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The Effect of Gaze Stability Exercise Intervention on Increasing Dynamic Balance in the Elderly

Ratu Karel Lina, Olivia Filziah Ningrum, Erna Sariana, Santa Manurung, Wartonah

Health Polytechnic of Jakarta III, Indonesia

A B S T R A C T

Background: Physiological changes from decreased muscle strength, posture change, somatosensory system (visual, vestibular, proprioception) causes balance disorders in elderly. Gaze stability exercise is a proper exercise since it is based on pathophysiology of elderly imbalance caused by aging of sensory system and skeletal muscle. Objective: to find out the effect of Gaze Stability Exercise Intervention on increasing dynamic balance in elderly. Method: a pre-experimental with one group pre-posttest design. There were 11 elderly as samples selected with purposive sampling technique. Intervention was done twice a week for four weeks with duration of 60 minutes. Dynamic balance measurement used Time Up and Go Test (TUGT). Data analysis used was paired- t test. Result: The average time up and go test before intervention was 17.82 and after invention was 13.82.the result of before and after statistical test showed p value of 0.000 (p<0.05). Conclusion: There is an effect of Gaze Stability Exercise Intervention on increasing dynamic balance in elderly

Keywords: Elderly, Gaze Stability Exercise, Dynamic Balance

INTRODUCTION

Balance is the body's ability to control the body's center of mass 2 (center of mass) or center of gravity (center of gravity) on the fulcrum (base of support). Types of balance are divided into two, namely static and dynamic balance. Dynamic balance is the body's ability to maintain body balance when moving, for example when walking and running. As many as 30% of elderly cases of falling in Indonesia are caused by dynamic balance disorders.[1–3]

One of the conditions and risk factors that can cause dynamic balance disorders are neurological disorders, for example vestibular disorders. Physiotherapy plays a role in improving and maintaining balance for the elderly population. One way that can be done is to use gaze stability exercises. Gaze stability exercise is an adaptive movement based on the ability of the vestibular system to modify the amount of the vestibulo-ocular reflex (VOR) to improve balance, self-confidence and cognitive function. In the elderly, there is a decrease in the vestibulo-ocular reflex (VOR) which can cause loss of balance when standing and walking.[4–7]

Significant changes that occur in the elderly are related to a decrease in the ability of body tissues to function in the physiology of the musculoskeletal system and the neurological system which will cause various overall physical changes in the elderly.[8] This decrease is caused by the number and ability of body cells to decrease with age. This study aims to improve Dynamic Balance in the Elderly.

METHODS AND MATERIALS

The type of research used is pre-experiment. The research design used was one group pretest and posttest. This research was conducted at the TresnaWerdha Social Institution (PSTW) Budi Dharma Bekasi Timur. Research time starts from February to April 2022 which begins with the preparation of research proposals, followed by data collection in March to April 2022.The number of samples in this study was calculated using the Lameshow formula and the results were 11 people. With a frequency of exercise 2 times a week for 4 weeks with a duration of 60 minutes.

The sampling technique in this study used purposive sampling. Where the sampling was based on certain inclusion criteria made by the researcher, with criteria

including: Male and female gender aged 60-74 years; having a time upmand go test result of ≥ 14 seconds; cooperative in carrying out instructions given by researchers; willing to be a respondent during the research carried out with

intervention treatment, able to see and hear. This research was approved by the Research Ethics Commission of Semarang State UniversityNo. 143/KEPK/EC/2022.

RESULTS

Table 1: Characteristics of respondents

Characteristics	Frequency	%
Age		
62-66	3	27.3
67-70	2	18.2
71-74	6	54.5
Gender		
Male	4	36.4
Female	7	63.6

Table 1 shows that the age range, the highest number of samples was aged 71-74 years, namely 6 people with a percentage of 54.5% of the total sample, namely 11 people.

There were more male respondents than female respondents. The number of male respondents is 63.6% and the number of female respondents is 36.4%

Table 2: Results of Dynamic balance measurement used Time Up and Go Test (TUGT)

Dynamic balance measurement	Mean	SD	Min – Max	95% CI
Pre-test	17.82	2.926	14-24	12.35-15.28
Post-test	13.82	2.183	10-17	12.35-15.28

Table 2 shows that the results of the average score before and after the intervention in the 11 samples and the value of the difference between the two, namely the average score before being given the intervention was 17.82 and after being given the intervention was 13.82. The standard deviation value also showed an increase before being given an intervention of 2.926 and after being given an

intervention to 2.183. the highest TUGT score before being given an intervention was 24 while the lowest TUGT score before being given an intervention was 14 and the highest TUGT score after being given an intervention was 17 while the lowest TUGT score was after being given an intervention of 10 with a confidence value of 95%.

Table 3: Data Normality Before and After Gaze Stability Exercise Intervention

Variable	Mean ± SD	p-value
Pre-test	17.82 ± 2.926	0.138
Post-test	13.82 ± 2.183	0.132

Table 3 shows that the results of the normality test for dynamic balance data as measured using the Time Up and Go Test prior to the intervention had a p-value > 0.05 which is a normal data distribution. The value of the Time Up and Go Test after the intervention has a value of p> 0.05 which

is a normal data distribution. It can be concluded that the p-values for both are > 0.05, which means that all data are normally distributed, so the different test that can be used is the Paired Samples T-Test.

Table 4: Test of Effectiveness Before and After Gaze Stability Exercise Intervention

Variable	Mean ± SD	p-value
Pre-test	4 ± 1.483	0.000
Post-test		

Based on table 4, it shows the average value of changes in the Time Up and Go Test before and after being given the Gaze Stability Exercise intervention with a positive statement which means that there is an increase in the results

of the Time Up and Go Test.The statistical test results obtained a value of 0.000, which means there is a difference between the results of the Time Up and Go Test before and after the Gaze Stability Exercise intervention was given.

Thus it can be concluded that Gaze Stability Exercise has a significant effect on dynamic balance as assessed using the Time Up and Go Test in the elderly.

DISCUSSION

The results of this study indicate changes in balance before the intervention as measured by the Timed Up and Go Test (TUGT) with the lowest value of 14 seconds and the highest value of 24 seconds. The average value before the intervention was 17.82 seconds and a standard deviation of 2.926 seconds, indicating that the respondent experienced a dynamic balance disorder. This is in accordance with research, which stated that several causes of dynamic balance disorders are lack of physical activity, fear of falling which causes the elderly to limit physical and social activities resulting in muscle weakness and imbalance.[9–11]

TUGT results after being given the intervention obtained the lowest value of 10 seconds and the highest value of 17 seconds. The average value of dynamic balance after the intervention was 13.82 seconds, and the standard deviation was 2.183 seconds. The average change in dynamic balance before and after the intervention is 4 seconds. Where the greatest change in dynamic balance occurs in respondents as much as 7 seconds while the smallest occurs in respondents as much as 2 seconds.

Based on statistical tests using the Paired Samples T-Test with a mean of 4 and a standard deviation of 1.483 and a 95% confidence level, a p value of 0.000 <0.05 was obtained which indicated that there was a significant increase in dynamic balance so that it was concluded that there was an effect of Gaze Stability Exercise on increasing dynamic balance in the elderly at the Budi Dharma Social Institution, East Bekasi, in 2022. This is in accordance with research which shows statistically significant differences in the results of dynamic balance because doing this exercise for 4 weeks will make the elderly adapt in focusing on objects and changes in head position, when changes in head position are good it will cause good balance as well, besides that to help improve coordination of head and eye movements.[5] Therefore, the system interacts optimally so as to help maintain body balance by controlling the postural muscles.[12] The limitation in this study is that the researcher cannot control the activities of the respondents before the intervention is carried out which can affect the balance. Respondents' time discipline in carrying out the intervention during the research. There was no control group in this study so it could not distinguish the effect of the intervention on the treatment group and the control group.

CONCLUSION

Based on the results of the study, it can be concluded that there is a significant effect of the gaze stability exercise intervention on the Dynamic Balance of the Elderly which is carried out 8 times in 4 weeks.

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