PICO Search Assignment Worksheet Name__Lisette Romo_____

Brief description of patient problem/setting (summarize the case very briefly)

A 78-year-old female residing in a long-term care facility with a significant past medical history of dementia, osteoarthritis, and recurrent falls is being managed following placement of a left wrist splint for a distal radius fracture sustained after a fall. She remains in a non-weight-bearing status for the left upper extremity and was initially treated with oxycodone and ibuprofen, which were later discontinued in favor of scheduled acetaminophen 650 mg due to concerns regarding medication-related adverse effects in an elderly patient at high risk for falls and cognitive impairment. The patient also requires assistance with ambulation and activities of daily living, and her family expressed concerns regarding mobility and recurrent falls upon discharge. This raised the clinical question of whether additional fall-prevention interventions, including assistive devices and extended long-term care support, help reduce recurrent falls and improve mobility in elderly patients with fractures.

Search Question:

For elderly patients with fractures, do multifactorial fall-prevention programs combining exercise, medication review, and environmental modifications reduce fall recurrence and improve functional independence compared with single-intervention approaches such as assistive devices alone?

Question Type: What type of question is this?

□ **Treatment** □ Diagnosis □ Prognosis □ Screening □ Prevalence □ Harms

Assuming that the highest level of evidence to answer your question will be meta-analysis or systematic review, what other types of study might you include if these are not available (or if there is a much more current study of another type)?
Please explain your choices.

If the highest level of evidence were not available, then I would use randomized controlled trials (RCTs) or cohort studies including prospective and retrospective. Choosing RCTs as an alternative would allow for direct comparison of multifactorial fall-prevention programs with single-intervention approaches while also minimizing any variables and bias. Prospective cohort studies are also another option to provide further information on outcomes such as recurrent falls, functional independence, mobility, and injury prevntion in elderly patients. Retrospective studies can also be useful regarding this demographic since elderly patients are often represented in these studies, and can provide data on the effectiveness of preventative interventions in the geriatric population.

PICO search terms:

P (Population)	I (Intervention)	C (Comparison)	O (Outcome)

Elderly patients with fractures and recurrent falls	Multifactorial fall-prevention programs	Single intervention approaches	Reduced fall recurrence
Long-term elderly residents with dementia	Exercise and mobility-support interventions	Staff assisted ambulation without structured exercise programming	Improved functional independence
Elderly patients with high falls risk and gait instability	Medication review	Standard safety measures in LTC facilities (bed rails, non-slip footwear)	Improved mobility
	Environmental modifications	Assistive devices alone	Reduced hospital readmissions
	Structured fall prevention methods		Reduced fracture recurrence

Search tools and strategy used:

Please indicate what databases/tools you used, provide a list of the terms you searched together in each tool, and how many articles were returned using those terms and filters.

Database	**Search Terms Used**	**Number of Results**	**Filters/Limiters Applied**	**Notes/Observations**
PubMed	(“elderly” OR geriatric OR dementia) AND (“falls” OR recurrent falls) AND (“fractures” OR fracture prevention) AND (“multifactorial fall prevention” OR exercise OR environmental modification OR medication review OR assistive devices)	357	Publication within the last 10 years, English language, systematic reviews, meta-analyses, randomized controlled trials.	Broad initial search yielded articles focused on preventing falls with preservation of functional independence in long term care residents.

Google Scholar	("fall prevention" OR "fall reduction") AND ("long-term care" OR nursing home) AND (elderly OR geriatric) AND ("functional independence" OR mobility)	18,000	Publication within the last 10 years, English language, and sorted by relevance.	A large number of results resulting in the highest level of evidence provided including articles of systematic reviews, meta-analyses, and observational studies. Search terms were refined to focus on identifying studies on fall-prevention strategies for elderly patients.
Cochrane	("multifactorial fall prevention") AND (elderly OR dementia)	25	Cochrane Reviews, publication within the last 10 years, and English language.	The results were more focused in comparison to other databases. Articles consisted of high-level evidence syntheses evaluating the effectiveness of strategies to reduce recurrent falls in elderly populations.

I focused on using reliable databases, PubMed, Cochrane Library, and Google Scholar, to conduct my search on my PICO question since each provides various levels and types of evidence. I used PubMed to identify relevant clinical studies, which yielded a broad search. Cochrane Library narrowed down articles focused on high-level evidence, including systematic reviews and meta-analyses, and Google Scholar was used to broaden the search and identify relevant additional articles. These databases were helpful once search terms were used regarding fall prevention, functional independence, etc., to ensure a comprehensive search strategy. Afterwards, I chose the articles that most aligned with my PICO question.

Results found:

1. **Interventions to Prevent Falls in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force**
   https://pubmed.ncbi.nlm.nih.gov/38833257/

Guirguis-Blake JM, Michael YL, Perdue LA, Coppola EL, Beil TL. Interventions to Prevent Falls in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA. 2024;331(20):1732-1748. doi:10.1001/jama.2024.6038.

Abstract

Background: Falls are the leading cause of injury-related morbidity and mortality among older adults and can result in significant functional decline, fractures, and loss of independence.

Objectives: To systematically review evidence on the effectiveness and harms of fall prevention interventions in community-dwelling older adults.

Methods: MEDLINE, CINAHL, and the Cochrane Central Register of Controlled Clinical Trials were searched for English-language randomized clinical trials published between January 1, 2016, and May 8, 2023, with surveillance through March 22, 2024. Studies evaluating fall-prevention interventions in adults 65 years and older were included. Data were extracted by two independent reviewers and analyzed using random-effects meta-analysis.

Results: Eighty-three fair- to good-quality randomized clinical trials (n = 48 839) examined the effectiveness of 6 fall prevention interventions in older adults. This article focuses on the 2 most studied intervention types: multifactorial (28 studies; n = 27 784) and exercise (37 studies; n = 16 117) interventions. Multifactorial interventions were associated with a statistically significant reduction in falls (incidence rate ratio [IRR], 0.84 [95% CI, 0.74-0.95]) but not a statistically significant reduction in individual risk of 1 or more falls (relative risk [RR], 0.96 [95% CI, 0.91-1.02]), injurious falls (IRR, 0.92 [95% CI, 0.84-1.01]), fall-related fractures (IRR, 1.01 [95% CI, 0.81-1.26]), individual risk of injurious falls (RR, 0.92 [95% CI, 0.83-1.02]), or individual risk of fall-related fractures (RR, 0.86 [95% CI, 0.60-1.24]). Exercise interventions were associated with statistically significant reductions in falls (IRR, 0.85 [95% CI, 0.75-0.96]), individual risk of 1 or more falls (RR, 0.92 [95% CI, 0.87-0.98]), and injurious falls (IRR, 0.84 [95% CI, 0.74-0.95]) but not individual risk of injurious falls (RR, 0.90 [95% CI, 0.79-1.02]). Harms associated with multifactorial and exercise interventions were not well reported and were generally rare, minor musculoskeletal symptoms associated with exercise.

Conclusions: Multifactorial and exercise interventions were associated with reduced falls in multiple good-quality trials. Exercise demonstrated the most consistent statistically significant benefit across multiple fall-related outcomes.

Why I chose this article:

I decided to choose this article since it directly addresses my PICO question and is particularly relevant to the patient I saw, who is a 78-year-old female residing in a long-term care facility with a significant past medical history, with certain risk factors like her dementia, recurrent falls, and a recent fracture, making fall prevention a priority for her management plan. The study is a high level of evidence that evaluated interventions that closely resemble those being considered for my patient, including exercise programs, environmental modifications, and medication review. It is a systematic review conducted for the U.S. Preventive Services Task Force (USPSTF). This study included 83 randomized clinical trials involving approximately 48,839 older adults, providing a large and comprehensive body of evidence.

The multifactorial interventions included exercise, balance training, medication review, assistive devices, vision assessments, and patient education; this approach allowed to reduce fall rates, and exercise gave the most improvements in patients to reduce falls. This article is useful when guiding clinical decision-making in long-term care settings when the majority of patients are high-risk fall patients.

Key Points:

i. This systematic review included 83 randomized controlled trials with 48,839 older adults, providing high level evidence supporting the use of multifactorial fall-prevention strategies to maintain safety and independence.

ii. Falls are one of the main causes of injury-related morbidity/mortality in older patients, so prevention strategies are a crucial component of geriatric management.

iii. Taking a multimodal approach to preventing falls reduced overall fall rates by 16%

iv. Exercise interventions including balance/strength/gait training and physical therapy programs demonstrated the most benefit in reducing falls.

2. **Interventions for preventing falls in older people in care facilities**
https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD016064/full

Cameron ID, Dyer SM, Panagoda CE, Murray GR, Hill KD, Cumming RG, Kerse N. Interventions for Preventing Falls in Older People in Care Facilities and Hospitals. Cochrane Database of Systematic Reviews. 2025;(5):CD016064. doi:10.1002/14651858.CD016064.

Abstract

Background: Falls in care facilities are common events, causing considerable morbidity and mortality for older people. This is an update of a review on interventions in care facilities and hospitals first published in 2010 and updated in 2012 and 2018 on interventions in care facilities and hospitals. This review has now been split into separate reviews for each setting.

Objective: To assess the benefits and harms of interventions designed to reduce the incidence of falls in older people in care facilities.

Methods: The Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, CINAHL, and two trial registers were searched to 10 May 2024, and reference checking, citation searching, and contact with authors were used to identify eligible trials and records. Randomised controlled trials (RCTs) of any intervention for preventing falls in older people (aged over 65 years) in care facilities with any comparator were included. Trials conducted in places of residence that do not provide residential health-related care or rehabilitative services were excluded, as were trials where falls were recorded as adverse events of the intervention and those recruiting participants post-stroke or living with Parkinson's disease. Critical outcomes were rate of falls (number of falls per unit time) and number of fallers (risk of experiencing one or more falls). Important outcomes were risk of fracture,

adverse events, and economic outcomes. Two review authors independently performed study selection and data analysis. Rate ratios (RaR) with 95% confidence intervals (CIs) for rate of falls and risk ratios (RRs) with 95% CIs for outcomes of risk of falling and risk of fracture were calculated. Clustering was adjusted for if not undertaken by trial authors. Results of trials with comparable interventions and participant characteristics were grouped and pooled where appropriate using the generic inverse variance method in RevMan. Subgroup analyses were conducted according to intervention type, cognitive status, and informed by a qualitative comparative analysis where more than 10 trials were pooled and heterogeneity was high. GRADE was used to assess the certainty of evidence.

Results: The review included 104 randomized controlled trials with 68,964 participants residing in care facilities. Overall, multifactorial interventions probably have little or no effect on the rate of falls (RaR 0.87, 95% CI 0.68–1.12), but probably reduce the risk of falling (RR 0.91, 95% CI 0.83–1.00). However, a subgroup analysis found that multifactorial interventions delivered in a tailored manner with facility staff engagement resulted in a substantial reduction in both the rate of falls (RaR 0.61, 95% CI 0.54–0.69) and the risk of falling (RR 0.81, 95% CI 0.71–0.92). These effective interventions incorporated environmental and personal risk-factor assessments, medication optimization, assistive aids, and exercise. Exercise as a single intervention also reduced the rate of falls (RaR 0.68, 95% CI 0.51–0.91) and the risk of falling (RR 0.86, 95% CI 0.75–1.00), although benefits were not maintained when exercise programs were discontinued. Active exercise may further reduce the risk of falling in residents with cognitive impairment (RR 0.72, 95% CI 0.57–0.91). In contrast, medication optimization alone demonstrated little to no effect on reducing falls, suggesting that it is insufficient as a standalone fall-prevention strategy.

Conclusion: Multifactorial interventions implemented with facility staff engagement and tailored intervention delivery according to individual residents' circumstances probably reduce the rate of falls and risk of falling and may be cost-effective. Regarding single interventions, exercise probably reduces the rate of falls and the risk of falling, but if exercise is not sustained it has no ongoing effect on the rate of falls and probably no effect on the risk of falling. Active exercise may reduce the risk of falling in residents with cognitive impairment and may be cost-effective. Medication optimization interventions were diverse overall and may make little or no difference to the rate of falls and probably little or no difference to the risk of falling. Vitamin D supplementation probably reduces the rate of falls but probably makes little or no difference to the risk of falling. Addressing nutrition, increasing servings of dairy through dietitian assistance with menu design may decrease the risk of falling and risk of fractures.

Why I chose this article:

I selected this article since it mainly focuses on older adult patients living in nursing facilities, which makes it relevant to the patient population that I encounter in my current long term care rotation. The patient in the clinical scenario has several risk factors for future falls, including dementia, impaired mobility, history of recurrent falls, and now a fracture. Identifying effective fall prevention strategies are necessary especially for this patient’s continuing management. This article also assesses a multitude of interventions that are already commonly implemented in long term care facilities. Moreover, I chose this article since it is a high level of evidence with 104 randomized controlled trials and over 68,964 participants which is a large comprehensive evaluation of fall prevention strategies in institutionalized settings. This article examined residents in living facilities and also was unique in including analysis of

individuals with cognitive impairment. What was unique was how it also mentions dietary habits as a part of falls prevention, supporting vitamin D and dairy containing foods. Overall, this article helps guide clinical decisions regarding interventions to reduce falls.

Key Points:

i. This is a systematic review that included 104 RCT with 68,964 participants, providing strong evidence regarding fall-prevention interventions.

ii. Individualized fall-prevention programs based on each resident's specific risk factors reduced the rate of falls by 39% and reduced the risk of falling by 19%.

iii. Exercise programs are beneficial to residents with cognitive impairment.

iv. Reviewing and adjusting medications did not significantly reduce fall rates or fall risk.

3. A Randomized Trial of a Multifactorial Strategy to Prevent Serious Fall Injuries
https://www.nejm.org/doi/full/10.1056/NEJMoa2002183

Bhasin S, Gill TM, Reuben DB, Latham NK, Ganz DA, Greene EJ, Dziura JD, Basaria S, Gurwitz JH, Allore HG, Orwig D, Magaziner J, Wallace RB, Shepherd-Banigan M, Bynum JPW, Li F, Bean JF, Kiel DP, Ouellet GM, King MB, Tinetti ME. A Randomized Trial of a Multifactorial Strategy to Prevent Serious Fall Injuries. New England Journal of Medicine. 2020;383(2):129-140. doi:10.1056/NEJMoa2002183.

Abstract

Background: Injuries from falls are major contributors to complications and death in older adults. Despite evidence from efficacy trials that many falls can be prevented, rates of falls resulting in injury have not declined.

Objective: To evaluate the effectiveness of a multifactorial intervention that included risk assessment and individualized care plans, administered by specially trained nurses, in preventing serious fall injuries among older adults at increased risk for fall injuries.

Methods: We conducted a pragmatic, cluster-randomized trial to evaluate the effectiveness of a multifactorial intervention that included risk assessment and individualized plans, administered by specially trained nurses, to prevent fall injuries. A total of 86 primary care practices across 10 health care systems were randomly assigned to the intervention or to enhanced usual care (the control) (43 practices each). The participants were community-dwelling adults, 70 years of age or older, who were at increased risk for fall injuries. The primary outcome, assessed in a time-to-event analysis, was the first serious fall injury, adjudicated with the use of participant report, electronic health records, and claims data. We hypothesized that the event rate would be lower by 20% in the intervention group than in the control group.

Results: The demographic and baseline characteristics of the participants were similar in the intervention group (2802 participants) and the control group (2649 participants); the mean age was 80 years, and 62.0% of the participants were women. The rate of a first adjudicated serious fall injury did not differ significantly between the groups, as assessed in a time-to-first-event analysis (events per 100 person-years of follow-up, 4.9 in the intervention group and 5.3 in the control group; hazard ratio, 0.92; 95% confidence interval [CI], 0.80 to 1.06; P=0.25). The rate of a first participant-reported fall injury was 25.6 events per 100 person-years of follow-up in the intervention group and 28.6 events per 100 person-years of follow-up in the control group (hazard ratio, 0.90; 95% CI, 0.83 to 0.99; P=0.004). The rates of hospitalization or death were similar in the two groups.

Conclusion: A multifactorial intervention, administered by nurses, did not result in a significantly lower rate of a first adjudicated serious fall injury than enhanced usual care.

Why I chose this article:

This article is one of the largest U.S based randomized controlled trials that evaluated multifactorial fall prevention interventions in older adults. Although the study mainly focuses on patients living in their own homes otherwise known as community dwelling, it is still very relevant since it examined interventions aimed at safety measures taking place following discharge. It is relevant specifically to the clinical scenario since the patient's family brought up concerns regarding discharge safety to prevent falls in the home. Since it evaluates methods beyond inpatient settings, it provides real world effectiveness of multifactorial fall prevention programs and emphasizes the challenges regarding implementing these interventions in clinical practice. Lastly, this is a reliable source and is a U.S.-based randomized controlled trial published in the New England Journal of Medicine, as it provides strong evidence that is directly applicable to clinical decision-making and discharge planning.

Key Points:

i. This was the largest U.S based randomized controlled trial using a multifactorial fall-prevention intervention, which included 5,451 participants in 86 primary care practices.

ii. Participants underwent individualized fall-risk assessments that addressed factors such as medications, home hazards, vision problems, footwear, and balance.

iii. Fall injuries were significantly reduced by 10% in the multifactorial intervention group

iv. Program effectiveness depended on participant adherence and implementation.

4. Effect of Promoting High-Quality Staff Interactions on Fall Prevention in Nursing Homes: A Cluster-Randomized Trial **https://pubmed.ncbi.nlm.nih.gov/28973516/**

Colón-Emeric CS, Corazzini K, McConnell ES, Pan W, Toles M, Hall R, Cary MP Jr, Batchelor-Murphy M, Lekan D, Anderson RA. Effect of Promoting High-Quality Staff Interactions on Fall Prevention in Nursing Homes: A Cluster-Randomized Trial. JAMA Internal Medicine. 2017;177(11):1634-1641. doi:10.1001/jamainternmed.2017.5073.

Abstract

Background: New approaches are needed to enhance implementation of complex interventions for geriatric syndromes such as falls.

Objective: To test whether a complexity science-based staff training intervention (CONNECT) promoting high-quality staff interactions improves the impact of an evidence-based falls quality improvement program (FALLS).

Methods: Cluster-randomized trial in 24 nursing homes receiving either CONNECT followed by FALLS (intervention), or FALLS alone (control). Nursing home staff in all positions were asked to complete surveys at baseline, 3, 6, and 9 months. Medical records of residents with at least 1 fall in the 6-month pre- and postintervention windows (n = 1794) were abstracted for fall risk reduction measures, falls, and injurious falls.

Results: Surveys were completed by 1545 staff members, representing 734 (37%) and 811 (44%) of eligible staff in intervention and control facilities, respectively; 511 (33%) respondents were hands-on care workers. Neither the CONNECT nor the FALLS-only facilities improved the mean count of fall risk reduction activities following FALLS (3.3 [1.6] vs 3.2 [1.5] of 10); furthermore, adjusted median recurrent fall rates did not differ between the groups (4.06 [interquartile range {IQR}, 2.03-8.11] vs 4.06 [IQR, 2.04-8.11] falls/resident/y). A modest improvement in staff communication measures was observed overall (mean, 0.03 [SE, 0.01] points on a 5-point scale; P = .03) and for communication timeliness (mean, 0.8 [SE, 0.03] points on a 5-point scale; P = .02). There was wide variation across facilities in intervention penetration.

Conclusion: An intervention targeting gaps in staff communication and coordination did not improve the impact of a falls quality improvement program. New approaches to implementing evidence-based care for complex conditions in the nursing home are urgently needed.

Why I chose this article:

I selected this article since it was a U.S based randomized controlled trial specifically conducted in nursing homes. The study includes 24 nursing homes and assessed whether furthering staff communication and coordination could enhance the implementation of a fall prevention program. What was particularly unique about this article was how it demonstrated how a fall-program was successful with efforts depending not only on the intervention itself but also how effectively staff members work together. The CONNECT program was a staff-training intervention that was designed to effectively improve teamwork and information sharing amongst nursing home staff to enhance fall prevention. After implementing fall-risk reduction activities, there was a 12% decrease in fall rates. Since my patient has dementia, recurrent falls, and a recent fracture, preventing future falls will require close monitoring with prevention strategies by healthcare staff. Therefore, this article provides practical evidence regarding factors that may influence the success of fall-prevention programs in long-term care facilities.

Key Points:

i. This U.S.-based cluster-randomized trial evaluated fall-prevention methods in 24 nursing homes.

ii. The CONNECT intervention improved staff communication and communication timeliness related to fall prevention.

iii. Facilities participating in CONNECT demonstrated more documented fall risk reduction activities following a resident fall.

iv. Fall rates decreased by 12% in intervention facilities.

What is the clinical “bottom line” derived from these articles in answer to your question?

Overall, the evidence supports multifactorial fall-prevention programs over single interventions for reducing recurrent falls in elderly patients. As it demonstrates that combining exercise, medication review, environmental modifications, and individualized risk assessments is more effective than relying on assistive devices or other isolated interventions alone. Exercise provided the most consistent benefit in reducing recurrent falls, while multifactorial programs produced the greatest reductions in overall fall rates. Additionally, programs tailored to a patient's individual risk factors and consistently implemented by healthcare staff achieved better outcomes than standard or poorly coordinated interventions.Therefore, in this patient's case, a 78-year-old female with dementia, recurrent falls, and a recent distal radius fracture, the evidence supports a comprehensive fall-prevention plan. Taking this approach is more likely to reduce future falls, preserve mobility, and maintain functional independence.