

## Change of Blood Pressure and Headache in People with Hypertension Using Relaxation of Handgrip and Classical Music in Dr. M. Haulussy Hospital Ambon

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### **Abstract**

*The purpose of this study IS to determine effectiveness of handgrip relaxation and classical music in lowering blood pressure and headache in people with hypertension. The present Non-randomized design uses quasi experimental control group (nonrandomized control group pretest-posttest design). This research was conducted in Dr. M. Haulussy Hospital, Ambon with research population is people with hypertension recorded in Dr. M. Haulussy Hospital, Ambon, with 4 groups respectively, 7 respondents were experimental group of relaxation handgrip, 7 respondents were classical music group, 7 respondents were handgrip relaxation group and classical music, and 7 respondents were control group. Sampling method was carried out by using consecutive sampling. Blood pressure measurement instruments are calibrated mercury sphygmometer and pain levels using numerical rating scale (NRS). The analysis used is t test. The result indicate that 3<sup>rd</sup> day systolic rate decrease is the highest in relaxation handgrip group with significance value of 0.003 (<0.05), and 3<sup>rd</sup> day diastolic day with significance value of 0.014 (<0.05), pain level decreased on the 1st day with significance of 0.001 (<0.05).*

**Keywords:** Handgrip relaxation, Classical music, Blood pressure, Headache.

### **I. INTRODUCTION**

Hypertension is a condition in which nearly one-third of the world's population is the major cause of mortality and morbidity. Hypertension is not only "ordinary cardiovascular disease", it can damage some organs such as the kidneys and other organs. Many hypertensive patients are unaware of hypertension as hypertensive symptoms are asymptomatic to cause prolonged effects with emergence of complicated diseases such as stroke, IMA, renal dysfunction, visual impairment) (Klabunde, 2015).

World Health Organization (WHO) in 2012 recorded the number of cases of hypertension reaching 839 million cases. It is estimated that the figure will be 1.15 billion in 2025 or 29% of the total world population. Hypertensive more common occur in women by about 30% and in men is 29%, and the number of cases will increase approximately 80% of cases, especially in developing countries (Triyanto, 2015).

Prevalence of hypertension in population is over 18 years and above in Indonesia in 2013 based on health personnel diagnosis by 9.4% and blood pressure measurement is 25.8%. Based on the diagnosis of health workers, the highest prevalence was found in the Bangka Belitung Islands Province by 30.9% and the lowest prevalence based on diagnosis of health personnel and measurement is in Papua Province by 16.8%. Hypertension is one of risk factors for cardiovascular disease. Provinces of Sulawesi and Kalimantan are provinces with sufficient hypertension prevalence. Hypertension is the third cause of death after stroke and tuberculosis, the number reached 6.8% of the causes of death at all ages in Indonesia (Pusdatin Kemenkes RI, 2013).

Prevalence of hypertension patient in RSUD Dr. M. Haulussy Ambon during the last 3 years there indicate 635 cases of hypertension with the percentage of 30.86% in 2013, increased by 36.86% in 2014 and decreased the following year by 32.27% in 2015 (Medical record of Dr. M. Haulussy Hospital Ambon, 2016). Patients with hypertension are usually hospitalized with initial symptoms of headache and accompanied by the occurrence of stiffness and a sense of tension in the shoulder and neck of the patient.

Interview conducted to nurses in charge of women's interna, men's interna, women's surgery, self-administered interventional surgery given to hypertensive patients at the beginning of room treatment usually only with deep breathing relaxation, this action is not routinely performed and only taught at the beginning of therapy and will be followed by pharmacological therapy to lower blood pressure and headaches felt by the patient.

Increased blood pressure in arteries can occur through several stages, first the heart pumps stronger that it will drain more fluid in every second, the large arteries will lose flexibility and become rigid that can not expand (vasodilatation) in the process of heart pumps blood through the artery. Blood on each heartbeat will be forced to

pass through the narrower vessels than usual and causes increased pressure, this is also the case in some elderly, where arterial wall is rigid due to arteriosclerosis. Increased fluid in the circulation can cause increased blood pressure. This occurs when there is a kidney function disorder so it is not able to remove some blood and water from the body.

The volume of blood in the body increases that blood pressure also increases. Conversely, if the activity of pumping the heart decreases the artery widened, a lot of fluid out of circulation, then blood pressure will decrease. Adjustment of these factors is carried out by changes in renal function and the autonomic nervous system (part of the nervous system that regulates various functions of the body automatically).

Changes in kidney function in controlling blood pressure is performed in several ways; if blood pressure increases, kidney will increase the salt and water expenditure, which will lead to reduced blood volume and restore blood pressure to normal. The increase in plasma volume will lead to an increase in late diastolic volume resulting in increased stroke volume and increased blood pressure, suggesting most clinical symptoms arise after years of hypertension in the form of headache, nausea and vomiting due to increased intracranial blood pressure (Crowin 2000 and Triyanto, 2015).

Management is needed to reduce the impact of hypertension, ie with pharmacological therapy and nonpharmacological therapy. One of the non-pharmacological treatments that can be performed is relaxation technique. Relaxation is one of self-management technique based on the workings of the sympathetic and parasympathetic nervous system. Handgrip relaxation/ finger grip relaxation is an easy way to manage feelings and emotions and develop emotional intelligence in a person. Along our fingers there is a channel or meridian of energy that is connected with various organs and emotions. The points of reflection on the hand provide stimulation reflex (spontaneous) at the time of grasping (Liana, 2014).

Classical music can provide a positive effect. It also has influence as entertaining effect, learning support effect and as an enriching-minf effect. As music can affect the heart rate of a person who listens to it, it increases calmness as music with a soft rhythm heard through the ear will go directly into the brain and directly processed so as to produce a very good effect on one's health. Sound with a medium frequency of 750-3000 Hertz was able to provide a controlling in blood pressure in patients with hypertension. The sounds of the vibrating music rhythm form a pattern and create a field of resonance energy and movement in the surrounding room.

Energy will be absorbed by the human body and subtly capable of altering breathing, heart rate, blood pressure, muscle tension, skin temperature, pain. Music is a unique stimulus that can affect physical and psychological response of a person in his hearing and is an effective intervention to improve physiological relaxation by decreasing pulse, respiration, blood pressure and pain (Triyanto, 2015).

The purpose of this study is to study effectiveness of relaxation handgrip and classical music therapy in lowering blood pressure and headache in patients with hypertension in RSUD Dr. M. Haulussy Ambon.

## **II. METHOD**

This study used Quasi-experiment, involving control and experimental groups. In both groups treatment was initiated by pre-test (blood pressure and headache measurements), and after treatment, post-test (measurement of blood pressure and headache) was performed. In other term it is called Non randomized Control Group Pretest-Posttest Design. The sampling method is consecutive sampling. The measurement instruments used were the observation sheets for blood pressure and headache using the Numeric Rating Scale pain scale observation. The sample used was 28 respondents, each group consists of 7 respondents for handgrip relaxation group, 7 respondents for classical music group, 7 respondents for relaxation handgrip group and classical music, and 7 respondents for the control group. Data collection was taken in internal disease Dr. M. Haulussy Hospital Ambon. Each respondent was measured for blood pressure and headache then respondents were given time to rest for 5-10 minutes, then each group was given treatment for 15 minutes, after given the respondent's treatment is given the opportunity to rest for a moment and the researchers back to measure blood pressure and headache. The analysis used is t test.

## **III. RESULT**

Based on Table 1, the highest ages were 41-50 years (28.6%), female sex (53.6%), and for history of hypertension, most has family history with hypertension (75%), siblings suffering from hypertension "yes" (53.6%), smoking history "not" (53.6%), Length of Hypertension suffered most at respondent with duration 1-7 Years (78.6%), anti

hypertension drug consumed by respondent many at one kind (85.7%), pain scale felt by average respondents on medium pain scale with percentage (78,6%).

Table 1. Characteristics of each group

Karakteristik	Group								Total	%
	K0 (Control) (n=7)		K1 (handgrip relaxation) (n=7)		K2 (classial music) (n=7)		K3 (handgrip relazation and classical music) (n=7)			
	f	%	F	%	f	%	f	%		
Age										
- < 41 year	1	14.3	1	14.3	0	0.0	0	0.0	2	7.1
- 41 - 50 year	0	0.0	2	28.6	5	71.4	1	14.3	8	28.6
- 51 - 60 year	3	42.9	1	14.3	0	0.0	2	28.6	6	17.9
- 61 - 70 year	2	28.6	2	28.6	0	0.0	2	28.6	6	17.9
- > 70 year	1	14.3	1	14.3	2	28.6	2	28.6	6	28.6
Sex										
- Female	2	28.6	3	42.9	7	85.7	3	42.9	15	53.6
- Male	5	71.4	4	57.1	0	14.3	4	57.1	13	46.4
Hypertention history										
- Yes	4	57.1	6	85.7	5	71.4	6	85.7	21	75.0
- No	3	42.9	1	14.3	2	28.6	1	14.3	7	25.0
Family with hypertention										
- Yes	5	71.4	1	14.3	3	42.9	6	85.7	15	53.6
- No	2	28.6	6	85.7	4	57.1	1	14.3	13	46.4
Duration of hypertention										
- 1-7 Year	6	85.7	6	85.7	7	100	3	42.9	22	78.6
- 9-14 Year	1	14.3	1	14.3	0	0.0	2	28.6	4	14.3
- 15-21 Year	0	0.0	0	0.0	0	0.0	2	28.6	2	7.1
Smoking History										
- Yes	5	71.4	4	57.1	0	0.0	4	57.1	13	46.4
- No	2	28.6	3	42.9	7	100	3	42.9	15	53.6
Anti Hypertention medicine										
- One kind	3	42.9	7	100	7	100	7	100	24	85.7
- two kinds	4	57.1	0	0.0	0	0.0	0	0.0	4	14.3
Headache scale										
- Light (1-3)	0	0.0	3	42.9	1	14.3	2	28.6	6	21.4
- Medium (4-6)	7	100	4	57.1	6	85.7	5	71.4	22	78.6
- Heavy (7-10)	0	0	0	0.0	0	0.0	0	0	0	0.0

Table 2. Variable Normality Test Using KS on Group Treatment

Variable	Significant Value of KS Test Normality Test							
	K0		K1		K2		K3	
	P	Ket	P	Ket	P	Ket	P	Ket
Sistolik								
Pre	0.002	TN	0.001	N	0.052	TN	0.181	TN
Post	0.002	TN	0.088	TN	0.052	TN	0.336	TN
Diastolik								
Pre	0.115	N	0.004	N	0.249	TN	0.329	TN
Post	0.252	N	0.009	TN	0.118	TN	0.343	TN
Nyeri								
Pre	0.003	S	0.037	TN	0.152	TN	0.233	TN
Post	0.007	S	0.000	N	0.123	TN	0.013	N

Table 3. Test of Variable Paired t Sample

Variabel	Significant Value of Paired Sample T Test							
	K0		K1		K2		K3	
	P	Ket	P	Ket	P	Ket	P	Ket
Sistolik								
Pre	1.000	TS	0.157	TS	-	-	0.165	TS
Post								
Diastolik								
Pre	0.336	TS	0.011	S	0.054	TS	0.005	S
Post								
Nyeri								
Pre	0.317	S	0.004	S	0.022	S	0.004	S
Post								

Table 4. Analysis Results Using One Way Anova

Variable	Group	Mean	Standart Deviasi
Systolic Day 1	K0 (Control)	0.000	0.000
	K1 (Handgrip relaxation)	1.429	3.631
	K2 (Classical music)	0.000	0.000
	K3 (Handgrip relaxation and classical Music)	1.429	3.631
	Chi-square count	= 4.231	
	Significance	= 0.238	
Diastolic Day 1	K0 (Control)	1.429	5.345
	K1 (Handgrip relaxation)	5.714	6.462
	K2 (Classical music)	4.286	7.559
	K3 (Handgrip relaxation and classical Music)	8.571	9.493
	Chi-square count	= 7.009	
	Significance	= 0.072	
Systolic Day 1	K0 (Control)	0.000	0.000
	K1 (Handgrip relaxation)	5.714	5.136
	K2 (Classical music)	0.000	0.000
	K3 (Handgrip relaxation and classical Music)	5.714	6.462
	Chi-square count	= 20.091	
	Significance	= 0.000	
Diastolic Day 2	K0 (Control)	0.000	0.000
	K1 (Handgrip relaxation)	8.571	6.630
	K2 (Classical music)	0.000	3.922
	K3 (Handgrip relaxation and classical Music)	7.143	6.113
	Chi-square count	= 24.805	
	Significance	= 0.000	
Systolic Day 3	K0 (Control)	0.000	0.000
	K1 (Handgrip relaxation)	5.000	5.189
	K2 (Classical music)	1.667	5.774
	K3 (Handgrip relaxation and classical Music)	0.833	2.887
	Chi-square count	= 13.657	
	Significance	= 0.003	
Diastolic Day 2	K0 (Control)	-3.571	11.507
	K1 (Handgrip relaxation)	7.143	6.113
	K2 (Classical music)	11.667	18.505

Variable	Group	Mean	Standart Deviasi
	K3 (Handgrip relaxation and classical Music)	5.000	6.742
	Chi-square count = 10.560 Significance = 0.014		
Headache Day 1	K0 (Control)	0.071	0.267
	K1 (Handgrip relaxation)	2.000	1.414
	K2 (Classical music)	0.857	1.231
	K3 (Handgrip relaxation and classical Music)	1.500	1.160
	Chi-square count = 17.259 Significance = 0.001		

With the result, the average of the 3rd day systolic decrease was highest in handgrip relaxation group with significance value of 0.003 (<0.05), and 3<sup>rd</sup> day diastolic with significance value of 0.014 (<0.05), and for pain level decreased on the first day with Significance of 0.001 (<0.05).

Anova test shows that K1 group (handgrip relaxation) is considered the most effective can lower blood pressure and pain levels. The results also show effectiveness of decreased blood pressure in 3 days, yet level of pain can decrease the first day.

From the test, pre and post differences showed that there was a significant decrease in diastolic and pain level. Thus such treatment can effectively affect the decrease in blood pressure and level of pain.

#### IV. DISCUSSION

Research respondents are clients who suffer from hypertension visiting Room of internal disease in Dr. M. Haulussy Hospital, Ambon aged between 41 years to > 70 years. The age of the respondent is in the middle adult age category. Most (28.6%) respondents were aged 41-50 years. This study is in line with the theory that adult blood pressure increases with age, in elderly systolic blood pressure increases with respect to decreased elasticity of blood vessels (Perry & Potter, 2005; LeMone & Burke, 2008).

The respondents' gender was 53.6% female. This is in contrast to the theory that the incidence rate of hypertension is higher for men than women up to age 55 years. According to Black & Hawk (2005) between the ages of 55 - 74 years the risk is almost the same, after the age of 74 years women have greater risk. Kaplan (2002) assumes that women have better tolerance than men to hypertension. Clinically there is no significant difference in blood pressure in men or women. After puberty, men tend to have higher blood pressure, and postmenopausal women tend to have higher blood pressure than men at that age (Perry & Potter, 2005).

Family history suffers from hypertension is 75%. Black & Hawk (2005) asserts that hypertension is caused by polygenic and many factors in which some genes may interact with the environment causing blood pressure to rise in the future. The genetic predisposition in family is more acceptable in hypertension, this may be due to increased intracellular sodium and a decrease in the potassium and sodium ratios often found in blacks.

Respondents in this study had a smoking history of 53.6%. For smoker, CO and nicotine content in cigarettes can damage endothelial cells and cause blood vessels and branches to become stiff and may increase norepinephrine and catecholamines, increase fibrinogen, increased platelet aggregation as well as an increase in the amount of lipids that can cause increased blood pressure.

Table 1 indicates that the highest decrease of systolic number of 1st day on group handgrip relaxation and handgrip relaxation group and classical music respectively for 1,429, and the average decrease of lowest systolic number in control group and classical music group that is of 0.000. In table 2, the average decrease in diastolic number of day 1 is highest in handgrip relaxation group and classical music is 8,571, and the average decrease of diastolic number in group control is 1,429. Table 3 shows the highest rates of systolic reduction is in relaxation handgrip group and relaxgas handgrip group and classical music respectively of 5,714, and the lowest average systolic count in group control and classical music group is 0.000. Table 4 shows the highest rate of diastolic drop in the relaxation handgrip group of 8,571.

The lowest average diastolic rate in control group and the classical music group is 0.000. table 5 shows the highest average systolic decrease in relaxation handgrip group of 5,000, and the lowest average systolic count rate in the control group is 0.000. Table 6 also shows the highest diastolic drop in classical music group of 11,667, and the average decrease in the lowest diastolic level in the control group is -3,571 (an increase of 3,571). Based on the average, there is difference of average of diastolic decrease in each group.

The results of the study in table 8 indicates that the average decrease in the category of the highest pain rate is in relaxation handgrip group of 2000, and the average decrease in the lowest pain category is in the control group of 0.071.

Based on the averages, there is an average difference of decreasing category of pain level in each group. This study reveals that grasping a finger will produce an impulse transmitted through a non nociceptic afferent nerve fiber. Non-nociceptic nerve fibers will result in closed gate in thalamus that the stimulus leading to the cerebral cortex is inhibited; causing intensity of pain can to reduce. Anova testing indicates that K1group (handgrip relaxation) is considered most effective to lower blood pressure and level of pain. The results also show effectiveness of decreased blood pressure in 3 days, yet level of pain can be decreased the first day.

Pre and post test differences shows that there was a significant decrease in diastolic and pain level. Thus, such treatment can effectively affect the decrease in blood pressure and the level of pain.

This is supported by Pinandita (2012)'s research on "The Effect of Handheld Relaxation Technique on Reduction of Pain Intensity in Patient of Post Laparatomy Surgery at PKU Muhammadiyah Gombong Hospital"; showing difference of mean value or mean of pre and post with treatment technique of hand finger relaxation to decrease intensity of pain in experimental group. Mean before the hand-held relaxation technique was 6.64 and mean after the technique of hand-held finger relaxation was 4.88.

Another study conducted by Sri Ramadina (2014) on effectiveness of hand and breath hand relaxation technique on the decrease of dysmenorrhea with the average intensity of dysmenorrhea before the relaxation technique in the experimental group was 5.47 and the intensity of dysmenorrhea in the control group was 5.20. the average intensity of dysmenorrheal after hand relaxation and breath deep relaxation technique in experimental group was 1.87 and the intensity of dysmenorrhea without finger and breath deep relaxation in group control was 5.07.

Potter and Perry (2009) stated that relaxation techniques effectively lower heart rate and blood pressure, decrease muscle tension, improve well-being, and reduce symptom pressure in individuals who experience various situations. The effect of finger grip relaxation according to theory is caused by grasping the fingers will free up the locked energies called safety energy locks so that the flow of energy becomes smooth (Hill, 2011).

Handgrip relaxation technique is an easy way to manage emotions and develop emotional intelligence. This technique helps the body, mind and spirit to achieve relaxation. Relaxation technique is also an action to free the mental and physical from tension and stress, so as to increase tolerance to pain. Various relaxation methods are used to reduce anxiety and muscle tension so that decreased heart rate, decreased blood pressure, decreased respiration and decreased muscle tension. This relaxation is easy to learn by anyone for a regular and relaxed breathing pattern and instructions on how to release endorphins in the body or natural relaxation in the body under normal circumstances.

From the above explanation it can be concluded that relaxation handgrip technique is one way to lower blood pressure and headache felt by people with hypertension. This result should also be able to decrease blood pressure and headache in the relaxation handgrip group and classical music, but there is a decrease in blood pressure and headache on the 4th day different from the group handgrip which decrease on day 3, basically all treatment groups are able to lower blood pressure and headache, supported by Chiang who conducted a study of the effects of music therapy and natural sound on the level of pain and anxiety of cancer patients in the Taiwan cancer hopice treatment unit in years2012. The technique used is Randomized Control Trial (RCT), with 117 samples of cncer patients. Participants were divided into four groups. The treatment group listened to music, natural sound, and a combination of both for 20 minutes every day for 3 days, using earphones. Group control is given earphones without music. After the study was completed, the control group was also given the opportunity to listen to a CD containing music for therapy. The result of the research is there is a significant decrease of pain in the three intervention groups compared to group control (P value = 0,001).

Music therapy with a combination of natural sound has the greatest effect to reduce the pain of cancer patients. Campell (2002) states that music is able to clear the mind and the sound of music is able to create physical forms that affect our health, awareness and everyday behavior. The power of music is a powerful source of emotional healing to ward off negative forces and increase strength positive. Music can touch the level of physical, psychological, spiritual, and social awareness. Asin and Triyanto (2007) based on research that has found the use of music that produces medium frequency sounds (750-3000 Hertz) is able to significantly control blood pressure of hypertensive patients.

## V. CONCLUSION

Intervention to each group indicates that relaxation handgrip group more effectively lower blood pressure within 3 days and headache on the first day, compared with other groups that can lower blood pressure on day 5 to day 7. The result also can be applied as one technique to lower non-pharmacology blood pressure and headache of.

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