

The Effect Of Physical Training in the Form of Walking on Blood Pressure Reduction and the Quality of Life of the Elderly Living With Hypertension

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Abstract--- This study aims to analyze the effects of physical exercise in the form of walking on systolic blood pressure, diastolic blood pressure and the quality of life of the elderly with hypertension. Hypertension is called a silent killer because the disease causes death. Hypertension affects the quality of life of the elderly in terms of their physical health, psychological condition, social relations and environmental condition. The study design used was quasi-experimental. The sample involved consisted of 27 respondents in the intervention group and 27 respondents in the control group. The independent variable in this study was physical exercise on foot and the dependent variables were blood pressure and quality of life. The instruments used were an aneroid tensimeter, a stethoscope and a questionnaire. Analysis was done using the Wilcoxon Signed Rank Test and the Mann Whitney test with a significance level $\alpha \leq 0.05$. Physical exercise on foot significantly impacted systolic blood pressure ($p = 0,000$), diastolic blood pressure ($p = 0.001$) and quality of life in terms of physical health ($p = 0.014$), psychological condition ($p = 0,000$), social relations ($p = 0,000$) $p = 0,000$) and the environmental conditions ($p = 0,000$). The walking exercise has positive benefits when it comes to overcoming the problem of blood pressure and improving the quality of life of hypertensive patients. For further research, the researchers suggest carrying out physical exercise in the form of walking at different intensities and paying attention to confounding factors for hypertension.

Keywords--- Physical Exercise On Foot; Hypertension; Quality Of Life; Elderly.

I. INTRODUCTION

Hypertension represents a health problem which is experienced by a lot of human beings, especially the elderly. Hypertension is conceived of as a dark murderer (the silent killer) because the disease is not contagious but it can result in death. Hypertension is often considered to be an ordinary problem so the patient will be lose time ignoring it [1]. One of the factors that trigger hypertension is age. Older people tend to have increased systolic blood pressure. This is caused because of the thickening of the venous wall. From the results of the RISKESDAS 2018 in Indonesia, it is indicated that the highest cause of death is due to diseases that are not contagious (PTM) such as cardiovascular disease inclusive of hypertension at

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34.1% [2]. Hypertension can be caused by a poor lifestyle: cigarette smoking, consuming alcohol, low activity, obesity, consuming abundant salt and stress [3]. Hypertension that [is] not controlled in the elderly will be a risk factor for the occurrence of stroke, failure of the heart and coronary disease. The management of Hypertension can be done pharmacologically and non-pharmacologically [4].

Some groups medicine as the first line used for the treatment of hypertension. This comes in the form of diuretics, beta-blockers, Angiotensin-Converting Enzyme (ACEI) resistors, angiotensin receptor (ARB) resistors and calcium antagonists (CCB). The non-pharmacological management of hypertension can be carried out by having a well-balanced diet, through physical activity, having a healthy lifestyle, and good stress management [3].

The non-pharmacological management of hypertension can be carried out by maintain a well-balanced diets, physical activity, having a healthy lifestyle and good stress management. The elderly who are less active physically are at risk of the complications of hypertension. Physical activity can be conducted in the form of aerobics and walking. Walked has a lower risk of injury that aerobics for the elderly. Walking can be done anywhere, at any time and at a very low expense. Walking can reduce the blood pressure, improve and repair the lipid profile, lessen the ratio of body fat, encourage emotional prosperity, lessening pain in the bones and decrease heart sickness [5]. Some research mentions that physical activity is very useful for the treatment of chronic problems such as hypertension. Some of that research results indicate that 32.9% are active elderly individuals and 67.1% are less active physically. The risk in the group that does activities is 0.40 lower times than the group that is less active physically [6]. Previous research (Ohta, 2015) mentions that walking over 4 weeks has the significant result of lowering the systolic and diastolic blood pressure, LDL and triglyceride [7].

According to the WHO, the number of hypertension occurrences will increase to 29.2% in 2025. Out of the 972 million people with hypertension, 333 million reside in developed countries and the rest of the 639 million are residing in developing countries inclusive of Indonesia. Pursuant to the results of the RISKESDAS 2018 survey, the hypertension prevalence in Indonesia is 34.1%. This shows the improvement from 2013 which had a prevalence of 25.8%. According to RISKESDAS 2018, the highest prevalence of hypertension resistance is in the province of South Kalimantan at 44.1%, while East Java resides in sixth equals to 36.3%. The oldest hypertension patient is 75 years old, more women have hypertension by 36.9%, those not in school totaled 51.6% and those not working made up 39.7%. Hypertension prevalence according to the characteristics of old age are 55-64 years old is equal to 55.2%, 65-74 years old is equal to 63.2% and 75 years and above is equal to 69.5% [2].

The quality of life of hypertension patients depends on their blood pressure, organ damage, comorbidity and medication. Elderly hypertension can destroy their vitality, social functioning, immune system, psychological functioning and mood. A lot of hypertension patients complain of a headache, confusion, depression, dread and fatigue. Quality of life covers the physical concept with an 8-item scale: 75.40% refers to physical function, role limitation because of the problems related to physical health makes up 67.10%, body pain 49.30%, functioning 83.14%, immunity 25.80%, role limitations due to emotional problems 33.43%, fatigue 36% and common health perceptions 54.25%. From the research previously found, data on the prevalence of good quality of life among hypertension patients shows that 61.39% have physical problems and 44.54% have immunity problems [8].

Hypertension is reported as being the fourth cause of death in early developed countries and the seventh in developing countries [8]. Hypertension represents a disease that is suffered by a lot of society, especially the elderly. The aging process can result in cardiovascular system changes, including changes in the veins and aorta. The walls of the big veins and aorta

will thicken and the venous elasticity will decrease. The existence of change can increase the systolic blood pressure. Venous elasticity degradation can also cause vascular improvements in terms of peripheral resistance. Baroreceptor sensitivity also changes with age. The effect of the degradation of baroreceptor sensitivity often causes a fluctuation in blood pressure and causes postural hypotension. The fluctuation of the effects of stress and physical activity also become more regular in the elderly. Stiff arteries cause the blood pressure to be measured as higher. According to the SYST-EUR, hypertension symptoms which can include pain in the bones of the hand joint, palpitations, dry eyes, blurry eyesight and nocturia.

Roy's theory of adaptation mentions that regular athletics effectively improve their blood circulation. Walking in the morning can slow down the degeneracy process due to age and also improve the cardiovascular health that ordinarily continues to lessen with age [6]. The physical practice of walking will get the maximum result if all of the elderly suffering from hypertension do so routinely. The lowering of the blood pressure of hypertensive patients, especially the elderly, will positively affect the quality of life of the elderly. This matter can be shown in their physical health, in their social relations with others, and in the supportive environmental condition. In this research, walking conducted at intensity, especially by the elderly aged 60 - 74 years old, was done for 30 minutes, 5 days a week for 4 weeks. The researchers determined that the best duration was 30 minutes to prevent the occurrence of fatigue to minimize the risk factor related to the occurrence of elderly injuries. The researchers used the research place Kendal Ngawi Puskesmas for the reason of there being a high prevalence of hypertension with the number of visits being 70-80 people per month. This study aims to analyze the effect of the physical exercise of walking on systolic and diastolic blood pressure and to see if there is an increase in the quality of life of the elderly with hypertension.

II. METHODS

In this research, the researchers used a quantitative research type, namely quasi-experimental. The population of this research was all of the elderly patients suffering from hypertension (70 - 80 people per month) [in] Puskesmas Kendal Ngawi. The sample in this research relied on meeting the criterion of being elderly, namely being 60 - 74 years old, being able to walk and there being no physical weaknesses. The elderly with hypertension also should not have complications. The sampling technique used was a consecutive sampling technique and the researcher got 54 samples. This meant that the control group had 27 respondents and the treatment group had 27 respondents. The intake of the respondents' data started after receiving ethic approval from KEPK with the number 1798-KEPK. The data intake for the treatment group was 22nd - 25th October 2019 while the data intake data for the control group was 26th - 30th October 2019.

The procedure was conducted for 30 minutes. The time division meant that 5 minutes was used to conduct the warm-up, 20 minutes to conduct the intervention (by foot) and 5 minutes to conduct the cool down 5x / week. The instrument used to assess the therapeutic efficacy was a questionnaire and an observation sheet. The questionnaire was used to assess quality of life and observation sheet was used to collect the data regarding blood pressure and pulse. The analysis of the data was done using the Mann Whitney test with a significant value $<0,05$.

III. RESULTS

The characteristic presented in Table 1 above make it known that most of the hypertension patients were in the age range of 60 - 70 years old (49 people) and thus in the category of early old age, most were women (37 people), most were semi-working as an entrepreneur (18 people) and most were educated to the level of having semi-finished high school (16 people).

Table 1. Respondent characteristics of age, sex, occupation and education

Variable	Category	Group		Total
		Treatment	Control	
Age	60 – 70 years old	26	23	49
	<i>Early old age</i>			
	>70 years old	1	4	5
Gender	<i>Advance old age</i>			
	Male	6	11	17
Profession	Female	21	16	37
	Retired	3	6	9
	Civil servant	1	1	2
	Private	3	5	8
	Farmer	8	4	12
	Does not work	3	2	5
	Entrepreneur	9	9	18
	Diploma	4	8	12
Education	Elementary school	7	6	13
	Middle school	6	10	16
	High school	9	3	12
	No school	1	0	1
	Total	27	27	54

Table 2. The results of the post-test analysis of the blood pressure values and the quality of life of the control and treatment groups.

Group	Control		Treatment		P*
	Mean	Std. Deviation	Mean	Std. Deviation	
Sistol_Post	167.04	12.346	150.19	11.307	0.000
Diastol_Post	99.26	4.744	94.81	5.798	0.003
Domain1_Post	26.93	6.861	33.33	3.363	0.031
Physical health					
Domain2_Post	23.89	4.414	28.78	3.776	0.000
Psychological condition					
Domain3_Post	3.63	5.285	8.52	7.329	0.006
Social relations					
Domain4_Post	32.74	4.950	35.44	3.479	0.033
Environmental condition					

Table 2 shows the value of the respondent's blood pressure after conducting the intervention (post-test) in both the control group and treatment group while the Mann Whitney test obtained the systolic value $p = 0,000$ and diastolic value blood pressure $p = 0,003$. To assess the quality of life after the conducted intervention (post-test), we examined both the control group and the treatment group. We obtained a quality value result for domain 1 (physical health) $p = 0.031$, domain 2 (Psychical condition) $p = 0.000$, domain 3 (social link) $p = 0.006$ and domain 4 (environmental condition) $p = 0.033$. All of the measurements were used to assess blood pressure and quality of life to see if it shows a value of $p = 0.05$.

IV. DISCUSSION

The results of the research concerning blood pressure after the intervention of a walk for 30-minutes showed that most respondents experienced a lessening of their systolic and diastolic blood pressure. This matter is supported by the results of the Mann Whitney test expressing that there is a significant difference between the treatment group and the control group. The result of the Wilcoxon signed-rank test also showed a difference between the pre- and post-test treatment group values.

Changes in physiology in terms of structure and function have cardiovascular effects. This process generates trouble in the cardiovascular organs including the thickening of the aortic wall. The change refers to is atherosclerosis which is a loss of network elasticity and the degradation of the ability to relax and move the vein. This results in venous distension and stretching. The aging process related to the cardiovascular system changes the veins and aorta. The ability of the big arteries and aorta to carrying blood in volume pumped by the heart decreases, resulting in the bulk degradation of the peripheral

heart muscle [4]. The wall of the big veins and aorta thicken while downhill in the system, venous elasticity lessens according to age. This change causes an increase in systolic blood pressure [9]. The increase in diastolic blood pressure [of] in those aged 50 - 60 years old is common[10]. From the data obtained during the research, the elderly with hypertension have a systolic blood pressure above 140 mmHg and a diastolic blood pressure at almost 100 mmHg. This matter is caused by a number of factors that were not detected during this research.

Athletics represents the physical activity that is conducted related to the condition of the body, improving health and maintaining body fitness. Physical activity can also be done as a therapy action. One of the athletic examples as a therapy for patients with hypertension is walking for 20 - 60 minutes at a frequency of 3 - 5 times a week. Athletics can lower their blood pressure because physical activity relaxes the small blood vessel channels [11]. In another research, it mentioned that physical activity can also improve and repair the endothelial-dependent vasodilatation system. This means that physical activity can stimulate the exiting of NO (nitric oxide) from the body. NO is a small reactive molecule, representing a remarkable important bioregulator. NO can cause muscle relaxation so it functions as a regulator of blood pressure and flow. It prevents the aggregation and adhesion of the platelets. NO also assists in oxygen transportation by widening the venous walls [12]. Physical activity represents one of the non-pharmacological approaches to increasing NO bioavailability and improving the functioning of endothelial hypertensive patients [13]. Hypertension patients getting additional therapy in the form of physical exercise training will get more significant results in terms of lowering their blood pressure compared to hypertension patients who only gets the pharmacological therapy.

The results of the research used to assess the quality of life after the given intervention of a walk for 30 minutes showed that all of the respondents experienced an increase in all of the domains. This matter is supported by the results of the Mann Whitney test expressing that there is a significant difference between the treatment group and the control group. The Wilcoxon signed-rank test also shows that there is a significant difference between the values of the pre- and post-group intervention.

According to the WHO, quality of life is the individual perception of their physical health, psychological status, degree of independence, social relations, personal confidence and their relations in society. In general, older people who are more than 60 years old will change either psychosocially or physiologically. The physical condition of progressively getting old will continue to make them feel like life is meaningless and hopeless [14]. Obtaining an optimum level of physical activity among the elderly is very important in the form of athletic routines according to ability. High-level physical activities are proven to relate to health and a better life quality, a lower solitude score and being more active in terms of social activity participation. Higher-level activity also relates to the time taken to sit being lower which shows a higher-level clutch strength, lowering the potential for disability later on in life. This is in addition to lowered IMT, lowering the feeling of dread and better cognitive abilities [3]. Physical activity is recommended by the WHO and it aims to repair cardiorespiratory health, increase muscle fitness and bone health, and lessen the disease risk. The likelihood of depression is also lowered by doing the following: (1) physical activity at a medium level for 150 minutes a week or a high level of physical activity 75 minutes a week, (2) physical activity for a minimum duration of 10 minutes, (3) [redacted] and (4) adding to their muscle strength which can be done by stretching the muscles 2 days or more a week. Regular physical activity is also proven to be able to maintain or even improve and repair the cognitive functioning of all elderly individuals.

Hypertension represents a chronic disease requiring sufficient medication. It can affect the psychology of the patient. The psychological impact includes the existence of dread, hopelessness and dissatisfaction with oneself. The physical practice of walking in the house can generate the effect of relaxation and have a recreational value for the elderly with hypertension. Walks are able to lessen the sense of dread. Most of the more reflective respondents in this research had a high school level of education. Education can form emotional intelligence. Someone with high emotional intelligence will be able to get a grip when it comes to managing their emotions, self-motivation and instructing themselves to be more active. If the

level of emotional intelligence is low, then the person will become quickly become worried, stand apart, not feel loved, feel sorrowful and they will tend to be easily diagnosed with depression. Stress can influence getting satisfaction in life.

The elderly with hypertension will tend not to feel loved, so they need the existence of support from their family and friends as well as the environment. The support that can be given can come in the form of motivation and support to allow them to be able to overcome their problems. The environmental domain also has a value related to the quality of life of the elderly. According to Hilleson's research (2010) about the environmental factors influencing quality to life, this can include satisfaction related to the nursing provided. A related / relevant place and the type and availability of the health services in addition to the patient's involvement in the social environment can improve their life quality. In this research, most of the respondents work as an entrepreneur and they are able to fulfill their personal requirements. This means that their health requirements will also need to be fulfilled. The availability of new information and health services also had a positive impact on the quality of life of the elderly.

Hypertension patients getting additional physical therapy in the form of a walk for 30 minutes showed a result that is significant when it comes to increasing their quality of life compared to the patients with hypertension who only got the pharmacological therapy. Previous research also shows that athletic walking can improve cardiovascular health [5].

V. CONCLUSION

The elderly with hypertension were given an intervention in the form of a walk for 30 minutes 5x per week for 4 weeks. This has a significant influence when it comes to lowering blood pressure and improving quality of life.

For the elderly suffering from hypertension, they can physically walk for 30 minutes according to the SOP. Future researchers should be able to conduct further studies related to the same intervention at the different intensities while paying attention to the presence of confounding factors.

CONFLICT OF INTEREST

None.

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