THE EFFECTIVENESS OF BALANCE EXERCISE ON CHANGES IN THE FUNCTIONAL STATUS OF THE ELDERLY

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Abstract

The increasing life expectancy is in line with the increasing number of elderly people that causing the elderly to be a risk group (At Risk). The risks that arise in the elderly are changes in functional status in daily activities. This study aims to determine the effectiveness of balance training on changes in the functional status of the elderly at the Tresna Werdha Nirwana Puri Social Home Samarinda. The method used in this study is a quasi-experimental research with a pre and post approach with control group design. Meanwhile the research samplers were 40 elderly people. The samplers were divided into 20 elderly as intervention group and 20 elderly as control group. The intervention group was given balance exercises 3 times in a week for 3 consecutive weeks. The instrument used in assessing functional status is the Barthel Index. The results of the study based on the Wilcoxon test in the control group, the Asym value. Sig (2-tailed) was obtained P value 0.428, or P value > 0.005, meaning that there was no difference in functional status scores between pre and post in the elderly in the control group. While in the intervention group with the Asym value. Sig (2-tailed), was obtained P value 0.000, or P value < 0.05, meaning that there was a difference in functional status scores between before and after balance exercise. Finally, balance training is effective in improving the functional status of the elderly.

Keywords: *Elderly, functional status, balance exercise*

INTRODUCTION

The development of science and technology have a positive impact on the welfare of the elderly dealing with the increasing life expectancy. The increasing life expectancy contributes to the number of elderly population from year to year which tends to increase. According to the 2017 World Population Prospect in BPS (2018), the world's population is currently in the era of the aging population, with a population aged >60 years exceeding 7% of the population. Dealing with this growth, the number of elderly people (elderly) is increasing and contributing quite high to the overall population growth. The elderly population reached 962 million people in 2017, more than double the 1980 population of only 382 million elderly people worldwide.

In 2018, there were 9,27 percent or around 24,49 million elderly from the entire population in Indonesia. This figure has increased more significant than the previous year, where there were only 8,97 percent (approximately 23,4 million) of elderly people in Indonesia. This increase will continue to occur for the next several years, although the number and composition of the population is actually very dynamic and depends on three demographic

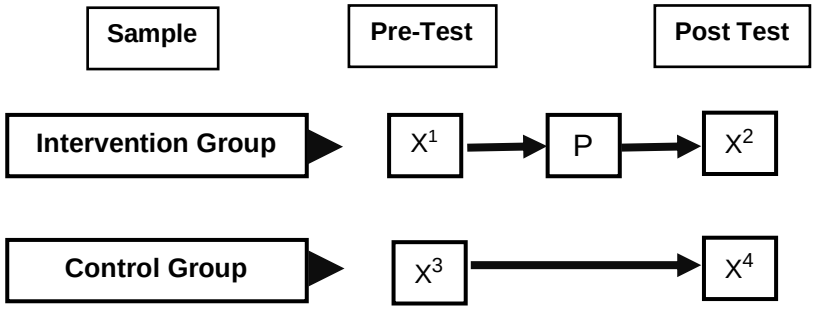
processes that surely cannot be predicted, namely births, deaths and migration. (Central Bureau of Statistics, 2018). The increasing number of elderly causes the elderly to be one of the risk groups (at risk).Judith Ann Allender, Cherie Rector (2010), states that risk is the possibility of developing an event, disease or condition over a certain period. Meanwhile, according to Nies and McEwen, (2014) risk is the chance of a bad event or the chance that a healthy person who has certain factors will get a certain disease. An individual or group is included in the at risk group if they have several risk factors.

According to Stanhope and Lancaster (2004) As a risk group, the elderly often experience functional problems in performing daily activities. Miller (2012) in his theory of functional consequences says that the decline in various body functions is a consequence of increasing age. The same opinion was expressed by Suwarni, S., Setiawan and Syatibi, MM (2017)s Along with increasing age in the elderly, it has an impact on the decline in the functional status of the elderly. Functional status is the ability to maintain independence and to perform activities of daily living (Permenkes RI Number 79 of 2014). Various efforts have been made to improve the functional status of the elderly, one of which is physical exercise. According to Ko and Lee (2012), physical exercise is very important for those the elderly in improving the quality of life that can optimize the functional status of the elderly. Regular exercise can improve social relationships, improve physical health and mental health. Exercise also plays an important role in reducing the risk of disease and maintaining bodily functions in the elderly. Various studies related to physical exercise, one of which is balance training. Balance exercises are carried out to improve the health and well-being of the elderly. In general, the benefits of balance training are improving balance, preventing falls and protecting yourself from falling.

According to Anto and Veni (2015) about the effect of adding balance exercises to core stability exercises, the results of which have an effect on reducing the risk of falling in the elderly. Other studies are: about the effect of balance exercise on the quality of life of the elderly, the results of the study show a significant effect on the quality of life of the elderly[5].

MATERIAL AND METHODS

Design of the research used in this study is a quasi-experimental approach with pre and post and control group design. Respondents or research subjects are consisted of two groups, namely the control group and the treatment group (given balance exercises). Before being given treatment/training, both groups were examined for functional status based on the Barthel Index (Pre Test). Then the treatment group performed balance exercises for 3 (three) weeks with a frequency of 3 times per week.



Schematic 1 Research Design

Information :

X1 : The group of elderly people who had a functional status pre-test with the Barthel index

P : Intervention in the form of balance exercises for the elderly

X2 : The group of elderly who did post-test functional status with the Barthel index after balance training.

X3 : Elderly group (control group) who had a functional status pre-test with the Barthel index.

X4 : The elderly group (control group) underwent a functional status post-test with the Barthel index.

Population and Sampel

This study was held in August-November 2020 at the Tresna Werdha Nirwana Puri Social Home Samarinda. The population in this study were all the elderly who were in the Tresna Werdha Nirwana Puri Social Home Samarinda. The sampling technique used was non-probability sampling (non-random samples) with Consecutive sampling. Consecutive sampling is a sample selection method that is carried out by selecting all individuals encountered who meet the inclusion and exclusion criteria[6]. Inclusion criteria in this research were subjects aged > 60 years, able to walk without assistive devices, the results of the Barthel Index level of dependence were mild to moderate, and were willing to be respondents. The exclusion criteria were the elderly who suffered from stroke, Parkinson's and were not willing to be respondents. While the Drop Out criteria were those who did not participate in the exercise 3 times in a row, the respondent decides not to continue the exercise.

Based on the calculation of the sample obtained, the number of samples are 24 respondents. The minimum amount is added by 10% in anticipation of respondents dropping out, so the number of samples in the study are 27 people in each group. So that the total of respondents were 54 people, but in reality some of the respondents could not continue the exercise to completion due to illness, and the weak condition of the elderly, as well as some

elderly who were categorized as heavy dependence, so the final number of each intervention and control group was 20 people, so the total of all elderly in this study are 40 people.

Data collection

Data was collected on the elderly at PSTW Nirwana Puri Samarinda who were selected to be research subjects according to the inclusion and exclusion criteria. The research subjects were divided into 2 groups, namely the control group and the treatment group. Then the initial stage (pre test) for both groups were measured by using functional status measurements with the Barthel Index. The Barthel index instrument contains components of activities that are usually carried out daily, which are carried out by the elderly independently or with assistance. As for the balance exercises carried out for 3 weeks with a frequency of 3 times a week. In the balance exercise there is an observation sheet for the activities/exercises carried out by the practice group.

In collecting data during the COVID-19 pandemic, researchers provided direction and training to nursing home staff for the implementation and assistance of balance exercises for the elderly at the orphanage. The process of collecting data is carried out by online which is reported in stages according to the specified time.

Analysis Techniques

The test technique used in this study applied a univariate test for characteristics of the elderly such as age and gender by using a frequency distribution table presented in tabular form. Then data of the functional status before and after the balance exercise was analyzed by using the "Paired T-Test" statistical test. This test is used to test the difference in the mean of two measurement results in the same group. If the assumptions are not met (the data are not normally distributed), then use the Wilcoxon test[6].

RESULTS

Characteristics of Respondents

Table 1. Characteristics of respondents in the intervention and control groups at Tresna Werdha Nirwana Puri Samarinda Social Institution in October 2020

Elderl Age	N	Minimum	Maximum	Mean	Std. Deviation
Intervention group	20	63	88	70,30	7,087
Control group	20	63	92	71,75	7,973

Functional Status Before and After Balance Training

Before the Balance Exercise (Pre Test)

Table 2. Distribution of respondents based on the results of functional status before the Balance Exercise at the Tresna Werdha Nirwana Puri Social Home Samarinda in October 2020

Evaluation	Elderly Group					
	Intervention			Control		
	Min	Max	mean	Min	Max	Mean
Before (Pre)	9	20	15,45	9	20	16,00

After the Balance Exercise (Post Test)

Table 3. Distribution of respondents based on the results of functional status after the Balance Exercise at the Tresna Werdha Nirwana Puri Samarinda Social Home in October 2020

Evaluation	Elderly Group					
	Intervention			Control		
	Min	Max	Mean	Min	Max	Mean
After (Post)	11	21	17,80	8	21	15,80

Based on Table 3, it is known that the results of the functional status scores of the elderly after balance training were carried out, namely for the intervention group the lowest score was 11 and the highest score was 21 where the average was 17,80, while for the control group the lowest score was 8 and the highest was 21, and the average was 15,80.

The Effectiveness of Balance Training on the Functional Status of the Elderly

Before performing an analysis of data related to the effectiveness of balance training on the functional status of the elderly, previously the researchers conducted a data normality test for the data of the elderly group in the pre and post assessment of balance exercise. Based on the results of the normality test which refers to the Shapiro-Wilk value, it was found that one of the data was not normally distributed from either the control or intervention groups, namely p value <0,05. So the test used is the Wilcoxon test. The results of the test analysis are as follows:

Control Group

Table 4. Analysis of the control group Wilcoxon test based on the results of functional status before and after the Balance Exercise at the Tresna Werdha Nirwana Puri Samarinda Social Institution in October 2020

Control Group		N	Mean Rank	Sum of Ranks	Asym.Sig
Post Test-Pre Test	Negative Ranks	9a	7,22	65,00	0,428
	Positive Ranks	5b	8,00	40,00	
	Ties	6c			
	Total	20			

a. Post Test Control Group < Pre Test Control Group

Control Group	N	Mean Rank	Sum of Ranks	Asym.Sig
b. Post-Test Control Group > Pre-Test Control Group				
c. Post Test Control Group = Pre Test Control Group				

Based on the results of the Wilcoxon test in table 4, it was found that of the 20 elderly as a control group, 9 of them experienced a decrease in functional status, with an average decrease of 7,22. While the increase only occurred in 5 elderly people, with an average increase of 8,00. while there were no changes (pre and post no changes) for 6 people.

Based on the test results from the Asym.Sig (2-tailed) value, P value was 0.428, or P value > 0,005, meaning that there was no difference in functional status scores between pre and post in the elderly control group.

Intervention Group

Table 5. Analysis of the Intervention Group Wilcoxon Test based on the results of functional status before and after the Balance Exercise at the Tresna Werdha Nirwana Puri Samarinda Social Institution in October 2020

Control Group		N	Mean Rank	Sum of Ranks	Asym.Sig
Post Test-Pre Test	Negative Ranks	0a	0,00	0,00	0,000
	Positive Ranks	16b	8,50	136,00	
	Ties	4c			
	Total	20			
a. Post Test Control Group < Pre Test Control Group					
b. Post-Test Control Group > Pre-Test Control Group					
c. Post Test Control Group = Pre Test Control Group					

Based on the results of the Wilcoxon test in table 5, it was found that of the 20 elderly as the intervention group, almost all 16 elderly people experienced an increase in functional status scores, with an average of 8,50. While the other 4 elderly people, there was no increase between before and after the exercise (Pre results = Post results).

Based on the test results from the Asym.Sig (2-tailed) value, it was found that P value 0,000, or P value <0,05, meaning that there was a difference in functional status scores between before and after balance exercise in the intervention group. Thus, balance exercises carried out for 3 weeks were effective in improving the functional status of the elderly at the Tresna Werdha Nirwana Puri Samarinda Social Home.

DISCUSSION

The results in this study emphasize the role of caregiver or nursing staff in training the elderly, monitoring and evaluating in balance training activities on the functional status of the elderly. Based on the number of respondents studied, 40 elderly people were divided into 20

intervention groups and 20 control groups. Most of them were female. The same thing was found in previous studies[7] which focuses on the subject of the elderly in social institutions that the majority of residents of social institutions are women. As for the characteristics of the elderly, in this study the average age of the elderly in the intervention group was 70,3 years, while the average age of the elderly in the control group was 71,75.

Based on these age characteristics, the elderly living in nursing homes are 60 years old or older. Although there are several privately owned institutions that accept the elderly under 60 years for certain reasons, either because of family activities or others, so that the elderly are placed/entrusted in orphanages, government-owned Social Institutions accept elderly people who reach the age of 60 years or more. In addition, the Minister of Social Affairs of the Republic of Indonesia Number 19 of 2012 concerning guidelines for social services for the elderly, explains in the general provisions of article (1) that an elderly person is someone who has reached the age of 60 (sixty) years and over, and the Tresna Werdha social institution accepts elderly age 60 years or older[8].

Judging from the functional status, based on the Barthel Index in assessing the ability of the elderly to carry out daily activities, almost all elderly in nursing homes experience a decline in physical function and body system functions. In this study, it was found that most of the elderly population in the orphanage had mild-moderate functional status (mild-moderate dependence level) and a small portion of their functional status was in the severe category or the level of dependence was heavy. Several studies have stated that increasing age causes the elderly to experience a decrease in the ability of physical activity, thereby increasing dependence on others[9]. Other explanations presented in the research[10] states that age is a factor causing or root cause of decreased functional ability of the elderly.

The focus in this study is related to the functional ability of the elderly, where the results obtained in this study are balance exercises that contribute to improving the functional status of the elderly in carrying out daily activities. This can be seen from the difference before and after balance training. In the elderly as a group given the intervention of balance training, it was found that most of the elderly experienced an increase in their functional status, namely a number of 16 elderly people. While the elderly as a control group who were not given intervention/exercise, almost half experienced a functional decline, and in the other half there was no change between before and after.

The results of this study are supported in previous studies, which with exercise or practice the functional abilities of the elderly will become more prime so that their cognitive abilities can be maintained[11]. The exercise referred to in this study is exercise from the physical aspect. If it is related to the balance exercise carried out in this study, it is an exercise in which there are elements of relaxation, strength training, balance training itself and stretching exercises, so this exercise is very complex and very supportive in improving the functional

status of the elderly. According to research results[12] Balance training is basically functioned as an exercise to prevent falls in the elderly, but it is a combination of all exercises that can support the function of the elderly.

Judging from the changes in functional status in this study, different results were obtained in the elderly in the control group, namely the elderly group who did not receive intervention or were not given balance exercises. The results obtained were from 20 elderly as a control group, 9 of them experienced a decrease in functional status, with an average decrease of 7,22. While the increase only occurred in 5 elderly people, with an average increase of 8,00. while there were no changes (pre and post no changes) as many as 6 people. When compared with the elderly who were given balance training 9 times for 3 consecutive weeks, the functional improvement was far compared to the elderly in the control group, there was not even a decrease in functional status.

CONCLUSION

The results in this study emphasize the role of caregiver or nursing staff in training the elderly, monitoring and evaluating balance exercise activities on the functional status of the elderly. Balance training is very effective in improving the functional status of the elderly, this is evident from the 20 elderly who were given balance training for 3 weeks with a total of 9 exercises, almost all of the elderly experienced an increase in functional status scores. This functional status is manifested by the level of dependence in daily activities, changes that occur from moderate to light dependence, even becoming independent (not dependent on others). The results of this study can be used as guidelines or references in programs to improve the welfare of the elderly, especially from the functional aspect of the elderly, so it is necessary to continue or programmed/scheduled exercise in its implementation, so that the results are more optimal. As for the next research, it can be seen from other aspects, both from mental and social aspects.

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