

Risk factors associated to falls of hospitalized patients in medical-surgical clinics

Fatores de risco associados à queda em pacientes internados na clínica médica-cirúrgica
Factores de riesgo asociados a caídas en pacientes internados en clínica médica-quirúrgica

Jefferson Ribeiro Aguiar¹
Amanda de Oliveira Barbosa¹
Nelson Miguel Galindo Neto²
Marcos Aguiar Ribeiro¹
Joselany Áfio Caetano³
Lívia Moreira Barros¹

Keywords

Patient safety; Accidental falls; Risk factors

Descritores

Segurança do paciente; Acidente por quedas;
Fatores e risco

Descriptores

Seguridad del paciente; Accidentes por caídas;
Factores de riesgo

Submitted

June 6, 2018

Approved

July 22, 2019

Abstract

Objective: To identify the risk factors associated to falls of hospitalized patients in medical-surgical clinics.

Methods: Analytic and descriptive study with a quantitative approach, carried out from June to September 2017 in a large-scale public hospital in the northern area of Ceará state, Brazil. The sample had 155 patients and data collection was made through a structured tool split in five parts: a) Clinical-Epidemiologic Data; b) Mini-mental state examination; c) Morse Fall Scale application; d) Katz Index application; and e) "Fall Risk" Nursing Diagnosis (ND). For statistical analysis, a 5% sample error was taken into consideration.

Results: Out of 155 patients, 41.2% (64) had a clinical diagnosis and 58.8% (91) were traumatological patients. Statistic correlation was identified for fall occurrences between hospitalization days ($p=0.07$), mini mental examination ($p=0.048$) and Katz ($p=0.017$) for clinical patients, while traumatological patients presented fall occurrence positive association on variables age ($p=0.028$) and Katz ($p=0.037$).

Conclusion: Main identified risk factors were: use of auxiliary devices, fall background, post-surgical status, walking difficulties, decreased strength on body extremities, impaired balance, impaired physical mobility, little-known setting, and insufficient non-slip flooring in bathrooms.

Resumo

Objetivo: Identificar os fatores de risco associados à quedas em pacientes internados na clínica médica-cirúrgica.

Métodos: Estudo analítico e descritivo com abordagem quantitativa realizado de junho a setembro de 2017 em hospital público de grande porte da região norte do estado do Ceará-Brasil. A amostra foi de 155 pacientes e a coleta ocorreu por meio de instrumento estruturado dividido em cinco partes: a) Dados Clínico-Epidemiológicos; b) Aplicação do Mini-mental; c) Aplicação da Escala de queda de Morse; d) Aplicação do índice de Katz; e) Diagnóstico de Enfermagem "Risco de Quedas". Para análise estatística, foi considerado erro amostral de 5%.

Resultados: Dos 155 pacientes, 41,2% (64) possuíam diagnóstico clínico e 58,8% (91) eram pacientes traumatológicos. Foi identificado correlação estatisticamente para ocorrência de quedas entre dias de internamento ($p=0,07$), Mini exame mental ($p=0,048$) e Katz ($p=0,017$) para os pacientes clínicos enquanto que os pacientes traumatológicos apresentam associação positiva para ocorrência de quedas nas variáveis idade ($p=0,028$) e Katz ($p=0,037$).

Conclusão: Os principais fatores de risco identificados foram: uso de dispositivos auxiliares, história de quedas, estar em pós-operatório, dificuldade na marcha, força diminuída nas extremidades, equilíbrio prejudicado, mobilidade física prejudicada, cenário pouco conhecido e material antiderrapante insuficiente no banheiro.

Resumen

Objetivo: Identificar los factores de riesgo asociados a caídas en pacientes internados en clínica médica-quirúrgica.

Métodos: Estudio analítico y descriptivo con enfoque cuantitativo realizado de junio a septiembre de 2017 en un hospital público grande de la región norte del estado de Ceará, Brasil. La muestra fue de 155 pacientes y la recolección se realizó a través de instrumento estructurado dividido en cinco partes: a) Datos clínico-epidemiológicos, b) Aplicación de la prueba Mini-mental, c) Aplicación de la escala de caídas de Morse, d) Aplicación del índice de Katz y e) Diagnóstico de enfermería "Riesgo de caídas". Para el análisis estadístico, se consideró error muestral de 5%.

Resultados: De los 155 pacientes, el 41,2% (64) tenía diagnóstico clínico y el 58,8% (91) era de pacientes traumatológicos. Se identificó correlación estadística en casos de caídas con días de internación ($p=0,07$), prueba Mini-mental ($p=0,048$) y Katz ($p=0,017$) en pacientes clínicos, mientras que los pacientes traumatológicos presentaron relación positiva en casos de caídas en las variables edad ($p=0,028$) y Katz ($p=0,037$).

Conclusión: Los principales factores de riesgo identificados fueron: uso de dispositivos auxiliares, historia de caídas, estar en posoperatorio, dificultad para caminar, fuerza debilitada en las extremidades, deterioro del equilibrio, deterioro de la movilidad física, entorno poco conocido y material antideslizante insuficiente en el baño.

Corresponding author

Lívia Moreira Barros
https://orcid.org/0000-0002-9763-280X
Email: livia.moreirab@hotmail.com

DOI

http://dx.doi.org/10.1590/1982-0194201900086



How to cite:

Aguiar JR, Barbosa AO, Galindo Neto NM, Ribeiro MA, Caetano JÁ, Barros LM. Risk factors associated to falls of hospitalized patients in medical-surgical clinics. Acta Paul Enferm. 2019;32(6):617-23.

¹Universidade Estadual Vale do Acaraú, Sobral, CE, Brazil.

²Instituto Federal de Pernambuco, Pesqueira, PE, Brazil.

³Universidade Federal do Ceará, Fortaleza, CE, Brazil.

Conflict of interest: nothing to declare.

Introduction

Patient safety has been a growing priority, motivating new international health policies and leading to joint efforts from institutions, health professionals and patients. The objective is, thus, to decrease and control risks arising in health services in an effective and qualified way.^(1,2)

One of the main adverse events in hospitals is patient falls, which is a global public health problem that impacts patient safety culture in hospital environments, since it is associated to emerging complications in patients' clinical state, extended hospitalizations and increasing hospital costs.^(3,4) Furthermore, it may restrict daily activities, thus contributing to the onset of post-fall syndromes with dependency, loss of autonomy, immobilization and depression. Fall incidence in hospital environments varies from 1.1% to 22%, depending on care department and patient profile.^(5,6)

Faced with this setting, the World Health Organization alerts that the number of injuries cause by falling will double until 2030 if fall prevention strategies are not implemented.⁽⁶⁾ Several factors may contribute to fall occurrence, such as impairments to balance, walking pace, visual acuity and cognition, as well as chronic diseases, postural hypotension, use of psychotropic medication, slippery surfaces, path obstacles and poor lighting.^(3,4,7,8)

Such factors may vary according to the location and the profile of care public. Therefore, identification of risk factors is important for efficient planning and implementation of fall prevention interventions,^(3,4) guided by the identification of individuals with higher fall susceptibility.^(4,6)

Considering that the medical clinic is a department which is present in most hospital institutions, the following question arises: what are the main risk factors for fall occurrence in the medical clinic department?

Thus, the objective of this study is to identify the risk factors associated to falls of hospitalized patients in medical clinics.

Methods

This is an analytic and descriptive study of quantitative approach which was carried out in a hospital located in the north area of the state of Ceará, Brazil, a regional reference in high-complexity health care. That philanthropic entity provides health services for approximately 40 thousand patients a month, and it contributes to the academic training of professionals of several areas, thus it is also consolidated as a teaching hospital. With 450 hospital beds, the institution provides care for over 60 municipalities in the area and for a population of approximately two million people.⁽⁹⁾

The medical clinic of that hospital has 56 beds, out of which 29 ones are destined to clinical patients and 27 ones are reserved for traumatological patients. The sample population counted on patients who were hospitalized in the medical clinic during the timeframe from June to September 2017.

Sample calculation was made based on data about the number of hospitalizations performed from January to December 2016. On that year, the department provided care for 513 patients, averaging 42.75 patients a month. Sample calculation used the percentual estimation formula with sample error of 5%, confidence interval of 95%, $n=513$ and outcome occurrence proportion of 15%,⁽³⁾ resulting in 142 patients. Considering also the possibility of losses, 9% were added to quantitative factor, resulting in 155 patients.

Inclusion criteria were: a) being hospitalized in the medical clinic department under study during the data collection timeframe; and b) being literate. Otherwise, exclusion criteria were: a) presenting some cognitive or communication limitation that could compromise the individual's participation in the interview or the answer to the data collection tool; b) referral of transference to another hospital department; and c) being in hemodynamic instability that could prevent bedside approach for participation in the study.

During hospitalization, patients were invited to take part in the research – that happened through interviews to fill in a structured tool that contained five parts: a) Clinical-Epidemiologic

Data; b) Mini-mental state examination; c) Morse Fall Scale application; d) Katz Index application; and e) Fall Risk ND.

In clinical-epidemiologic data assessment, information such as sex, age, marital status, educational attainment, origin, income level, medical diagnosis and medication. Mini-Mental State Examination (MMSE) assesses capabilities such as temporal and space orientation, immediate and recall memory, calculation, language-naming, repetition, understanding, writing, and copying a picture. As a clinical tool, it may be used to detect cognitive losses on evolutive disease monitoring and on treatment response monitoring.⁽¹⁰⁾ It presents a maximum score of 30 points in its analysis, where a score under 24 points is considered an indication of cognitive deficit.⁽¹¹⁾

Morse Fall Scale comprises six items with two or three possible answers for each question. Assessed items are: previous fall background, secondary diagnosis, assistance to walk, intravenous therapy, walking posture, transference posture, and mental state, resulting in an indication of fall risk varying from 0 to 125 points – the higher the score, the higher the risk, as it is considered a high fall risk when the result is 45 points or higher, moderate fall risk from 25 to 45 points, and low fall risk from 0 to 24 points.⁽¹²⁾

Katz Index, also known as Index of Independence in Activities of Daily Living, assesses daily living activities in hierarchic relation, thus it is organized to measure functional capability upon performance of six tasks: bathing/showering, getting dressed, using the toilet, moving, having continence, and having food. Score varies from 0 to 6 points, rated as total care dependence at 0 to 1 point; partial dependence from 2 to 4 points; and independence over 5 points.⁽¹³⁾

Risk factor presence was also assessed regarding “Fall Risk” ND, according to NANDA-I Taxonomy II⁽¹⁴⁾, which is defined as vulnerability to increasing fall susceptibility that may cause physical harm and compromise health.

Statistical analysis was carried out on SPSS software in order to obtain absolute and percentual frequencies, averages and standard deviation.

Significance level was set at 5% and confidence interval at 95%. Normality distribution of continuous variables was verified through Kolmogorov-Smirnov Test and, for comparison purposes between independent groups, Mann-Whitney Test was used. For categorical variables, Pearson’s Chi-Square Test was chosen.

Study development observed all Brazilian and international regulations for ethics in research involving human beings (Opinion n. 2102871). Patients were included in the study only after signing an Free and Informed Consent Term.

Results

Out of 155 participants, 41.2% (64) had a clinical diagnosis and 58.8% (91) were traumatological patients. The clinical-epidemiologic profile found in this research is presented on table 1.

Table 1. Description of patients’ sociodemographic characteristics and comorbidities

Variables/Categories	Group		p-value†
	Clinical n(%)	Trauma n(%)	
Sex			
Female	30(46.9)	9(9.9)	0.000
Male	34(53.1)	82(90.1)	
Occupation			
Active	19(29.7)	66(72.5)	0.000
Inactive	45(70.3)	25(27.5)	
Marital status			
Married	37(57.8)	60(65.9)	0.006
Divorced	6(9.4)	2(2.2)	
Single	14(21.9)	28(30.8)	
Widow/Widower	7(10.9)	1(1.1)	
Religion			
Atheist	2(3.1)	2(2.2)	0.813
Catholic	54(84.4)	80(87.9)	
Evangelical	8(12.5)	9(9.9)	
Educational attainment			
0 to 8 years	44(68.8)	62(68.1)	0.388
9 to 11 years	16(25.0)	27(29.7)	
Over 12 years	4(6.3)	2(2.2)	
Average Age (SD)	47.69(±20.29)	42.42(±18.62)	0.116*
Hospitalization days	8.52(±8.11)	8.64(±7.42)	0.589*
MMSE	17.75(±8.65)	21.30(±7.54)	0.005*

† Pearson’s Chi-Squared; * Mann-Whitney Test

Table 2 describes the assessment of independence in activities of daily living.

Table 2. Description of Katz Scale variables and care dependence rating among patients

Katz Scale	Group		p-value†
	Clinical n(%)	Trauma n(%)	
Variables			
Bathing/Showering	51(79.7)	36(39.6)	0.000
Getting Dressed	55(85.9)	32(35.2)	0.000
Personal Hygiene	52(81.3)	28(30.8)	0.000
Transference	55(85.9)	38(41.8)	0.000
Continence	56(87.5)	74(81.3)	0.303
Food	60(93.8)	81(89.0)	0.311
Rating			
Independent	52(81.3)	25(27.5)	
Partially dependent	5(7.8)	24(26.4)	0.000
Totally dependent	7(10.9)	42(46.2)	

† Pearson's Chi-Square

Upon comparison of the clinical group with the traumatological one, there was a statistically significant difference in activities: bathing/showering (p=0.000), getting dressed(p=0.000), performing personal hygiene tasks (p=0.000), and moving (p=0.000). Regarding the rating of care dependence level according to Katz Scale, traumatological patients were deemed totally dependent to a significantly higher percentual (p=0.000) (Table 2).

On table 3, it is possible to analyze fall risk factors verified with the Morse Scale among hospitalized patients in the medical clinic department.

On table 3, it is observed that there are statistically significant differences when comparing fall risk assessment among clinical and traumatological patients, i.e.: presence of comorbidities (p=0.000) and walking pace (p=0.000). In both groups, patients present previous fall backgrounds (84.4% for clinical patients vs. 93.4% for traumatological ones), they have comorbidities (Clin.: 50% vs. Traum: 82.4%), they don't use intravenous therapy (Clin.: 65.6% vs. Traum: 73.6%), they don't need assistance to move/walk (Clin.: 85.9% vs. Traum: 74.7%), and they are oriented in space and time (Clin.: 96.9% vs. Traum: 96.7%).

Only concerning the walking pace there was a divergence on patient profiles, such that, for the clinical group, 75% (48) patients either presented a normal pace; they don't walk or are totally bedridden, while 60.4% (55) of traumatological patients present a compromised or reeling pace (table 3). Regarding the fall risk rating according to Morse Scale, 40% (62) of patients presented low fall risk,

Table 3. Distribution of hospitalized patients in the medical clinic department according to Morse Fall Scale items

Variables/Categories	Group		p-value†
	Clinical n(%)	Trauma n(%)	
Fall background			
Yes	54(84.4)	85(93.4)	
No	10(15.6)	6(6.6)	0.069
Comorbidities			
Yes	32(50.0)	75(82.4)	
No	32(50.0)	16(17.6)	0.000
Intravenous therapy			
Yes	22(34.4)	24(26.4)	
No	42(65.6)	67(73.6)	0.283
Assistance to move/walk			
Doesn't use; totally bedridden	55(85.9)	68(74.7)	
Uses crutches. cane/walker	5(7.8)	15(16.5)	0.212
Takes support on furniture/walls	4(6.3)	8(8.8)	
Walking pace			
Normal; doesn't walk	48(75.0)	33(36.3)	
Weak	4(6.3)	3(3.3)	0.000
Compromised	12(18.8)	55(60.4)	
Mental state			
Oriented	62(96.9)	88(96.7)	
Disoriented	2(3.1)	3(3.3)	0.952

† Pearson's Chi-Squared

33% (51) presented moderate fall risk, and 27% (42) presented high fall risk.

Table 4 presents the correlation between Morse Fall Scale scores and the following variables: age, hospitalization days, MMSE score, and Katz Scale score.

Table 4. Correlation between variables such as age, hospitalization days, MMSE average and Katz Scale with Morse Scale scores

Variables	Morse Score p-value*	
	Clinical	Traumatological
Age	0.501	0.028
Hospitalization days	0.070	0.198
MMSE	0.048	0.311
Katz	0.017	0.037

*Spearman's correlation test

On table 4, it is noticeable that there is a statistically significant correlation between hospitalization days (p=0.07), MMSE (p=0.048) and Katz (p=0.017) for clinical patients, whereas traumatological patients present positive association for fall occurrence on variables age (p=0.028) and Katz (p=0.037).

On table 5, the relation of risk factors for Fall Risk diagnosis, identified among clinical and traumatological patients, may be observed.

Table 5. Distribution of risk factors for “Fall Risk” ND according to patient groups

Risk factors	Group		p-value†
	Clinical n(%)	Trauma n(%)	
In adults			
Over 65 years old	13(20.3)	12(13.2)	0.235
Lower limb prosthesis	-	2(2.2)	0.233
Wheelchair use	3(4.7)	8(8.8)	0.327
Auxiliary device use	8(12.5)	35(38.5)	0.000
Fall background	15(23.4)	28(30.8)	0.315
Cognitive			
Alterations to cognitive function	3(4.7)	3(3.3)	0.659
Physiological			
Arthritis	3(4.7)	2(2.2)	0.388
Anemia	23(35.9)	7(7.7)	0.000
Lack of sleep	18(28.1)	10(11.0)	0.006
Post-surgery	9(14.1)	35(38.5)	0.001
Proprioceptive deficits	3(4.7)	3(3.3)	0.659
Diarrhea	5(7.8)	3(3.3)	0.211
Walking pace difficulties	20(31.3)	68(74.7)	0.000
Hearing difficulties	4(6.3)	4(4.4)	0.607
Visual difficulties	10(15.6)	10(11.0)	0.397
Vascular disease	4(6.3)	-	0.016
Decreased strength on extremities	19(29.7)	33(36.3)	0.000
Impaired balance	17(26.6)	57(62.6)	0.393
Urinary urgency	4(6.3)	2(2.2)	0.900
Orthostatic hypotension	8(12.5)	12(13.2)	0.198
Impaired physical mobility	19(29.7)	60(65.9)	0.000
Neoplasm	7(10.9)	1(1.1)	0.006
Neuropathy	5(7.8)	1(1.1)	0.033
Incontinence	3(4.7)	3(3.3)	0.659
Altered blood sugar levels	2(3.1)	3(3.3)	0.952
Feet-affecting conditions	10(15.6)	12(13.2)	0.668
Environmental			
Disorganized environment	4(6.3)	1(1.1)	0.074
Little-known setting	19(29.7)	20(22.0)	0.276
Exposure to unsafe conditions	2(3.1)	3(3.3)	0.952
Insufficient lighting	2(3.1)	-	0.090
Insufficient non-slip flooring in bathrooms	23(35.9)	23(25.3)	0.153
Use of immobilization	-	2(2.2)	0.233
Use of loose carpets	-	-	-
Pharmacological agents			
Pharmacological agent	24(37.5)	15(16.5)	0.003
Use of alcohol	3(4.7)	15(16.5)	0.024

† Pearson's Chi-Square

Discussion

Similar frequencies were observed between sexes regarding clinical patients, whereas there was a predominance of men in the traumatological patient group. According to scientific literature, there is no formed consensus whether sex is a risk factor increasing fall occurrence. There are studies showing fall incidence as higher among men, and others present women as the most frequent victims of this kind of accident.⁽¹⁵⁾

In this study, age average did not diverge between groups: 47.6 years among clinical patients and 42.4 among traumatological ones. Upon analysis of other studies, old age is considered a risk factor for falls and for their consequent injuries, due to alterations cause by the physiological process of aging.^(15,16)

Regarding the length of hospitalization, average time spent in the medical clinic department ranged from 8.52 days (\pm 8.11) – among clinical patients – to 8.64 days (\pm 7.42) among traumatological patients. These data are in agreement with a study that was conducted in a hospital in the countryside of Rio Grande do Sul state, Brazil, with hospitalized patients in Surgical Clinic and Medical Clinic I and II departments, which identified a hospitalization length of 7.7 days (\pm 9.2),⁽³⁾ with a longer amount of days upon comparison with the patients in this study. It is known that the longer hospitalization time is, the higher fall risk is,⁽¹⁷⁾ what poses as a warning about the importance of implementing preventive measures aiming at decreasing risks and providing safe environments to patients.

Concerning educational attainment, there was a predominance of 0 to 8 years of education in both groups. Educational level directly influences fall occurrence, because patients may present low health literacy, thus impairing their understanding of provided guidance about fall prevention. Thus, it is important to identify cognitive deficit based on standardized scales, aiming at tracking down those patients under risk of cognitive compromise. Moreover, individuals of low educational level need a longer time to adapt to the new environment (hospital), what may lead to an impaired sense of space location, impacting their performance of tasks such as self-care practices.⁽¹⁸⁾

Regarding MMSE application, it was observed that clinical patients present lower cognitive performance (17.75 average scores) when compared to traumatological patients (21.30 average scores), thus reinforcing the importance of closer attention to individuals with a clinical diagnosis concerning the nurse-patient communication process, as language has to be adapted to patients' educational level. According to literature, there is a positive as-

sociation between hospitalized patients' increased fragility and low cognitive performance, thus contributing to fall occurrence.⁽¹⁹⁾

Concerning the presence of comorbidities, most patients presented associated diseases, so that was a statistically significant factor among both groups. Patients with more than one medical diagnosis have a higher chance of presenting limitations to several systems (musculoskeletal, cardiovascular, neurological, psychological, among others). According to some studies, there is a direct association between the number of comorbidities and patients' higher number of falls.⁽³⁾

The prevalence of patients with low dependence to nursing care among clinical patients and the higher frequency of patients with complete need of assistance in order to carry out activities of daily life in the traumatological group are associated to the fact that, in many cases, patients that suffer trauma, mainly those who suffer fractures, need to be immobilized for a certain timeframe, what impairs their self-care and increases fall risks. A study conducted in a private hospital, in the northwestern area of Rio Grande do Sul state, with 112 patients, confirms the necessary care towards traumatological patients, since 42.3% of patients who underwent traumatological surgery were in high fall risk.⁽²⁰⁾

Regarding the average score of predominant Morse assessments in this study, low fall risk was found. Compared to other literature, there is a research that scored 31.7 (± 16.9) in the Morse Scale, what grants it a rating of moderate fall risk.⁽¹⁹⁾ According to the literature, that divergence happens due to the hospital department and to offered services.⁽³⁾

Main risk factors related to "Fall Risk" ND make evident in this study were the use of auxiliary devices, impaired physical mobility, little-known setting, insufficient non-slip floorings in bathrooms, and pharmacological agents.

According to a study that was conducted in a large hospital in Southern Brazil with 174 hospitalized patients in clinical and surgical departments, main fall risk factors were identified as impaired balance, walking pace difficulties, impaired physical mobility, being over 60 years old, proprioceptive

deficit, and medication. Faced with the results for Fall Risk diagnosis, fall prevention interventions were developed, according NIC reference, reinforcing literature findings that recommend multifactor interventions for fall prevention.⁽¹⁵⁾

All across the world, fall prevention challenges keep prevailing, despite validated risk assessment tools and several risk prevention programs.⁽²¹⁾ Identifying people in high risk of fall occurrence and improving awareness about existing risk factors, as well as access to information through educational interventions, may decrease the devastating effects of falls.⁽¹⁾ Nurses have a fundamental role in fall prevention in hospital environments, starting from the identification of individuals' risk factors for fall occurrence and health education about this theme.⁽²²⁾

Limitations of this study are the fact it was conducted in a public hospital, what may not correspond to the reality in private hospitals, and that it was carried out during four months of the year, thus factors related to fall risk may be different in other months. It is important to develop new studies that aim at identifying the fall incidence rate existing in this area. It is also worth emphasizing that no studies were found in literature which associated the variables age, Katz and MMSE among patients of medical clinic departments, what impaired the discussion of these findings. It is suggested that new studies focus on the construction of educational technologies in tune with health service reality, what may increase the effectiveness of guidance provided about this adverse event that causes grievous impacts to the health status of individuals.

Conclusion

In this study, the main risk factors that were identified were: use of auxiliary devices, fall background, post-surgical status, walking pace difficulties, decreased strength on body extremities, impaired balance, impaired physical mobility, little-known setting, and insufficient non-slip flooring in bathrooms. Higher association for fall risk was observed in traumatological patients, who presented higher dependence to carry out activities of daily life. It must be highlighted that

it is necessary to raise professionals' awareness to take hold of tools made available in literature to guarantee patient safety, such as specific scales to assess fall risks and the systematization of Nursing care, which may contribute to fall occurrence prevention and care qualification. It is of utmost importance that nurses know fall susceptibilities, so they can identify risk factors and develop a care plan with effective interventions to prevent falls and provide quality care, based on NANDA, NOC and NIC terminologies.

Acknowledgements

To *Santa Casa de Misericórdia de Sobral* (Holy House of Mercy of Sobral), state of Ceará, Brazil, for providing financial support to this research. (DEPE Notice 01/2017).

Collaborations

Aguiar JR, Barbosa AO and Barros LM contributed to project conception, data collection and interpretation, article writing, critical review of article content and approval of final version for publication. Galindo Neto NM, Ribeiro MA and Caetano JÁ contributed to article writing, critical review of article content and approval of final version for publication.

References

- Arandia G, Hargrove JL, Shubert TE, Bangdiwala SI, Linnan LA. Feasibility of Assessing Falls Risk and Promoting Falls Prevention in Beauty Salons. *J Prim Prev*. 2017;38(6):567–81.
- Carlesi KC, Padihla KG, Toffoletto MC, Henriquez-Roldán C, Juan MA. Patient safety incidents and nursing workload. *Rev Lat Am Enfermagem*. 2017;25(0):e2841.
- Pasa TS, Magnago TS, Urbanetto JS, Baratto MA, Morais BX, Carollo JB. Risk assessment and incidence of falls in adult hospitalized patients. *Rev Lat Am Enfermagem*. 2017;25(0):e2862.
- Harper KJ, Barton AD, Bharat C, Petta AC, Edwards DG, Arendts G, et al. Risk assessment and the impact of point of contact intervention following emergency department presentation with a fall. *Phys Occup Ther Geriatr*. 2017;35(3):182–94.
- Vieira ER, Berean C, Paches D, Caveny P, Yuen D, Ballash L, et al. Reducing falls among geriatric rehabilitation patients: a controlled clinical trial. *Clin Rehabil*. 2013;27(4):325–35.
- Park SH. Tools for assessing fall risk in the elderly: a systematic review and meta-analysis. *Aging Clin Exp Res*. 2018;30(1):1–16.
- Panel on Prevention of Falls in Older Persons, American Geriatrics Society and British Geriatrics Society. Summary of the Updated American Geriatrics Society/British Geriatrics Society clinical practice guideline for prevention of falls in older persons. *J Am Geriatr Soc*. 2011;59(1):148–57.
- Toye C, Kitchen S, Hill A, Edwards D, Sin M, Maher S. Piloting staff education in Australia to reduce falls in older hospital patients experiencing delirium. *Nurs Health Sci*. 2017;19(1):51–8.
- Santa Casa de Misericórdia de Sobral. Histórico da Santa Casa de Misericórdia [Internet]. Sobral; 2019. [citado 2018 Jan 11]. Disponível em: <<http://stacasa.com.br/site/historico/>>
- Brucki SM, Nitrini R, Caramelli P, Bertolucci PH, Okamoto IH. Sugestões para o uso do mini-exame do estado mental no Brasil. *Arq Neuropsiquiatr*. 2013;61 3B:777–81.
- Lourenço RA, Veras RP. Mini-Exame do Estado Mental: características psicométricas em idosos ambulatoriais. *Ver Saúde Pública*. 2006;40(4):712-9.
- de Urbanetto JS, Creutzberg M, Franz F, Ojeda BS, da Gustavo AS, Bittencourt HR, et al. Morse Fall Scale: translation and transcultural adaptation for the Portuguese language. *Rev Esc Enferm USP*. 2013;47(3):569–75.
- Lino VT, Pereira SR, Camacho LA, Ribeiro Filho ST, Buksman S. Adaptação transcultural da Escala de Independência em Atividades da Vida Diária (Escala de Katz). *Cad Saúde Pública*. 2008;24(1):103-112.
- North American Nursing Association International (NANDA-I). Diagnósticos de Enfermagem da NANDA: definições e classificação 2015-2017. Tradução: Regina Machado Garcez. 10a ed. Porto Alegre: Artmed; 2015. 468 pp.
- Luzia MF, Victor MA, Lucena AF. Nursing Diagnosis Risk for falls: prevalence and clinical profile of hospitalized patients. *Rev Lat Am Enfermagem*. 2014;22(2):262–8.
- Correa AD, Marques IA, Martinez MC, Laurino PS, Leão ER, Chimentão DM. The implementation of a hospital's fall management protocol: results of a four-year follow-up. *Rev Esc Enferm USP*. 2012;46(1):67–74.
- Nassar N, Helou N, Madi C. Predicting falls using two instruments (the Hendrich Fall Risk Model and the Morse Fall Scale) in an acute care setting in Lebanon. *J Clin Nurs*. 2014;23(11-12):1620–9.
- Faria CA, Lourenço RA, Ribeiro PC, Lopes CS. Cognitive performance and frailty in older adults clients of a private health care plan. *Rev Saude Publica*. 2013;47(5):923–30.
- Bittencourt VL, Graube SL, Stumm EM, Battisti ID, Loro MM, Winkelmann ER. Factors associated with the risk of falls in hospitalized adult patients. *Rev Esc Enferm USP*. 2017;51(0):e03237.
- Forrest GP, Chen E, Huss S, Giesler A. A comparison of the Functional Independence Measure and Morse Fall Scale as tools to assess risk of fall on an inpatient rehabilitation. *Rehabil Nurs*. 2013;38(4):186–92.
- McQuaid-Bascon K, Royal M, Sinno M, Ramsden R, Baxter K, Peladeau N, et al. Evolving a multi-factorial, data driven, interprofessional approach to prevent falls and associated injuries during a system-level integration. *J Interprof Educ Pract*. 2018;12:8–12.
- Gringauz I, Shemesh Y, Dagan A, Israelov I, Feldman D, Pelz-Sinivani N, et al. Risk of falling among hospitalized patients with high modified Morse scores could be further Stratified. *BMC Health Serv Res*. 2017;17(1):721.