

A critical appraisal of “Integration of balance and strength training into daily life activity to reduce rate of falls in older people (the LiFE study): a randomized parallel trial”

By

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Abstract

Balance and strength training is a common intervention strategy to reduce the fall risk in older adults. However, there are multiple ways to implement this intervention. This study conducted a randomized, three arm parallel trial to analyze the effect that an integrated approach and a structured approach can have on the fall risk of older adults compared to a control group. This single blinded, prospective study found that both the integrated approach and structured approach had a statistically significant impact on the fall risk of older adults. However, only the integrated approach had a clinically significant difference in fall risk reduction compared to the control group.

Key words

Balance and strength training, fall risk in older adults

Introduction

As people age, the risk of falling increases substantially. Balance training has become a common treatment protocol used to decrease the risk of falling in older adults. However, there are many approaches and theories a physical therapist can use when improving balance in an older adult. Not all approaches are appropriate for all patients, as every patient is different and has unique circumstances. I was curious to see what effect an integrated training program had on the fall risk of older adults compared to a more traditional, structured approach. The question I wanted to answer was, “What effect can balance training have on the fall risk of older adults?”

Methods

To search for literature to answer my question, I began with a Pubmed search. PubMed is a free, comprehensive database that collects articles from many online journals. To find articles that were relevant to my question I used the key words “*balance training and fall prevention*” and “*balance training and fall risk.*” I limited the results to only those that were either clinical trials or randomized controlled trials. I also only included articles published in the last 10 years. By doing this, I was able to narrow down the number of articles and to exclude any non-experimental articles and only include more up-to-date studies. I began reviewing the titles and abstracts of the articles when I had around 200 hits. I focused on articles that were focused on the effect of balance training in older people. I found ten articles that were more relevant to my research question, and I began looking more into those for credibility, study design, and results to find the one that best answered my question.

The study I chose was conducted in Australia by professors from the University of Sydney and as well as a physical therapist. The study was approved in 2006 by the University of Sydney human research ethics committee and published in 2012. This article recruited participants from

a variety of sources and had fairly high adherence rates for each group. This study consisted of three groups: an integrated approach, structured approach, and a control group. Compared to the other articles, this one was well designed, and the outcome measures were accurate assessments of the change in fall risk of the study participants. Additionally, the study was long enough to assess more long-term outcomes of the three groups.

Results

Summary of the study

This study conducted a randomized parallel trial to measure fall risk at baseline, six months, and twelve months. Participants were adults over the age of 70 that had experienced at least 2 falls in the past year. The participants were randomly divided into an integrated approach group, structured program group, and a control group. The integrated approach group received strategies and balance training throughout their day. The structured program group was given seven balance exercises and six lower limb exercises three times a week. The control group was given 12 gently, more flexibility focused exercises that do not require the subject to balance while standing. Outcome measures taken included fall surveillance, balance and strength, and other functional outcomes. The study then conducted a three-way comparison of the groups and compared the results.

Appraisal of the study introduction

The introduction portion of the article has several strengths. One of these strengths is that the authors provide sufficient background information and references literature to support their reasons for conducting the study. The literature referenced in the introduction to support the background information and rationale for completing the study is current and almost all are

published in credible journals. Another strength of this article is that the critical variables of balance and strength training and rate of falls in older adults are highlighted in the introduction. The introduction also clearly states that the independent variables of the study are integrated balance and strength training, and the dependent variable are rate of falls in older adults. Some weaknesses of the introduction section of the article include that while the rationale for conducting the experiment is discussed, it does not go into detail of what these interventions would entail, specifically the structured program. The majority of the literatures referenced are credible. However, one reference was sponsored by the University of New South Wales but not published at the time this article was written. Overall, this introduction is clear and well-written. More information on what the structured program group would have included would have been helpful, but this may be discussed in the Methods section.

Appraisal of the study methods

This study was a randomized parallel trial with three groups into which the participants were randomly divided. The researcher assigning the participants to their groups was not involved in the data collection portion of the study. The study was a prospective and longitudinal experiment that focused on the differences between the outcomes of the three groups. The researchers conducting the surveillance and assessment of the participants were blinded to the group assignments of the participants, but the participants and clinicians were not. The methods for collecting and analyzing the data for each group was conducted in the same manner. The only difference between the three groups was the intervention aspect.

The study was able to recruit 317 participants with roughly 105 subjects in each group. There was some subject withdrawal in the study. Around 20-25% of the subjects withdrew. This could

have been due to the age of the participants, the length of the study, or other circumstances that arose in the duration of the study. The participants in the study all had similar demographics and health statuses, with only slight variation in the number of hospital admissions in the last year. While the outcome measures were all taken in the same manner for all three groups, the methods used to assess the number of falls was self-reported and may not have been the most reliable method. The other outcome measures, balance, strength, and functional outcomes were measured using more standardized tools and tests that would provide less variability and bias.

Appraisal of the study results

The results section of the article is organized in a way that follows the order of the rest of the paper. Each outcome measure and their results are discussed in relation to the original aim of the study. The results of the outcome measures are discussed in the text as well as displayed in tables and graphs to aid in visualizing the results. The threshold p value for the study was 0.05, and the confidence interval used for each outcome measure was 95%. In the last two paragraphs of the results section, the authors discussed any adverse events that occurred to any participants and discussed the adherence rate, including possible reasons for subject withdrawal.

There were many statistically significant results for the outcome measure tests. Both the integrated program and the structured program had statistically significant evidence to support that they were more effective in reducing fall risk in older adults compared to the control group. However, while these results were statistically significant, they were not necessarily clinically significant. There were a few clinically significant outcomes between the control group and the integrated approach group. Neither the minimally clinically important difference (MICD) nor the number needed to treat (NNT) were mentioned in the results section. However, in tables 2-5 the

authors included Cohen effect sizes to help consumers interpret the indication of clinical effectiveness. This was most likely used in place of the MICD and NNT values.

Appraisal of the study discussion

In the discussion section of the article, the authors compared the results of this study with literature from similar studies. This allowed them to further interpret their findings instead of simply restating the results. Of the literatures listed, most were current and had been published in credible journals. A few literatures mentioned were older, mostly from the 1990s. In the discussion section, the authors include a section to discuss the limitations of the study. One limitation mentioned is that the control group received less contact time than the intervention groups which may have led to some bias. Additionally, the study had a smaller sample size than originally planned. The smaller sample size may have led to an error in the study. Finally, the outcome fall rate of all groups was higher than the authors had anticipated.

The conclusions made by the authors are reflective of the results of the study. The authors claim that an integrated approach to balance and strength training in older adults may be beneficial to some patients. The authors encourage this approach as an additional choice to the traditional structured approach. The integrated approach allows for opportunities to work balance and strength training into the daily activities of patients. There was not an additional study recommended because this was a follow up study to a pilot study conducted by the same authors.

Discussion

This article is clinically significant to current physical therapy practice because it provides an additional way to reduce fall risk in older adults through balance and strength training. My original research question was, “What effect can balance and strength training have on the fall risk of older adults?” This study shows how two different approaches to balance and strength training can affect the fall risk of older adults.

The integrated approach described in this study may be an effective program to reduce the fall risk of some patients. This approach would require more one-on-one time between the patient and the therapist. It would also require the therapist to accompany the patient throughout their daily activities. In this situation, the patient may also become accustomed to the cues coming from the therapist and forget these techniques when the therapist leaves.

The integrated approach may be very beneficial to certain populations, but it may not be suitable or practical in all situations. Using the integrated approach, the therapist would be without the potential technologies and assistance that a clinic can offer. Additionally, the patient’s activities of daily living may not include many activities that provide opportunities for enhancing balance and strength. This approach may not be exactly replicable in a clinical setting, but some of the theories could potentially be applied.

Overall, this study was well conducted and planned. The methods of conducting the study, collecting the data, and analyzing the results were well executed. The findings of this study have the potential to be beneficial to certain populations and to physical therapists that can execute

this method. However, since the integrated approach was not clinically significant compared to the structured approach, both approaches are valid options when working to reduce the fall risk of older adults.