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INTERVENÇÕES DE ENFERMAGEM PARA A PREVENÇÃO DE QUEDAS EM IDOSOS INSTITUCIONALIZADOS: UMA REVISÃO INTEGRATIVA

NURSING INTERVENTIONS FOR FALL PREVENTION IN INSTITUTIONALIZED OLDER ADULTS: AN INTEGRATIVE REVIEW

INTERVENCIONES DE ENFERMERÍA PARA LA PREVENCIÓN DE CAÍDAS EN ADULTOS MAYORES INSTITUCIONALIZADOS: UNA REVISIÓN INTEGRADORA

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RESUMO

Introdução: As quedas entre idosos institucionalizados são um importante problema de saúde pública, levando a consequências físicas, psicológicas e sociais adversas. As intervenções de enfermagem desempenham um papel central na prevenção de quedas, mas a eficácia das diferentes abordagens continua a ser um objeto de estudo.

Objetivo: Esta revisão integrativa da literatura avalia o impacto das intervenções conduzidas por enfermeiros na redução do risco de quedas em idosos institucionalizados.

Métodos: Foi realizada uma pesquisa na PubMed, SciELO e Google Scholar para identificar estudos relevantes sobre intervenções de enfermagem para a prevenção de quedas. Após a aplicação dos critérios de inclusão e exclusão, foram selecionados cinco estudos.

Resultados: Os resultados indicam que as intervenções de enfermagem multifacetadas, como protocolos estruturados de prevenção de quedas, avaliações de risco individualizadas, treino de força e equilíbrio e modificações ambientais, reduzem eficazmente a incidência de quedas. Além disso, as intervenções assistidas por tecnologia, como os exergames e a terapia de vibração de corpo inteiro, mostraram benefícios potenciais, mas requerem validação adicional.

Conclusão: Esta revisão destaca o papel fundamental dos enfermeiros na mitigação dos riscos de quedas e apela a estratégias interdisciplinares baseadas em evidências para melhorar a segurança e o bem-estar entre os idosos institucionalizados.

Palavras-chave: prevenção de quedas; intervenções de enfermagem; idosos institucionalizados; cuidados de longa duração; segurança do doente; prática baseada na evidência.

ABSTRACT

Introduction: Falls among institutionalized older adults are a major public health issue, leading to adverse physical, psychological, and social consequences. Nursing interventions play a central role in fall prevention, yet the effectiveness of different approaches remains a subject of study.

Objective: This integrative literature review evaluates the impact of nursing-led interventions in reducing fall risk in long-term care settings.

Methods: A systematic search was conducted across PubMed, SciELO, and Google Scholar to identify relevant studies on nursing interventions for fall prevention. After applying inclusion and exclusion criteria, five studies were selected, including prospective studies, methodological research, and randomized controlled trials.

Results: The findings indicate that multifaceted nursing interventions, such as structured fall prevention protocols, individualized risk assessments, strength and balance training, and environmental modifications, effectively reduce fall incidence. Additionally, technology-assisted interventions, such as exergames and whole-body vibration therapy, showed potential benefits but require further validation.

Conclusion: This review underscores the critical role of nurses in mitigating fall risks and calls for evidence-based, interdisciplinary strategies to improve safety and well-being among institutionalized older adults.

Keywords: fall prevention; nursing interventions; institutionalized older adults; long-term care; patient safety; evidence-based practice.

RESUMEN

Introducción: Las caídas en adultos mayores institucionalizados son un importante problema de salud pública, con consecuencias físicas, psicológicas y sociales adversas. Las intervenciones de enfermería desempeñan un papel fundamental en la prevención de caídas; sin embargo, la eficacia de los diferentes enfoques sigue siendo objeto de estudio.

Objetivos: Esta revisión bibliográfica integradora evalúa el impacto de las intervenciones dirigidas por enfermería en la reducción del riesgo de caídas en adultos mayores institucionalizados.

Métodos: Se realizó una búsqueda sistemática en PubMed, SciELO y Google Académico para identificar estudios relevantes sobre intervenciones de enfermería para la prevención de caídas. Tras aplicar los criterios de inclusión y exclusión, se seleccionaron cinco estudios.

Resultados: Los hallazgos indican que las intervenciones de enfermería multifacéticas, como los protocolos estructurados de prevención de caídas, las evaluaciones de riesgo individualizadas, el entrenamiento de fuerza y equilibrio, y las modificaciones ambientales, reducen eficazmente la incidencia de caídas. Además, las intervenciones asistidas por tecnología, como los exergames y la terapia de vibración de cuerpo completo, mostraron beneficios potenciales, pero requieren mayor validación.

Conclusión: Esta revisión subraya el papel crucial del personal de enfermería en la mitigación del riesgo de caídas y exige estrategias interdisciplinarias basadas en la evidencia para mejorar la seguridad y el bienestar de los adultos mayores institucionalizados.

Palabras Clave: prevención de caídas; intervenciones de enfermería; adultos mayores institucionalizados; atención a largo plazo; seguridad del paciente; práctica basada en la evidencia.

Introduction

The demographic ageing process in Portugal has been increasing significantly in recent decades, bringing substantial challenges to healthcare and social support systems. According to the National Institute of Statistics (2023), this shift has led to a greater demand for specialized healthcare and social services for older adults. Institutionalization has emerged as an alternative for elderly individuals requiring continuous or intensive care. However, this transition presents several challenges, particularly in ensuring service quality while preserving dignity and autonomy.

The World Health Organization (2020) defines an older adult as a person aged 60 or over in developing countries and 65 or over in developed countries. Ageing is a multifaceted process that involves biological, psychological, and social changes. While many older adults remain autonomous, others face chronic conditions and functional limitations that compromise their quality of life. Maintaining health and functionality is a key objective in elderly care, as functional capacity is a primary indicator of well-being in this population. Older adults living in the community benefit from social networks, family support, and engagement in activities that promote autonomy and inclusion. However, when these factors deteriorate, institutionalization may become necessary.

Institutionalized older adults reside in long-term care facilities, receiving support for their health and well-being. Institutionalization typically results from a loss of functional capacity, complex health conditions, or a lack of social support (Fu et al., 2015). Although such institutions provide specialized care, the transition to institutional living can significantly impact the physical and emotional health of older adults. Studies indicate that institutionalized older individuals have a higher prevalence of conditions such as depression, loneliness, falls, and functional dependency compared to those living independently (Martins et al., 2022). These factors contribute to reduced autonomy and increased vulnerability, heightening the risk of adverse events, including falls.

Falls are a major concern in institutionalized settings, as they often result in serious physical, psychological, and social consequences. A fall is defined as an unintended shift in body position to a lower level, typically due to a loss of balance. Falls occur when an individual fails to correct their balance in time, often due to a combination of intrinsic and extrinsic factors (Giovannini et al., 2022). Intrinsic factors are physiological changes associated with ageing, such as reduced muscle mass, decreased bone density, joint fragility, and diminished sensory perception. These changes impair balance and mobility, making falls more likely. Chronic conditions such as cardiovascular diseases, diabetes, and neurological disorders further exacerbate this risk. Extrinsic factors, on the other hand, are environmental elements such as slippery surfaces, loose rugs, poor lighting, and a lack of support structures like handrails (Martins et al., 2022). The interplay of intrinsic and extrinsic factors increases the likelihood of falls, especially in institutionalized settings where older adults often have multiple comorbidities and varying degrees of dependence (Araújo et al., 2017).

Falls among older adults have profound consequences, affecting physical, psychological, and social well-being. Physically, approximately 20% of falls result in severe injuries such as fractures and head trauma, often leading to hospitalization and secondary complications (Giovannini et al., 2022). Psychologically, the fear of falling again is common, leading to self-imposed limitations in daily activities, which further reduces mobility and functional independence (Sadaqa et al., 2023). Socially, falls can result in increased dependency, reduced confidence, and isolation, ultimately impacting the overall quality of life of older adults (Araújo et al., 2017). The complexity of fall risk among institutionalized older adults requires multifactorial prevention strategies that integrate healthcare professionals, caregivers, and the older adults themselves.

Nursing interventions play a crucial role in fall prevention, particularly in institutional settings where interprofessional collaboration is essential. Evidence-based nursing interventions focus on physical, emotional, and social dimensions, aiming to reduce fall risk while promoting overall well-being. Ongoing risk assessments are fundamental in identifying individual vulnerabilities and implementing tailored interventions. Exercise programs that enhance muscle strength, balance, and coordination have been shown to significantly reduce fall rates (Sadaqa et al., 2023). Educational initiatives targeting older adults, caregivers, and healthcare teams also play a key role in fall prevention by increasing awareness

of risk factors and promoting adherence to preventive measures. Additionally, modifying the physical environment by removing hazards, improving lighting, and installing handrails contributes to a safer living space. Protocol-based interventions, guided by best practices and international recommendations, further strengthen fall prevention strategies in institutional settings (Martins et al., 2020).

The ageing population has led to an increasing demand for preventive healthcare strategies to mitigate fall-related risks. In institutional settings, nurses are at the forefront of implementing preventive measures, ensuring that interventions are adapted to each resident's specific needs. A holistic approach is essential, considering both individual and environmental factors that contribute to fall risk. Personalized care plans, medication reviews, and rehabilitation programs all contribute to a comprehensive fall prevention framework (Sitjà-Rabert et al., 2015).

Innovative approaches, such as technology-assisted interventions, have gained attention in recent years. Studies suggest that interactive exercise programs using digital tools, such as exergames, can effectively improve balance and strength while increasing motivation among older adults (Fu et al., 2015). Similarly, whole-body vibration (WBV) platforms have demonstrated potential in enhancing muscle function and reducing fall risk, particularly for frail individuals with limited mobility (Sitjà-Rabert et al., 2015). However, the effectiveness of these interventions depends on their accessibility, adherence, and integration into a broader framework of institutional care. Further research is needed to assess the long-term impact of such technologies on fall prevention in institutionalized settings.

Addressing fall risk requires a multidimensional approach that combines clinical interventions, environmental modifications, and technological advancements. Nursing professionals play a central role in fall prevention through individualized care, ongoing assessments, and the implementation of evidence-based interventions. By fostering a culture of safety and proactive fall prevention strategies, institutional settings can enhance the well-being and autonomy of older adults while minimizing the adverse effects associated with falls. Continued research and innovation in fall prevention strategies remain essential to improving the quality of life for institutionalized older adults and ensuring their safety within care facilities.

This integrative literature review aims to identify and analyze the available scientific evidence, with the primary objective of evaluating the impact of nursing interventions in preventing falls among institutionalized older adults.

1. Methods

This study follows an Integrative Literature Review (ILR) methodology, which enables a synthesis of knowledge and its practical application. ILR is a research method that allows the integration of different studies, providing a comprehensive overview of the available evidence on a given topic. This method is aligned with Evidence-Based Practice (EBP), which consists of systematically gathering, evaluating, and applying research findings to improve clinical decision-making (Mena-Tudela et al., 2018).

The purpose of this review is to evaluate the impact of nursing interventions in preventing falls among institutionalized older adults by synthesizing the most relevant scientific evidence. Given the complexity of falls in older adults and the multidimensional nature of nursing interventions, an integrative approach allows for the inclusion of both experimental and non-experimental studies, enhancing the scope of analysis.

According to Sousa et al. (2017) conducting an ILR involves six fundamental steps to ensure rigor and validity:

- Identifying the research topic and formulating the research question;
- Defining inclusion and exclusion criteria;
- Determining the information to be extracted from the studies;
- Evaluating the quality of the selected studies;
- Interpreting and synthesizing the findings;
- Presenting the final review.

This study follows these steps systematically, ensuring a methodologically sound and transparent research process.

1.1 Research Question Formulation

The first step in conducting an ILR is defining a clear and focused research question. To achieve this, the PICO strategy (Population, Intervention, Comparison, and Outcomes) was used. PICO is widely applied in systematic reviews and evidence-based clinical research to structure research questions and guide literature searches effectively (Sousa et al., 2017). The components of PICO applied in this review are:

- P (Population): Institutionalized older adults aged 65 and over;
- I (Intervention): Nursing interventions aimed at fall prevention;
- C (Comparison): Comparison with institutionalized older adults who do not receive nursing interventions;
- (Outcomes): Reduction in fall incidence and improvement in quality of life.

Based on this structure, the research question guiding this review was formulated as follows: "What is the impact of nursing interventions in preventing falls among institutionalized older adults?"

1.2 Inclusion and Exclusion Criteria

Defining inclusion and exclusion criteria is crucial to selecting relevant and high-quality studies. These criteria ensure methodological rigor and reduce bias, making the results more reliable (Higgins et al., 2022).

The inclusion and exclusion criteria were established based on the research question and the scope of the study. According to Donato & Donato (2019), inclusion criteria define the characteristics that selected studies must have, while exclusion criteria eliminate studies that do not meet the necessary methodological or thematic standards.

The selection criteria applied in this review are presented below:

Table 1 – PICO method description (selection criteria applied)

Selection Criteria	Inclusion	Exclusion
Participants	Institutionalized older adults aged 65 or over	Non-institutionalized older adults or those under 65
Intervention	Nursing interventions for fall prevention	Nursing interventions unrelated to fall prevention
Comparator	Institutionalized older adults with and without nursing interventions	Studies without a comparative group
Outcomes	Reduction in fall incidence through preventive measures	Studies not addressing fall prevention outcomes

1.3 Search Strategy

To ensure a comprehensive and systematic literature search, electronic databases were selected based on their relevance to the field of nursing and healthcare sciences. The search was conducted and adapted in the following databases: PubMed, SciELO and Google Scholar.

To maximize the relevance of retrieved articles, Boolean operators (AND, OR) and controlled vocabulary terms (MeSH and DeCS descriptors) were used to refine the search.

A time frame from January 2014 to March 2024 was established to include only recent evidence on nursing interventions for fall prevention among institutionalized older adults. This range was chosen to reflect developments from the past decade, during which significant progress has been made in patient safety practices and healthy aging within long-term care facilities.

The search strategy was limited to two databases and one grey literature source widely used in the health sciences field (PubMed, SciELO, and Google Scholar), as the specific focus on nursing interventions in institutionalized settings revealed a reduced number of eligible studies in primary sources, justifying a more focused and iterative approach.

Table 2 – Database and Search Strategy.

Database	Search date	Search phrase
PubMed	10.11.2024	("aged"[MeSH Terms] OR "elderly"[Title/Abstract] OR "institutionalized elder-ly"[Title/Abstract]) AND ("nursing care"[MeSH Terms] OR "nursing interven-tion"[Title/Abstract] OR "nursing program"[Title/Abstract]) AND ("fall preven-tion"[MeSH Terms] OR "risk reduction behavior"[Title/Abstract]) AND (2014:2024[pdat])
SciELO	10.11.2024	"elderly AND nursing AND fall prevention"
Google Scholar	10.12.2024	"institutionalized elderly AND nursing care AND fall reduction"

1.4 Study Selection

The study selection process followed a rigorous multi-step approach to ensure the inclusion of high-quality and relevant research. To enhance reliability and minimize selection bias, two independent reviewers evaluated the studies. A third reviewer was consulted in case of discrepancies (Donato & Donato, 2019).

The selection process was conducted in four stages:

- Removal of duplicate studies;
- Title and abstract screening;
- Full-text eligibility assessment;
- Final selection of relevant studies.

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Page at al., 2021) flowchart was used to document the study selection process (figure 1).

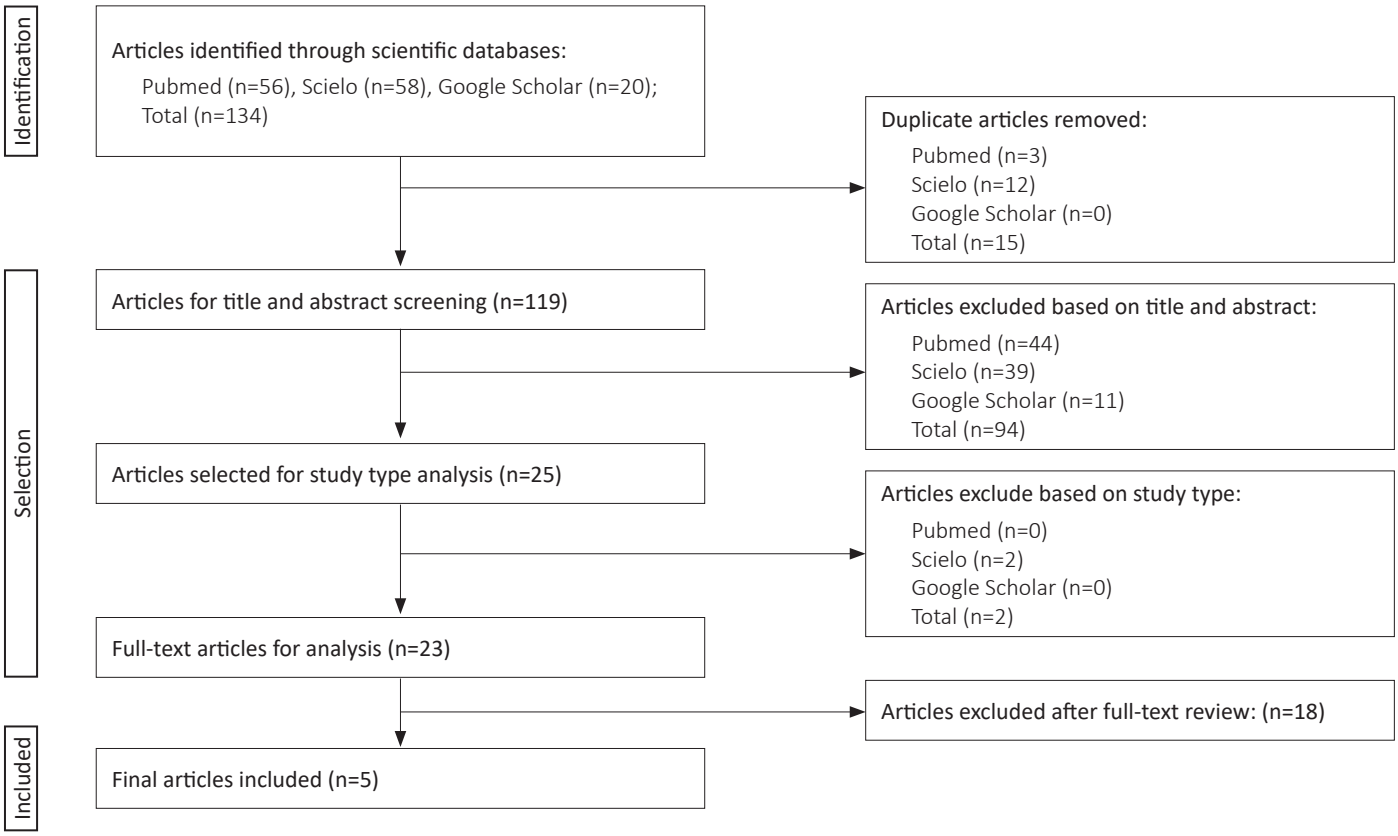

Figure 1 – Prisma Flowchart (Page et al., 2021)

A total of 134 studies were initially identified through database searches. After removing 15 duplicates, 119 studies were screened based on title and abstract. Of these, 94 studies were excluded for not meeting the inclusion criteria. A total of 25 full-text articles were assessed for eligibility, and 20 studies were further excluded due to methodological limitations or lack of relevance to nursing interventions for fall prevention in institutionalized older adults. Finally, five studies were selected for this integrative literature review.

1.5 Quality Assessment of Studies

Assessing the quality and reliability of the selected studies is essential for ensuring the validity of the review's findings (Higgins at al., 2022).

The key quality assessment criteria included: clarity of research objectives; methodological rigor; appropriateness of data analysis and ethical considerations and compliance.

According to Higgins et al. (2022), studies scoring 75% or higher in the quality assessment criteria were considered high-quality and were included in the final synthesis.

1.6 Data Extraction and Synthesis

The final set of studies was systematically analyzed and synthesized to identify key themes related to nursing interventions for fall prevention in institutionalized older adults. The results were categorized based on intervention types, effectiveness, and outcomes.

By following these methodological steps, this integrative literature review ensures a comprehensive, rigorous, and evidence-based analysis of the impact of nursing interventions on fall prevention among institutionalized older adults.

2. Results

Characteristics of the Included Studies

The five selected studies include different methodological approaches, providing a comprehensive perspective on nursing interventions in fall prevention among institutionalized older adults. The studies vary from prospective cohort studies to randomized controlled trials (RCTs) and methodological research focusing on protocol validation.

- E1- Lee et al. (2024) conducted a prospective study with 123 institutionalized older adults, comparing general nursing care with specialized nursing interventions for fall prevention;
- E2- Baixinho et al. (2017) performed a methodological study, validating a fall prevention protocol through expert consensus;
- E3- Sousa et al. (2016) conducted an analytical study on 61 institutionalized older adults, analyzing risk factors contributing to falls;
- E4- Fu et al. (2015) carried out a randomized controlled trial (RCT) with 60 older adults, assessing the effectiveness of Wii Fit exergames for balance improvement and fall reduction;
- E5- Sitjà-Rabert et al. (2015) implemented a randomized controlled trial (RCT) with 159 institutionalized older adults, investigating the effects of whole-body vibration (WBV) therapy on fall prevention.

The results of these studies provide insights into different nursing interventions and their impact on reducing fall risk among institutionalized older adults. A summary of the key findings is presented in Table 3.

Table 3 – Presentation of the main findings

Study, Type of study and Sample	Intervention	Main Findings
Lee et al. (2024); Prospective Study; 123 institutionalized older adults	Comparison of general vs. specialized nursing care models	Nursing care models influence fall risk. Those receiving specialized nursing care had fewer falls
Baixinho et al. (2017); Methodological Study; 14 experts in fall prevention	Validation of a nursing protocol for fall prevention	Validated fall prevention protocol showed improvements in safety and implementation of best practices
Sousa et al. (2016); Analytical Study; 61 institutionalized older adults	Analysis of fall risk factors and preventive strategies	Identified key fall risk factors: polypharmacy, sarcopenia, and inadequate mobility aids
Fu et al. (2015); Randomized Controlled Trial; 60 institutionalized older adults	Use of Wii Fit exergames to improve balance	Exergames improved balance and reduced fall incidence more effectively than traditional training
Sitjà-Rabert et al. (2015); Randomized Controlled Trial 159 institutionalized older adults	Whole-body vibration (WBV) therapy for balance and muscle strength	WBV therapy showed improvements in muscle strength and balance, but effects on fall reduction were inconclusive

The prospective study by Lee et al. (2024) revealed that the type of nursing care model significantly affects fall risk in institutionalized settings. Older adults who received specialized nursing interventions, including personalized risk assessments and structured exercise programs, had fewer falls compared to those receiving general nursing care. This highlights the importance of tailored interventions to address individual fall risk factors.

The methodological study by Baixinho et al. (2017) focused on validating a structured fall prevention protocol for use in long-term care facilities. The study involved 14 experts in fall prevention, who evaluated best practices and provided recommendations for implementation. The validated protocol emphasized: (i) Early risk assessments; (ii) Training for nursing staff and caregivers; (iii) Environmental modifications; and (iv) Individualized exercise plans. The study found that using standardized fall prevention protocols significantly improves safety measures and enhances the implementation of best practices in institutional care settings.

The analytical study by Sousa et al. (2016) analyzed fall risk factors among 61 institutionalized older adults. The study identified several key contributors to falls, including: (i) Polypharmacy (use of multiple medications increasing dizziness and instability); (ii) Sarcopenia (age-related muscle loss reducing strength and balance); and (iii) Inadequate use of mobility aids (e.g., improper use of walkers and canes). The findings suggest that nurses play a critical role in managing these risk factors through medication review, mobility training, and physical strengthening programs.

The RCT by Fu et al. (2015) investigated the use of Wii Fit exergames as a strategy to improve balance and reduce falls. The study included 60 institutionalized older adults, with one group participating in traditional balance exercises and the other using interactive exergames. The results indicated that: (i) Exergames significantly improved balance and coordination compared to conventional exercises; (ii) Participants in the exergame group reported higher motivation and engagement in physical activity; and (iii) The incidence of falls was lower in the exergame group than in the control group. These findings suggest that incorporating technology-assisted interventions into nursing care plans can enhance fall prevention strategies.

The RCT by Sitjà-Rabert et al. (2015) evaluated the effects of whole-body vibration (WBV) therapy in 159 institutionalized older adults. The intervention aimed to strengthen muscles and improve balance, thereby reducing fall risk. Key findings included: (i) WBV therapy improved muscle strength and balance over time; (ii) The overall incidence of falls did not differ significantly between the intervention and control groups; and (iii) WBV therapy was particularly beneficial for older adults with mild mobility impairments but showed limited impact in frailer individuals. These results indicate

that while WBV therapy may enhance physical function, additional research is needed to determine its long-term effectiveness in fall prevention.

3. Discussion

Although fall prevention in older adults is widely studied, few reviews focus specifically on nursing interventions within institutional care settings. This review fills that gap by synthesizing evidence on nursing-led strategies tailored to the unique characteristics of institutionalized populations. This integrative literature review offers insight into a relatively underexplored area: the role of nursing interventions specifically targeted at fall prevention in institutionalized older adults, a population often overlooked in broader fall prevention studies. The findings highlight those multifactorial approaches combining personalized nursing care, structured exercise programs, educational interventions, and environmental modifications are essential to reducing fall risk and improving the quality of life of institutionalized older adults. The five selected studies analyzed different strategies, ranging from traditional fall prevention protocols to technology-assisted interventions, providing a broad perspective on the role of nursing in mitigating fall-related risks.

A key finding across multiple studies is that specialized nursing care significantly influences fall outcomes. The study by Lee et al. (2024) demonstrated that institutionalized older adults receiving structured nursing interventions, including individualized mobility assessments, daily monitoring of risk factors, and implementation of tailored exercise routines experienced fewer falls compared to those under general nursing care. This finding aligns with previous research, reinforcing that nursing-led fall prevention strategies should be individualized, addressing both intrinsic risk factors (e.g., muscle weakness, cognitive impairment) and extrinsic risk factors (e.g., environmental hazards, improper use of mobility aids). Despite these promising findings, the variability in methodological approaches across studies—including differences in intervention duration, sample size, and assessment tools—poses challenges to establishing standardized nursing protocols for fall prevention. These differences must be considered when translating findings into practice.

The validation of fall prevention protocols, as observed in Baixinho et al. (2017), further emphasizes the importance of standardized approaches in institutional care settings. Protocols that integrate risk assessments, training programs, and environmental modifications contribute to a safer environment, ensuring that nurses and caregivers are well-equipped to implement preventive measures effectively. However, one limitation of this study is that it does not provide quantitative data on the actual reduction of falls following protocol implementation, suggesting the need for further empirical studies. This limitation is consistent with the overall methodological variability identified in the reviewed studies and highlights the need for future research to report more robust outcome measures. Future research should also explore how these protocols can be effectively disseminated and sustained in practice, particularly in facilities facing organizational or financial constraints.

The identification of fall risk factors, as examined by Sousa et al. (2016), highlights the role of nurses in addressing polypharmacy, sarcopenia, and improper mobility aid use. These findings reinforce that medication reviews, strength training programs, and gait assessments should be integral components of fall prevention strategies. Furthermore, the study confirms that fall risk is multidimensional, requiring continuous monitoring and adaptation of nursing interventions to meet the evolving needs of institutionalized older adults. This evidence strongly supports the inclusion of pharmacist collaboration and individualized medication management protocols in institutional nursing routines.

Innovative interventions such as exergames and whole-body vibration therapy (WBV) (Sitjà-Rabert et al., 2015) present promising, yet varied, outcomes in fall prevention. Exergames were found to be highly effective, as they enhanced balance, engagement, and adherence to physical activity, leading to a significant reduction in fall incidence. This suggests that integrating technology-based interventions into nursing care can improve the overall effectiveness of fall prevention strategies. However, the accessibility and feasibility of implementing such interventions in long-term care facilities must be considered, as they require specialized equipment, staff training, and individualized adaptation to ensure optimal patient participation. Additionally, considerations such as digital literacy of older adults and institutional funding availability may affect the feasibility and sustainability of these technologies. However, most of these studies are

limited by small sample sizes and lack of replication, which suggests that caution is needed before widely adopting such interventions. Additional cost-benefit analyses and user acceptability studies are required to validate their long-term utility in institutional settings.

Conversely, WBV therapy showed improvements in strength and balance, yet its direct impact on fall reduction remained inconclusive. The findings suggest that while WBV therapy may benefit older adults with mild mobility impairments, it may not be as effective for frailer individuals. This highlights the importance of targeting specific populations within institutional settings and customizing interventions based on the functional status of older adults.

The results of this review have important implications for nursing practice, particularly in institutional settings. These findings offer actionable insights for nursing managers and clinical teams seeking to enhance fall prevention practices through evidence-based protocols tailored to institutional realities. The integration of evidence-based interventions in nursing care can significantly enhance fall prevention outcomes. The following recommendations emerge from this review:

- Individualized Fall Risk Assessments – Routine evaluations should be conducted to identify intrinsic and extrinsic risk factors, guiding personalized nursing interventions;
- Structured Exercise Programs – Strength and balance training should be incorporated into daily routines, particularly evidence-based approaches such as exergames and functional mobility exercises;
- Medication Review and Management – Nurses should collaborate with healthcare teams to monitor and adjust medication regimens, minimizing the effects of polypharmacy on fall risk;
- Standardized Fall Prevention Protocols – Institutions should adopt and implement validated nursing protocols, ensuring that all staff members follow a consistent and evidence-based approach;
- Technology-Assisted Interventions – The use of digital tools, such as exergames, should be further explored as engaging and effective alternatives to traditional exercise programs.
- While this integrative literature review provides valuable insights into the impact of nursing interventions on fall prevention in institutionalized older adults, several limitations must be acknowledged. These limitations highlight areas that require further research and methodological improvements in future studies:
- Variability in Study Designs and Methodologies: One of the primary limitations of this review is the heterogeneity of the included studies, which encompass prospective cohort studies, methodological studies, and randomized controlled trials (RCTs). The differences in sample sizes, intervention protocols, and outcome measures make direct comparisons between studies challenging. Some studies focused on nursing-led protocols, while others evaluated exercise-based interventions, leading to variations in reported effectiveness;
- Limited Number of High-Quality Randomized Controlled Trials (RCTs): Although RCTs are the gold standard for evaluating intervention effectiveness, only two of the five studies included in this review were RCTs (Fu et al., 2015; Sitjà-Rabert et al., 2015). The small number of high-quality experimental studies limits the ability to draw strong causal conclusions about the effectiveness of nursing interventions;
- Lack of Longitudinal Follow-Up: Most studies included in this review had short follow-up periods, which limits the ability to assess the long-term impact of nursing interventions on fall prevention. Fall prevention strategies require continuous monitoring and adaptation, yet few studies examined the sustained effects of interventions over extended periods;
- Potential Publication Bias: As with any systematic or integrative review, publication bias may have influenced the findings. Studies with positive outcomes are more likely to be published, whereas studies reporting null or negative results may be underrepresented in the literature. This could lead to an overestimation of the effectiveness of certain interventions, particularly technology-assisted approaches such as exergames and WBV therapy;
- Limited Generalizability to Diverse Institutional Settings: The studies included in this review were conducted in different geographical and institutional contexts, including nursing homes, long-term care facilities, and rehabilitation centers. However, factors such as staffing ratios, resource availability, and institutional policies vary

significantly between settings, which may affect the applicability of these findings to all institutions. Additionally, the cultural and socioeconomic contexts of the study populations were not extensively analyzed, limiting the ability to generalize the results to different healthcare systems and regions;

- Limited Evaluation of Patient Adherence and Engagement: Some interventions, such as exercise programs and technology-assisted approaches (e.g., exergames, WBV therapy), depend on heavily on patient adherence and engagement. However, most studies did not assess participant motivation, compliance, or barriers to intervention uptake. Without a clear understanding of adherence factors, it is difficult to determine the real-world effectiveness of these interventions.

To address these limitations, future studies should: (i) Conduct large-scale, high-quality RCTs to evaluate the effectiveness of different nursing interventions; (ii) Implement longitudinal follow-ups to assess the sustainability of fall prevention strategies; (iii) Minimize publication bias by encouraging the publication of negative or inconclusive results; and (iv) Evaluate adherence and feasibility of interventions in real-world institutional settings.

The scarcity of studies identified may reflect a general lack of research specifically addressing nursing interventions for fall prevention in institutionalized older adults. Future research could benefit from expanding the range of databases consulted and including grey literature to capture underreported interventions.

Despite the limited number of included studies, the findings are consistent and reflect evidence-based approaches with potential impact on nursing practice in institutional settings.

Conclusion

Falls in institutionalized older adults remain a major public health concern, with significant physical, psychological, and social consequences. This review highlights that nursing interventions play a critical role in reducing fall risk, improving patient safety, and promoting autonomy in institutionalized settings. The studies included in this review demonstrate that multifaceted interventions, combining nursing care, exercise programs, risk assessments, and environmental modifications, are the most effective strategies for fall prevention.

The findings suggest that individualized nursing care models, validated prevention protocols, and technology-assisted interventions can greatly enhance fall prevention outcomes. However, there is still a need for further research to evaluate long-term sustainability, feasibility, and cost-effectiveness of certain interventions, particularly in resource-limited institutional settings.

As the ageing population continues to grow, nurses must take an active role in implementing evidence-based fall prevention strategies, ensuring holistic and person-centered care. Future research should focus on developing innovative nursing interventions, evaluating their long-term impact, and exploring ways to integrate digital health technologies into institutional care settings.

By adopting a proactive and multidisciplinary approach, nursing professionals can play a pivotal role in minimizing fall-related risks, ultimately enhancing the quality of life and safety of institutionalized older adults.

Conflict of Interests

No conflicts

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