

THE EFFECT OF BALANCE EXERCISE ON POSTURAL BALANCE IN ELDERLY

ST Fatimah*, Satrio Kusumo Lelono, Yoyo Haryono, Lina Kurnia Lestari

Wijaya Husada Health Institute
Jl. Letjend Ibrahim Adjie, No. 180, Sindang Barang, Bogor, West Java, Indonesia
***corresponding author:** wijayahusada@gmail.com

ABSTRACT

Elderly is someone who is in the stage of late adulthood or in other words, the stage of the late adult age, with a range of age from 60 years and above. The biggest problem that often occurs in the elderly is impaired balance and musculoskeletal disorders, resulting in the elderly are often dropped. One form of exercise intervention related to the elderly balance is to provide a regular and directed exercise to improve the balance of one of them with balance exercise.

The purpose of this research is to know the Effect of Balance Exercise on Postural Balance in the Elderly in Ciherang Kidul RW 02 Village Laladon, District Ciomas, Bogor Regency in 2019. This type of research is Quasi Experiment with Non Random Pretest & Posttest Control Group Design. The method of sampling in this study used purposive sampling technique with a total sample of 32 respondents. Data collection was obtained through observation with the Berg Balance Scale observation sheet and giving balance exercises using the standard operational balance exercise procedures.

The result of bivariate analysis using the Independent Sample T-Test, in the intervention group obtained values ($\rho = 0.012$ or $\rho < 0.05$) and in the control group obtained values ($\rho = 1,000$ or $\rho > 0.05$). The results of the analysis of the effect of balance exercise on postural balance in both groups with the Paired Sample T-Test showed an average value of the difference in postural balance increase before and after the intervention is ($\rho = 0,000$ or $\rho < 0.05$). This indicates that there is a difference in the postural balance increase in the intervention and control group which means there is a meaningful influence between the two variables. There Is The Effect Of Balance Exercise On Postural Balance In Elderly In Ciherang Kidul RW 02 Village Laladon District Ciomas Bogor Regency In 2019.

Based on the conclusions of the research results, as for suggestions for the elderly in Ciherang Kidul, it is expected that the elderly can practice balance exercise movements routinely at least 2 times a week with supervision from one of the families. Because balance exercise is done to improve postural balance and give the effect of increasing the strength of the lower extremity muscles.

Keywords : Balance Exercise, Postural Balance, Elderly

INTRODUCTION

Elderly or elderly is someone who is in the late adulthood stage or in other words, the stage of late adulthood, with an age range from 60 years and above.¹ Meanwhile, the process of aging is a natural process of life that occurs from the

beginning of a person's life, and has several phases, namely children, adults, and old people.²

According to data from World Population Prospects: the 2015 Revision, in 2015 there were 901,000,000 people aged 60 years or over, comprising 12% of the global total. By 2050 the elderly population is projected to more than double in 2015, to reach 2.1 billion.³ Asia ranks first with the largest elderly population and Indonesia is among the top five countries with the largest number of elderly people in the world.³ Based on the population census in 2010, the number of elderly people in Indonesia is 18.1 million people (7.6% of the total population). In 2014, the number of elderly people in Indonesia became 18,781 million and it is estimated that by 2025, the number will reach 36 million.⁴

The increase in the number of elderly people also has an impact on increasing the life expectancy in Indonesia. Life expectancy in Indonesia increased from 69.1% in 2005-2010 to 70.1% in 2010-2015.⁵

With the increase in the number of elderly people, the problems in the elderly are increasing, because the number of elderly people is increasing from year to year.⁶

The biggest problems that often occur in the elderly are balance disorders and musculoskeletal disorders that cause them to fall frequently.⁷ Balance (balance) is the ability to maintain the muscle nerve system in an efficient position or attitude while we move.⁸

Balance disorders in the elderly are closely related to the risk of falling, the appearance of balance disorders in the elderly is caused by degenerative processes and decreased sensory (vestibular, proprioceptive, visual) and musculoskeletal (muscle, joint, soft tissue strength) which will affect the body's center of gravity against the spilled plane.⁹ This decrease in function causes a decrease in the ability to maintain postural balance or body balance in the elderly.¹⁰ As for the balance problem of the elderly, it will affect the decrease in daily activities, the risk of the elderly falling, and not doing enough activities so that it directly affects social activities or work and results in decreased self-confidence in the elderly.⁹

From the problems that arise in the elderly, one form of exercise intervention related to the balance of the elderly is to provide regular and targeted exercises to improve balance, one of which is balance exercise.¹⁰

Balance exercise is a physical activity that is performed to increase body stability by increasing the muscle strength of the lower limbs.¹¹ The increase in muscle strength in the elderly will make the body stronger in supporting the body, so that it will be strong in maintaining its movements. This will make the elderly more postural in balance.¹²

The purpose of this study was to determine the effect of balance exercise on postural balance in the elderly in Ciherang Kidul Rw 02 Laladon Village, Ciomas District, Bogor Regency in 2019.

RESEARCH METHOD

The design of this study used a Quasi Experimental design with Non Randomize Pre test and Post test Control Group Design. Where a study was conducted with two groups without randomization, one group was given treatment and the other group as a control, then observed before and after.¹³

This research was conducted in Ciherang Kidul RW 02 Laladon Village, Ciomas District, Bogor Regency on August 20 to September 10 2019.

The population in this study were 46 elderly respondents in Ciherang Kidul Rw 02 Laladon Village, Ciomas District, Bogor Regency in 2019. With the technique of taking The sample in this study using purposive sampling, purposive sampling is a sampling technique with the consideration of the researcher.¹⁴ So that the sample in this study was 32 samples with the division of groups in this study divided into 2 groups, namely intervention and control where each group contained a minimum of 16 samples.

The research variables consist of balance exercise and postural balance. Data processing and data analysis using computer software statistical program for social science (SPSS) version 20. Data analysis with bivariate using the test Independent Sample T-Test and analysis results regarding the effect of balance exercise on postural balance in both groups using the Paired Sample T-Test.

RESEARCH RESULTS

This research was conducted on 20 August to 10 September 2019 to determine the effect of balance exercise on postural balance among the elderly in Ciherang Kidul RW 02 Laladon Village, Ciomas District, Bogor Regency in 2019. With 32 samples of respondents who had been studied.

Table 1 Frequency Distribution of Postural Balance Differences Before and After Balance Exercise in the Elderly Intervention Group

| No | Treatment | N | Mean \pm SD | P |
|----|-------------------------|----|-------------------|-------|
| 1 | Before Balance Exercise | 16 | 40.44 \pm 5.808 | 0.002 |
| 2 | After Balance Exercise | 16 | 47.06 \pm 5,234 | |

Source: Processed primary data

Based on table 1 the difference in the average postural balance before and after the balance exercise in the elderly intervention group in Ciherang Kidul Rw 02, Laladon Village, Ciomas District, Bogor Regency, 2019 shows that the results of the table data above show the average pretest value the postural balance was 40.44 and at the post-test it increased to 47.06, so the increase was 6.62. Based on the results of the t test using the independent sample t test, it is concluded that giving atreatment balanced exercise can improve postural balance with the sig value. 0.002 <0.05. Thus, the results of the t-test show that there is a significant difference in the increase in the average postural balance before and after the balance exercise in the elderly intervention group.

Table 2 Frequency Distribution of Average Postural Balance Before and After Balance Exercise in the Elderly Control Group

| No | Treatment | N | Mean ± SD | P |
|----|-----------------------------------|----|-----------------|-------|
| 1 | Before Balance Exercise (Control) | 16 | 45.88 ± 5.439 | 1,000 |
| 2 | After Balance Exercise (Control) | 16 | 45 , 88 ± 5,439 | |

Source: Processed primary data

Based on table 2, the difference in the average postural balance before and after a balance exercise in the elderly control group in Ciherang Kidul Rw 02, Laladon Village, Ciomas District, Bogor Regency, 2019 above shows no increase or decrease in postural balance because of the average value. - The resulting average is 0 for the two control groups or groups that are not given the treatment balance exercise. From the results of the t test using the independent sample t test, it is concluded that not given atreatment balanced exercise cannot reduce or increase postural balance (p value 1,000 > 0.05). So it can be concluded that the t-test results show no significant difference in the average postural balance before and after balance exercise in the control group at Ciherang Kidul Rw 02 Laladon Village, Ciomas District, Bogor Regency in 2019.

Table 3 Effect of Balance Exercise on Balance Postural in the Intervention Group and the Control Group for the Elderly in Ciherang Kidul Rw 02 Laladon Village, Ciomas District, Bogor Regency, 2019

| No | Group | N | Mean ± SD Pretest | Mean ± SD Post-test | P |
|----|--------------|----|----------------------|------------------------|-------|
| 1 | Intervention | 16 | 40.44 ± 5.808 | 47.06 ± 5,234 | 0.000 |

| | | | | | |
|---|---------|----|---------|-------|---------------|
| 2 | Control | 16 | 45.88 ± | 5.439 | 45.88 ± 5.439 |
|---|---------|----|---------|-------|---------------|

Source: Processed Primary Data

Based on table 3 the effect of balance exercise on postural balance in the intervention group and the control group in the elderly in Ciherang Kidul Rw 02 Laladon Village, Ciomas District, Bogor Regency in 2019, it can be seen that there is a difference between the intervention and control groups. If the research hypothesis is accepted if the actual probability value is smaller than the required probability (0.05). Based on the t-test analysis, after being tested using the paired sample t test, the p-value = 0.000, which means ρ -value <0.05. So that the decision taken is H_a accepted and H_0 rejected, meaning that there is an effect of balance exercise on postural balance in the elderly in Ciherang Kidul RW 02 Laladon Village, Ciomas District, Bogor Regency in 2019.

DISCUSSION

- a. The difference in the average postural balance before and after a balance exercise in the elderly intervention group at Ciherang Kidul Rw 02 Laladon Village, Ciomas District, Bogor Regency in 2019

Postural balance is the body's ability to maintain the center of body mass within the limits of stability determined by the base of the support.¹⁵

The balance and gait in the elderly also need to be assessed to determine the risk of falling. The body's ability to maintain coordination in a standing position and to prevent falls depends on the musculoskeletal system. Balance disorders are usually characterized by a unsteady gait.⁶

According to Gunarto (2005), one of the causes of balance disorders in the elderly is muscle weakness in the lower extremities. This weakness of the lower limb muscles can cause postural balance disorders, which can result in sluggishness of movement, short strides, decreased rhythm, the foot cannot tread firmly and tends to look unsteady or late in anticipating disturbances such as slips and trips.¹⁶

One of the solutions to overcome and prevent this balance disorder is an effort to provide exercise, one of which is balance exercise. Nyman (2007) stated that balance exercise is a physical activity that is done to increase the muscle strength of the lower limbs.¹¹

In addition, it also supports Richardson's statement in Dharmmika (2005) which states that postural balance exercises with increased muscle strength can be carried out for 3 weeks and there are variations in the improvement of postural balance in each elderly person after the intervention balance exercise. This can be because each elderly is different in maximizing every movement in balance exercise, so the muscle strength obtained is different and in the end the postural balance is different.¹⁶

Based on table 1, the difference in the average postural balance before and after the balance exercise in the elderly intervention group at Ciherang Kidul Rw 02, Laladon Village, Ciomas District, Bogor Regency in 2019 shows that the results of the table data above show the average postural balance pretest value of 40.44 and at the time of post-test it increased to 47.06, so the increase was 6.62. Based on the results of the t test using the independent sample t test, it is concluded that giving a treatment balanced exercise can improve postural balance with the sig value. $0.002 < 0.05$. Thus, the results of the t-test show that there is a significant difference in the increase in the average postural balance before and after the balance exercise in the elderly intervention group.

This research is in line with the research conducted by Ainun Saleha on "The Effect of Fitness Gymnastics for the Elderly on Postural Balance for the Elderly at the Karang Werdha Keramat Jaya Home, Summersari District, Jember Regency in 2016" The research design used in this study was pre-experimental with one group pre-test and post-test design. The sample in this study were 27 elderly who had met the inclusion criteria of the researcher. The sampling technique used nonprobability sampling with purposive sampling type. Analysis of data of wicoxon test ($p < 0.05$). The results of this study the average postural balance of the elderly in the pre-test of the elderly had sufficient postural balance as many as 23 elderly (85.2%), poor postural balance were 3 elderly (11.1%), and good postural balance was 1 elderly (3.7 %) and post-test elderly had adequate postural balance as many as 16 elderly (59.3%), good postural balance increased by 11 elderly (40.7%), and none of the elderly had poor postural balance (0%). So, in this study, there is an effect of Gymnastics for the elderly on postural balance in the elderly with a significance value ($p = 0.000$).

From the description above, it can be concluded that there is harmony between the theory and the results of the study, because the provision of interventions balance exercise can increase body stability by increasing the strength of the lower extremity muscles. So that there is a significant difference between the average postural balance before and after the balance exercise in the elderly intervention group.

- b. The difference in the average postural balance before and after a balance exercise in the elderly control group in Ciherang Kidul Rw 02, Laladon Village, Ciomas District, Bogor Regency in 2019

Balance exercise is a series of movements designed to improve postural balance, both for static balance and dynamic balance. When this series of movements is carried out there is a process in the brain, which is called central compensation, in which the brain will try to adjust any signal changes as a result of this series of movements to adapt.¹⁶

The theory put forward by the American College of Sport Medicine, exercise that can increase muscle strength which in turn will improve postural balance in the elderly can be done 3-4 weeks of exercise with a frequency of 3 times a week.¹⁶

In accordance with the theory put forward by Nyman (2007) that exercise (balance exercise) can cause muscle contraction.

Based on table 2, the difference in the average postural balance before and after the balance exercise in the elderly control group at Ciherang Kidul Rw 02, Laladon Village, Ciomas District, Bogor Regency, 2019 above shows no increase or decrease in postural balance because the resulting average value is 0 against both the control group or the group that was not given atreatment balanced exercise. From the results of the t test using the independent sample t test, it is concluded that not given atreatment balanced exercise can not improve postural balance (p value $1,000 > 0.05$). So it can be concluded that the t-test results show no significant difference in the average postural balance before and after the balance exercise in the control group at Ciherang Kidul Rw 02 Laladon Village, Ciomas District, Bogor Regency in 2019.

This research is in line with the research conducted. Anita Dyah Listyarini about "The Effect of Balance Exercise on the Body Balance of the Elderly in Singocandi Village, Kudus Regency in 2018" This type of research is Experiment Research with the design of One Group Pretest-Posttest With Control Design. The number of samples of 70 respondents with 35 samples of the intervention group and 35 samples of the control group, the sampling used the total sampling technique according to the inclusion and exclusion criteria. The analysis of this study used the Wilcoxon test. The results showed that there was an effect of balance exercise on the body balance of the elderly in the experimental group and no effect on body balance in the non-experimental group because the non-experimental group was not given intervention with p value the experimental group's= 0.000 ($P < 0.05$) and the group non-experimental p -value 0.317 ($P > 0.05$).

From the description above, it can be concluded that there is an agreement between the theory and the results of the study, because there is no significant difference between the average postural balance before and after the balance exercise in the control group. This is because the absence of balance exercise does not make a difference to improve postural balance.

c. Effect of balance exercises on postural balance in the intervention group and the control group in the elderly in Ciherang Kidul RW 02, Village Laladon District of Ciomas Bogor District 2019

Balance (balance) is the ability to maintain the nervous system the muscle is in a position or attitude efficient while we move.¹⁷

Balance disorders in the elderly are closely related to the risk of falling, the appearance of balance disorders in the elderly is caused by degenerative processes

and decreased sensory function (vestibular, proprioceptive, visual) and musculoskeletal (strength of muscles, joints, soft tissue) which will affect the body's center of gravity on spilled field.⁹ This decrease in function causes a decrease in the ability to maintain postural balance or body balance in the elderly.¹⁰

As for the balance problem of the elderly, it will affect the decrease in daily activities, the risk of the elderly falling, and not doing enough activities so that it directly affects social activities or work and results in a reduced level of self-confidence in the elderly.⁹

From the problems that arise in the elderly, one form of exercise intervention related to the balance of the elderly is to provide regular and directed exercises to improve balance, one of which is balance exercise.¹⁰

Balance exercise is a physical activity carried out to increase body stability by increasing the muscle strength of the lower limbs.¹¹ The increase in muscle strength in the elderly will make the body stronger in supporting the body, so that it will be strong in maintaining its movements. This will make the elderly more postural in balance.¹²

According to Madureira (2006), states that balance training is very effective for improving functional and static balance and mobility of the elderly. This balance exercise will also reduce the frequency of falls in the elderly, if done with an optimal frequency of 2 times a week for 3 weeks. Seeing the above, it is very interesting to find out more about the phenomenon that occurs in the postural balance of the elderly after being given a balance exercise.¹⁸

Based on table 3 the effect of balance exercise on postural balance in the intervention group and the control group in the elderly in Ciherang Kidul Rw 02, Laladon Village, Ciomas District, Bogor Regency in 2019, it can be seen that there is a difference between the intervention and control groups. If the research hypothesis is accepted if the actual probability value is smaller than the required probability (0.05). Based on the t-test analysis, after being tested using the paired sample t test, the p-value = 0.000, which means p -value < 0.05. So that the decision taken is H_a accepted and H_0 rejected, meaning that there is an effect of balance exercise on postural balance in the elderly in Ciherang Kidul RW 02 Laladon Village, Ciomas District, Bogor Regency in 2019.

This research is in line with the research conducted by Wenny Lazdia on "Balance Exercise Against Postural Balance in the Elderly at Pstw Kasih Sayang Ibu Batusangkar in 2014". This research method uses a pre-experimental one group pre-post test design with One Group Pre-Post test Design.. The population and sample of this study were elderly people with postural balance disorders who met the inclusion criteria using purposive sampling technique, namely 41 respondents. From the results of the paired-t test by comparing the Postural Balance before the intervention (pre-

test) and after the intervention (post-test) resulted in $p = 0.000$, meaning that there was a significant difference before and after the balance exercise for 3 weeks where the increase in the balance score where the mean different = 8.171. The results above show that there is an effect of balance exercise on the postural balance of the elderly at PSTW Kasih Sayang Ibu Batusangkar.

From the description above, it can be concluded that there is harmony between the theory and the results of the study, because the provision of interventions is balance exercise basically very influential in improving postural balance and has the effect of increasing muscle strength in the lower extremities because the increase in muscle strength in the elderly will make the elderly's body stronger. In supporting the body, likewise will be firm in maintaining its movements. So that it will make the elderly more balanced in posture.

CONCLUSION

1. The difference in the average postural balance before and after balance exercise in the elderly intervention group. Based on the results of the t-test using the independent sample t test shows that the sig. $0.002 < 0.05$. This means that there is an increase in postural balance after being given a balance exercise of 6.62. Thus, the results of the t-test show that there is a significant difference in the increase in the average postural balance before and after the balance exercise in the elderly intervention group. in Ciherang Kidul RW 02 Laladon Village, Ciomas District, Bogor Regency in 2019.
2. The difference in the average postural balance before and after the carried out balance exercise was in the elderly control group in Ciherang Kidul RW 02 Laladon Village, Ciomas District, Bogor Regency in 2019. Based on the results of the t test using the independent sample t test it concluded that not given a treatment balance exercise could not reduce or improves postural balance (p value $1,000 > 0.05$). So it can be concluded that the results of the t-test show no significant difference in the average postural balance before and after the balance exercise in the elderly control group in Ciherang Kidul RW 02 Laladon Village, Ciomas District, Bogor Regency in 2019.
3. The effect of balance exercise on postural balance in the intervention group and the control group in the elderly in Ciherang Kidul RW 02, Laladon Village, Ciomas District, Bogor Regency in 2019, it can be seen that there is a difference between the intervention and control groups. If the research hypothesis is accepted if the actual probability value is smaller than the required probability (0.05). Based on the t-test analysis, after being tested using the paired samples t test, the p -value = 0.000, which means that p -value < 0.05 . So that the decision taken is H_a accepted and H_0 rejected, meaning that there is an effect of balance

exercise on postural balance in the elderly in Ciherang Kidul RW 02 Laladon Village, Ciomas District, Bogor Regency in 2019.

SUGGESTIONS

1. For Educational Institutions

It is hoped that it can further improve the facilities and infrastructure that support research and it is hoped that the results of this study can add sources of reference and information to female students at STIKes Wijaya Husada Bogor so that they can become a reference for further researchers.

2. For the Nursing Profession

It is hoped that it can provide information through health education and counseling, especially regarding improving postural balance, and providing effective ways to handle it. One of them is with a balance exercise.

3. For the Elderly

It is hoped that with this research, the elderly can practice balance exercise regularly at least 2 times a week with supervision from one of the families. Because balance exercise is done to improve postural balance and give the effect of increasing the strength of the lower limb muscles.

4. For Further Researchers It is

hoped that this research will become a reference material for further research on balance exercise. In addition, it is hoped that the next researchers will increase the number of samples and there is a need for monitoring in carrying out the balance exercise, the exercise time is determined with certainty so that the sample can be monitored to get better results regarding the balance exercise. And it is expected to use a real experimental design (True Experiment) because this design is one of the strongest designs in controlling threats to validity.

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