



The Effect of Walking Exercise on Blood Pressure in The Elderly With Hypertension in Mulyoharjo Community Health Center Pemalang

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Abstract

The prevalence of hypertension in Indonesia at the age of 18 is 34.1%, lower than that of in Central Java, which is 38.4%. One of the causes of hypertension is lack of physical activities. One of the physical activities that can reduce hypertension is walking. This study aims at determining the effect of walking exercise on blood pressure in the elderly with hypertension of obesity nutritional status. This study used a control group time series design involving 10 samples consisting of 5 respondents with hypertension of normal nutritional status and 5 respondents with hypertension of obesity nutritional status. The results of this study showed that the blood pressure of the elderly with hypertension before doing walking exercise was 152.20 / 95.80 mmHg and after doing walking exercise was 147.60 / 93.60 mmHg in average. Walking exercise decreases blood pressure in the elderly with hypertension of obesity nutritional status. The results of the study can be regarded as a consideration in taking community health program policy for the elderly with hypertension on the effectiveness of walking exercise as one of the means in reducing blood pressure.

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INTRODUCTION

WHO states that about 1.13 billion people in the world suffer from hypertension. It means that 1 from 3 people in the world is diagnosed as having hypertension, and only 36.8% of them are taking medication. Hypertension has led to death of 8 million people every year, and 1.5 million of which comes from countries in Southeast Asia. The prevalence of hypertension globally is 42% (WHO, 2018).

The largest proportion of the whole Communicable Diseases (PTM), which reportedly still occupied by hypertension, is 57.87%. The prevalence of hypertension in Indonesia which is obtained by measuring people at the age of ≥ 18 is 34.1%. The prevalence of hypertension in the elderly in Indonesia showed 45.9% for those aged 55-64, 57.6% for those aged 65-74, and 63.8% for those aged > 75 years (Risksedas, 2018).

The prevalence of hypertension in Central Java province is 38.4%. The prevalence of hypertension in the elderly in Central Java is 58.84% for those aged 55-64, 61.6% for those aged 65-74, and 65.5% for those aged > 75 . The prevalence of hypertension in Central Java is considered greater than that of in Indonesia (Risksedas, 2018).

Based on the data published by Public Health Office of Central Java, hypertension as a chronic disease is caused by various risk factors. The factors of hypertension fall into modifiable risk factors and unmodifiable risk factors. Examples of risk factors that cannot be modified such are heredity, gender, race, and age. Meanwhile, examples of modifiable risk factors are obesity, lack of exercises or activities, smoking, alcoholism, stress, and diet (Hafiz, 2016).

Changes in blood pressure that occur in the elderly are due to structural and functional changes in the peripheral vascular system (Rohaendi, 2008). Lack of exercise can lead to buildup of cholesterol, especially LDL (low density lipoprotein) in the arterial wall. The

entry of lipoproteins into the inner lining of blood vessel walls increases as high blood pressure and increased permeability of blood vessel walls, malfunctioning of the blood vessel wall lining this be the beginning of a process atherosclerosis (Dede, 2003). The influence of regular exercises on the metabolism of the body's cells is going on efficient use of oxygen in muscle metabolism corrected so that the heart and hypertension also decreases (Soeharto, 2008).

Lack of physical activity increases the risk of suffering from hypertension as it increases the risk of being overweight. People who do not actively exercise also tend to have higher heart rate so that the heart muscles have to work harder in each contraction. The harder and more often the heart muscles pump, the greater the pressure imposed on the arteries (Sugiharto, 2007).

Obesity is closely associated with indulgence foods containing high fat. Obesity increases the risk of hypertension for several reasons. The larger the body mass, the more blood is needed to supply oxygen and nourishment to the body's tissues. This means that the volume of blood circulating through the blood vessel increases so that it puts a greater pressure on the artery walls. Weight and Body Mass Index (BMI) is directly correlated with blood pressure, especially systolic blood pressure. The relative risk of hypertension for people with obesity is 5 times higher compared to those with normal weight. It was found out that 20-30% hypertension patients 20-30% were overweight (Sugiharto, 2007).

To the same extent with the research conducted by Kornelia and Dida in 2012, it was stated that the obesity risk of hypertension was OR = 4.02 times compared to the people without obesity (Kornelia & Dida, 2012).

Based on the health profile of Central Java (2018), the average percentage of hypertension at age ≥ 15 reached 17.74%, in

which the highest number was in Wonosobo regency (42.82%), and the lowest was in Pati district (4.50%). From 36 districts/ cities in Central Java, Pemalang is in 11th position with the average number of hypertension patients 29.28%, which is considered as relatively high cluster.

The percentage of obesity at the age >15 s in Central Java (2018) in average is 28.97%, in which the highest rate is in Salatiga (71.18%) and the lowest one is in Pati district (4.47%). Pemalang is in the middle position, 18th from the total 36 districts/ cities, with rate of 39.87%. It means Pemalang is considered representative enough to be used as an object in this study. According to the data from Pemalang District Public Health Office in 2018, hypertension is included as 10 biggest Communicable Diseases in Pemalang. The population aged over 18 years who do blood pressure checks and as many as 813.657 people who have hypertension as many as 27.942 people or 5.61%. (Pemalang District Health Office, 2018). These conditions still has not come into a solution, especially by promoting walking exercise among patients with obesity and hypertension by Pemalang District Health Office in an effort to improve the quality of their health. The aim of this study is to determine the effect of walking exercise on

blood pressure in the elderly with hypertension of obesity nutritional status.

METHOD

This study is a quantitative research with quasi-experimental research design (quasi-experimental). The population in this study were the elderly with hypertension in Mulyoharjo Community Health Center Pemalang in July 2018, involving 32 people. Samples were taken by using incidental purposive sampling. 10 respondents were taken then divided into two groups: 5 respondents with hypertension and obesity and 5 respondents with normal nutritional status. This research used parametric analyze technic (Paired T- test) to examine differences in systolic and diastolic blood pressure before and after doing walking exercise and used independent t-test analyze to determine the effect of walking exercise on blood pressure in the elderly with hypertension and obesity nutritional status.

RESULTS AND DISCUSSION

Characteristics of Respondents

Table 1. Frequency Distribution of Respondent Characteristics in Mulyoharjo Community Health Center, Pemalang

Characteristics	Nutritional status				Total		*P Value
	Obesity		Normal		n	%	
	n	%	n	%			
Age							0.777
60-63 years	0	0.0	1	10.0	1	10.0	
64-67 years	4	40.0	3	30.0	7	70.0	
68-71 years	1	10.0	1	10.0	2	20.0	
Gender							1.000
Man	2	20.0	2	20.0	4	40.0	
Woman	3	30.0	3	30.0	6	60.0	
Total	5	50.0	5	50.0	10	100.0	

Table 1 shows that the experimental group (obesity nutritional status) mostly

consists of the elderly aged 64-67 as many as 4 respondents (40.0%), and the control group

(normal nutritional status) mostly consists of the elderly aged 64-67 also as much as 3 respondents (30.0%) with p value 0.777 (> 0.05), meaning that there are no significant differences in age of the respondents between experimental and control groups.

The frequency distribution by gender between the experimental and control groups is

dominated by female with the same number as many as three respondents (30.0%) with p value 1.000 (> 0.05), meaning that there are no significant differences by gender among the experimental group and control.

Blood pressure

Table 2. Systolic and Diastolic Blood Pressure before Doing Exercise Walking

Variables	Experiment				Control			
	Mean	STD	Min	Max	Mean	STD	Min	Max
Systolic blood pressure in mmHg (Pre)	152.2	1.304	151	154	151.0	0.707	150	152
Diastolic blood pressure in mmHg (Pre)	95.80	0.837	95	97	94.40	0.894	93	95

Table 2 shows that blood pressure before doing walking exercise in the elderly in Puskesmas Mulyoharjo Pematang in the experimental group was in average 152.20/ 95.80 mmHg while in the control group is

151.00 / 94.40 mmHg. This suggests that blood pressure before doing walking exercise in the control group was lower than the experimental group.

Table 3. Systolic and Diastolic Blood Pressure after Doing Walking Exercise

Variables	Experiment				Control			
	Mean	STD	Min	Max	Mean	STD	Min	Max
Systolic blood pressure (Post)	147.60	0.548	147	148	150.00	1.000	149	151
Diastolic blood pressure (Post)	93.60	1.342	92	95	94.20	0.837	93	95

Table 3 shows that blood pressure after doing walking exercise in the elderly in the experimental group in average was 147.60/ 93.60 mmHg while in the control group

average was 150.00/ 94.20 mmHg. This suggests that blood pressure after doing walking exercise in the control group was higher than the experimental group.

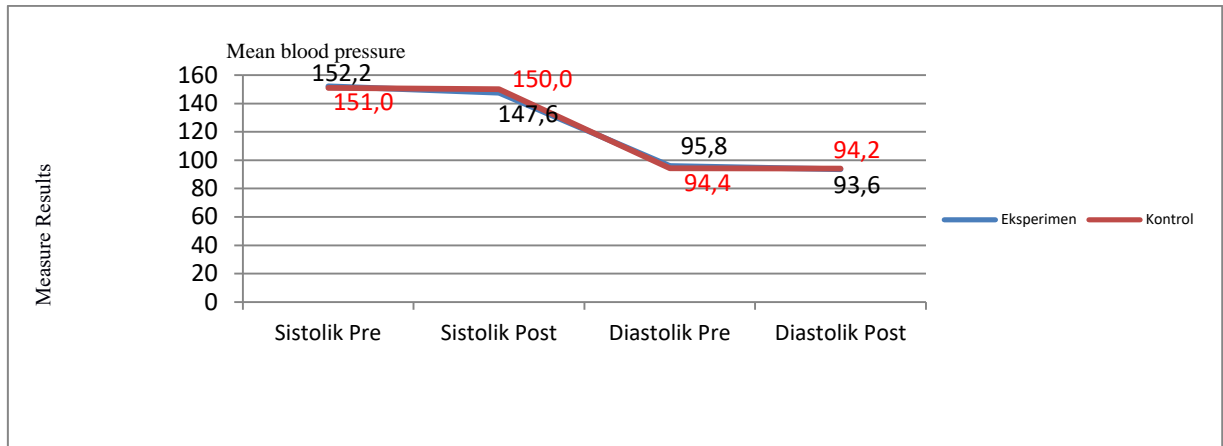


Figure 1. Overview difference in the average systolic and diastolic blood pressure before and after walking.

Figure 1 shows decline in systolic and diastolic blood pressure before and after

walking. The decrease is more common in the experimental group.

Normality test

Table 4. Data Normality Test Results

Normality test	statistical	standard Error	Sig
systolic			
Pre Test Score			0.108
<i>mean</i>	151.60	0.371	
<i>skewness</i>	0.989	0.687	
Post Test Scores			0.225
<i>mean</i>	148.80	0.467	
<i>skewness</i>	0.425	0.687	
diastolic			
Pre Test Score			0.359
<i>mean</i>	95.10	0.348	
<i>skewness</i>	-0.238	0.687	
Post Test Scores			0.067
<i>mean</i>	93.90	0.348	
<i>skewness</i>	-0.388	0.687	

Table 4 shows that the normality test results obtained value of systolic pre test significance 0.108 ($p > 0.05$), systolic significance post test value of 0.225 ($p > 0.05$),

diastolic pre test significance value 0.359 ($p > 0.05$) and significance post test 0.0673 diastolic ($p > 0.05$), so that the otherwise normal distribution of data.

Homogeneity Test Two Variances

Table 5. Test Homogeneity of Two Variances
Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Systolic (Pre)	3.160	1	8	0.113
Diastolic (Pre)	0.094	1	8	0.767
Systolic (Post)	2.415	1	8	0.159
Diastolic (Post)	2.743	1	8	0.136

The output homogeneity of variance test for significance values greater than 0.05, it can be concluded that in the control group and the

experimental group derived from populations that have the same variance, or the two groups were homogeneous.

Table 6. Differences in blood pressure before and after exercise walking

Variabel	Experiment (Obesity)	Control (Normal)	t	df	Sig.
	Mean ± SD	Mean ± SD			
Systolic blood pressure (Pre)	152.20 ± 1.304	151.00 ± 0,707	3.772	9	0.004
Systolic blood pressure (Post)	147.60 ± 0.548	150.00 ± 1.000			
Diastolic blood pressure (Pre)	95.80 ± 0.837	94.40 ± 0.894	3.087	9	0.013
Diastolic blood pressure (Post)	93.60 ± 1.342	94.20 ± 0.837			
Systolic difference	4.6 ± 0.756	1 ± 0.293			
Diastolic difference	2.2 ± 0.505	0.2 ± 0.057			

There is the influence of systolic blood pressure before and after exercise walking to the significant value of 0.004 and there are

significant diastolic blood pressure before and after exercise walking to the significant value of 0.013.

Table 7. Effects of walking exercise on blood pressure in elderly hypertensive levels of obesity nutritional status
Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		95% Confidence Interval of the Difference				
		F	Sig.	t	Df	Sig. (2-tailed)	(2-Mean Difference)	Std. Error Difference	Lower	Upper
Systolic	Equal variances assumed	.034	.858	-3.882	8	.005	-3.600	.927	-5.739	-1.461
	Equal variances not assumed			-3.882	7.961	.005	-3.600	.927	-5.740	-1.460
Diastolic	Equal variances assumed	1.969	.198	-4.714	8	.002	-2.000	.424	-2.978	-1.022
	Equal variances not assumed			-4.714	6.113	.003	-2.000	.424	-3.033	-.967

Table 7 shows that the value of significance (sig.2-tailed) with independent t-

test test is 0.05 systolic and diastolic 0.02. Because the probability value is less than 0.05,

Ha is received, meaning there is significant influence between exercise walking towards blood pressure in the elderly hypertensive levels of obesity nutritional status

Effect of walking exercise on blood pressure in elderly hypertensive levels of obesity nutritional status

The results showed that there is an effect of walking exercise on blood pressure in elderly with hypertension and obesity nutritional status. This happens because after doing walking exercise, systolic and diastolic blood pressure decreases. Decrease in blood pressure occurs more frequently in the elderly with hypertension and obesity nutritional status.

Physical activity brisk walking regularly will reduce blood pressure. According Sharkley (2011), it was found that regular activity can reduce blood pressure in old age. Recent studies show that regular activity can help maintain the elasticity of blood vessels. In addition, regular physical activity leads our body to properly distribute blood to muscles during walking. Therefore, it further reduces the heart's workload. This change serves to lower the heart rate and blood pressure during physical activity because heart muscle's needs on oxygen is related to heart rate and blood pressure.

The results are interrelated with the research carried out by Syatria (2016), which states that programmed exercise affects blood pressure reduction. The study explains that physical exercise will give a good effect against a wide range of systems that work in the body, one of which is the cardiovascular system in which the physical exercise properly and regularly will occur efficiency of the heart. Efficiency of the heart or the heart's capacity will be increased in accordance with the changes that occur. A decrease in blood pressure can also be resulted from reduced heart pumping activity. Heart muscles in people who exercise regularly are very strong, then the individual heart muscle to contract less than the cardiac muscle of individuals who

rarely exercise to pump the same volume of blood. Because exercise can lead to a decrease in heart rate, it will lower cardiac output, which in turn causes a decrease in blood pressure. Increased efficiency of the heart is reflected by a decrease in systolic pressure while a decrease in peripheral resistance is reflected by the drop in pressure Diastole. The research results show that there is a decrease in systolic significantly after doing exercise programmed (Syatria, 2016).

Another study that is related is Convention (2016) which states that exercise affects the reduction of blood pressure in patients with hypertension. The study shows that a given intervention program is gymnastics healthy heart. Gymnastics healthy heart is a mild aerobic exercise in a relatively short time. Results from these studies show that the results of the multivariate analysis, the factors that influence the decrease in systolic and diastolic blood pressure in hypertensive patients is to exercise with a healthy heart gymnastics regularly and measurable.

Walking exercise is very influential on the decrease in blood pressure. Besides, walking can also reduce the risk of heart disease. The heart muscle requires more blood flow freely (of the coronary arteries that provide supply) to fit and function normally without stopping the blood pumping. To that end, the heart muscle needs harder and smoother bloods. Walking hurriedly raises bloodstream into the heart. Thus, oxygen in the heart muscle is sufficient, and heart muscle can stay awake for quite a beat. Not only that, the flexibility of the arteries body of trained and will be helped by mengejangnya floating body muscles located around the walls of blood vessels while engaged in activities on foot rushed it. In the end, blood pressure tends to be lower, adhesions between blood cells that can result in clots of blood clots and blood vessel blockages will decrease (Kusuma, 2016).

Inggita Kusumastuty research results (2016) show that most patients have never exercise habits (43%). People with low exercise habits are more at risk of developing

hypertension. It shows that the respondents were less in sports activities or not ideal (<3 times a week and <30 minutes) at risk of developing hypertension by 4.73 times compared to people who are active in sports. This shows that there is a significant relationship between physical activity with hypertension.

Obesity is a risk factor of hypertension. In obese or normal peripheral resistance decreased while the elevated sympathetic nerve activity with low plasma renin activity. Obesity increases the risk of hypertension for several reasons. The larger the body mass, the more blood is needed to supply oxygen and nourishment to the body's tissues. This means that the volume of blood circulating through the blood vessel to be increased so that puts a greater emphasis on the artery walls. Being overweight also increases heart rate and blood insulin levels. Increased insulin causes the body to retain sodium and water (Yundini, 2006).

According to Dalimartha et al. (2008), treatment of hypertension can be done with non-pharmacological treatment, including changing unhealthy lifestyle. Adopting a healthy lifestyle for everyone is very important to prevent high blood pressure and is an important part in the treatment of hypertension (Directorate General of Pharmaceutical and Medical Devices, 2006). Non-pharmacological management of hypertension is carried out either by increasing exercise and physical activity such as walking. It is recommended to exercise regularly, at least 3 times a week, thereby lowering blood pressure even though weight is not necessarily down (Nurkhalida, 2003). Exercise can induce a feeling of relaxed and reduce weight so that it can lower blood pressure (Gunawan, 2005).

Results of the research according to research conducted by Saputro (2015) which states that there is a leisurely stroll effect on blood pressure in pre elderly Posyandu Elderly Sejahtera Abadi IX Candi Baru Semarang. Surbakti's research results (2014) states that a 30-minute walk exercise leads to the decrease in diastolic blood pressure in hypertension

patients at the General Hospital of Kabanjahe. Research conducted by Larasiska (2017) states that the foot affect changes in blood pressure (down) in the elderly with hypertension. Research conducted by Sari (2018) states that there is an influence of physical activity on the level of the early morning hypertension elderly Posyandu Elderly Hamlet Blue Trihanggo Gamping Sleman.

The results showed that after doing walking exercise, systolic and diastolic blood pressure decreased. There were significant differences in blood pressure before and after walking. There are differences in the normal nutritional status and obesity on the reduction of blood pressure in the elderly with hypertension. Walking exercise done by older people with hypertension is more effective in decreasing blood pressure than normal elderly.

CONCLUSION

Respondents are in average 65.5 years-old, with a standard deviation of 1.767. The youngest respondent was 63 years-old and the oldest one was 68 years-old. The elderly with hypertension were female as many as 6 respondents (60.0%) while the male respondent as many as 4 respondents (40.0%). The nutritional status of elderly with hypertension off normal category was 5 respondents (50.0%), and obesity as many as 5 respondents (50.0%). The blood pressure of elderly hypertensive prior to walking exercise in the experimental group in average is 152.20/ 95.80 mmHg and after doing walking exercise decreased into 147.60/ 93.60 mmHg. The blood pressure of elderly hypertensive prior to walking exercise in the control group average of 151.00/ 94.40 mmHg and after doing walking exercise declined into 150.00/ 94.20 mmHg. There are significant differences in blood pressure before and after walking. There is a walking exercise influence on blood pressure in elderly hypertensive levels of obesity nutritional status.

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