

ASSESSMENT OF ELDERLY BLOOD PRESSURE WITH BACKWARD TANDEM WALK INTERVENTION

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ABSTRACT

Blood pressure is the impulse generated by the walls of the arteries, which are then pumped from the heart throughout the body. In maintaining balance in the elderly, physical exercise is needed to prevent the risk of falling. One of the exercises that can be done is a balance exercise by using a backward tandem walk. This exercise is intended to improve the lateral part of the postural balance, train the attitude or position of the body, control balance, muscle coordination and body movements of the elderly. This study aimed to analyze the effect of assessing blood pressure in the elderly after and before the backward tandem walk intervention. The design used was the Pre-Experimental with the Pre-Post design approach with a sample of 60 elderly respondents who were taken using a non-probability sampling technique and also a consecutive sampling technique. The independent variable is the backward tandem walk exercise while the dependent variable is blood pressure. Blood pressure measurement using observation sheet pre and post-backwards tandem walk exercise. The data were analyzed and then obtained a p-value of 0.000 (<0.005) meaning that there was a difference in blood pressure before and after treatment. From the mean results, it is known that there is an effect of blood pressure on the elderly. The results of the study imply that the backward tandem walk exercise for the elderly is carried out routinely, especially for the elderly with hypertension.

Keywords: Blood Pressure Assessment, Intervention, Backward Tandem Walk

1. INTRODUCTION

Blood pressure is described as a hemodynamic situation in the elderly. A hemodynamic state is a condition in which blood pressure and flow maintain tissue exchange and perfusion. ⁽¹⁾ Blood pressure is the impulse generated by the walls of the arteries that are pumped from the heart throughout the body. High blood pressure is often referred to as the silent killer, which is a disease that attacks and kills a person regardless of age, whether young or old. ⁽²⁾

Changes in the ageing process can be seen from physical factors such as facial appearance, hair colour, and body shape, whereas cognitive factors such as mental decline and movement also become an important part of the defined criteria for the elderly. ⁽³⁾

There are 30% of elderly aged approximately 65 years who are prone to falling every year. Some of these incidents

have experienced repeated falls. The incidence of falls in the elderly aged 65 years and over each year has caused 1800 deaths in the United States. ⁽⁴⁾

In maintaining balance in the elderly, physical exercise is needed to prevent the risk of falling. One of the exercises that are usually done is the balancing exercise, namely by using a backward tandem walk, to improve the lateral part of the postural balance, train the attitude or position of the body, control balance, muscle coordination and body movements of the elderly.

Time Up and Go Test (TUGT) is a simple test used to assess a person's mobility and requires static and dynamic balance. It aims to assess functional statuses such as mobility, balance, walking ability, and the risk of falling in the elderly.

This screening is intended to test daily activities such as lying to sitting, sitting to lying, sitting to standing, standing, gait,

walking time and the range of steps that will be achieved. ⁽⁵⁾ The Elderly Mobility Scale Score (EMSS) is a screening to monitor mobility problems in the elderly so that steps can be taken to prevent diseases such as osteoporosis, multiple sclerosis, muscular dystrophy and other neurological disorders.

2. RESEARCH RESULT

This research used a post-test-only control group design which used two groups, namely the control group and the intervention group.

This research is aimed to analyze the variable blood pressure assessment with the Time Up Go Test and Elderly Mobility Scale Score as a measurement of blood pressure assessment.

Data collection was carried out on 60 elderly people in nursing homes managed by the Guna Budi Bhakti Foundation. The sampling technique was carried out using consecutive sampling techniques. The research instrument used a demographic data questionnaire and an observation sheet measuring the increase in balance.

The materials and tools prepared include a stethoscope, sphygmomanometer, chair with armrests, stopwatch, floor marker, and observation sheet of pre and post-mobilization ability.

The operational definition of a variable i.e:

1. Blood pressure is a condition that describes diastolic and systolic blood

pressure, which is measured using a sphygmomanometer.

2. Backward Tandem Walk Test is an exercise to walk backwards in a straight line by positioning your right foot backwards with the tips of your toes touching the heel of your left foot and walking 3-6 meters with your hand holding a chair.

3. The Time Up and Go Test is a measuring tool to measure the ability to mobilize by walking a distance of 3 meters towards a wall, and then turning around.

Data collection was carried out by observing the elderly before and after training. After the data was collected, univariate and bivariate data analysis was carried out. Univariate analysis used the proportion of data and bivariate analysis using the chi-square test ($\alpha=0.05$).

3. RESEARCH RESULT

1) Elderly Blood Pressure Before Backward Tandem Walk Intervention

The blood pressure of the elderly in this research was measured before the Backward Tandem Walk was carried out. Measuring tools used are manual sphygmomanometer, stationery and books to record results. The following describes the blood pressure of the elderly before the intervention.

Table 1. Frequency Distribution of Elderly Blood Pressure before Intervention (N=60).

No	Blood Pressure	f	Percentage (%)
1	<130 (Normal)	19	31,7
2	140-159 (TD Low)	33	55
3	160-179 (TD Mild)	8	13,3
	Total	60	100.0

Table 1 showed that the blood pressure of the elderly in the TUGT group before the intervention was mostly mild with a result of 140-159 mmHg in 33 people (55.7%).

The category of normal blood pressure <130 mmHg was 19 people (31.7%). While the blood pressure category was 160-179 mmHg as many as 8 people (13.3%).

2) Elderly Blood Pressure After Backward Tandem Walk Intervention

There are 3 categories of blood pressure measurements after the backward

tandem walk intervention, namely Normal, Mild, and Moderate. The following is data describing blood pressure measurements after performing backward tandem in the TUGT group.

Table 2. Frequency Distribution of Elderly Blood Pressure after Intervention (N=60).

No	Blood Pressure	f	Percentage (%)
1	<130 (Normal)	21	35
2	140-159 (TD Mild)	32	53,3
3	160-179 (TD Moderate)	7	11,7
Total		60	100.0

Table 2 showed that the results of elderly blood pressure measurements after the intervention were mostly mild blood pressure of 140-159 mmHg in 32 people (53.3%). Normal blood pressure category

<130 mmHg in as many as 21 people (35%). While the category of moderate blood pressure is 160-179 as many as 7 people (11.7%).

3) Effect of Elderly Blood Pressure After Backward Tandem Walk Intervention

Table 2. Frequency Distribution of Elderly Blood Pressure After Intervention (N=60).

No	Blood Pressure	Mean	P Value
1	Systole before	144,7	0,000
2	Systole after	136,4	
3	Diastole before	88,6	
4	Diastole after	83	

The results of the Statistical T test obtained a p-value of 0.000 (<0.05) meaning that there was a difference in blood pressure before and after treatment. The mean result was that there was an effect on blood pressure in the elderly after the backward tandem walk intervention.

4. DISCUSSION

1) Elderly Blood Pressure Before Intervention

Blood pressure is the hemodynamic state of the elderly at the time it is measured. Hemodynamics is a picture where the pressure and blood flow can maintain the exchange or perfusion of substances in the tissues. ⁽⁶⁾

The unit for measuring blood pressure is millimetres of mercury (mmHg), which consists of two numbers, namely systolic blood pressure (when the heart contracts) and diastolic blood pressure (when the heart is resting). Systolic blood pressure is the amount of pressure on the walls of the arteries each time the heart contracts or forces blood to leave the heart. While the definition of diastolic pressure is the amount of pressure in the arteries when the heart relaxes. If there is pressure pushing blood through the vessels it is the effect of the pumping action of the heart. When the heart beats, blood is pumped out of the heart, brought into the blood vessels, and circulated throughout the body. To keep the

blood vessels open, a certain amount of pressure is required in the vascular system.⁽⁷⁾

The results of data collection in this research showed that the majority of blood pressure in the elderly was mild with a result of 140-159 mmHg in 33 people (55.7%). The category of normal blood pressure <130 mmHg was 19 people (31.7%). While the blood pressure category was 160-179 mmHg as many as 8 people (13.3%). These data are to the theory stated by the American Heart Association (2017), that adolescents and adults have normal blood pressure ranges, namely systolic blood pressure <120 mmHg and diastolic pressure <80 mmHg. Based on observations, blood pressure in the elderly is influenced by several factors, namely elasticity of the arterial walls, blood volume, and strength of the heart, blood viscosity, cardiac output, and vessel capacity. Berman et al (2016) and Ardiansyah (2012) expressed the opinion that several factors affect blood pressure including age, exercise, stress, race, drugs, obesity, diurnal variations, medical conditions, temperature, genetics and lifestyle.^(9, 10)

High blood pressure in the elderly will result in hypertension. Increasing age in the elderly will have an impact on increasing blood pressure because in old age there is a thickening of the arterial walls, which will result in the accumulation of collagen in the muscle layer, and causes the blood vessels to narrow and become stiff.

The importance of evaluating the factors that affect blood pressure is important from the research results. These factors are age, gender, employment history, level of education, and body mass index. This helps determine the intervention to be given to the elderly who experience increased blood pressure.

2) Elderly Blood Pressure After Intervention

Tandem walking exercise is a test and exercise in which activities take place by walking in a straight line in the position of the heel of the foot touching the other foot 3-6 meters away.⁽¹⁰⁾ This exercise can improve lateral postural balance, which reduces the risk of falling in old age. This exercise also aims to train the proprioceptive system, namely training body posture and position, controlling balance abilities, muscle coordination and body movements. The method used will be able to cultivate habits in controlling body posture, step by step, which is carried out with the help of cognition and coordination of the trunk, lumbar spine, pelvic, hip, and abdominal muscles to the ankles.⁽¹⁰⁾ According to Batson et al (2009) Tandem training consists of 2 forms of exercise, namely Walking Tandem and Backward Tandem walking.

According to Batson et al., 2009, tandem walking exercises can cause disturbances in sensory ataxia conditions. This is due to the reduced:

1. B12 Vitamin (*cobalamin*)
2. Conditions that interfere with the dorsal column of the spinal cord, eg *tabes dorsalis (neurosyphilis)*.
3. Conditions that interfere with the sensory nerves (*sensors peripheral neuropathy*), e.g. *polyradicular neuropathy demielinasi inflamasi kronis (CIDP)*.

Tandem walking is a test and also an exercise that is carried out by walking in a straight line, where the heel of the foot touches the toes of the other for 5-6 meters. This exercise can improve the lateral postural balance, which reduces the risk of falling in the elderly (Azizah N, 2018).

The results of the research showed that the majority of elderly blood pressure measurements after intervention were mild blood pressure 140-159 mmHg in 32 people

(53.3%). Normal blood pressure category <130 mmHg as many as 21 people (35%). While the category of moderate blood pressure 160-179 as many as 7 people (11.7%). At the age of 75-83 years, blood pressure will experience an increase in blood pressure. In the female sex group there is higher blood pressure and are more at risk of developing hypertension than men, due to hormonal problems in women. The hormonal problem that occurs in women is menopause, where this causes hormonal imbalances that trigger hypertension, where in the age range of 45-59 years blood pressure will decrease. This decrease is due to more active movements and more perfect movements. Gymnastics activities performed by the elderly can stimulate increased heart pumping power and stimulate vasodilation of blood vessels so that blood circulation is smooth and blood pressure decreases.

Research conducted by Kristiani & Dewi (2018) obtained a p-value of 0.000 (<0.05) that there were differences in blood pressure before and after exercise and from the mean results there was an effect of exercise on elderly blood pressure.⁽¹³⁾ The results of Regimen and Ansyah's research (2020), obtained a p-value of 0.000 (p value <0.005) obtained that H_a was accepted and H_o was rejected, it can be defined that there is a difference in systolic blood pressure before and after doing gymnastics and we can conclude that there is an influence on elderly gymnastics to changes in blood pressure in elderly hypertensive.⁽¹⁴⁾

The effect of elderly exercise is able to reduce blood pressure and can be seen from the initial and final results of the elderly participating in gymnastics. These results are in accordance with the theory presented by Potter and Perry (2010), that elderly exercise is effective in increasing well-being, lowering blood pressure and heart rate, and reducing symptom pressure in individuals who experience various situations (for example complications from

medical treatment or illness, or bereavement due to lost loved ones).⁽¹⁵⁾

3) Effect of Elderly Blood Pressure After Backward Tandem Walk Intervention

The statistical test results mean systolic blood pressure after 136.4 and diastolic blood pressure after 83.0. The mean statistical test results obtained a p-value of 0.000 (<0.05), which means that there is a difference in blood pressure before and after the intervention. From the mean results, it was concluded that there was an effect of blood pressure on the elderly. From these results, it is important for the elderly to do backward tandem walk physical exercise. The benefits of doing the backward tandem walk exercise are to improve and maintain immunity, heart health, lungs, blood circulation, muscle and joint strength.

Physical activity training is able to have a good impact on the systems that work in the body, such as the cardiovascular system, which when done regularly can reduce systolic and diastolic blood pressure.

The recommended duration of exercise to produce strong mobilization is 4-8 weeks (Batson et al., 2009). If the exercise is done regularly it will gradually have an impact on reducing blood pressure.

4) CONCLUSION

Backward Tandem Walk is an exercise to train the proprioceptive system, namely training body posture and position, controlling balance abilities, muscle coordination and body movements.

By doing this exercise regularly, the muscles and blood circulation will run smoothly, reducing the incidence of blood clots so that the possibility of blockage of blood vessels leading to the heart muscle will be reduced and will lower blood pressure.

Therefore, it is recommended that the elderly do the Backward Tandem Walk exercise every day for at least 10 seconds every day.

5) REFERENCE

- Muhith, A., & Siyoto, S (2016). Pendidikan Keperawatan Gerontik. Yogyakarta: ANDI
- Wulandari, P., Arifianto, & Sekarningrum, D. (2016). Pengaruh Rendam Kaki Menggunakan Air Hangat dengan Campuran Garam dan Serai Terhadap Penurunan Tekanan Darah Pada Penderita Hipertensi di Wilayah Podorejo RW 8 Ngaliyan. Keperawatan
- Guccione et all, 2012. Geriatric Physical Therapy, Missouri. Elsevier.
- Ashar, PH, 2016. Gambaran Persepsi Fakta Resiko Jatuh Lansia di Panti Sosial Tresna Werdha Budi Mulia 4 Margagona Jakarta Selatan. (Skripsi). Jakarta: UIN Syarif Hidayatullah
- Smith. A. D. *et all* (2017) 'Assessment of Risk Of Falls In Elderly Living At Home 1'. Doi: 10.1590/1518-8345.0671.2754
- Muttaqin. (2018). Gizi Usia Lanjut .jakarta: Erlangga
- Sari, N. A., Sarifah, S., Iii, P. D., Pku, K.S., & Surakarta, M. (2016). Senam Aerobic Low Impact Intensitas Sedang Terhadap Perubahan Tekanan Darah Pada Lansia, 13 (2), 50-54.
- Berman, A., Snyder, S., & Frandsen, G. (2016). *Kozier & Erb's Fundamental Of Nursing: Concepts, Practice. and Process.*
- Ardiansyah, M.(2012) . Medikal Bedah Untuk Mahasiswa. Yogyakarta: Diva Press.
- Budhiparama, Nicolaas C. 2021. Pendidikan Interprofesional Gangguan Muskuloskeletal. Surabaya: Universitas Airlangga
- Azizah, N.2018. pengaruh kombinasi core stability exercise dan jalan tandem terhadap tingkat keseimbangan lanjut usia di posyandu lansia desa Junrejo Kota Batu. Diss. University of Muhammadiyah Malang.
- Kristiani, R. B., &Dewi, A.A (2018). Pengaruh Senam Lansia Terhadap Tekanan Darah Pada Hipertensi Di Posyandu Lansia Puntodewo Wilayah Penanggungan RW 05 Surabaya. Adi Husada Nursing Journal, 4(2), 24-28.
- Kristiani, R. B.,& Dewi, A.A (2018). Pengaruh Senam Lansia Terhadap Tekanan Darah Pada Hipertensi Di Posyandu Lansia Puntodewo Wilayah Penanggungan RW 05 Surabaya. Adi Husada Nursing Journal, 4(2), 24-28.
- Rasimen, N. B., & Ansyah, A. (2020). Pengaruh Senam Lansia Terhadap Tekanan Darah pada Lansia Jurnal Pustaka Katulistiwa, 1 (1). <https://doi.org/10.1029/92JB01556>
- Potter dan Perry. (2010). Fundamental of Nursing edisi 7. Jakarta. Salemba Medika