⁾. The *PNSP* is composed of six goals, among them falls prevention which is defined by WHO as an “event in which the person inadvertently falls to the ground, floor or lower levels, excluding the intentional alteration of the position for resting on furniture, walls or other objects”⁽¹⁻³⁾.

Brazilian studies developed in hospital environments where the rate of falls was evaluated found that they ranged from 1.37 to 12.6 per 1,000 patients/day⁽⁴⁻⁵⁾. These rates are related to the characteristics of the hospital institutions, as well as the patients. Different risk factors interact as decisive and predisposing agents for the occurrence of falls. This gives healthcare professionals the challenge of identifying the possible intrinsic and extrinsic risk factors presented by the patient with the objective of intervening in them.

The risk of falls can be monitored by scales such as the Morse Scale, translated and validated in Brazil in 2013⁽⁶⁻⁷⁾, which is one of the most widely used methods for evaluating the risk of falls in the hospital environment, and in which factors related to the patient are assessed. Falls are classified into three types: accidental, physiologically anticipated and physiologically unanticipated. This study will address Anticipated Physiological Falls, considered as predictable and detectable by Morse Scale classification. It is relevant to emphasize the importance of differentiating between the three types of falls for defining prevention strategies⁽⁸⁾.

Furthermore, among causes that influence falls may include intrinsic and/or extrinsic risk factors. Intrinsic factors are those associated with the characteristics of the individual and the changes related to age, gender and clinical conditions. Among them, the most frequent are illness/disease, use of devices, gait alteration, ocular, auditory and cognitive impairment, impaired mobility and previous history of falls. Extrinsic factors are commonly related to the hospital environment conditions and to situations involving health care by a caregiver and interdisciplinary team⁽⁹⁻¹⁰⁾. Among the extrinsic risk factors are: light switches out of reach, stairs, slippery floor, mats/carpets, improper lighting and inadequate footwear⁽⁹⁾.

The prevalence of falls in a service is one of the indicators of the quality of care provided and one of the international goals for patient safety. Thus, it constitutes one of the concerns of health institutions since it is an event that can determine complications such as increased hospitalization time, morbidity, mortality, and higher hospital costs. In this sense, understanding the risk factors makes it possible to implement strategies to reduce the occurrence and damage from falls.

In doing so, combining extrinsic and intrinsic factors to the risk of falls will enable establishing a prevalent diagnosis, as well as implementing an assertive intervention in the prevention of falls. Thus, the relevance of the study in focus lies in the association of risk factors and classification of the Morse Scale, as this association was not found in databases to date. Thus, this study aimed to analyze the factors related to the risk of falls in hospitalized adult patients.

METHOD

A quantitative, cross-sectional and analytical study developed in Clinical and Surgical Hospitalization Units of a medium-sized private hospital in the northwest region of the state of Rio Grande do Sul. The institution has 115 beds, and 79 are located in the study scenario.

Participants were hospitalized patients at these units from June 1 to August 17, 2015. The sample definition was based on the number of hospital admissions in the same period of the previous year in order to have similar hospitalization characteristics, meaning that 1,356 patients were admitted to the units. The sample size was calculated with a 3% error, a 95% confidence level and a 50% risk of fall ratio ($p=0.5$), resulting in 597 patients and an estimated excess of 5% to compensate for eventual losses, thus totaling 627 patients. Therefore, 627 patients were invited, eight refused, six were hospitalized more than once during the study period and one was excluded due to incomplete data, corresponding to 612 patients. The inclusion criteria were patients older than 18 years, hospitalized in clinical or surgical units within a period of up to 24 hours. Exclusion criteria were patients who were hospitalized more than once in the study period.

Data collection was performed by the researcher and six previously trained nursing students, using a protocol with conceptual and operational definitions for the evaluated variables, the subject guidelines and data collection instruments. The sociodemographic and clinical variables were: age, gender, reason for hospitalization, medical specialization that referred hospitalization, type of hospitalization, diseases, use of devices, deficiencies, and extrinsic and intrinsic factors. The Morse Scale was used in addition to this instrument.

This scale includes six topics: history of falls, secondary diagnosis, walking assistance, endovenous therapy/salinized or heparinized endovenous device, gait and mental state, each with different scores. It has a variation from zero to 125 points, and classification occurs according to the score: from zero to 24 points indicates a low risk of falling during hospitalization; between 25 and 44, a moderate risk of falls; and 45 points or higher indicates a high risk of falls⁽⁶⁻⁸⁾.

Data collection instruments were individually applied in the patient's hospitalization unit in their bed after explanation about the research and signing of the Clear and Informed Consent Form two ways. In cases of unresponsive patients, the patient's family member or responsible caregiver (having more than 3 months of accompanying the patient) was consulted.

Data collection instruments were applied sequentially by sociodemographic data, general aspects, factors associated with the risk of falls, Morse Scale, and finally, analysis of

medical records. Changes in gait were evaluated based on the operational definition of the Morse Scale, and hearing and vision deficit were self-reported by the patients⁽⁷⁾. The patients were accessed only once, and the record of occurrence of falls was made available by notifying the nursing coordination of the hospital institution.

Descriptive statistics (absolute and relative frequency) were used to characterize the sample in the data analysis. The chi-square test was used in the bivariate analysis in order to verify the association between type of hospitalization, intrinsic and extrinsic factors, comorbidities, reason for hospitalization and risk of falls, considering a 5% level of significance. SPSS v. 23 (Statistical Package for Social Sciences) was used for all statistical analyzes. Data was entered in the mentioned software by double typing and checking for typing errors.

Ethical aspects have been respected according to Guidelines and Norms Regulating Research Involving Human Beings and Resolution 466/2012 of the National

Health Council, and the study was submitted and approved by the Research Ethics Committee of UNIJUÍ, CAAE 43893615.6.0000.5350. We emphasize that the hospital institution provided the Term of Consent for use of the data in the medical records.

RESULTS

Six hundred and twelve (612) patients participated in the study, 62.3% were females aged between 18 and 100 years, 54.6% of the patients were under the age of 60, 29.1% had incomplete primary education, 96.2% were white and 62.4% were married.

Regarding the risk of falls according to the Morse scale, 38.2% of the patients were classified as having a low risk of falling, 30.1% with moderate risk and 31.7% with high risk (Table 1). No association ($p=0.072$) between gender and the risk of falls (Morse scale) was observed. On the other hand, an association ($p < 0.001$) between age (elderly and non-elderly) and risk of falls was found.

Table 1 – Characterization of patients related to the risk of falls in hospitalized adults in a private hospital – Ijuí, Rio Grande do Sul, Brazil, 2015.

	Risk classification			Total n (%)	P value
	0 - 24/ Low risk n (%)	25 - 44/ Moderate risk n (%)	Higher or equal to 45/ High risk n (%)		
Gender					
Males	75 (32.5)	75 (32.5)	81 (35.1)	231 (37.7)	0.072
Females	159 (41.7)	109 (28.6)	113 (29.7)	381 (62.3)	
Age					
Less than 60 years of age	188 (56.3) [†]	88 (26.3) [‡]	58 (17.4) [‡]	334 (54.6)	< 0.001
60 years of age or more	46 (16.5) [‡]	96 (34.5) [†]	136 (48.9) [†]	278 (45.4)	
Total	234 (38.2)	184 (30.1)	194 (31.7)	612 (100.0)	

p for the chi-square test; [†] Larger than expected absolute frequency observed in the study, detected by analysis of the standardized chi-square test residuals; [‡] Smaller-than-expected absolute frequency observed in the study, detected by analysis of the standardized chi-square test residuals.

An association ($p < 0.001$) between type of hospitalization (clinical or surgical) and risk of falls (Table 2) was found. Some of the patients with clinical admission had high risk (45.1%), followed by moderate risk (33%) of falls. Among the patients with high risk of falls, the majority were neurological admissions (59.4%), followed by respiratory hospitalization (48.1%). On the other hand, hospitalization

for surgical reasons occurred in 52.9% of the total number of hospitalized patients in the study period. Of these, the majority (52.8%) had low risk of falls, and among them 70.9% were obstetric admissions. Furthermore, a considerable number of patients who underwent trauma surgery (42.3%) had a high risk for falls. The significance of the chi-square test was due to the low and moderate risk categories.

Table 2 – Distribution of the type of patient hospitalization related to the risk of falls in hospitalized adults in a private hospital – Ijuí, Rio Grande do Sul, Brazil, 2015.

Type of hospitalization	Risk classification			Total n (%)	P value
	0 - 24/ Low risk n (%)	25 - 44/ Moderate risk n (%)	Higher or equal to 45/ High risk n (%)		
Type					< 0.001
Total Clinical	63 (21.9) [‡]	95 (33.0) [†]	130 (45.1)	288 (47.1)	

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Type of hospitalization	Risk classification			Total n (%)	P value
	0 - 24/ Low risk n (%)	25 - 44/ Moderate risk n (%)	Higher or equal to 45/ High risk n (%)		
Respiratory	10 (12.3)	32 (39.5)	39 (48.1)	81 (28.1)	
Neurological	12 (18.8)	14 (21.9)	38 (59.4)	64 (22.2)	
Gastrointestinal	11 (34.4)	11 (34.4)	10 (31.3)	32 (11.1)	
Oncological	3 (11.5)	11 (42.3)	12 (46.2)	26 (9.0)	
Psychiatric	7 (50.0)	4 (28.6)	3 (21.4)	14 (4.9)	
Cardiologic	1 (7.7)	4 (30.8)	8 (61.5)	13 (4.5)	
Others	19 (32.8)	19 (32.8)	20 (34.4)	58 (20.1)	
Total Surgical	171 (52.8)[#]	89 (27.5)[#]	64 (19.8)	324 (52.9)	
Obstetric	61 (70.9)	17 (19.8)	8 (9.3)	86 (26.5)	
Traumatological	25 (35.2)	16 (22.9)	30 (42.3)	71 (21.9)	
Gastrointestinal	19 (44.2)	20 (46.5)	4 (9.3)	43 (13.3)	
Urological	16 (44.4)	13 (36.1)	7 (19.4)	36 (11.1)	
Gynecological	10 (55.6)	6 (33.3)	2 (11.1)	18 (5.6)	
Vascular	5 (27.8)	9 (50.0)	4 (22.2)	18 (5.6)	
Others	35 (67.3)	8 (15.4)	9 (17.3)	52 (16.0)	

p for the chi-square test; # Larger than expected absolute frequency observed in the study, detected by analysis of the standardized chi-square test residuals; § Smaller-than-expected absolute frequency observed in the study, detected by analysis of the standardized chi-square test residuals.

Of the comorbidities, systemic arterial hypertension (SAH) had the highest percentage (38.2%), with moderate (43.2%) and high (41.9%) risk for falls. The other comorbidities (diabetes mellitus and Parkinson's) presented high risk for falls.

All intrinsic risk factors had a significant association with risk of falls. Patients who presented hearing difficulties (55.6%), vertigo (49.5%), fear of falling (40.7%) and

visual difficulty (36.0%) had high risk for falls. In the analysis of the extrinsic risk factors, no relationship was observed between factors such as not maintaining raised bed rails and having a high bed with the risk of falls. Of the patients who considered carpets/mats as a risk factor for falls, 52.4% and 21.8% presented low and high risk for falls, respectively. Thus, these categories contributed to the significance of the chi-square test (Table 3).

Table 3 – Analysis of intrinsic and extrinsic factors related to the risk of falls in hospitalized adults in a private hospital – Ijuí, Rio Grande do Sul, Brazil, 2015.

Factors	Risk classification			Total n (%)	P value
	0 - 24/Low risk n (%)	25 - 44/ Moderate risk n (%)	Higher or equal to 45/ High risk n (%)		
Intrinsic Factors					
Visual Difficulty (Uses glasses)	117 (31.0) [§]	125 (33.1) [#]	136 (36.0) [#]	378 (61.8)	< 0.001
Auditory Difficulty (Uses hearing apparatus)	5 (27.8)	3 (16.7)	10 (55.6) [#]	18 (2.9)	0.001
Fear of falling	77 (28.2) [§]	85 (31.1)	111 (40.7) [#]	273 (44.6)	< 0.001
Extrinsic Factors					
Does not maintain raised bed rails	9 (26.5)	13 (38.2)	12 (35.3)	34 (5.6)	0.325
High bed	29 (35.4)	21 (25.6)	32 (39.0)	82 (13.4)	0.296
Carpets/mats	77 (52.4) [#]	38 (25.9)	32 (21.8) [§]	147 (24.0)	< 0.001

p for the chi-square test; # Larger than expected absolute frequency observed in the study, detected by analysis of the standardized chi-square test residuals; § Smaller-than-expected absolute frequency observed in the study, detected by analysis of the standardized chi-square test residuals.

DISCUSSION

This study analyzed factors related to the risk of falls in adult patients hospitalized in a private hospital and related them to the mentioned classification in the following aspects: intrinsic and extrinsic factors, comorbidities and types of hospitalization. Most of the participants of the study had the following characteristics: less than 60 years of age, females and incomplete secondary education. Regarding age, gender and education, studies have shown a higher risk of falls among women over 65 years⁽¹¹⁻¹²⁾. One study indicates

that educational level influences spatial location, so that individuals with a low educational level need more time and make more errors when performing visual search tasks⁽¹³⁾.

The data mentioned resemble those of a study conducted in a private hospital of high complexity, with accreditation of its quality by the *International Joint Commission*. This study found that the clinic was one of the hospitalization units with the highest fall rates (2.79 falls/1,000 patients per day), while the index ranged from zero to 1.66 falls/1,000 patients per day in the other units⁽⁵⁾. Another study found

755 incidents reported after evaluating electronic records of incidents, with the highest frequency of notifications occurring in the hospitalization/inpatient units (64.8%), and the most prevalent incident in the study was falls (45.4%)⁽¹⁴⁾.

Surgical admission presented statistical significance in the high risk classification of falls for traumatic surgical patients (42.3%). It is important to emphasize that this surgical procedure notoriously increases the risk of falling because it affects the patient's mobility and memory due to the use of drugs for sedation, pain control and others, which may increase the risk of falls⁽¹⁵⁾.

Patients with medical diagnosis of diabetes mellitus (DM) presented high risk for falls (51.6%). In this sense, it is important to pay attention to these patients because of their potential complications that the pathophysiology predisposes, as evidenced in a study that identified differentiated characteristics of patients with type 2 DM complicated by nephropathy, neuropathy or retinopathy lesions who had suffered hip fractures related to falls. The analysis of 1,225 patients admitted to six hospitals showed that 107 (8.7%) had clinical evidence of end organ damage related to type 2 DM, thus verifying the need to identify and offer preventive actions aimed at reducing the risk of falls in this population⁽¹⁶⁾.

Patients with Parkinson's disease presented high risk for falls. One study has shown that gait and balance are impaired in patients with Parkinson's, which can lead to severe falls and injuries⁽¹⁷⁾. Another study showed that these patients also present this type of risk, therefore, they should be referred to early postural rehabilitation in order to improve gait and accordingly prevent falls⁽¹⁸⁾.

This research identified that auditory deficit is related to the high risk of falls. The study analyzed the prevalence of vertigo and associated factors in a group of elderly people and found that the sensation of falling was related to the auditory deficit and recurrent falls⁽¹⁹⁾. Moreover, it also mentioned that vestibular dysfunctions limit control and cause postural misalignment, which may explain how dizziness can be a trigger for falls.

The Morse Scale includes parameters that may be associated with comorbidities (DM, SAH and Parkinson's) and with intrinsic factor (vertigo), such as presence of secondary diagnosis and staggering/unsteady gait. Literature points out that these problems are expected to be associated with the risk of falls, and this study reinforces findings^(16-17,19) that can determine serious consequences, including death.

Regarding the fear of falling, 40.7% of the patients who mentioned having this feeling had high risk for falls. Falls and the fear of falling are related to each other as risk factors, as verified in a study that evaluated 53 individuals aged between 65 and 89 years with a history of previous falls. Introducing interventions to reduce the fear of falling, improve health and balance have proven effective, as the fear of falling is influenced by physical, psychological and cognitive problems⁽²⁰⁾.

Visual difficulty was evidenced in this study as a risk factor for falls, with significant relevance. This data is in line with a study in which visual difficulty was evidenced as a risk factor for falls in the elderly population. The study also

identified the prevalence of visual impairment in 81.4% of the participants and a 54.2% drop in those who had this impairment⁽²¹⁾. Thus, the classification of falls risk favors the planning of interventions with the purpose of preventing this adverse event⁽²²⁾. Another study which used the Morse Scale to analyze risk factors for falls in the first 48 hours of hospitalization and associate them with the occurrence of falls, also found a statistical association between visual impairment and occurrence of falls, since 88.6% of those who (previously) fell had this impairment⁽²³⁾. It is important to emphasize that this risk factor is little emphasized in existing studies related to the risk of falls.

Regarding extrinsic factors, an association between carpets/mats and risk of falls was found and did not occur between the risk of falls with other extrinsic factors. Another study identified the risks of new accidents due to falls in the elderly in a hospital outpatient clinic of traumatology, and found that the identification of intrinsic and extrinsic factors can help nurses in planning and implementing actions and measures that stimulate an environmental change, changes in life habits and reduction of falls⁽²⁴⁾.

Research into the factors associated with risk of falls is a resource that positively influences health care. The use of the Morse Scale was effective in other studies because its use showed high sensitivity in classification⁽²⁵⁾ since the great majority of patients who fell had a high risk for falls⁽²³⁾. One study analyzed the Morse Scale in hospitalized Portuguese adult patients in association with their characteristics, diagnosis and length of stay, evidencing that several risk factors for falls are not evaluated by it; a result that is in agreement with the results of this study⁽²⁶⁾.

Among the limitations of this study, we can point out that the data were collected in a single moment during participants' hospitalization. In addition, changes in health status during hospitalization were not measured, thus, potential risk factors may have altered the risk of falls during hospitalization.

CONCLUSION

An association between risk of falls, reason for hospitalization, comorbidities and intrinsic factors was identified. Carpets/mats were the only extrinsic factors for falls. The elderly participants who presented a high risk of falls were hospitalized due to clinical neurological (59.4%) or traumatic surgical (42.3%) reasons, with Parkinson's (100%), diabetes mellitus (51.6%), or systemic arterial hypertension (41.9%). A statistically significant association was found between the high risk of falling and intrinsic factors of hearing difficulty (55.6%), vertigo (49.5%), fear of falling (40.7%), and visual impairment (36.0%).

The results show the need for health professionals to understand the factors related to falls, so that it is possible to develop health education, falls prevention and care qualification actions. In this sense, it is important that new studies are carried out in other institutional realities and scenarios. Thus, hospitals would be improved by obtaining information about falls, as well as the associated risk factors for effectively intervening and potentiating patient safety.

RESUMO

Objetivo: Analisar os fatores relacionados ao risco de quedas em pacientes adultos internados em um hospital. **Método:** Estudo transversal, analítico e quantitativo, desenvolvido em Unidades de Internação Clínica e Cirúrgica, no período de junho a agosto 2015. Os instrumentos de coleta de dados foram formulários sociodemográfico, clínico e Escala de Morse. Os dados foram obtidos com os pacientes e nos prontuários. Na análise estatística univariada utilizou-se de frequência absoluta e relativa, e na bivariada utilizou-se do teste de qui-quadrado. **Resultados:** Participaram do estudo 612 pacientes. Foi encontrada associação ($p < 0,001$) entre o elevado risco de queda e a internação clínica neurológica, a cirúrgica traumatológica e comorbidades como diabetes mellitus, hipertensão arterial sistêmica, dificuldade visual, vertigens e medo de cair. **Conclusão:** Existe associação entre o risco de quedas com motivo de internação, comorbidades e fatores intrínsecos. Em relação aos fatores extrínsecos, foi encontrada associação entre tapetes e risco de quedas. Não houve associação entre o risco de quedas com outros fatores extrínsecos.

DESCRITORES

Acidentes por Quedas; Pacientes Internados; Segurança do Paciente; Cuidados de Enfermagem.

RESUMEN

Objetivo: Analizar los factores relacionados con el riesgo de caídas en pacientes adultos en estancia hospitalaria. **Método:** Estudio transversal, analítico y cuantitativo, desarrollado en Unidades de Estancia Clínica y Quirúrgica, en el período de junio a agosto de 2015. Los instrumentos de recolección de datos fueron formulario sociodemográfico y clínico y Escala de Morse. Los datos fueron obtenidos de los pacientes y las fichas. Para el análisis estadístico univariado se utilizó frecuencia absoluta y relativa y en el bivariado se utilizó la prueba de chi-cuadrado. **Resultados:** Participaron en el estudio 612 mujeres. Se encontró asociación ($p < 0,001$) entre el elevado riesgo de caída y la estancia hospitalaria clínica neurológica, la quirúrgica traumatológica y las comorbilidades como diabetes mellitus, hipertensión arterial sistémica, dificultad visual, vértigos y miedo de caer. **Conclusión:** Existe asociación entre el riesgo de caídas por motivo de estancia hospitalaria, comorbilidades y factores intrínsecos. Con relación a los factores extrínsecos, se encontró asociación entre alfombras y riesgo de caídas. No hubo asociación entre el riesgo de caídas con otros factores extrínsecos.

DESCRIPTORES

Accidentes por Caídas; Pacientes Internos; Seguridad del Paciente; Atención de Enfermería.

REFERENCES

- World Health Organization. World Alliance for Patient Safety. Summary of the evidence on patient safety: implications for research [Internet]. Geneva: WHO; 2008 [cited 2016 Jan 5]. Available from: http://www.who.int/patientsafety/information_centre/20080523_Summary_of_the_evidence_on_patient_safety.pdf
- Brasil. Ministério da Saúde. Portaria n. 529, de 1º de abril de 2013. Institui o Programa Nacional de Segurança do Paciente (PNSP) [Internet]. Brasília; 2013 [citado 2016 jan. 5]. Disponível em: http://bvsm.sau.gov.br/bvs/sau/legis/gm/2013/prt0529_01_04_2013.html
- Brasil. Ministério da Saúde; Agência Nacional de Vigilância Sanitária. Segurança do Paciente. Protocolo de Prevenção de Quedas [Internet]. Brasília: ANVISA; 2013 [citado 2016 jan. 5]. Disponível em: <http://www20.anvisa.gov.br/segurancadopaciente/index.php/publicacoes/item/prevencao-de-quedas>
- Abreu HCA, Reiners AAO, Azevedo RCS, Silva AMC, Abreu DROM, Oliveira AD. Incidence and predicting factors of falls of older inpatients. Rev Saúde Pública [Internet]. 2015 [cited 2016 Jan 5];49:37. Available from: <http://www.scielo.br/pdf/rsp/v49/0034-8910-rsp-S0034-89102015049005549.pdf>
- Correa AD, Marques IAB, Martinez MC, Laurino PS, Leão ER, Chimentão DMN. The implementation of a hospital's fall management protocol: results of a four-year follow-up. Rev Esc Enferm USP [Internet]. 2012 [cited 2016 Jan 4];46(1):65-71. Available from: http://www.scielo.br/pdf/reeusp/v46n1/en_v46n1a09.pdf
- Morse JM, Black C, Oberle K, Donahue P. A prospective study to identify the fall-prone patient. Soc Sci Med. 1989;28(1):81-6.
- Urbanetto JS, Creutzberg M, Franz F, Ojeda BS, Gustavo AS, Bittencourt HR, et al. Morse Fall Scale: translation and transcultural adaptation for the portuguese language. Rev Esc Enferm USP [Internet]. 2013 [cited 2016 Jan 24];47(3):568-74. Available from: http://www.scielo.br/pdf/reeusp/v47n3/en_0080-6234-reeusp-47-3-00569.pdf
- Morse JM. Preventing patient falls: establishing a falls intervention program. 2nd ed. New York: Springer; 2009.
- Chianca TCM, Andrade CR, Albuquerque J, Wenceslau LCC, Tadeu LFR, Macieira TGR, et al. Prevalência de quedas em idosos cadastrados em um Centro de Saúde de Belo Horizonte-MG. Rev Bras Enferm [Internet]. 2013 [citado 2016 jan. 24];66(2):234-40. Disponível em: <http://www.scielo.br/pdf/reben/v66n2/13.pdf>
- Lovallo C, Rolandi S, Rossetti AM, Lusingnani M. Accidental falls in hospital inpatients: evaluation of sensitivity and specificity of two risk assessment tools. J Adv Nurs. 2010;66(3):690-6.
- Abreu C, Mendes A, Monteiro J, Santos FR. Falls in hospital settings: a longitudinal study. Rev Latino Am Enfermagem [Internet]. 2012 [cited 2016 Jan 14];20(3):597-603. Available from: <http://www.scielo.br/pdf/rlae/v20n3/a23v20n3.pdf>
- Costa SGRF, Monteiro DR, Hemesath MP, Almeida MA. Caracterização das quedas do leito sofridas por pacientes internados em um hospital universitário. Rev Gaúcha Enferm [Internet]. 2011 [citado 2016 fev. 13];32(4):676-81. Disponível em: <http://www.scielo.br/pdf/rgenf/v32n4/v32n4a06.pdf>
- Custódio EB, Malaquias JJ, Voos MC. Relação entre cognição (função executiva e percepção espacial) e equilíbrio de idosos de baixa escolaridade. Fisioter Pesq [Internet]. 2010 [cited 2015 nov. 28];17(1):46-51. Disponível em: <http://www.scielo.br/pdf/fp/v17n1/09.pdf>

14. Lorenzini E, Santi JAR, Bão ACP. Segurança do paciente: análise dos incidentes notificados em um hospital do sul do Brasil. *Rev Gaúcha Enferm* [Internet]. 2014 [citado 2015 nov. 28];35(2):121-7. Disponível em: http://www.scielo.br/pdf/rge/v35n2/pt_1983-1447-rge-35-02-00121.pdf
15. Costa-Dias MJM, Ferreira PL. Escalas de avaliação de risco de quedas. *Rev Enferm Ref* [Internet]. 2014 [citado 2016 jan. 20];4(2):153-61. Disponível em: <http://www.scielo.mec.pt/pdf/ref/vser1Vn2/ser1Vn2a16.pdf>
16. Formiga F, Chivite D, Ruiz D, Navarro M, Perez CJM, Duaso E et al. Clinical evidence of diabetes mellitus end-organ damage as risk factor for falls complicated by hip fracture: a multi-center study of 1225 patients. *Diabetes Res*. 2015;109(2):233-7.
17. McNeely ME, Ducan RP, Earhart GM. Medication improves balance and complex gait performance in Parkinson disease. *Gait Posture*. 2012;36(1):144-8.
18. Barbosa AF, Chen J, Freitag F, Valente D, Souza CO, Voos MC, et al. Gait, posture and cognition in Parkinson's disease. *Dement Neuropsychol* [Internet]. 2016 [cited 2016 Feb 8];10(4):280-6. Available from: <http://www.scielo.br/pdf/dn/v10n4/1980-5764-dn-10-04-00280.pdf>
19. Moraes SA, Soares WJS, Rodrigues RAS, Fett WCR, Ferriolli E, Perracini MR. Tontura em idosos da comunidade: estudo de base populacional. *Braz J Otorhinolaryngol* [Internet]. 2011 [citado 2016 mar. 7];77(6):691-9. Disponível em: <http://www.scielo.br/pdf/bjorl/v77n6/v77n6a03.pdf>
20. Meléndez-Moral JC, Garzón-Soler T, Sales-Galán A, Mayordomo-Rodríguez T. Efectividad de una intervención para reducir el miedo a caer en las personas mayores. *Aquichan* [Internet]. 2014 [citado 2016 jan. 24];14(2):207-15. Disponible en: <http://aquichan.unisabana.edu.co/index.php/aquichan/article/view/2397>
21. Menezes RL, Bachion MM. Condições visuais autorrelatadas e quedas em idosos institucionalizados. *Rev Bras Oftalmol* [Internet]. 2012 [citado 2016 jan. 24];71(1):23-7. Disponível em: <http://www.scielo.br/pdf/rbof/v71n1/05.pdf>
22. Luzia MF, Victor MAG, Lucena AF. Nursing Diagnosis Risk for falls: prevalence and clinical profile of hospitalized patients. *Rev Latino Am Enfermagem* [Internet]. 2014 [cited 2016 Jan 02];22(2):262-8. Available from: <http://www.scielo.br/pdf/rlae/v22n2/0104-1169-rlae-22-02-00262.pdf>
23. Remor CP, Cruz CB, Urbanetto JS. Analysis of fall risk factors in adults within the first 48 hours of hospitalization. *Rev Gaúcha Enferm* [Internet]. 2014 [cited 2016 Dec 02];35(4):28-34. Available from: <http://www.scielo.br/pdf/rge/v35n4/1983-1447-rge-35-04-00028.pdf>
24. Gautério DP, Zortea B, Santos SSC, Tarouco BS, Lopes MJ, Fonseca CJ. Risk factors for new accidental falls in elderly patients at traumatology ambulatory center. *Invest Educ Enferm* [Internet]. 2015 [cited 2017 Feb 08]; 33(1):35-43. Available from: <http://www.scielo.org.co/pdf/iee/v33n1/v33n1a05.pdf>
25. Cumbler EU, Simpson JR, Rosenthal LD, Likosky DJ. Inpatient falls: defining the problem and identifying possible solutions. Part I: an evidence-based review. *Neurohospitalist*. 2013;3(3):135-43.
26. Sardo PMG, Simões CSO, Alvarelhão JJM, Simões JFFL, Melo EM. Fall risk assessment: retrospective analysis of Morse Fall Scale scores in Portuguese hospitalized adult patients. *Appl Nurs Res*. 2016;31:34-40.

