

Table 4. Study Evaluation

Researchers (authors), Year	Clearly focused issue?	Methods	Selection	Bias	Confounders	Results
Arkkukangiaset et al. (2019)	Yes, the study evaluates the effectiveness of home-based exercise and home based exercise plus motivational interviewing on physical performance, fall self efficacy, balance, activity level, handgrip strength, adherence to the exercise, and fall frequency in those 75 years or older	Yes, the participants were randomly assigned to one of the two intervention groups or control groups and the physical therapist who measured outcome variables were blinded	Yes, participants were recruited from multiple health centers that provided home care services and assistive devices for the elderly making it likely to enroll subjects from a pool of people where falls are a huge concern for. The inclusion and exclusion criteria were strict, ensuring homogeneity of the sample.	Selection bias was minimized by obtaining subjects from multiple health centers in Sweden. Information bias was minimized by using multiple well known standardized methods of measurements for all the outcome variables being studied.	Confounders such as age, sex, education level, marital status, falls during the past year, use of a walking aid, help in daily living, and a baseline outcome measurement were taken into account. However, confounders such as comorbidities was not taken into account and that was a limitation of the study	Are the results believable/generalizable? The results are likely not believable or generalizable due to the very specific setting (Sweden) and small sample size (175). Do the results fit with the available evidence? No these results do not fit with the available evidence regarding fall prevention programs, which demonstrates a reduction in falls after implementation of home based programs
Barker et al. (2019)	Yes, the study evaluates the effect of the RESPOND fall prevention	Yes, participants were recruited from two emergency departments in	Participants were randomized to either the RESPOND or usual care group	Group assignment was not revealed to participants or assessors until	Confounders: Gender differences were accounted for and secondary analyses were	The results are believable as this was a multi-center randomized control trial with adequate sample size and reduction of bias.

	program on falls and fall injuries as compared to usual care in elderly who presented to the ED status post fall.	Australia. Yes, a randomized controlled trial was used to answer the research question of whether the RESPOND program had an effect on falls and fall injuries in elderly who present to the ED status post fall.	on a 1:1 basis using a web-based symptom by permuted block randomization (blocks of 2 and 4).	the baseline assessment was complete to ensure that the assessors remained unbiased. Both groups may have underreported falls and fall injuries due to recall bias. Participants in the intervention group may have been less likely to report falls due to their engagement in fall prevention.	adjusted to provide consistent results. Age and cognitive impairment were taken to account and there was no different between groups. Researchers also included baseline comparison between groups of employment status, living situation, medications, comorbidities, vision impairment, and fall and fall injury history within the last 12 months. Concomitant fall-prevention intervention by primary care doctors was mentioned as a potential risk as the patients' falls risk status was reported to their doctors.	The study included a sample representative of the at-risk for falls population in Australia. Results are generalizable to community-dwelling elderly adults with a history of falls within the past 12 months, but further research must be performed to generalize to those at risk who have not had a fall-related ED visit in the prior 12 months. Authors reference similar studies that have been performed across the globe with similar results.
Iliffe et al. (2014)	Yes, the study evaluates the effectiveness of two types of home based exercises	Primary care clinics were selected and then patients were randomly selected. This is an	All patients were recruited through their primary care clinics so it is not more likely to enroll	Researchers listed the following biases: Because the	Potential Confounders: age, comorbid conditions, educational attainment, living	It is believable that after 12 months of a regular and coordinated exercise program with continued physical activity, fall rates were reduced compared to

	compared to usual care and resulting and the effect on overall physical activity and falls.	appropriate method to recruit a large number of participants that meet the inclusion criteria. This recruitment method is acceptable to aid in answering the research question.	patients with a particular bias. The inclusion and exclusion criteria were strict, ensuring homogeneity of the sample. The intervention group did not seem to be more fit in the beginning of the study compared to the control group.	intervention is exercise, the participants could not be blinded, which can be listed as a bias. Recruitment of relatively active older adults, those at high risk of falling, limited retention and variation in 'doses' of exercise.	alone, forgetfulness and the patients lost to follow up.	the group where there was no regular exercise. Based on the large and diverse sample, these results are generalizable.
Boongird et al. (2017)	Yes, the study evaluates the effectiveness of home-based exercise on falls in the community dwelling adult.	Patients were recruited through 2 primary care offices. Recruitment method and intervention are appropriate to answer the question.	All enrolled patients had balance instability at baseline, therefore randomization into groups and selection from the same clinics ensures that the control and intervention group were alike prior to the start of the study.	Patients were appropriately randomized to the control and intervention groups and the researchers were blinded to the group assignment. Patients could not be blinded because the intervention is exercise.	Confounders were addressed: age, comorbid conditions, family support, and forgetfulness. Some patients received follow up by a nurse or researcher over the phone and others received home visits based on need to ensure understanding of instructions. Additionally, compliance with exercise was low in	The results are believable. The rate of falls in the intervention group was 16% lower compared to the control group; This was not statistically significant. This might be due to the fact that the study population had mild to moderate balance dysfunction prior to the initiation of the study. The results are generalizable to the community dwelling adult over age 60 in Thailand who has balance difficulties but may not apply to all older adults.

					the beginning of the study and improved after the first few months.	
Liu-Ambrose et al. (2019)	Yes, the study evaluates the effectiveness of a home-based exercise program on reducing falls among community-dwelling older adults who have already fallen	Community dwelling adults aged at least 70 years who had fallen in the last year were recruited from a fall prevention clinic. Quantitative methods were appropriate for this research question.	Participants were randomly assigned to the intervention or control group in a 1:1 ratio via randomization sequences by a central internet randomization service.	Participants were appropriately randomized, the plan to stratify randomization by participants' geriatrician was not followed because one geriatrician cares for 70% of the participants. Fall adjudication was completed by a blinded investigator, but monthly data collection was performed by an unblinded research assistant.	Confounders were addressed via a parallel-group single-blinded RCT. Disclosure of variable of inability to stratify randomization of participants' by geriatrician due to one geriatrician caring for 70% of the participants was discussed. This single-center study may not represent other nonurban centers. Few communities have fall prevention clinics.	Monthly reporting and follow-up of events, statistical analyses using proven methods, attention to strengths and limitations, and funding disclosure make the results believable. Not generalizable to those who do not meet eligibility criteria. Results are consistent with evidence on fall prevention programs, but few trials have implemented programs in the setting of general medical practice.
Siegrist et al. (2016)	Yes, his study evaluates the effectiveness of an exercise-based fall prevention program in the German	Community dwelling adults aged at least 65 years with increased fall risk were recruited from 33 general practices in	General practices were randomized to the intervention or control group by a biostatistician who was purposely not	Bias was not entirely minimized; participants were randomized by an otherwise uninvolved	Yes, participants held similarities according to the inclusion and exclusion criteria. Variables in adherence to the program was	Results were significant and are believable. Limitations were discussed and funding was disclosed. Results are generalizable: exercise-based fall

	primary care setting on fall rates among community dwelling older adults at high risk of falls.	southern Germany. Quantitative methods were appropriate for this research question.	involved in the study using computer-generated random numbers.	biostatistician; masking was not feasible since 50% of the patients were allocated to usual care and not enrolled in a program. Demographic data, body-mass index, medications, and comorbidities were assessed by trained assistants who were not otherwise involved in the study. Data on falls was subject to participant reports. Researchers stated that they cannot exclude that general practitioners may have chosen patients who were in superior shape to participate in the intervention group versus the	accounted for as means.	prevention programs encouraged by general practitioners can reduce fall rates in community dwelling older adults. Results are consistent comparable research (included in the references) that has been performed to validate the use of home exercises in fall prevention.
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				control group.		
Mohammed et al. (2019)	Yes, the study investigates the effects of a fall prevention program with a home-based exercise program component on the number of falls in community dwelling older adults in Egypt	Adults aged 60 and older were recruited from one family medicine center in Ismailia Governorate, Egypt.	Sample for intervention was selected by simple random sampling from registries within the Fanara Family Medicine Center. There was no control group as this was a quasi-experimental study.	Selection bias was not minimized as the sample pool was selected from only one facility in rural Egypt. Information bias was not clear as the authors reported that the participants were contacted monthly by telephone for an interview about their experienced falls, but did not indicate how they accounted for errors in interpretation of falls by participants and informants.	Confounders such as age, sex, number of medical conditions, number of medications taken, systolic and diastolic blood pressure, height, weight, BMI, previous falls with consequences were taken into account.	Though statistically significant, the results are likely not believable or generalizable. Issues included the very specific setting (Shahrud, Egypt), small sample size (100), and presence of multiple biases. Other studies suggest that home-based exercises like the Otago exercise program may reduce the incidence of falls in the elderly.
Dadgari et al. (2016)	Yes, the study investigates the effects of the Otago program on the rate of falls among community-dwelling	Recruitment of older adults that had a history of at least one fall took place at several public health centers in Shahrud, Iran.	Block random sampling was used to assign each public health center into intervention and control groups. Interviews and examinations	Selection bias was minimized via block randomization of multiple medical centers in Iran. Information collected is	Confounders such as age, BMI, medication numbers, falls frequency and measurements of functional capacity such as the Berg balance scale (BBS)	The results of this study are believable as the sample size was adequate and minimal biases. However, they may not be generalized as this study took place in a small city in Iran.

	elderly who have a history of falls in Shahroud, Iran.	Participants completed a home based exercise program and were followed for 6 months to assess the frequency of falls	were conducted by medical professionals to exclude anyone who did not meet the inclusion criteria	subject to bias data collection relied on self-reported data. However, general practitioners who performed medical tests to evaluate functional capacity and physical performance were blinded about the program and subjects in both groups, which minimized bias. Inter-rater reliability between the two general practitioners was conducted and reflected strong reliability ($r = 0.94$).	and the timed up and go test (TUGT), as well as measurements of physical performance including the chair stand test (CST) and arm curl test (ACT) were accounted for.	Available evidence suggests that home based exercises like the Otago exercise program may reduce the incidence of falls in the elderly.
El-Khoury et al. (2015)	Yes, the study evaluates whether a progressive balance retraining program will reduce injurious falls	Yes, women aged 75-85 living in the community near study sites were recruited through voter registration lists. They received letters inviting them to a	Yes, Women randomised to the control group did not receive the Ossébo exercise programme.	Many participants dropped out of the study for various reasons such as no longer interested,	Confounders such as age, visual acuity measurements, amount of walking, history of falls and fractures, fear of falling, and sociodemographic	Yes, results are believable for women because a large sample size was used. Limitations this study only focused on women aged 75-85 years old. Men should be included in future studies.

	and the increased risk of falls in women aged 75 -85 years of age living in the community	free balance and health examination. Yes, a randomized control study was used to address the research question		family problems, too busy, etc. Dropout can cause attrition bias; however, sensitivity analysis with a worst case scenario suggest that attrition bias is low.	characteristics.	Also there was incomplete participation in the exercise which might have underestimated the effectiveness of the program. Results are generalizable, there were fewer injurious falls (305) in the intervention group than the control group (397) Yes, these results fit with the available evidence regarding fall prevention programs.
Gallo et al. (2018)	Yes , the study investigates whether incorporating a moderate to high intensity home exercise program over 6 months will decrease the risk of falls compared to the usual physical therapy at Rusk Rehab.	Yes, 69 participants identified to be at risk of falls were recruited from November 2013 to November 2014 Yes, a randomized control study was used to determine the efficacy of new evidenced-based fall prevention recommendations versus the usual physical therapy on fall risk and fall rates among older adults living in the	Yes, participants provided informed consent and were randomly assigned into the experimental group or usual care group by a blinded scheduler.	The lack of double blinding limits the validity of the results. Researchers state that this design study does prevent performance or detection bias. The high dropout rate of 49% is a source of attrition bias.	Confounders such as age, difficulty walking or complaint of instability, capacity to consent, and ability to read/write in English were taken into account.	Are the results believable? No, these results are not believable because results are generated from a small sample size of thirty-five people. There was a 49% dropout rate in this study. Are they generalizable? With a limited sample size of 35, these results are generalizable to those in New York City who meet the inclusion/exclusion criteria to decrease fall risk in community-dwelling older adults when implementing home exercise programs. The

		community.				small sample size and specific location limits generalizability to other populations.
Suttanon et. al. (2018)	Yes, the study aims to provide evidence of effectiveness of a home based falls prevention program, focusing on balance exercise programs on falls and falls risk factors including physical performance in community dwelling older people in Thailand.	Yes, participants were recruited from a previous study on balance and falls risk in older people in Thailand. Yes. RTC was used to evaluate the feasibility and effectiveness of a falls prevention intervention program for older people in Thailand.	277 participants were randomized of which 131 were assigned to the intervention group and 146 to the control group. Randomization was used and the study was approved by the Human Research ethics committees and consent was obtained from each participant.	Since the participants were recruited from a previous study they could increase bias to some degree because they were already exposed to certain interventions which may make them act differently.	The participants were similar in age, fall risk without any serious orthopedic conditions.	Yes. The sample size was large Yes the result were generalizable to the female older adults living in Thailand.
Patil et al. (2015)	Yes, the study investigates the effects of multimodal supervised exercise on physical functioning, falls, and related injury in older	Invitation letters were sent out with health history questionnaires to those who were willing to participate in the city of Tampere, Finland. Yes. RTC was	Yes. Participants were randomized to a control and exercise group. The exercisers participated in the group exercise classes twice a week for the first 12 months and once	Information on participant's health, medications and physical activity was obtained through questionnaires which may lead to self reporting bias by not	Yes, confounders such as age, gender and physical functions were addressed.	The results are believable because the sample size was large. The results are generalizable to older women who are 70-80 years old and those who reside in Thailand. Yes. Multimodal exercise

	women.	used wherein participants were provided with written consent and randomly assigned to A control or intervention group.	a week for the subsequent 12 months. The control group maintained their current physical activity	answering the questions correctly.		programs enhanced physical functioning and reduced the number of falls.
Voukelatos et al. (2015)	Yes, This study investigates the impact of a 48-week walking program on falls in older people	Acceptable recruitment methods? Yes, methods included paid advertisements and editorials in community newspapers, personal and professional referrals and sampling from the Australian electoral roll. The Sydney South West Area Health Service Ethics Review Committee approved this study, and informed consent was obtained from all participants prior to their participation.	Yes, after baseline assessments (questionnaire) were completed participants were randomized into either the intervention group or control group by a research assistant using sequentially numbered sealed opaque envelopes. The randomization scheme used randomized permuted blocks of size six and four prepared by the chief investigator (A.V.) who was blinded to the study and who had no	Bias was minimized by randomizing group allocation after baseline assessments were performed. Neither research assistants or participants were blinded to group allocation.	Yes, the groups were homogenous based on demographics, socioeconomic status and functional abilities	Are the results believable? Yes, the sample size and research methods are adequate Are they generalizable? Yes, to those who are greater than 65 years old, living in the community and who had a mostly sedentary lifestyle Do the results fit with available evidence? Yes these results fit with the available evidence regarding fall prevention programs

			interaction with the participants. Those who were in the control group were sent the walking program materials once the study was completed			
Gill et al. (2016)	Yes, this study looked to determine if a structured exercise program is more effective at reduction of injurious falls than a series of workshops providing instruction on stretching and exercising among sedentary older persons	Acceptable recruitment methods? Yes Targeted mass mailings Appropriate method to answer the research question? Yes, randomized controlled trial	Participants were randomized to a physical activity or health education program through a secure web based data management system using a permuted block algorithm (with random block lengths) stratified by field center and sex.	Bias was minimized by blinding assessment. For the purpose of safety monitoring, unblinded staff recorded falls and serious fall injuries occurring during intervention sessions.	Yes, the groups were homogenous based on age, mobility and risk of injurious falls	Results were not statistically significant and are believable due to the study being underpowered to detect small outcomes Results are generalizable to sedentary older adults with functional limitations who do not already have major mobility disability The study found a 46% reduction in serious fall injuries, 53% reduction in the rate of fall related fractures and a 59% reduction in fall injuries leading to hospital admission in men. This benefit was not found in women.
Li, et al (2018)	Yes this study looked at whether, Tai Chi or MME, was more	Yes recruitment was done through promotions at local senior centers, senior	Yes, eligible participants were randomly assigned to intervention or	Bias was minimized as much as possible, but was limited	Yes confounders such as age, previous falls, medication use, time up and go	Are the results believable? Yes because the sample size was large

	effective at preventing falls in high risk elderly people compared to stretching.	meal sites, medical clinics, statewide senior falls prevention networks, targeted mass mailing and local newspaper advertisements. Yes, a randomized control study was used to address the research question	control group in a 1:1:1 ratio via a computer-generated randomization sequence with a block size of 3 or 6 to prevent anticipation of assignment to study condition	because falls were self-reported. To ensure that self-reporting bias was minimized, multiple methods were used, including monthly telephone calls, confirmations during follow-up assessments, proxies, and medical records, to ensure data accuracy. Participation in the study classes required traveling. Therefore, the results are most likely to be generalizable to persons who are able to travel regularly to exercise class sites.	evaluation, physical functioning, sex, ability to attend follow up appointments and comorbidities were addressed	Are they generalizable? Participation in the study classes required traveling. Therefore, the results are most likely to be generalizable to persons who are able to travel regularly to exercise class sites. The relatively low representation of African American participants was noted given this group has high rates of falls and of injurious falls. However, there is no indication in the results that these participants responded differently to the interventions than did other participants. Finally, this trial was conducted in a single state. Although Oregon has one of the nation's highest death rates from falls, generalizability of the findings could be enhanced by a multicenter trial involving multiple states Do the results fit with available evidence? Yes these results fit with the available evidence
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