

■ Systematic Review

Risk for falls among community-dwelling older people: systematic literature review

Risco de quedas em idosos residentes na comunidade: revisão sistemática da literatura

Riesgo de caídas de los ancianos residentes en la comunidad: revisión sistemática de la literatura



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ABSTRACT

Objective: To identify the risk factors for falls of the community-dwelling elderly in order to update the Taxonomy II of NANDA International.

Method: A systematic literature review based on research using the following platforms: EBSCOHost[®], CINAHL and MEDLINE, from December 2010 to December 2014. The descriptors used were (*Fall* OR Accidental Fall*) AND (*Community Dwelling OR Community Health Services OR Primary health care*) AND (*Risk OR Risk Assessment OR Fall Risk Factors*) AND (*Fall* OR Accidental Fall*) AND (*Community Dwelling OR older*) AND *Nurs* AND Fall Risk Factors*.

Results: The sample comprised 62 studies and 50 risk factors have been identified. Of these risk factors, only 38 are already listed in the classification.

Conclusions: Two new categories of risk factors are proposed: psychological and socio-economical. New fall risk factors for the community-dwelling elderly have been identified, which can contribute to the updating of this nursing diagnosis of the Taxonomy II of NANDA International.

Keywords: Accidental falls. Risk factors. Nursing diagnosis. Aged.

RESUMO

Objetivo: Identificar fatores de risco de queda em idosos residentes na comunidade para atualização da taxonomia II da NANDA Internacional.

Método: Revisão sistemática da literatura, com pesquisa na plataforma EBSCOHost[®], na CINAHL e MEDLINE, no período de dezembro de 2010 a dezembro de 2014. Utilizaram-se os descritores (*Fall* OR Accidental Fall*) AND (*Community Dwelling OR Community Health Services OR Primary health care*) AND (*Risk OR Risk Assessment OR Fall Risk Factors*) AND (*Fall* OR Accidental Fall*) AND (*Community Dwelling OR older*) AND *Nurs* AND Fall Risk Factors*.

Resultados: Obteve-se uma amostra de 62 estudos e um total de 50 fatores de risco, dos quais, apenas 38 estão presentes na classificação.

Conclusões: São propostas duas novas categorias de fatores: os psicológicos e socioeconômicos. Foram identificados novos fatores de risco de queda dos idosos residentes na comunidade, o que contribui para a atualização deste diagnóstico na taxonomia II da NANDA Internacional.

Palavras-chave: Acidentes por quedas. Fatores de risco. Diagnóstico de enfermagem. Idoso.

RESUMEN

Objetivo: Identificar los factores de riesgo de caídas en los ancianos residentes en la comunidad.

Método: Revisión sistemática de la literatura. La búsqueda fue realizada en plataforma EBSCOHost[®], en CINAHL y MEDLINE, entre diciembre de 2010 y diciembre de 2014. Los descriptores utilizados fueron (*Fall* OR Accidental Fall*) AND (*Community Dwelling OR Community Health Services OR Primary health care*) AND (*Risk OR Risk Assessment OR Fall Risk Factors*) AND (*Fall* OR Accidental Fall*) AND (*Community Dwelling OR older*) AND (*Nurs**) AND (*Fall Risk Factors*).

Resultados: Fueron seleccionados 62 artículos en los cuales se identificaron 50 factores de riesgo, de los que apenas 38 están presentes en la NANDA Internacional.

Conclusiones: Se proponen dos nuevas categorías de factores: los psicológicos y los socioeconómicos. Se identificaron nuevos factores de riesgo de caídas en los ancianos residentes en la comunidad, lo que contribuyó para la actualización de la taxonomía II NANDA Internacional.

Palabras clave: Acidentes por caídas. Factores de riesgo. Diagnóstico de enfermería. Anciano.

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■ INTRODUCTION

A fall is an unexpected event, in which a person moves from a higher level to a lower level of the floor⁽¹⁾. Preventing the injuries associated with this event is crucial, especially among the elderly⁽²⁾ due to the morbidity and mortality that this event brings, and because it is one of the leading causes of hospitalisation among this population⁽³⁾. The global annual fall rate among people over 65 years of age is between 28% and 35%, and 32% to 42% in people over 70 years of age⁽³⁾. Therefore, the risk for falls should be the focus of nursing care for community-dwelling older people.

The ability to establish the nursing diagnosis risk of falls requires knowledge on the multifactorial nature of falls, namely, the risk factors for falls that contributed to the event. The fall history, medication, and deficits in mobility, muscle strength, gait and balance, have been described in the literature as frequent fall risk factors⁽⁴⁻⁵⁾, and they are included in NANDA International (NANDA-I) as risk factors for the nursing diagnosis risk for falls (00155).

The nursing diagnosis "Risk for falls" (00155) is defined as "increased susceptibility to falling that may cause physical harm"^(6, p. 384). This means that the susceptibility of the elderly to falls depends on the risk factors they may have. For adults, the risk factors listed in the NANDA-I are: age greater than or equal to 65 years, history of falls, living alone, lower limb prosthesis, and use of assistive devices. The environmental factors are: cluttered environment, exposure to conditions of insecurity related to weather conditions (e.g., wet floor, ice), dimly-lit room, no anti-slip material in bath and/or shower, unfamiliar room, restraints, throw/scatter rugs. The pharmacologic agents listed as risk factors are alcohol use and drugs. The physiological factors are acute illness, blood sugar changes, anaemia, arthritis, foot problems, decreased lower extremity strength, diarrhoea, difficulty with gait, faintness when extending the neck, faintness when turning the neck, hearing difficulties, impaired balance, impaired physical mobility, incontinence, neoplasms, neuropathy, orthostatic hypotension, postoperative conditions, proprioceptive deficits, insomnia, urinary urgency, vascular disease, and visual difficulties. Finally the cognitive factors are related to changes in cognitive function⁽⁶⁾.

For the clinical practice of community nursing, it is essential to assess the risk for falls based on the multifactorial nature of the event. The use of standard classifications and languages that represent current knowledge is also desirable. When nurses are provided with the right information to an accurate diagnosis they can intervene appropriately and obtain positive outcomes in the health of the elderly.

Moreover, in-depth reviews on the reported concepts of diagnosis and its elements, and clinical research that provides clinical evidence can essentially improve the basis of this clinical practice.

Consequently, we based the systematic literature review (SLR) on the following research question: What are the risk factors for falls of community-dwelling older people?

The SLR can be used to obtain an accurate assessment and a summary of the scientific evidence with minimal biases that can be reproduced⁽⁷⁾. Systematic methods are specifically used to identify, select, critically evaluate, and synthesize research evidence that can be used to solve a particular problem of clinical practice⁽⁸⁾.

■ METHODOLOGY

The historical review of the NANDA-I nursing diagnosis risk for falls was used to extract information on the inclusion date (2000)⁽⁹⁾ and review date (2013) of the diagnosis. Based on these data and on the evidence that is currently available on this phenomenon, a SLR has been considered the most adequate method, as it only included the original research studies.

The review question and inclusion criteria has been based on JBI guidelines of the Joanna Briggs Institute (JBI)⁽¹⁰⁾ and the research questions were created according to the PICo format, which considered Population (P), the elderly; Interest Area/Intervention (I), fall risk factors; Context (Co), community.

In this study, we used the seven stages recommended for the SLR⁽¹¹⁾: construction of the protocol; adaptation of the question; studies search; selection; critical evaluation of the studies; data collection; and summary of findings. The steps were: collection of scientific evidence on the fall risk of community-dwelling older people, and related risk factors; identification of types of research and methodological procedures; description and critical analysis of the results, and, finally, synthesis of the results.

The online search was performed in January 2015 via the EBSCOHost® platform and in the databases CINAHL and Complete and MEDLINE Complete. The search terms were: *(Fall* OR Accidental Fall) AND (Community Dwelling OR Community Health Services OR Primary health care) AND (Risk OR Risk Assessment OR Fall Risk Factors) AND (Fall* OR Accidental Fall) AND (Community Dwelling OR older) AND Nurs* AND Fall Risk Factors*. The searches were based on the presence of these terms in the abstract.

In addition to the criteria defined by the question and PICo format, only studies with the full text available in Portuguese, English or Spanish, published between Decem-

ber 2010 and December 2014, and with an experimental, quasi-experimental, cohort or quantitative descriptive design have been included. Studies that referred to institutionalized older people were excluded from the research.

Research was independently conducted by two reviewers to ensure the accuracy of the method and the accuracy of the results. The articles included in the sample were selected using the sequence: reading of the title, reading of the abstract, and reading of the full text. In case the reviewers disagreed, the articles were included in the stage that followed analysis.

The guidelines of the JBI⁽¹⁰⁾ and the Registered Nurses' Association of Ontario⁽¹²⁾ were applied to classify the levels of evidence (LE).

Finally, we applied the JBI tables related to controlled and random clinical trials; cohort studies/case control studies; descriptive studies/case series studies, economic evaluation studies⁽¹⁰⁾ and systematic reviews⁽¹³⁾ to assess the feasibility, appropriateness, significance and effectiveness of the articles for the SLR. At this stage, 4 studies that did not meet at least 75% of these criteria were excluded^(10, 13) (Figure 1).

All the new terms in English related to risk factors for falls in this review and the risk factors in the NANDA-I were translated into European Portuguese by two independent translators.

A table was used for the full reading of the articles to systematize the information and to help process and interpret the data.

Since the aim of this study was the articles, intellectual property was observed by fully and accurately citing the authors of all the articles used as the sample of this study⁽¹⁴⁻¹⁵⁾.

■ RESULTS

Of the 62 articles included in this review, 60% were published in 2012 (16-34) and 2013⁽³⁵⁻⁵²⁾. The articles are from 15 different countries, but especially from the United States of America^(18-19,24-25,30,33,39,53-61) and Australia^(17,28,32,34,36,42,44,46-47,52,62-64), with 16 and 13 studies, respectively. The other countries with most articles were Canada^(23, 29, 40, 65-68) with seven, Netherlands^(20, 31, 35, 51, 69) with five, and United Kingdom^(48, 70-72) with four. Then came China^(26, 50, 73), France^(45, 49, 74) and Sweden^(37-38,41), with two, Ireland⁽⁷⁵⁻⁷⁶⁾ with one, and Germany⁽²¹⁾, Brazil⁽¹⁶⁾, Korea⁽²⁶⁾, Spain⁽⁷⁷⁾, Japan⁽²²⁾, and Thailand⁽⁴³⁾.

Six of the selected studies are secondary (systematic literature reviews) and the remaining 56 are primary studies based on quantitative methodology, i.e. seven random controlled clinical trials, two quasi-experimental studies, 20 cohort studies, and 27 descriptive studies. Of the analysed

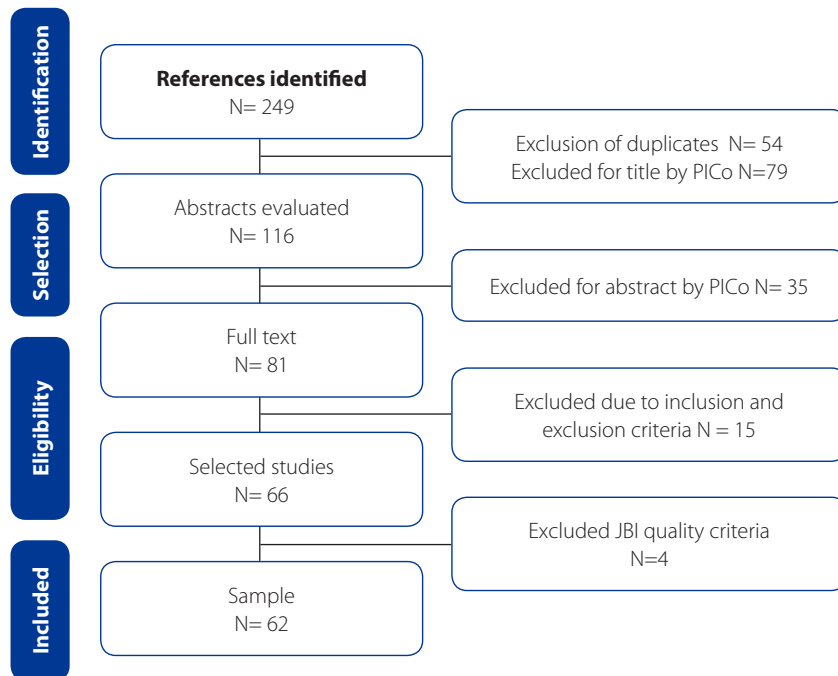


Figure 1 – Mapping of article identification, analysis, and selection

Source: Research data, 2015.

studies, six were SLR with a Ia level of evidence^(29, 41, 45, 58, 63, 75) and seven were randomized clinical trials with a Ib level of evidence^(21, 23, 37, 55, 65, 69, 71). The quasi-experimental studies were two, one with a IIa⁽¹⁷⁾ level of evidence and one with a IIb level of evidence. Finally, 47 of the studies had a III level of evidence^(16, 18, 20, 22, 24-28, 30-36, 38-40, 42-44, 46-50, 52, 54, 57, 59-61, 63-64, 66-68, 70, 72-74, 76-77), with 20 cohort studies^(22, 24-25, 28, 31-32, 34, 40, 42-44, 46-47, 51-53, 59-60, 70, 77) and 27 descriptive and correlational studies^(16, 18, 20, 26-27, 30, 33, 35-36, 38-39, 48-50, 54, 57, 61-62, 64, 66-68, 72-74, 76).

The samples in the primary studies ranged from 27⁽⁴⁸⁾ to 21,020⁽²⁰⁾ community-dwelling elderly participants.

In this SLR, only one study was conducted in the field of nursing. The aim of the study was to determine housing, environment, and health factors in Korean women who fall at home, and recurrent falls in the community⁽²⁷⁾.

A total of 50 risk factors for falls were identified in this review, and organised according to the NANDA-I categories (Chart 1).

With regard to adults and as mentioned above, NANDA-I presents the risk indicators in six categories. However, this SLR allowed the addition of two categories that were named, by common agreement, psychological factors and socio-economic factors. In the personal factors (adult), the most prevalent risk factors in relation to the NANDA-I were history of falls (n = 7), old age (n = 6), and female (n = 8).

In the category of environmental factors, the identified risk for falls were: cluttered environment (n = 4), no anti-slip material on bath/shower (n = 4), and dimly lit room (n = 3). However, two additional risk factors for falls were referenced, namely, access to external areas without grab bars and handrails/obstacle of the doorway (n = 3), and toilets without grab bars (n = 1).

In the pharmacological agents group, there was a reference to drugs in general (n = 14), poly-medication (n = 11), antihypertensive agents (n = 2), and benzodiazepines (n = 2). The studied antihypertensive agents were diuretics, angiotensin converting enzyme inhibitors, calcium channel blockers, beta-adrenergic blockers^(53, 63).

The category of cognitive factors consists of one identified NANDA-I factor: change in cognitive function (n = 8). However, another factor was identified in this review: diminished executive functions (n = 3).

The category of physiological factors consists of 23 risk factors in NANDA-I. The most frequently identified factors in this category were: difficulty with gait (n = 13), impaired balance (n = 13), visual difficulties (n = 10), orthostatic hypotension (n = 5), decreased lower extremity strength (n = 4), blood sugar changes (n = 3), limited mobility (n = 3), vascular disease (n = 3), insomnia (n = 2), arthritis (n = 2), urinary incontinence (n = 1), and urinary urgency (n = 1).

Other fall risk factors were confirmed for community-dwelling older people, especially the decline of basic activities of daily living (n = 10), associated comorbidity/chronic disease (n = 6), chronic pain (n = 5), decline of instrumental activities of daily living (n = 4), and arterial hypertension (n = 4). Additional factors were detected and presented in the table. The comorbidities were cardiopulmonary diseases, metabolic diseases, neurological diseases, sensory diseases, stroke, and cancer^(17, 43, 64). With respect to chronic diseases, the studies referred to hypertension, arthritis, visual difficulties, COPD, diabetes, and heart disease^(27-28, 68). Metabolic syndrome corresponds to the presence of abdominal obesity, hypertriglyceridemia, hypertension, and impaired glucose tolerance⁽²⁶⁾.

In the category of psychological factors, the studies confirmed the fear of falling (n = 14) as one of the most important risk factors for falls in community-dwelling older people. This fear of falling is associated with the activities of daily living (basic and instrumental), such as hygiene, getting dressed/undressed, using the toilet, going up and down stairs, using public transportation, and shopping. The symptoms of depression/depression (n = 8) were confirmed as risk factors for falls in community-dwelling older people. The depressive symptoms were more prevalent in older people with recurring falls (44.7% versus 25%)⁽⁶¹⁾. Anxiety (n = 2) was also confirmed as a risk factor. Finally, the socio-economic factors consist of low education (n = 1), low family income (n = 1), and black/ethnic minority group (n = 1), all listed in a single study.

■ DISCUSSION

The discussion of results should focus on the implications of the presented evidence regarding decisions for the clinical practice. This, and the guiding question, revealed that the risk factors for falls that are not listed in the NANDA-I are female (women are more prone to falls in the community)^(20, 38, 40, 59, 63, 73-74, 77), compromised activities of daily living (basic and instrumental)^(16, 22, 25, 31, 33, 54-55, 63, 70, 73), the fear of falling^(30, 36-38, 44, 51, 59, 62-63, 66, 70-72), symptoms of depression/depression^(18, 30, 43, 45, 51, 59, 63), and lastly, low education⁽⁷⁰⁾, low family income⁽⁷⁰⁾, and ethnic minorities⁽⁷⁰⁾. As for the level of evidence of these risk factors, we found that symptoms of depression/depression and female are mentioned in at least two papers, and compromised activities of daily living and fear of falling are mentioned in at least three random clinical trials (Ib evidence). However, the other risk factors are described in level III studies. Regarding the recommendation for the clinical practice and additions to the NANDA-I, there is evidence of recommendations in the nursing

| Risk Factors | N | NANDA-I |
|--|----|---------|
| Adults | | |
| Age ≥ 65 years ^(50, 61, 63, 73, 74, 77) | 6 | √ |
| History of falls ^(28, 50, 53, 57, 63, 67, 69) | 7 | √ |
| Living alone ⁽⁶³⁾ | 1 | √ |
| Lower limb prosthesis | 0 | √ |
| Use of assistive devices (e.g. walker, cane, wheelchair) ^(17, 41) | 2 | √ |
| Female ^(20, 38, 40, 59, 63, 73, 74, 77) | 8 | |
| Use of slippers ⁽⁴³⁾ | 1 | |
| Environmental | | |
| Cluttered environment ^(17, 41, 43, 64) | 4 | √ |
| Dimly lit room ^(17, 27, 41) | 3 | √ |
| No anti-slip material in bath/shower ^(17, 27, 41, 43) | 4 | √ |
| External area: without grab bars and handrails/obstacle of the doorway ^(17, 27, 41) | 3 | |
| Toilets without grab bars ⁽⁴³⁾ | 1 | |
| Medication | | |
| Drugs ^(23,26,31,33-35,39,41,43,52-53,63,69,74) | 14 | √ |
| Poly-medication ^(23,26,31,33-34,39,41,43,52,63,69) | 11 | |
| Antihypertensive agents ^(53, 63) | 2 | |
| Benzodiazepines ^(35, 74) | 2 | |
| Cognitive | | |
| Change in cognitive function ^(29,31-32,46,48,55,67,76) | 8 | √ |
| Diminished executive functions ^(29, 49, 53) | 3 | |
| Physiological | | |
| Change of blood sugar ^(27-28, 68) | 3 | √ |
| Arthritis ^(50, 65) | 2 | √ |
| Diminished strength of the lower extremities ^(28, 31, 46, 52) | 4 | √ |
| Diarrhoea | 0 | √ |
| Difficulty in gait ^(16,21,23-24,28,32,37,46,59-60,63,69,75) | 13 | √ |
| Compromised balance ^(19,23-24,28,36-37, 47,51,53-54,59,70,74) | 13 | √ |
| Compromised mobility ^(27, 30, 46) | 3 | √ |
| Incontinence ⁽⁴⁰⁾ | 1 | √ |
| Orthostatic hypotension ^(42, 51, 56, 63, 69) | 5 | √ |
| Insomnia | 2 | √ |
| Urinary urgency ⁽⁴⁰⁾ | 1 | √ |
| Vascular disease ^(27-28, 68) | 3 | √ |
| Compromised eyesight ^(23, 26, 39, 41, 46, 51, 57, 63, 69, 73) | 10 | √ |
| Decline of basic daily living activity ^(16, 22, 25, 31, 33, 54-55, 63, 70, 73) | 10 | |
| Decline of instrumental activities of daily living ^(16, 33, 55, 70) | 4 | |
| Comorbidity/Chronic illness ^(17, 27-28, 43, 64, 68) | 6 | |
| Chronic pain ^(18, 28, 31, 39, 74) | 5 | |

Table 1 – Comparative synthesis of factors found in the SLR and the factors classified in the NANDA-I. Lisbon, 2015 (continue)

| Risk Factors | N | NANDA-I |
|---|----|---------|
| Arterial hypertension ^(42, 56, 63, 68) | 4 | |
| Reduced sensorimotor function ^(32-34, 69) | 4 | |
| Osteoporosis ^(38, 52) | 2 | |
| Vitamin D insufficiency ^(28, 41) | 2 | |
| Worse physical health ^(31, 70) | 2 | |
| Obesity ^(26, 70) | 2 | |
| Dizziness ⁽⁴⁷⁾ | 1 | |
| Elevated abdominal perimeter ⁽⁷³⁾ | 1 | |
| Metabolic syndrome ⁽²⁶⁾ | 1 | |
| Chronic obstructive pulmonary disease (COPD) ⁽⁶⁸⁾ | 1 | |
| Low serum albumin ⁽⁷³⁾ | 1 | |
| Psychological | | |
| Fear of falling ^(30,36-38,44,51,59,62-63,66,70-72) | 14 | |
| Symptoms of depression/Depression ^(18, 30, 43, 45, 51, 59, 63) | 8 | |
| Anxiety ^(28, 30) | 2 | |
| Socio-economic | | |
| Low education ⁽⁷⁰⁾ | 1 | |
| Low family income ⁽⁷⁰⁾ | 1 | |
| Black/Ethnic minority group ⁽⁷⁰⁾ | 1 | |

Table 1 – Comparative synthesis of factors found in the SLR and the factors classified in the NANDA-I. Lisbon, 2015 (conclusion)

Source: Research data, 2015.

diagnosis of the fall risk factors symptoms of depression/ depression, female, compromised activities of daily living, and fear of falling.

Based on the results of the SLR and the proposal of NANDA-I for risk factors for falls in community-dwelling older people, we confirmed the multifactorial nature of risk factors that requires comprehensive, interdisciplinary, and multifactorial/multicomponent interventions^(41, 69).

Thus, our SLR contributes to the knowledge of nurses by transferring these findings to the clinical practice, which supports the provision of evidence-based nursing care.

Recent studies with the elderly population indicate that the risk of falling increases with the number of risk factors, and each year the risk of falling of the elderly doubles with each additional risk factor⁽⁷⁸⁾.

Therefore, it is important to understand the multiple risk factors involved in this event in order to make appropriate assessments that target the older people who live in the community. The risk factors for falls of community-dwelling older people include environmental risk factors, pharmacologic agents, cognitive risk factors, physiological risk factors, psychological risk factors, and socio-economic risk factors.

■ CONCLUSIONS

This SLR identified risk factors associated with the nursing diagnosis risk for falls in community-dwelling older people. Some of these factors are already listed in NANDA-I and others were not. Therefore, one of the purposes of this review was the submission of these results to the commission for the development of diagnostics of NANDA-I.

Moreover, the implication of this SLR for the clinical practice of community nursing is the addition of the fall risk factors symptoms of depression/depression, female, compromised activities of daily living, and fear of falling in the diagnosis.

For nursing education, this SLR reveals the need to offer further training in this area, and consequently, the need for increasing the scientific production in nursing. In fact, only one of the studies that integrated the SLR was conducted by nurses. Therefore, we suggest further studies, especially those that aim to clinically validate nursing diagnoses.

The limitation of this study was the criterion to only include papers with full text available.

Finally, more importantly than reporting findings, we believe that incorporating the information presented here to the daily clinical practice can improve the quality of community nursing care.

The classifications and standard languages should represent the clinical practice, and they must be functional and comprehensive since they also represent nursing knowledge. Thus, studies such as this one do not only enhance the practice, but also the education of new nurses.

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