

LITERATURE STUDY: THE DIFFERENCE IN RISK OF FALLS BEFORE AND AFTER CHAIR-BASED EXERCISE ON ELDERLY

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ABSTRACT

Introduction: Indonesian Ministry of Health Research stated that in 2017 the population of the elderly reached 23.66 million people (9.03%) and also predicted that it will continue to increase. The aging process causes declined physical capacity and mental, which makes the elderly have a higher risk of falls. One of the preventions of falls in the elderly is physical exercise to increase muscle strength and joint mobility. Chair-based Exercise is a physical exercise done by sitting, consisting of aerobic and muscle resistance exercise with Thera Band.

Purpose: To analyze the risk of falls in the elderly before and after Chair Based Exercise.

Method: This study used literature synthesis. Keywords collected the Articles due to the topic in the research proposal.

Result: 13 articles were reviewed in this study. Most articles have similarities in research design, analysis techniques, sample characteristics, total sample, duration of the intervention, and effect of the intervention studied. The differences mainly on the age of the sample and the intervention method. The similarities between the articles and research proposal mostly on sample characteristics and measuring the risk of falls. The difference mostly in a total of the sample, research design, analysis technique, duration and method of the intervention.

Conclusion: Only a few articles published Chair Based Exercise as an intervention method. There are similarities in the interventions given in the form of combination training, and it was found that the risk of falls was improved in the elderly. Therefore, research on the effect of Chair Based Exercise on the risk of falls in the elderly needs to be realized by enriching various inputs from literature studies.

Keyword: Chair Based Exercise, Risk of Falls, Time Up and Go Test.

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INTRODUCTION

According to the Health Ministry of the Republic of Indonesia (Kemenkes RI), in 2017, the population of elderly in Indonesia reached 23.66 million (9.03%). This number is predicted to continue to increase (1). The aging process that occurs in the elderly causes a decrease in physical and mental capacity. A decrease in physical and mental capacity causes the elderly to experience falls (2).

Falls are more common in the elderly and the main cause of pain, disability, loss of independence and death. Muscle weakness and decreased joint mobility are causes of falls in the elderly (3). Muscle weakness and decreased joint motility in the elderly can be prevented by regular physical exercise. One of the good physical exercises for the elderly is Chair Based Exercise (4).

Chair Based Exercise is a physical exercise done by sitting and consisting of aerobic exercise and muscle endurance training using a thera band. The purpose of using this chair is to increase the stability of sitting and standing in the elderly as well as to prevent the elderly from falling during physical exercise (5). A study conducted by Razaob (2018) found a significant increase in physical performance in the elderly after following the Chair Based Exercise for eight weeks (6).

A simple test can measure the risk of falls on the elderly, namely, the Timed

Up and Go (TUG) test. This test is proven to be used as an initial screening to detect the risk of falls in the elderly (7). In previous studies, there was a decrease in the time for the TUG test after three months of Chair Based Exercise in the elderly (8). This study aims to determine whether there are differences in the risk of falls on elderly before and after Chair Based Exercise.

METHOD

This research was converted into a literature study due to the Covid-19 pandemic situation, so researchers could not collect research samples. The literature collection procedure begins with the search for Indonesian and English articles that match the research proposal's topic. Literature requirements are completeness of information, the accuracy of the information, primary sources, and online.

RESULTS

The results of the literature search found 13 articles which were then reviewed. The similarity found in 13 articles are research design using randomized controlled trial (58.8%) (13,14,16–19), data analysis techniques using ANOVA (61.5%) (8,13–15,17–19). The number of samples ($n > 50$) (58.8%) (8,12,15-19), the effects of the intervention studied were body function,

Table 1.1 Literature Mapping Matrix

No	Authors' Name	Title
1.	C.M Nicholson, S. Czernwicz, G Mandilas, J. Rudolph, M.J.Greyling(1997) (9)	The Role of Chair Exercises for Older Adults Following Hip Fracture
2.	E. E. Baum, D. Jarjoura, A. E. Polen, D. Faur, and G. Rutecki (2003) (10)	Effectiveness of A Group Exercise Program In A Long-term Care Facility: A Randomized Pilot Trial
3.	V.S.ThomasandP.A.Hageman(2003) (11)	“Can neuromuscular strength and function in people with dementia be rehabilitated using resistance-exercise training? Results from a preliminary intervention study”
4.	Matsuda, Patricia Noritake PT, DPT; Shumway-Cook, Anne PT, PhD, FAPTA;Ciol, Marcia A. PhD (2010)(12)	The Effects of a Home-Based Exercise Program on Physical Function in Frail Older Adults

5.	Lygia P. Lustosa, Juscélio P. Silva, Fernanda M. Coelho, Daniele S. Pereira, Adriana N., Parentoni, Leani S. M. Pereira (2011) (13)	Impact of Resistance Exercise Program on Functional Capacity and Muscular Strength of Knee Extensor in Pre-frail Community-Dwelling Older Women: A Randomized Crossover Trial
6.	Eduardo L. Cadore & Alvaro Casas-Herrero & Fabricio Zambom-Ferraresi & Fernando Idoate & Nora Millor & Marisol Gómez & Leocadio Rodriguez-Mañas & Mikel Izquierdo (2014) (14)	Multicomponent Exercises Including Muscle Power Training Enhance Muscle Mass, Power Output, and Functional Outcomes in Institutionalized Frail Nonagenarians
7.	Hunkyung Kim, Takao Suzuki, Miji Kim, Narumi Kojima, Noriyasu Ota, Akira Shimotoyodome, Tadashi Hase, Erika Hosoi, Hideyo Yoshida (2015) (15)	Effects of Exercise and Milk Fat Globule Membrane (MFGM) Supplementation on Body Composition, Physical Function, and Hematological Parameters in Community Dwelling Frail Japanese Women: A Randomized Double Blind, Placebo Controlled, Follow-Up Trial
8.	Nelson Sousa, Romeu Mendes, André Silva, José Oliveira(2016)(16)	Combined Exercise is More Effective than Aerobic Exercise in The Improvement of Fall Risk Factors: A Randomized Controlled Trial in Community-Dwelling Older Men
9.	Jose MCancela Carral, Estrella Pallin, Ander Orbeagoz, Carlos Ayan Perez	Effect of Three Different Chair Based Exercise Programs on Older Than 80 Years
10.	Maria Tsekoura, Evdokia Billis, Elias Tsepis, Zacharias, Dimitriadis, Charalampos, Matzaroglou, Minos Tyllianakis, Elias Panagiotopoulos, John Gliatis(2018) (17)	The Effects of Group and Home-Based Exercise Programs in Elderly with Sarcopenia: A Randomized Controlled Trial
11.	Nor Afifi Razaob, Nor Najwatul, Akmal Ab Rahman, Ain Efahera Ahmad, Tajuddin, Nor Azlin Mohd, Nordin (2018)(6)	Outcomes of Chair Based Exercise with Progressive Resistance Training on Physical Performances among Older Adults: A Preliminary Study
12.	Haritz Arrietaa, Chloe Rezola Pardo, Idoia Zarrazquinb, Iñaki Echeverriaa, Jose Javier, Yanguasc, Miren Iturburuc, Susana Maria Gila, Ana Rodriguez, Larrada, Jon Irazustaa(2018) (18)	Multicomponent Exercise Program Improves Physical Function in Long term Nursing Home Residents: A Randomized Controlled Trial
13.	Uratcha Sadjapong, Supachai Yodkeeree, Somporn Sungkarat, Penprapa Siviroj (2020) (19)	Multicomponent Exercise Program Reduces Frailty and Inflammatory Biomarkers and Improves Physical Performance in Community-Dwelling Older Adults: A Randomized Controlled Trial

body mobility, and the risk of falling (61.5%) (8,12-19), the duration of the intervention was 3 months (61.5%) (8,14,15,17-19), and the sample characteristics were without cognitive and mental disorders (92.31%) (6,8-10,12-19), without balance disorders (38.5%) (6,13,14,18,19), without musculoskeletal disorders (38.5%) (8.15-18), without chronic disease (30.8%) (6, 8,12,16), and using Fried's criteria (30,8%) (13,16,18,19).

The differences in the 13 articles were mainly on age of the sample and intervention method used. The similarities between 13 articles with research proposals are mainly on the effect of the intervention studied, which is the risk of falls on elderly with TUG test (53.8%) (12-14,16,19) and sample characteristics. The differences between the 13 articles with the research proposal included the research design, analysis technique, number of

samples, duration of intervention, intervention methods and data analysis techniques used.

DISCUSSION

In this literature study, 5 articles were found which were quite relevant to the research proposal that is using the Chair Based Exercise and measuring their effect on the risk of falls on elderly (6,8-11). Of the 5 relevant articles, 4 articles produced significant results. It can be explained that because the muscle strength in the elderly can be increased by regular physical exercise. Although there were no significant results in the study of Nicholson (1997) (9), there were differences before and after intervention in the results of measuring the risk of falls. This is related to the sample and the research's time used. The sample used is elderly postoperative women so that the effect of the intervention might be seen

longer than the elderly without a history of postoperative fracture as in a study conducted by Razaob (2018)(6). It is also associated with decreased flexibility in the postoperative fracture sample leading to limited joint scope.

On 8 other articles that were less relevant to the research proposal, it was seen from the intervention used, namely the combination exercise. This is related to the scope of exercise that is carried out more diverse and uses the body as a whole in the exercise so that it is considered to have a better effect when compared to exercise in sitting position (Chair Based Exercise) (12–19).

There are 3 articles that only use elderly women as samples. This is related to a higher prevalence of falling in woman when compared to men. This happens because estrogen decrease in preventing osteoporosis in women. On this basis, research to increase muscle strength in elderly women is considered more important (9,13,15).

The strength of research proposals compared with the 13 articles that have been reviewed are samples with age boundaries and the intervention used has not been widely studied, namely Chair Based Exercise. The weaknesses of the research proposal compared to 13 articles were the short duration of the intervention, the small number of samples, the lack of chair based exercise procedures in terms of body balance exercises, and the study design did not use a control group.

CONCLUSION

Based on the 13 articles that have been reviewed, it is concluded that there are only a few articles that contain Chair Based Exercise as an intervention method. There are similarities in the interventions given in the form of combination exercise and it was found that there was an improvement in the risk of falls on elderly. This positive condition can support promotive-preventive programs in the geriatric sector in reducing morbidity and

mortality due to falls. Therefore, research on the effect of chair based exercise on the risk of falls on elderly needs to be realized by enriching various inputs from literature studies.

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