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REVIEW

POSSIBILITIES FOR NURSING INTERVENTIONS IN THE PREVENTION OF FALLS IN THE ELDERLY: A REVIEW

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ABSTRACT
Objective: To identify the nursing interventions that increase the home safety of elderly and prevent falls.
Method: Integrative literature review guided by the question: "What nursing interventions are adequate to prevent falls in the elderly at home?". From May to June 2018, there was a search for studies in EBSCO, B-On, SCOPUS, ISI, and JBI.
Results: The 13 studies recommend interventions that were organized in five categories: environmental risk assessment; advices on changes; adaptation of the space and equipment; assistance in the purchasing of support products and cognitive-behavioral strategies that increase the safety of the elder in the use of the physical space at home.
Conclusion: The possible interventions for the prevention of falls include: environmental risk assessment; advices on changes; adaptation of the space and equipment; assistance in the purchasing of support products; and cognitive-behavioral strategies that increase the safety of the elder in the use of the physical space at home.

DESCRIPTORS: Accidental Falls; Aged; Housing; Nursing; Equipment Safety.

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REVISÃO / REVISIÓN

INTERVENÇÃO DA ENFERMAGEM NA PREVENÇÃO DE QUEDA EM IDOSO: ESTUDO DE REVISÃO

RESUMO
Objetivo: identificar as intervenções de enfermagem que aumentam a segurança da casa do idoso e previnem a queda.
Método: revisão integrativa da literatura orientada pela questão: 'Que intervenções de enfermagem são adequadas à prevenção de queda no domicílio da pessoa idosa?'. Entre maio e junho de 2018 identificaram-se estudos na EBSCO, B-On, SCOPUS, ISI e JBI.
Resultados: os 13 estudos recomendam intervenções que foram organizadas em cinco categorias: avaliação do risco ambiental; aconselhamento sobre modificações; adaptação do espaço e equipamentos; assessoria na aquisição de produtos de apoio; e estratégias cognitivo-comportamentais que aumentam a segurança do idoso na utilização do espaço físico da casa.
Conclusão: os achados desta revisão permitiram mapear as intervenções que podem ser introduzidas no domicílio do idoso para evitar a queda, a sua recorrência e as lesões associadas.

DESCRITORES: Acidentes por Quedas; Idoso; Habitação; Enfermagem; Segurança de Equipamentos.

POSIBILIDAD DE INTERVENCIÓN DE ENFERMERÍA EN LA PREVENCIÓN DE LA CAÍDA EN PERSONAS MAYORES: ESTUDIO DE REVISIÓN

RESUMEN:
Objetivo: identificar intervenciones de enfermería que aumenten la seguridad del hogar de ancianos y eviten caídas.
Método: Revisión integral de la literatura guiada por la pregunta: "¿Qué intervenciones de enfermería son apropiadas" para evitar caídas en el hogar de la persona mayor? Entre mayo y junio de 2018, se identificaron estudios en EBSCO, B-On, SCOPUS, ISI y JBI.
Resultados: los 13 estudios recomiendan intervenciones que se organizaron en cinco categorías: evaluación de riesgos ambientales; asesoramiento sobre modificaciones; adaptación de espacio y equipamiento; Asesoramiento en la adquisición de productos de apoyo y estrategias cognitivo-conductuales que aumenten la seguridad de las personas mayores en el uso del espacio físico del hogar.
Conclusión: Las posibilidades de intervención en la prevención de caídas, van desde la evaluación del riesgo ambiental; asesoramiento sobre modificaciones y adaptación de espacio y equipamiento; Asesoramiento sobre la adquisición de productos y estrategias cognitivo-conductuales que aumenten la seguridad de las personas mayores en el uso del espacio físico del hogar.

DESCRIPTORES: Accidentes por caídas; Anciano; Vivienda; Enfermería; Seguridad de Equipos.

INTRODUCTION

Falls are the third greatest cause of chronic disability in the elderly, being a geriatric syndrome with a negative impact in the functioning of the elder who fell and/or is afraid of falling[1]. The increase in the mean life expectancy means that this event has been attentively observed by investigations and clinical professionals, since it is a "growth area" that has a negative impact in functionality[2]. It leads to high rates of morbidity, mortality, suffering, and to increases in the cost of treating injuries that are secondary to the event[2-4].

With a near 30% prevalence[4-6], this problem grows more common with age. While one third of the elders above 65 falls at least once a year, this number increases to 50% among 85-year-old or older ones[5], and one in every five falls demands healthcare. That is because they provoke moderate to serious injuries, and one in every ten incidents results in a fracture[2-4].

The authors warn that, in the context of the community, this adverse event has terrible consequences, increasing dependency due to the functional disability associated to the injuries or to the effects that the fear of falling provokes in the elders[4-7]. A set of restrictions is imposed upon the elders by others or by themselves, leading them to a state of physical, psychological, and social passivity[2,4], which is a predictor not only of losses in the quality of life, but also of institutionalization[8,9]. Therefore, falls, due to their prevalence and to their impact in the life of individuals, as well as in their families and society, constitute a preoccupation for public health[9].

The prevention of falls is difficult due to the multidimensional nature of the risk factors. That is why, from the risk assessment to the introduction of preventive measures customized to each senior, one must consider bio-physiological, psychological, socioeconomical, and environmental risk[2,10-13] factors.

International recommendations observe the importance of preventive visits to secure health and independence, and, consequently, to prevent disabilities and unnecessary hospitalization, diminishing costs[4,14]. The timely visit to the homes of the elderly is, by itself, a very important strategy to assess the risks of falls related to environmental factors[15] and to prevent falls in the older people from the community[2,4], not just as a result of immediate interventions, but also due to the planning of future interventions, including the involvement of other professionals[2,14].

However, the conclusions of the studies are not clear regarding the efficiency of some interventions carried out in the house of the elders regarding the reduction of risk and the prevalence of falls[16].

Therefore, the objective of this study was to identify the nursing interventions that increase the home safety of elderly and prevent falls.

METHOD

This Integrative Literature Review (ILR) was guided by the following investigation question, elaborated by the mnemonic device PICo (population, phenomenona of interest, and context): "What nursing interventions are adequate to prevent falls in the homes of the elderly?"

A six-stage protocol was used to operationalize the research: identification of the subject and selection of a hypothesis or research question; establishment of criteria to include and exclude studies; definition of the information to be extracted; evaluation of the studies included; interpretation of the results; and presentation of the revision/synthesis of

the knowledge acquired[17].

This methodological frame made it possible to define the eligibility criteria of the study, to reduce confidence intervals, and to facilitate the comparison of works and the interpretation of data, increasing the precision of the results. The inclusion criteria previously defined were: (P) - articles whose population or sample were elderly people (≥ 65 years); (I) – studies about interventions in the physical space of the house (to increase safety, improve accessibility, and eliminate risks) that have a positive impact on the risk of falls, falls, and/or injuries resulting from falls; and finally, articles whose context (Co) is related to the house of the person.

Were excluded articles whose population was made up of adults, or of hospitalized or institutionalized elders.

The MeSH descriptors used in the search, which was carried out from May to July 2018, were: ("interventions" or "prevention") and ("community" or "home visit" or "home hazard modification" or "home modifications") and ("elderly" or "aging") and ("falls" or "accidental falls") and ("architectural accessibility" or "safety" or "security measures" or "equipment safety" or "patient safety").

The search was carried out in three languages (Portuguese, Spanish, and English). It was carried out in the databases available in the search engines of EBSO, B-On, SCOPUS, ISI (Web of Science), and JBI (Joanna Briggs Institute). Due to the current relevance of the theme and considering the high number of studies carried out about it in the last years, this study only considered articles within a specific time frame: from 2013 to 2018.

Investigators created an Excel spreadsheet to record the contents extracted from the articles of the final bibliographic sample: identifying the title of the article/work; authors, year of publication, type of article; objective(s), methods, and techniques; evidence level and main results/conclusions.

At the end of the research, 39 articles potentially capable of answering the investigation question were found, all of which respected the eligibility criteria. The reading of their titles made it possible to identify 3 duplicate articles. The reading of the abstract made it possible to exclude 10 studies that did not respect inclusion criteria. From the 26 articles that were read in-full, half were excluded because they did not answer the investigation question. The 13 other articles became part of the final bibliographic sample.

The results of the articles that made it possible to answer the investigation question were extracted and submitted to content analysis. In the definition of the categories, it was guaranteed that they were representative, exhaustive, homogeneous, and pertinent with regards to the study object. Two investigators coded the results, and their work was later evaluated by the others, to increase the reliability of the analysis.

RESULTS

The 13 results from the bibliographic sample (Table 1) are not homogeneous, and their different objectives and designs make it difficult to compare their results. However, despite indicating different sources and methodology, their interpretation made it possible to answer the question proposed by this investigation.

Table 1 - Studies from the bibliographic sample, Lisbon, Portugal, 2018

Authors (year)	Type of study	Main results
Oliveira, Baixinho e Henriques (2018)[4]	Scoping review	The results of the scoping review suggest that the behavioral reinforcement related to the assistance for the change of the environment diminishes the prevalence of falls.
Oxtoby (2017)[18]	Literature review	The evaluation of the house of the elder makes it possible to identify risk factors for falls and to implement preventive measures not only for the use of the physical space of the house, but also for the elderly - for example, the use of footwear that is adequate for the gait, the presence of cables or loose carpets, and inadequate lighting, especially in corridors and stairs.
Cabrita e José (2013) [19]	Descriptive, cross-sectional, quantitative	The authors recommended the control of environmental risk factors through risk management, the promotion of safety in the house, and the adoption of safe behaviors.
Palvanen et al. (2014)[20]	RCT	The introduction of a program with multiple interventions that integrated the environmental change was efficient to diminish nearly 30% of the risk and prevalence of falls and related injuries.
Avin et al. (2015)[9]	Review Systematic	The triage of risk factors and the prescription of interventions adapted to environmental evaluation may diminish the prevalence of fall.
Kamei et al. (2015)[21]	RCT	Information on environmental and behavioral risk factors, related to changes in the environment, led the prevalence to diminish 18.5% in 12 weeks, in elders above 75.
Maggi et al. (2018)[22]	Quasi-experimental	Results showed that changes in the home environment, such as changes in the risk factors, have improved the quality of life of the elders, including their ability to stay in the same house for a longer period.
Wilson, Kvizhinadze, Pega, Nair e Blakely (2017)[23]	Modeling study	The intervention, which included the evaluation of safety, together with environmental changes, points at the reduction of risk and of the prevalence of falls, including considerable health gains, while being cost effective.
Pega, Kvizhinadze, Blakely, Atkinson e Wilson (2016)[24]	Modeling study	The results of the intervention, regarding the assessment of safety and the environmental changes in the house of the elder, prove that it brings economic benefits.
Ueda et al. (2017)[25]	Randomized study	The intervention group, with an intervention in the space, had 75% less near-falls when compared to the control group (hazard ratio, 0.25; 95% confidence interval, 0.09–0.75).
Rimland et al. (2017)[26]	Methodological study, qualitative (board of experts)	The elders who live in the community and have high risk of falling were recommended to have a safety evaluation at home and to do some changes (strong recommendation, moderate quality evidence).
Stark et al. (2018)[27]	Randomized study	The investigators recommended changing aspects of the house, since it is viable for the community elders who are more vulnerable.
Rimland et al. (2016)[28]	Systematic review	The environmental intervention must be considered as a measure to prevent falls in the elderly population, who live in the community and should be a part of the evaluation of the safety and the risks of the house, and should be considered with regards to carrying out changes.

Source: the authors (2018).

A detailed analysis of the results of the studies made it possible to organize results in five categories of action, all related to the intervention of health professionals. The categories that emerged were: environmental risk assessment; advices on changes; adaptation of the space and equipment; assistance in the purchasing of support products and cognitive-behavioral strategies that increase the safety of the elder in the use of the physical space at home.

DISCUSSION

The 13 studies that integrate the final sample were in accordance to the inclusion and exclusion criteria established, making it possible to answer the research question and to reach the objective if this ILR. The studies included are mostly primary (n= 9)[19-27], quantitative (n=8)[19-25,27], with four RCT[20,21,25,27], two modeling studies[23,24], one quasi-experimental study[22], one descriptive study[19], four literature reviews with scientific methodology[4,9,18,28], and one qualitative and methodological study (board of experts)[26].

The studies were different regarding methods and techniques and used diverse instruments to evaluate risk and its associated injuries. The size of the samples are different and the interventions implemented, despite the fact that all introduce changes in the safety of the house, are presented either in isolation or in conjunction with other interventions that vary from one study to the other. The evaluation stages and the effectiveness of the intervention are also different, which makes it difficult to compare the results.

In the quantitative studies, the means for the age of the elders are different, as are the inclusion criteria regarding the variable. In one of the studies, for example, the 1314 seniors who participated were 70 years old or older[20], which may alter the results and make comparisons more difficult, since a higher age is related to an increased risk of falling and to high rates of injuries associated to the falls; the highest prevalence of injuries related to falls is found in elders above 80 years old[29].

In another study, the age of the participants varied from 65 to 92[4]. The difference of 27 years affects the risk, the prevalence, and the severity of the lesions associated to the fall[2,30], influencing the unique perception of aging and the probability of functional and cognitive decline, even affecting the fear associated to the previous history of adverse events[2,4].

We agree with the authors that advocate that, for falls to be prevented and never repeated, different ages require a different approach to the management of the environmental risk, as well as for the implementation of interventions that respect the heterogeneity of this population group[2,4].

In the studies in the sample, it is not clear whether the intervention was always applied by the same nurse or by the same health team. It is also unknown whether the teams had any training on the management of the risk of falls. Studies suggest that a structured intervention in the health team[6,31], using the "TeamSTEPPS®" and its five domains — team formation, communication, leadership, monitoring, and mutual support [31] — may help improving the intervention in risk prone elders.

In the category of environmental risk assessment, all studies agree on the recommendation that there should be an evaluation of indoor safety in the house of the elder, especially in the case of those with a higher risk of falling[2,4,26]. On the other hand, the adaptation of the risk assessment, combined with the implementation of preventive measures that control such risk[15], become economic advantages[24].

The house visits, to this end, may, by themselves, help identifying and preventing the risks of fall[2,4,9,18], making it possible to create customized interventions in accordance to the actual risks found in the context[9,18], allowing for an immediate intervention and for

the planning of medium- to long-term interventions, including the involvement of other professionals[15], motivating the elderly, increasing their adherence to the therapeutic regime, their safety, and the satisfaction of the client[2,14].

The preventive house visits, with well-defined objectives, may favor self-esteem, promote control over the risk and over the decision making process in the implementation of preventive measures, and make the elders more aware of the importance of prevention, so they can remain active for longer[14].

Regarding the category of counseling about environmental changes, the findings show that there are evidences according to which falls can be avoided through simple alterations [2,4,9], such as removing or fixing loose carpets and selecting, after a careful analysis of the feet and the gait, the adequate footwear for the elder[4,9]. The assistance for environmental changes and the behavioral reinforcement diminish the prevalence of falls[12] and increase mobility and safety, when obstacles in the zones of transit are eliminated[11]. The results of the research point out that these interventions are a priority among people with a history of falls and/or high risk of falls[9].

The use of models of the house to inform and aid the elderly with regards to the safety of their house diminished the prevalence of falls in 75 year old or older people[21]. Further studies should explore the impact of other strategies, especially new technologies, as a clinical recourse to better manage resources and make the evidence more widely available[2].

In the category of space and equipment adaptation, interventions are included that introduce changes in the space of the house and show themselves to be effective in the reduction of the risk of this accident, of its prevalence, and of the injuries secondary to it, reducing them in nearly 30%[20].

The economic impact of these interventions should be measured. Although some changes are not expensive, such as removing carpets, pushing away furniture that hinders indoor mobility, removing loose wires, among others[18,28], certain ones may involve the purchasing of support products for the performance of daily life activities, leading to expenses that may be too high for the elderly and their family.

Studies on the economic impact of this phenomenon suggest that this intervention may lead to considerable gains in health, being actually cost-effective. Therefore, the investigators recommend its implementation in elderly with previous falls[23,24], considering that the results of the investigation show that these diminish the prevalence, the risk, and improve the performance of self-care[27], which is a modifiable risk factor.

In the category of assistance in the purchasing of support products that improve the safety of the environment, investigators recommend evaluating the needs, purchasing, and giving support in the training and supervising of the use of the following products: adequate lighting of the spaces; anti-slip devices for floors, bathtubs, and showers; side bars to give support and facilitate independence in self-care (excretion, bath, and personal hygiene); higher toilet seats, that facilitate sitting and getting up; handrails in the corridors and in stairs to offer support during gait and to go up and down the stairs; among others[2,28].

In groups with specific health conditions, such as previous falls with fractures, the introduction of a single intervention, such as changing the floor, was important to diminish falls in the elderly after the hospital discharge from an orthopedic service, with an intervention group of 75% less near-falls when compared to the control group[25].

Regarding behavioral-cognitive strategies to promote the adherence to safe behavior in mobility and in the use of the space and equipments of the house, the findings show that these have a positive effect in diminishing the risk, the prevalence, and the morbidities associated to the injury, which include physical and cognitive decline, while also diminishing the rates of mortality and the risk of institutionalization[4].

In one of the studies included in the analysis, in this ILR, the resource to behavioral-cognitive strategies proved to have positive effects in reducing the restriction of activities due to the fear of falling[13]. This piece of data must be investigated in further investigations, since the fear of falling has serious implications in the functioning of the elderly, be it due to the lack of trust in carrying out daily-life activities, be it due to the restriction of activities and diminished social participation[2,6].

FINAL CONSIDERATIONS

The findings of this review made it possible to map the interventions that must be introduced in the house of the elderly to avoid falls, repeated falls, and associated injuries.

The interventions identified were organized into five categories : environmental risk assessment; advices on changes; adaptation of the space and equipment; assistance in the purchasing of support products and cognitive-behavioral strategies that increase the safety of the elder in the use of the physical space at home.

The limitations of this study result from the heterogeneity of samples, methods, techniques, and instruments used in the different studies. The research included studies in Portuguese, Spanish, and English. Studies published in other languages were not identified and, since gray literature was not included, master's or doctorate degree studies that include interventions in the house of elders may have been lost.

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