

Review and Ethical Analysis of Paper “Falls among elderly population”

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Abstract

Background: Falls are a common and often devastating problem among the elderly population, causing a tremendous amount of morbidity, mortality. Different intervention modalities that result in decrease in the number of falls have been studied, these include exercise, medication reduction, support services and home hazard modifications. Similarly, multiple intervention programs also showed promising results in fall reduction.

Context: Ethical analysis of falls among elderly population especially in Day and colleagues research study.

Method: Review and ethical analysis of the topic of falls among elderly population. The main paper reviewed in is “Randomised factorial trial of falls prevention among older people living in their own homes”, by Day and colleagues

Results: Exercise interventions showed significant effect on fall incidence ($p < 0.05$), cited as the most important fall reduction intervention. Home hazard and vision interventions showed no significant effect. Overall, a combination of all three interventions showed greatest effect by reducing falls by 14%.

Conclusion : The elderly is becoming increasingly important. The elderly are more prone to falls and the resulting injuries can have serious implications on quality of life. Whilst the examples I provided illustrate that research into the subject is ongoing, one must appreciate that the full effects have yet to be seen. Future research needs to focus on replicating fall prevention studies like Day and colleagues in order to develop strong evidence for change and implementation of interventions into clinical practice.

Keywords: Falls in elderly, falls and prevention programs, fall statistics in Australia.

Introduction:

According to Rubenstein, “Falls are a common and often devastating problem among older people, causing a tremendous amount of morbidity, mortality and use of health care services including premature nursing home admissions (1, p. 37).” Thus, falls are a complex, multi-faceted issue consisting of medical, social, and economic components. Medically, the combination of a high incidence of falls and an increased susceptibility to

injury makes the elderly population vulnerable to falls.¹ Diseases such as osteoporosis and age-related physiological changes (slowed reflexes) serve to further increase risk of injury after even a minor fall.¹ Additional risk factors for falls include increasing age, weakness, unsteady gait, confusion, and certain medications.² More specifically, drugs that increase risk of falls are sedative-hypnotic, anxiolytic, Tricyclic antidepressants, and antihypertensive medications.³ The medical consequences

of falls depend not only on an individual's risk factors but the manner in which the person falls. Falls can result in fractures, head injuries, delayed healing, increased risk of subsequent falls, and post-fall anxiety syndrome.^{1, 2} Socially, falls can result in limitations in performing activities of daily living, increased caregiver burden, and decreased quality of life.² Economic consequences are extensive due to loss of independence and the cost of medical care.³ Injuries from falls are financially draining both for the elderly and health care systems around the world.^{3, 4} Consideration of the complexity of the problem of falls has led Day and colleagues to address these issues by studying the effectiveness and interaction of three fall prevention interventions, namely, group based exercise, home hazard management and vision improvement.⁵

At the time of research design by Day and colleagues, statistics indicated that increasing numbers of older adults in Australia were dying from accidental falls and suffering from distressing and costly injuries.⁶ Known factors included the increased susceptibility of older adults to falls, risk factors included muscle weaknesses, balance problems, poor eyesight and home hazards.⁷ Over the past 10 years, sufficient evidence has demonstrated the importance of various interventions to reduce falls, which has sparked international interest and funding for fall prevention programs.⁸ Single interventions such as exercise, medication reduction, support services and home hazard modifications all resulted in decreased falls. Similarly, multiple intervention programs also showed promising results in fall reduction.⁵ However, it was unclear whether multiple intervention programs were more effective in preventing falls than single, targeted interventions.⁸ Further unknowns included the interactions between specific interventions and the relative importance of each intervention in decreasing falls, which gave rise to Day and colleagues' study question.⁵

Prior to the timeframe 1991-1998, hospitalizations due to fall related injuries reached alarming proportions necessitating extensive health care resources.⁴ Fall prevention was a major public health issue in clinical practice due to the aging population. Subsequently, the focus shifted towards using health promotion strategies to prevent falls.⁴ In 2001, a survey of fall prevention services in Australia showed initiatives towards reducing falls and related injuries, conducting multidisciplinary assessments

of fall risk and developing individualized risk management plans.⁶ Implications for practice have emerged due to the division of funding between allied health (government funded) and general practitioners (fee-for service). As a result, making the clinic accessible to the target population and linking the two providers together seamlessly has been a challenge.⁶ Limited health care resources and the lack of consensus over the most effective fall prevention programs have created barriers to the advancement of clinical practice.^{6, 8}

Method:

The aim was to review and ethically analyze the topic of falls among elderly population. The main paper reviewed in is "Randomised factorial trial of falls prevention among older people living in their own homes", by Day and colleagues.⁵ Within the search strategy, various databases and methods were utilized to acquire relevant research for appraisal of Day and colleagues study. The main databases used were the Google scholar search engine, ProQuest medical library database, Ovid Full-Text Journals database and books. The first two databases mentioned above yielded the largest number of useful sources at 8 references. While, the research books were important in carrying out the analysis of the research paper. Search methods have been arranged below in tables to illustrate the search strategies for each source more effectively. Numbers in brackets refer to the reference list following this section. Search strategies for important references have been outlined, however, to avoid redundancy not all listed below but are included in the reference list.

Google Scholar Search Engine was searched:

Stage	Search Terms	Articles	Comment
1	Falls and older people	318, 000	Numerous articles, some relevant: (3) in reference list.
2	Falls in elderly in advanced search box, date 1990- 2002	35, 800	Large number articles found, some relevant.
3	Used related articles option for journal article #3 of 35, 800	101	Less articles, more relevant #6 useful: (7) in reference list.
4	Falls and prevention programs	125, 000	Large amount of relevant articles, #2 relevant: (13) in reference list.
5	Lesley Day and falls	26, 300 but cited 146 times by other sources.	Large amount of articles, only first one relevant: (5) in reference list.
6	Fall statistics in Australia	331, 000	Relevant sources.
7	Clicked on related articles of #1 of 331, 000	101	Relevant sources. #1 applicable: (4) in reference list.

ProQuest Medical Library was searched:

Stage	Search Terms	Articles	Comment
1	Falls and Prevention	1260	General keyword search; majority not relevant
2	Under suggested topics: Falls and prevention again	58	Relevant articles; #7 was highly relevant: (1) in reference list.
3	Same search terms as previous but continued searching through articles till end.	58	Relevant articles; #49 was highly relevant: (2) in reference list.
4	Narrowed search using terms: older people	42	Mainly same articles
5	Falls and Australia	119	Not relevant
6	Under suggested topics: Australia (location) and Falls	5	More relevant articles: #2 useful: (6) in reference list.

Ovid Database (Full-Text) was searched:

Stage	Search Terms	Articles	Comments
1	Falls and Australia, limited to full text articles	126	Articles not very relevant.
2	Falls and statistics in Australia & Falls statistics and Australia	Both yielded 157	Articles not very relevant.

Books:

Two research textbooks (9-10 in reference list) were purchased from Clarendon Medical Bookstore, in order to enhance analysis of the study by Day and colleagues.

Results:

Exercise interventions showed significant effect on fall incidence ($p < 0.05$), cited as the most important fall reduction intervention.⁵ Home hazard and vision interventions showed no significant effect. Overall, a combination of all three interventions showed greatest effect by reducing falls by 14%.⁵ The question left unanswered was, what interactions were present between interventions and why? Answering this query would be important in addressing the general research questions and would be possible with existing research data. Gender was another unrecognized factor that could potentially skew results due to differences in muscle mass and exercise capability between sexes. To address gender differences, a stratified sample or a hierarchical regression analysis could be utilized to look at gender separately.^{9,10}

Findings have shed light on the effect of exercise, home hazards and visual acuity interventions on falls in the elderly. Exercise alone warrants further investigation into specific exercises to reduce falls.^{11,12} Knowledge of these interventions can help physicians integrate fall prevention strategies into practice. Risk factor awareness facilitates patient screening for referral to fall programs. Practice implications include the fact that findings are not applicable to the general older adult population. Another important consideration is cost effectiveness, as insufficient funding may prevent implementation into practice.^{5,8}

The study concludes that exercise and a combination of three interventions most significantly reduces falls in older adults.⁵ While the researchers' conclusions are justified, problems with sampling,

reliability, validity, failure to address interventions interactions and gender differences may weaken the significance of findings.⁵ Future research needs to focus on strengthening research methodology in order to prevent these issues from compromising findings.

Discussion:

The population selected for Day and colleagues' study was adults ≥ 70 years old, which was consistent with the literature.^{1,5} However, comparison between the study group and general population revealed a higher proportion of Australian born person's aged 70-74, rating health as good to excellent in the study.⁵ Thus, over-representation of person's aged 70-74 and under-representation of those > 74 were noted. Evidence suggests that persons > 80 are at higher risk for falls than younger counterparts.⁸ Consequently, results are applicable to older adults sharing similar characteristics as the study group but are not representative of the entire older adult population.⁵

The sampling method recruited participants via invitation letters and telephone calls to persons ≥ 70 years old on the Australian electoral roll.⁵ In random sampling, all members of the target population must have an equal chance of being selected.⁹ Incomplete randomization occurred because one recruitment strategy used was local publicity and general practitioners, which could have biased results by obtaining a higher functioning sample. Sampling bias was an issue due to over-representation of persons aged 70-74, with no statistical corrections employed.^{9,10} Restrictive exclusion criteria eliminated high-risk persons (cardiac, respiratory or psychiatric

illnesses), which may have influenced fall results.⁵ Non-response¹⁷ and attrition rates^{11, 9} were low and did not significantly affect results.^{5,9} The sample size of 1090 was large enough to draw reliable conclusions, as 914 individuals were needed to detect a 25% reduction in annual falls.⁵ Nevertheless, incomplete randomization, sampling bias and restrictive exclusion criteria limited applicability of findings.

Group based exercise, home hazard management, and vision improvement were variables supported by research evidence and local government. Factors were relevant to the study question enabling assessment of the efficacy of multiple interventions and interactions.⁵ Variables were measured quantitatively using continuous measures, such as muscle strength, number of hazards, vision and number of falls.^{5,9} Utilizing this approach lends itself to statistical analysis and can also assess self-reported falls using a multi-factorial design to identify interactions between interventions.^{9,10}

Independent variables consisted of exercise condition, home hazards and vision. Exercise condition was continuous because muscle strength and balance were measured quantitatively.⁵ subsequently, it was a reliable and valid measure that provided consistent results and measured what was intended.⁹ Conversely, subjective measurement of home hazards indicated a lack of reliability and validity and the potential for construct validity issues to arise as the instrument failed to measure the intended concept.⁹ Problems emerged with vision, as not all patients required a referral to a physician⁵, leading to reliability and translational validity concerns.⁹ Number of falls was the dependent variable measured by participants. Self-report bias was possible because subjects were not blinded to intervention groups resulting in under-reporting of falls.⁵ Enlisting a second party to confirm falls could potentially eliminate this bias. All relevant outcomes were measured with the exception of fall intensity. Assessment of this factor would allow severity of injuries and groups with highest and lowest intensities to be determined and analyzed.

Findings support exercise as a means to reduce falls in the elderly. Previous research has acknowledged exercise as an important part of a myriad of intervention techniques. However, recent literature suggests that exercise is the single most important factor in decreasing falls.¹³ Although

it is difficult to implement changes in the clinical setting, more emphasis is being placed on increasing the physical activity of the elderly to prevent falls. Currently, organizations are assessing the feasibility and cost effectiveness of implementing the interventions outlined in the paper.¹³

Following publication of Day and colleagues study, several studies were conducted to reduce falls among the elderly in Australia and internationally. One study by the American Geriatrics Society examined the efficacy of a community-based program to reduce falls. Cost effectiveness, overall success of the program, and the number of elderly the program could benefit were additional factors assessed.¹³ subsequently, the Stepping On program reduced the number of falls by 31% among elderly Americans.¹³ The Australian article cited provided the means of best intervention - physical exercise, and this is what the program aimed to increase, along with other factors including regular visual screening and medication review for the elderly.¹³

Another study carried out by Tse reviewed the effect of environmental changes on the number of falls among the elderly. The study reviewed previous studies from 1993 up until 2004 concerning fall prevention among the elderly and included up to eighteen articles. The aim was to emphasize the role of different environmental modifications, either at one's home, occupation, and/or environment.¹⁴ Although, some environmental modifications did not reduce the number of falls (bed alarms), other interventions such as wearing slipper socks at night reduced number of falls. Tse concluded that more research is necessary in the field of occupational therapy, as there is evidence that environmental changes and interventions reduce falls.¹⁴

Conclusion:

It is no secret that the world's population is becoming increasingly older, so it's no surprise that care for the elderly is becoming increasingly important. The elderly are more prone to falls and the resulting injuries can have serious implications on quality of life. It can be said that the publication of Day and colleagues research has served as a catalyst for change in the way falls prevention in the elderly has been viewed over the years. Since its

publication, this paper has been cited at least 146 times, indicating that its findings were of value to current practices.⁵

The previously mentioned articles have referenced the data and results identified in Day and colleagues research. As a result, it has not only been of benefit to the Australian elderly community, but also globally with renewed focus on the effects and importance of various strategies to prevent falls. Whilst these examples illustrate that research into the subject is ongoing, one must appreciate that the full effects have yet to be seen. In conclusion, future research needs to focus on replicating fall prevention studies like Day and colleagues in order to develop strong evidence for change and implementation of interventions into clinical practice.¹⁵

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