Review Article

Interventions to prevent falls in older adults in Primary Care: a systematic review

Intervenções para prevenção de quedas em idosos na Atenção Primária: revisão sistemática

Intervenciones para la prevención de caídas de adultos mayores en la Atención Primaria: revisión sistemática

Francisco Wellington Dourado Júnior[1] https://orcid.org/0000-0002-3326-338X
Andréa Carvalho Araújo Moreira[2] https://orcid.org/0000-0001-9855-1449
Dafne Lopes Salles[2] https://orcid.org/0000-0002-8129-3428
Maria Adelane Monteiro da Silva[2] https://orcid.org/0000-0001-7579-2645

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Corresponding author:
Francisco Wellington Dourado Júnior
E-mail: wjunior0599@gmail.com

Associate Editor (Peer review process):
Paula Hino
(https://orcid.org/0000-0002-1408-196X)
Escola Paulista de Enfermagem, Universidade Federal de São Paulo, SP, Brazil

Abstract

Objective: To identify effective interventions for preventing falls in older adults in the national and international literature, developed in primary health care settings, and categorize them based on the World Health Organization's Report on Fall Prevention.

Methods: A systematic review registered in PROSPERO (CRD42020149529), conducted between 2019 and 2020, according to the PRISMA guidelines. Independent reviewers consulted MEDLINE®/PubMed®, Lilacs, Scopus, Cochrane, Web of Science, and Embase databases. The descriptors "*elderly*", "*elder*", "*aged*", *"aging*", "*care*", "*education*", "*primary health*", "*falls*" and "*prevention"* were used for the database search, and were defined from the PICO strategy. The PEDro scale was used to evaluate the methodological quality of the selected studies. The results are presented in order to favor comparability among the studies included in this review and categorization regarding the profile of the publications and classification of the intervntions.

Results: Twenty eligible articles were identified, with 35% (n=8) classified as high methodological quality and 25% (n=5) as excellent quality. Among the investigated interventions, 55% (n=11) consisted of physical exercise programs, and 45% (n=9) were multicomponent, with a duration time between 3 weeks and 12 months, implemented by professionals from different disciplines. Such interventions had an impact on reducing falls and decreasing the fear of falling in older adults, as well as contributing to muscle strengthening, motor skills, and cognitive improvement.

Conclusion: The interventions identified proved to be effective in strengthening the musculoskeletal system, maintaining geriatric functionality, improving balance, and assessing the risk of falls to promote better management of these events.

Resumo

Objetivo: Identificar na literatura, nacional e internacional, intervenções eficazes para prevenção de quedas em idosos desenvolvidas no âmbito da Atenção Primária à Saúde e classificá-las tendo por base o Relatório da Organização Mundial da Saúde sobre Prevenção de quedas.

Métodos: Revisão sistemática realizada entre 2019 e 2020, conduzida a partir do guia PRISMA e registrada na PROSPERO (CRD42020149529). Avaliadores independentes consultaram as bases de dados MEDLINE®/PubMed®, Lilacs, Scopus, Cochrane, *Web of Science* e Embase. Para a busca nas bases, utilizaram os descritores definidos a partir da estratégia PICO: "*elderly*", "*elder*", "*aged*", *"aging*", "*care*", "*education*", "*primary health*", "*falls*" e "*prevention".* Utilizou-se a escala PEDro para avaliar a qualidade metodológica dos estudos selecionados. Os resultados foram apresentados de modo a favorecer a comparabilidade entre os estudos incluídos nesta revisão e serem categorizados quanto ao perfil das produções e classificação das intervenções.

[1]Universidade Estadual do Ceará, Fortaleza, CE, Brazil.
[2]Universidade Estadual Vale do Acaraú, Sobral, CE, Brazil.
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Resultados: Identificaram-se 20 artigos elegíveis, sendo 35% (n=8) classificados como alta qualidade metodológica e 25% (n=5) como excelente qualidade. Das intervenções investigadas, 55% (n=11) consistiam em programas de exercício físico, e 45% (n=9) eram multicomponentes, com tempo de duração entre 3 semanas e 12 meses, realizadas por diferentes categorias profissionais. Tais intervenções influenciaram na redução de quedas e na diminuição do medo de cair nos idosos, bem como contribuíram para o fortalecimento muscular, a capacidade motora e a melhora cognitiva.

Conclusão: As intervenções identificadas mostraram-se eficazes no fortalecimento musculoesquelético, na manutenção da funcionalidade geriátrica, na melhoria do equilíbrio e na avaliação de riscos de quedas para promoção do enfrentamento dos mesmos.

Resumen

Objetivo: Identificar en la literatura nacional e internacional intervenciones eficaces para la prevención de caídas de adultos mayores desarrolladas en el contexto de la Atención Primaria de Salud y clasificarlas con base en el informe de la Organización Mundial de la Salud sobre prevención de caídas.

Métodos: Revisión sistemática realizada entre 2019 y 2020, a partir de la guía PRISMA y registrada en PROSPERO (CRD42020149529). Evaluadores independientes consultaron las bases de datos MEDLINE®/PubMed®, Lilacs, Scopus, Cochrane, *Web of Science* y Embase. Para la búsqueda en las bases, se utilizaron los descriptores definidos a partir de la estrategia PICO: "*elderly*", "*elder*", "*aged*", *"aging*", "*care*", "*education*", "*primary health*", "*falls*" y "*prevention"*. Se utilizó la escala PEDro para evaluar la calidad metodológica de los estudios seleccionados. Los resultados fueron presentados a fin de favorecer la comparabilidad entre los estudios incluidos en esta revisión y para que puedan ser categorizados respecto al perfil de las producciones y clasificación de las intervenciones.

Resultados: Se identificaron 20 artículos elegibles, de los cuales el 35 % (n=8) fueron clasificados de alta calidad metodológica y el 25 % (n=5) de excelente calidad. De las intervenciones investigadas, el 55 % (n=11) consistió en programas de ejercicio físico y el 45 % (n=9) fue de multicomponentes, con un tiempo de duración entre 3 semanas y 12 meses, realizadas por diferentes categorías profesionales. Tales investigaciones influyeron en la reducción de caídas y en la disminución del miedo de caer de los adultos mayores, así como también contribuyeron al fortalecimiento muscular, a la capacidad motora y a la mejora cognitiva.

Conclusión: Las intervenciones identificadas demostraron ser eficaces para el fortalecimiento musculoesquelético, la conservación de la funcionalidad geriátrica, la mejora del equilibrio y la evaluación de riesgo de caída para la promoción del afrontamiento de estos.

Introduction

Falls in old age constitute a serious and growing public health problem worldwide. Approximately 30% of older adults aged 65 years or more fall each year, resulting in serious injuries, decreased mobility, and loss of independence in activities of daily living.[1] Three older adults are estimated to die every hour as a result of a fall In the United States, and by 2030, that number is expected to rise to seven.[2]

In other countries, such as Canada, the prevalence of falls in older adults reaches close to 20%; 28.4% of older adults in England reported having had falls in the last two years; in Ireland, 19.4% of the older population reported at least one fall episode in one year.[3] In the national scenario, the occurrence of falls in this population may range from 10 to 35%, which expresses higher rates when compared to developed countries.[1]

These events leads to fractures, fear of repeated falling, and soft tissue injuries, all of which may intensify the decline in functional capacity, and interfere with the quality of life of the subject.[4] The family members, on the other hand, may need to make certain changes in the family routine, such as adaptation of daily household activities. Family income is required to better care for the individual who has been involved in a fall.[5]

The episodes of falls have a negative impact on the management of healthcare resources when they result in hospitalization of the patient, considering that these are generally longer hospitalizations, with more therapeutic interventions, adoption of more complex treatments, and more sophisticated tests.[6]

Primary health care is the main access door to health services, serving people who are also healthy, from a comprehensive care perspective. This implies commitment and responsibility from professionals in caring for the health maintenance of people in a community.[7]

Moreover, the Pan American Health Organization (PAHO) and the World Health Organization (WHO) declared this the Decade of Healthy Aging (2020-2030) and launched a manual of guidelines on person-centered assessment, as well as guidelines for gerontological care in primary care.[8,9] This manual encourages and guides primary health care professionals to perform actions to promote functional capacity, maintenance of autonomy and Independence, and early identification of health risks to older adults.

Furthermore, a gap in knowledge was perceived related to studies suggesting interventions considered effective for preventing falls in older adults, in the context of primary health care, as the studies generally tend to analyze factors associated with this con-

dition, and do not identify preventive actions.[1,3,9] From this perspective, this review contributes to the dissemination of scientific evidence, to assist managers and health professionals in adoption of preventive strategies and development of more appropriate and assertive public policies that minimize complex health situations caused by falls in older adults.

This study aimed to identify effective interventions for preventing falls in older adults in the national and international literature, developed within the scope of primary health care, and to classify them based on the World Health Organization's Report on Fall Prevention.

Methods

This was a systematic literature review conducted according to the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol, and registered in the International Prospective Register of Systematic Reviews (PROSPERO) under number CRD42020149529.

The PICO strategy was used to formulate the guiding question, with the following elements: P (Population: Older adults); I (Intervention: interventions performed within primary health care) and O (Outcomes: prevention of falls). No comparison (C) was made between the standard intervention and the others. Thus, the following guiding question was formulated: Which interventions performed within the scope of primary health care are effective for preventing falls in the older adults? Articles addressing interventions conducted within the scope of primary health care for preventing falls in individuals aged 60 years or older, and consisting of randomized clinical trials and quasi-experimental studies, were included, with no restriction as to publication date or language. Effective interventions were considered to be those that obtained significant outcomes in preventing falls in the older adults, either as primary or secondary outcomes. Letters to the editor, duplicate articles, and studies that did not obtain significant results in preventing falls in older adults were excluded.

The search was conducted during the months of July to October of 2020, in the following databases, National Library of Medicine (MEDLINE®/PubMed®), Latin American and Caribbean Literature on Health Sciences (Lilacs), Scopus, Cochrane, Web of Science, and Embase.

To define the search terms, iniitially, the search terms were defined according the descriptors for each component of the PICO strategy, found in the exploratory reading of studies that addressed the theme. The descriptors used in PubMed®, Scopus, Web of Science, and the Cochrane databases were identified using Medical Subject Headings (MeSH). Emtree terms were used for Embase, and, for Lilacs, they were identified using the Health Sciences Descriptors (Decs) tool.

For the study population, terms related to the word "elderly" were listed. For the intervention, terms related to "intervention for falls prevention in primary care" were selected. The outcome resumed the terms related to "falls prevention", already included in the item referring to the intervention. With the use of quotation marks, the synonymous descriptors were covered, using the Boolean operator "OR" and, among the components of the PICO strategy, using the Boolean operator "AND" (Appendix 1).

The titles and abstracts of the retrieved articles in each database were read to identify studies that met the eligibility criteria. Then, the full texts were analyzed in order to identify studies that truly addressed the research question. To ensure more rigor and reliability to the process, these steps were completed by a pair of researchers, who met to agree on the eligible articles, and, in case of any disagreement in the selection of studies, a third reviewer was consulted to assist in the final decision.

A self-developed instrument was used to collect data related to the characterization of the studies (authorship, year and country of publication, type of study, sample) and intervention (time duration; type and characterization of the intervention; professionals involved; population; variables evaluated; outcomes obtained).

The methodological quality of the eligible articles in this review was assessed according to the

Physiotherapy Evidence Database (PEDro) Scale for evaluation of clinical trials.[10]

The PEDro Scale consists of assisting and identifying, by means of 11 evaluation criteria, which randomized controlled trials have internal validity (criteria 2 to 9) and contain sufficient statistical information for results to be interpreted (criteria 10 and 11). After the scale was administered, the studies were classified according to the scores obtained, as follows: scores between zero and four were considered low quality; four and five were considered moderate quality; six and eight were considered high quality; and nine and ten were excellent methodological quality.[10] This instrument was also used for the same purpose in other recent systematic reviews.[11,12]

To favor comparability among the selected studies, we chose to extract information to characterize the profile of research and interventions to prevent falls in older adults in primary health care. These were classified into physical exercise programs and multicomponent interventions, based on the WHO report on falls prevention from 2007,[13] which discusses the magnitude of this problematic for health services management and for the older person. The following definitions for the classification of intervention on prevention of falls in the older adults in primary health care were adopted for this review: physical exercise program consisted of interventions that addressed practices related to physical activities developed in a systematic and continuous manner, with a standardization of the time of each session, including martial arts, musculoskeletal strengthening, balance, coordination, or strength;[14] multicomponent intervention was defined as an approach to multiple factors that could trigger the occurrence of falls. This category involved the following actions: balance and gait training with the appropriate use of support equipment; assessment of environmental risks and modifications; review of medications and any necessary changes; treatment of vision problems; provision of education and training; treatment of foot and shoe problems; and, treatment of orthostatic hypotension and other cardiovascular problems.[13]

Results

The studies identified in the databases totaled 3,885, of which 2,857 were excluded after reading the titles and abstracts. The researchers excluded 398 studies due to lack of interventions with significant outcomes for fall prevention, and 12 for duplication in the databases, resulting in a final sample of 20 publications (Figure 1).

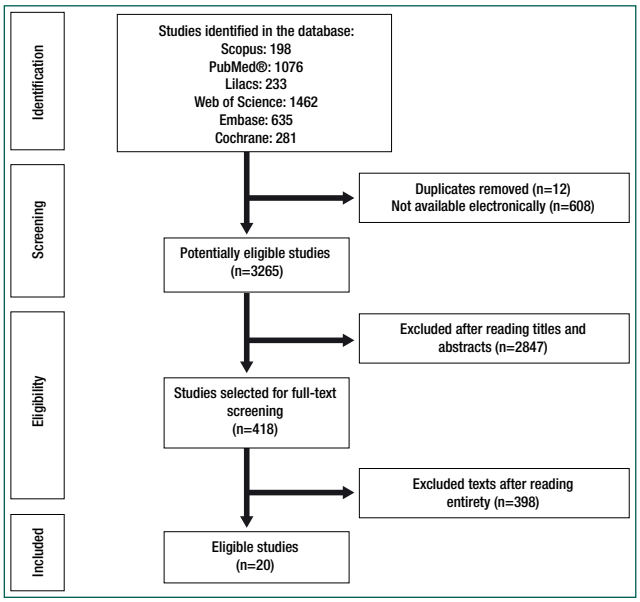

Figure 1. Flowchart of identification and selection of articles for systematic review

In the methodological quality assessment, 40% (n=8) of the studies were considered low quality, obtaining four points; 35% (n=7) were high quality, obtaining eight points, and, among the studies considered to have excellent methodological quality, 5% (n=1) obtained nine points and 20% (n=4) obtained ten points, as shown in chart 1.

These were recent studies, with those from the past five years, between 2016 and 2020, comprising 55% (n=11) of the publications. Only 10% (n=2) were published between 2010 and 2015. In the first decade of the 21st century, 35% of the publications with this theme were published. Regarding the countries where the studies were conducted, Europe was predominant, with Germany, 15% (n=3); Spain, 10% (n=2);

Chart 1. Characteristics of the included scientific publications

Authors	Country	Type of study	Sample	Professionals involved in the interventions	Duration of intervention (months)	Methodological quality PEDro scale (score)
Serra-Prat et al.[15]	Spain	RCT	CG: 92 IG: 80	Nurse, physical educator	12	10
Bustamante-Troncoso et al.[16]	Chile	RCT	IG: 70 CG: 70	Nurse	5	8
Kuhirunyaratn et al.[17]	Thailand	Quasi-Experimental	IG: 108 CG: 108	Physicians, physical therapists	6	4
Shumway-Cook et al.[18]	United States	RCT	476	Nurse, physiotherapist health educators	12	8
Boongird et al.[19]	Thailand	RCT	IG: 219 CG: 220	Physician, nurse	12	8
Elley et al.[20]	New Zealand	RCT	IG: 155 CG: 157	Nurse, physician	12	8
Saudi et al.[21]	Egypt	Quasi-experimental, before-and-after	100	Nurse, physician, physiotherapist	12	4
Duckham et al.[22]	England	RCT	319	Physician, physical therapist, physical educator, nurse	6	10
Spice et al.[23]	England	RCT by cluster	IG: 354 CG: 162	Nurse, physician, physical educator, occupational therapist	12	9
Siegrist et al.[24]	Germany	RCT	IG: 222 CG: 156	Physiotherapist, physician, physical educator	4	4
Li et al.[25]	China	RCT	669	Physician, physical educator	6	4
Cristopoliski et al.[26]	Brazil	RCT	5	Physical educators	3	8
Silva et al.[27]	Brazil	CT	61	Physical educator, physical therapist	3	8
Gschwind et al.[28]	New Zealand	RCT	153	Physical educator, neuroscientists	6	10
Liu-Ambrose et al.[29]	Canada	RCT	IG: 143 CG: 172	Physiotherapists	12	10
Li et al.[30]	China	RCT	*Tai Chi Chuan*: group 224 Multimodal intervention group:223 Usual care group: 223	Physiotherapist, physical educators	6	8
Van Ooijen et al.[31]	Germany	RCT	IG: 48 CG: 24	Physiotherapist, physical educator	12	4
Freiberger et al.[32]	Germany	RCT	IG: 222 CG: 150	Physical educators	12	4
Nguyen et al.[33]	Vietnam	RCT	IG: 56 CG: 56	Physical educator	6	4
Moura et al.[34]	Brazil	RCT	IG: 18 CG: 18	Physiotherapist	4	4

RCT - Randomized Clinical Trial; CG - Control Group; IG - Intervention Group; PEDro - Physiotherapy Evidence Database

England, 10% (n=2). This was followed by those from Asia, of which 10% (n=2) were from China, 10% (n=2) Thailand, and 5% (n=1) Vietnam, in addition to articles from the Americas, with 15% (n=3) from Brazil, 5% (n=5) from Chile, and 5% (n=1) from Canada. The continents of Oceania and Africa had only one publication each, New Zealand and Egypt, respectively. Regarding the professional disciplines that performed the interventions, physical educators were present in 60% (n=12) of the studies, physical therapists in 50% (n=10), physicians in 45% (n=9), nurses in 40% (n=8), and occupational therapists in only 5% (n=1) of the studies. Regarding the duration of the interventions, 40% (n=8) lasted 12 months, 30% (n=6) six months, and the remainder lasted between three weeks and five months. The interventions for fall prevention in older adults, and descriptions regarding type and efficacy, are shown in chart 2.

Among the interventions performed for fall prevention in older adults, within the scope of primary health care, 55% (n=11) were identified as physical exercise programs, and 45% (n=9) as multicomponent interventions.

Discussion

Effective fall prevention strategies are those that modify or eliminate factors that can be acted upon, whether intrinsic or extrinsic to the individual, considering that fall occurrence is a potentially preventable event that is related to multiple factors.

Chart 2. Synthesis of the studies regarding interventions to prevent falls in the older adults in primary health care, considering their type and effectiveness

Type of intervention	Authors	Characteristic of the intervention	Measured variables	Intervention effectiveness
Multi-component Intervention	Serra-Prat et al.[15]	Nutritional recommendations, physical activity program (aerobic, strengthening, balance and coordination activities), telephone follow-up	Prevalence of frailty	Effective in preventing frailty in community-dwelling pre-fragile older adults, with the CG showing a higher number of older adults (15.3%) who evolved to frailty, when compared to the IG (4.9%)
	Bustamante-Troncoso et al.[16]	Home visit, health education, development of a management plan for fall risk factors, telephone follow-up	Self-perception of fall risk, presence of risk factors for falls, occurrence of falls	Effective in reducing the frequency of falls (IG with only 7.9% falls versus CG, with 27.7%); management of extrinsic risk factors (24% shoes; 21% walking and 36% presence of mobile objects)
	Kuhirunyaratn et al.[17]	Program included exchange of learning and experiences among participants, home exercises, group dialogue	Presence of risk factors for falls	Effective in improving balance (IG with 52.9% versus CG with 60.8%), decreasing use of medications among older adults
	Shumway-Cook et al.[18]	Exercise program , health education group for older community adults	Occurrence of falls in older adults	Effective in improving balance (IG with 75% showed good balance versus CG with 50%); mobility and physical strength' dealing with the risk factors for falls
	Boongird et al.[19]	Exercise program, telephone follow-up	Occurrence of falls during the research period	Effective in reducing fear of falling (IG with rate of 24.7; CG with rate of 27); improvement in exercise adherence. The IG had a rate of 0.3 falls/person, while in the CG this rate increased to 0.4
	Elley et al.[20]	Assessment of risk factors for falls, health education, review of medications used, prescription of vitamin D, specialized follow-up if needed	Occurrence of falls during the research period	Effective in reducing the risk factors for falls; self-management of older adults. A discrete difference was verified in the frequency of falls when comparing IG (67%) with CG (70%)
	Saudi et al.[21]	Assessment of intrinsic and extrinsic risk factors for falls and assessment of the older adults' bone capacity	Occurrence of falls during the study period and the functionality of the older adults	Effective in reducing the occurrence of falls when comparing the pre-test (63.4) and post-test (49.5); reducing recurrence of this event (pre: 40.8% versus post: 25.8%)
	Duckham et al.[22]	Strength and balance exercise program, home visits, telephone follow-up	Bone mineral density of participants, especially of femur	Effective in reducing the risk of falls and fractures, as it increased muscle strength and functionality of older adults, but did not improve bone density of participants
	Spice et al.[23]	Assessment of fall risk factors	Reduction in the number of falls and injuries caused by falls	Effective in reducing the risk factors for falls (IG: 75% of the older adults fell, compared to 84% in the CG)
Physical exercise programs	Siegrist et al.[24]	Supervised exercise program, assessment of fall risk factors	Reduction in the occurrence of falls and injuries caused by falls	Effective in decreasing the occurrence of falls (IG: 291 falls; CG: 367 falls); reduction in injuries caused by these events
	Li et al.[25]	Tai Chi Chuan training as exercise	Physical performance, functionality, fear of falling	Effective in decreasing risk factors for falls; improved balance; strengthened musclesl reduced fall occurrences (IG: 28%; CG: 46%)
	Cristopoliski et al.[26]	Program of stretching exercises, flexibility promotion	Improved gait, flexibility	Effective in improving gait performance; motor ability to move feet and hip joint angle by 3.9°
	Silva et al.[27]	Aerobic stretching, movement exercise program	Balance, coordination, agility	Effective in improving mean functional and motor performance of older adults (IG: 11.33; CG: 10.81)
	Gschwind et al.[28]	Exercise programs for muscle strengthening	Risk factors for falls, self-care, mobility, pain	Effective in reducing risk factors for falls (IG: only 6 falls; CG: 16); postural sway; stepping reaction; cognitive function
	Liu-Ambrose et al.[29]	Exercise programs for muscle strengthening	Reduction in occurrence of falls during research period	Effective in reducing occurrence of falls (IG: 236 falls versus CG: 366 falls); injuries caused by such incidents
	Li et al.[30]	One group used a Tai Chi Chuan training program; the other used a multimodal physical exercise program	Occurrence of falls among older adults in the groups	Tai Chi Chuan was more effective in reducing fall occurrence (IG: 152 versus GC: 218) than multimodal exercises; it improved balance and flexibility of participants
	Van Ooijen et al.[31]	Physical exercise program	Mobility, muscle strength	Effective in improving physical mobility; educing risk and occurrence of falls (IG: 0.59 falls/person versus CG: 0.63 falls/person)
	Freiberger et al.[32]	Exercise programs for muscle strengthening; body self-knowledge	Occurrence of falls during research period	Effective in reducing occurrence of falls in community-dwelling older adults (IG: 291 and CG: 397)
	Nguyen et al.[33]	Tai Chi Chuan training as exercise	Sleep quality, risk of falls	Effective in improving balance; sleep quality; cognitive performance of older adults. In the falls risk assessment scale, a mean of 8.06 in IG and 9.48 in CG was identified.
	Moura et al.[34]	Exercise programs for muscle strengthening; functionality	Functional capacity	Analysis found improvement in functional mobility test (CG: mean of 26.38 and in IG: mean of 24.57); walking test (IG: 4.41 versus CG: 4.22)

CG – Control group; IG – Intervention group

The studies included in this review were mostly conducted in developed countries and published in the last decade, which reveals that only recently has this problem has been discussed in the field of gerontology. A precursor to these discussions is believed to be the elaboration of the global report on fall prevention in older adults, in 2007, by the WHO, which presents factors related to the occurrence of falls in old age, and defines the best prevention strategies, as well as encourages health services to make decisions designed to address this problem.[13]

The development of interventions with proven efficacy requires consideration of fall predictors in the geriatric population. According to the identified studies, such factors are related to: poor sleep quality,[15,18,25,30] depression,[15-18,25,30] funcional dependence,[15-34] frailty,[15-34] loss of autonomy,[15-18,31-34] impaired mobility[15-34] and previous history of falls.[15-25,29-34]

The authors who used physical exercise as intervention used both the application of a training program and the practice of martial arts. The programs adopted in some studies[24,26-29,31,32] were primarily aimed at muscle strengthening, balance, improving motor coordination, and gait enhancement. On the other hand, those that used martial arts[25,30,33] intended to improve balance, flexibility, and functional capacity of these individuals. The benefits of these interventions are similar to a clinical trial conducted in New Zealand with 72 older adults in treatment for Alzheimer's disease, with a mean age of 78 years, who participated in a multimodal physical exercise program and obtained a reduction in fall risk and improvement in gait, balance, and bone mineral density in the short and medium term.[35,36]

In multicomponent interventions, different types of approaches were found, but with similarities among them. Physical activity was used in most studies,[15,17-20] followed by telephone monitoring interventions,[15,16,18,19] and assessment of intrinsic and/or extrinsic fall risks.[16,19,20,26]

Such multicomponent interventions are considered low-cost, which is recommended by recent international evidence that suggests better design and implementation of low-cost and high-efficacy multifactorial interventions, appropriate for each country[37] Researchers have recently invested in the development of state-of-the-art technologies for fall detection, which demonstrates the concern with this public health issue and implies care innovation. However, access to these resources is a distant reality in developing countries, despite the fact that there is a considerable number of vulnerable older adults in these places.[38]

When comparing the studies that presented multicomponent intervention with those that involved physical exercises, some peculiarities in the results are found. While a 12-month multicomponent intervention reduced the probability of falls in older adults by 67%,[20] an exercise program of the same duration reduced probability by 59%,[31] which may be associated with increased adherence of the subjects to the multicomponent approach and an expanded clinical practice.[20,32]

Furthermore, those studies that used telephone intervention for monitoring the exercise program[15,16,18,19] found the potential that this type of intervention offers, as the telephone call allows the health professional to provide guidance on important points in the performance of activities, clarify doubts, and allows for better follow-up of each individual's particularities.

Another issue noticed in the multicomponent intervention concerns the review of medications used by the geriatric public. Some classes of medications require more attention from health professionals, especially psychotropic agents, which are associated with cognitive and functional impairment in these individuals, such as benzodiazepines, which can influence the older person's loss of functionality, as well as their walking and psychomotor capacity.[35]

Some studies also described home visits as a powerful technology of care for older adults, used as a care strategy by primary care professionals.[15,17,26] The home visit enables identification of risk factors that may be related to the fall occurrence in this population, so that guidelines and clarifications can be offered to provide the individual with

necessary empowerment to address risks and prevent fall episodes.[15]

Therefore, primary care is a preferred space for developing interventions to prevent falls in older adults, and to reduce intrinsic and extrinsic risk factors associated with this event. This can be justified when considering the role attributed to the primary level of care in the development of actions for health promotion and protection, prevention of diseases, diagnosis, treatment, rehabilitation, and maintenance of health and functionality in old age.[39]

The implementation of preventive measures requires involvement of the multidisciplinary team that works in primary health care to provide comprehensive care for the older person, and to provide improvement in the quality of life of these individuals. The most active professional categories in performing the interventions were physiotherapists, nurses, physical educators, and physicians.

The reviewed studies showed the unique contribution of nursing in the multifactorial approach for fall prevention, by means of health education[17-19] and telephone follow-up[15,16,19,21,34] of the participants. Educative skills are inherent to nurses when providing care, because this professional collaborates in the construction of knowledge, changing attitudes, and the adoption of healthy practices by the individual, family, and community, favoring the therapeutic adherence of older adults.[11]

The adoption of care for effective fall prevention requires a greater investment in human and health resources. The cost-effectiveness analysis of these interventions is important, including the monetary benefits of preventive actions and the consequent decrease in hospitalization of older adults due to falls. Such investments can also strengthen the delivery of primary care, given the high rates of hospitalization of older adults after episodes of falls.

This study presents as limitations the methodological differences used by the primary studies, such as the sample size, duration of interventions, type of intervention, statistical treatment and heterogeneity, preventing an adequate combination of the main results and the realization of a meta-analysis that would evidence the intervention with the best efficacy.

Conclusion

Effective interventions for preventing falls in older adults include physical exercise programs and multicomponent interventions, both aimed at strengthening the musculoskeletal system, maintaining geriatric functionality, improving balance, motor coordination, and assessing fall risk. The development of such interventions directly impacts the reduction of risk factors for falls, both intrinsic and extrinsic, which influences the promotion of quality of life for the geriatric population, with preservation of autonomy and independence of these individuals in performing activities of daily living. Further systematic reviews with the use of meta-analysis are also recommended, with the purpose of providing increased robustness to the comparability between studies, as well as new studies addressing nursing interventions for fall prevention in older adults

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