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Research Article

Benefits and Effect of Progressive Muscle Relaxation Therapy on the Blood Pressure of Patient with Hypertension in Mataram

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Abstract

Introduction: Hypertension is one of the leading causes of mortality in Indonesia, there is a significantly increasing trend in annual hypertension prevalence in Indonesia. Hypertension is one of the most common diseases in NTB, the prevalence of hypertension measured based on blood pressure in NTB is 1,523,574 (32.4%), it is higher than the national rate (1,255,537 (26.7%) of 4,702,389 people). The highest prevalence of hypertension in Mataram City is in Cakranegara Primary Care, there are 724 people with hypertension in this primary care working area. The purpose of this study is to determine the average number of patient's hypertension rate at Cakranegara Primary Care before and after given muscle relaxation techniques.

Method: This study uses "Quasi Experiment Design" with control group as comparison. The population in this study are 724 hypertension patients and 27 patients as sample based on inclusion and exclusion criteria.

Results: The results of this study indicates that the T-test calculation using Quasi Experiment Design shows the difference of average of hypertension rate before and after given progressive muscle relaxation technique. It is 10,306 mmHg in intervention group and 1,425 mmHg in control group. The p-value in the intervention group is 0.000 that is smaller than $\alpha = 0.05$ and the p-value of control group is 0.431 that is greater than $\alpha = 0.05$.

Conclusions: From this study, we can conclude that there is a difference of hypertension rate between intervention and control group. We hope this progressive muscle relaxation technique can be used as an appropriate alternative or complementing treatment to control Hypertension rate.

Keywords: *Hypertension; Progressive Muscle Relaxation Technique*

Introduction

Hypertension or high blood pressure is an abnormal blood pressure in the arteries continuously for more than one period. This occurs due to arterioles construction. Arteriole construction makes blood difficult to flow and increases pressure against the arterial wall. Hypertension adds more workload for the heart and arteries, which is might be continued and causes heart and blood vessels damage [1].

Based on the causes, hypertension is divided into 2 kind of types, primary hypertension and secondary hypertension, Primary hypertension which is also called idiopathic hypertension might caused by genetic or hereditary, environment, hyperactive renin sympathetic nervous system, angiotensin and the increasing of intracellular Na + Ca, obesity, smoking, excessive salt consumption and lifestyle. While secondary hypertension might caused by estrogen use, kidney disease, Cushing's syndrome and pregnancy-related hypertension [2].

According to WHO, the blood pressure limit that is still considered normal is 140/90 mmHg, while blood pressure> 160/95 mmHg is stated as hypertension. Blood pressure between normal tension and hypertension is called borderline hypertension. The WHO limit does not differentiate age and sex [1].

Hypertension classification is divided based on blood pressure values.

Classification	Systolic (mmHg)	Diastolic (mmHg)
Normal	< 130	< 85
Highly normal	130 - 139	85 - 89
Stage 1 (light)	140 - 159	90 - 99
Stage 2 (moderate)	160 - 179	100 - 109
Stage 3 (severe)	180 - 209	110 - 119
Stage 4 (very severe)	> 209	> 120

Table 1: *Hypertension classification based on blood pressure.*
Source: (Heart, J,T. Fahey, T. Sahage, W, 2011).

Hypertension is a global health problem that requires attention because it can lead to death in both developed and developing countries. According to the World Health Organization (WHO) in 2012, the prevalence of hypertension cases was 839 million and it is expected to increase in 2025 to 1, 15 billion (29%) of the total world population, with more sufferers in women (30%) than men (29%). About 80% of hypertension cases increase occur mainly in developing countries, including Indonesia [3].

Based on Riskesdas [4] data, the tendency of hypertension prevalence diagnosis by health workers based on interviews in 2007 amounted to 79,250,000 people (31.7%) and decreased in 2013 to 65,048,100 people (25.8%) from 252.125. 458 people of the Indonesian population, and the prevalence of hypertension in NTB based on the results of blood pressure measuring 1,523,574 people (32.4%) which is higher than the national figure which is 1,255,537 (26.7%) of 4,702,389 inhabitants NTB, and the data of hypertension patients in Mataram city in 2015 were 3532 people with hypertension and presented in the form of the table below, which shows the data of the hypertension of hypertension patients in the existing primary care in the area of Mataram City (Mataram City Health Office, 2015).

Based on the background above, the formulation of the problem of this study is "How big is the effect of progressive muscle relaxation techniques on blood pressure reduction in hypertension patients at Primary care in Mataram.

Aim of the Study

The aim of this study is to find out the effect of progressive muscle relaxation techniques on blood pressure reduction in hypertension patients at Primary care in Mataram.

Conceptual Framework

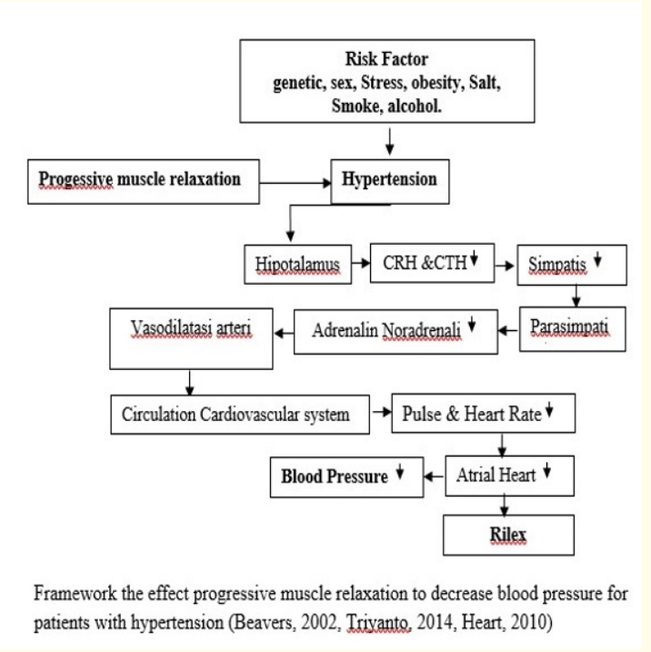

Figure 1: *Conceptual Framework.*

Methods

This study uses a "Quasi Experiment Design" using a control group as the comparison. The research used twice observation, before and after being given progressive muscle relaxation techniques. The observation conducted by measuring respondent's blood pressure before being given progressive muscle relaxation techniques in the intervention group and the control group, and after being given progressive muscle relaxation techniques. The population in this study were 724 people with hypertension and a sample of 27 people who were withdrawn based on inclusion and exclusion criterias.

Variable	N (%)
Control group	13
Sex	
Male	46.2
Female	53.8
Age (Year)	
26 - 36	7.69
36 - 45	30.76
46 - 55	38.46
56 - 65	23.08
> 65	-
Education	
Under elementary school	69.2
Elementary school	-
Junior high school	7.7
Senior high school	23.1
College	-
Work	46.6
Merchant	30.8
Farmer	23.1
Intervensi Group	14
Sex	
Male	50
Female	50
Age (Year)	
26 - 36	7.69
36 - 45	50
46 - 55	14.29
56 - 65	28.57
> 65	-
Education	
No	64.3
Elementary School	-
Junior High School	-
Senior High School	35.7
University	-
Work	
Housewife	28.6
Marketeer	35.7
Farmer	35.7

Table 2: *Socio-demographic characteristics of patient with hypertension.*

Result

Univariate Analysis

Before being given intervention

Variable	N (%)
Control group	
Normal	-
Highly normal	-
Stage 1	38.46
Stage 2	61.54
Intervention group	
Normal	-
Highly normal	-
Stage 1	14.37
Stage 2	85.63

Table 3: *Hypertension data distribution of respondents based on blood pressure in control and intervention groups before provision of progressive muscle relaxation therapy in Mataram.*

The results of univariate analysis on blood pressure of control group respondents before being given intervention progressive muscle relaxation techniques showed that stage 1 as many as 5 respondents (38.46%) and stage 2 as many as 8 people (61.54%) while blood pressure in the intervention group showed that stage 1 as many as 2 respondents (14.3%) and stage 2 as many as 12 respondents (85.7%).

After being given an intervention

Variable	N (%)
Control group	
Normal	-
Highly normal	-
Stage 1	38.46
Stage 2	61.54
Intervensi group	
Normal	21.4
Highly normal	64.3
Stage 1	14.3
Stage 2	-

Table 4: *Hypertension data distribution of respondents based on blood pressure in control groups and interventions after progressive muscle relaxation therapy at primary care in mataram.*

Results of blood pressure analysis in hypertension patients after being given therapy Progressive muscle relaxation technique showed blood pressure of the control group after being given progressive muscle relaxation therapy showed stage 1 as many as 5 respondents (38.46%) and stage 2 as many as 8 respondents (61.54%) while blood pressure in the intervention group experienced a change in blood pressure to normal blood pressure as many as 3 respondents (21.4%), high normal as many as 9 respondents (64.3%) and stage 1 as many as 2 respondents (14.3%).

Bivariate analysis

Variable	N	Mean (mmHg)	P value
Control group			
Before intervention	13	159.00	0.431
After intervention	13	157.58	
Intervensi group			
Before intervention	14	152.44	0.000
After intervention	14	142.44	

Table 5: *Data distribution of blood pressure between mean before and after giving therapy progressive muscle relaxation techniques in intervention and control groups in Mataram.*

Statistical tests using SPSS 16 software showed the average value of blood pressure in the control group before giving progressive muscle relaxation techniques was 159.00 mmHg and the average blood pressure value after giving progressive muscle relaxation technique therapy was 157.58 mmHg. The average blood pressure level shows a decrease in blood pressure after being given progressive muscle relaxation techniques. The blood pressure drop averaged 1,425. P-value obtained 0.431 greater than $\alpha = 0.05$ means that there is no significant effect on the provision of progressive muscle relaxation techniques to decrease blood pressure in the intervention group at primary care in Mataram.

While the results of the analysis in the intervention group before being given progressive muscle relaxation technique was 152.44 mmHg and the average value after the progressive muscle relaxation techniques was 142.14 mmHg. The average blood pressure level showed a decrease in blood pressure after being given a progressive muscle relaxation technique, each of which decreased the average blood pressure, each blood pressure decreased by an average of 10.306 mmHg. The value of p-value obtained 0,000, which is smaller than $\alpha = 0.02$ and it means that there is a significant effect on the provision of progressive muscle relaxation techniques to decrease blood pressure in the intervention group at Primary care in Mataram.

Discussion

Blood pressure identification before progressive muscle relaxation techniques are performed

Based on the results of the study it can be known that before therapy progressive muscle relaxation techniques, the respondent's blood pressure varies greatly according to the determination of blood pressure specified in the inclusion criteria. Variation in respondent's blood pressure before intervention is presented in table 4, the distribution of data in the intervention group and the control group can be seen in table 4 and the distribution of respondents in the intervention group is known to be normal 0 respondents (0%), high normal 0 respondents (0%), stage 1 hypertension (mild) 2 respondents (14.3%), stage 2 (moderate) 12 respondents (85.7%), while in the control group can be known the normal category 0 respondents (0%), high normal 0 respondents (0%), stage 1 hypertension (mild) 5 respondents (38.46%), stage 2 (moderate) 8 respondents (61.54%).

Differences in respondents' blood pressure before being treated, showed the difference in the causative factors that affect blood pressure in each respondent. According to Udjianti [1] states several factors that influence the pathogenesis of hypertension include changes in volume, changes in fluid volume affect systemic arterial pressure. When the body experiences excess salt and water, blood pressure increases through complex physiological mechanisms that change venous return to the heart and result in increased cardiac output. If the kidneys function adequately, increased arterial pressure results in dieresis and decreased blood pressure. Pathological conditions that change the pressure threshold in the kidneys in excreting salt and water will increase systemic arterial pressure, and hormones that play a role in regulating blood pressure in the kidneys are rennin and angiotensin.

Renin and angiotensin play a role in regulating blood pressure. The kidneys produce renin which is an enzyme that acts on the plasma protein substrate to separate angiotensin I, which is then converted by converting enzyme in the lungs to angiotensin II then into angiotensin III. Angiotensin III has a strong vasoconstrictor action in blood vessels and is a control mechanism for the release of primary aldosteronism. Through increased activity of the sympathetic nervous system, angiotensin II and III also have an inhibiting effect on the excretion of salt (sodium) due to increased blood pressure.

The factors that influence the increase of blood pressure includes heredity or genetic factors; increasing the likelihood of occurrence of hypertension in the family; and hypertension is closely related to age, the older a person, the greater the risk of developing hypertension. More than 40 years of age have a risk of developing hypertension. With increasing age, the risk of developing hypertension is greater so that the prevalence of hypertension among the elderly is quite high. Gender factors are very influential and men are generally more susceptible to hypertension than women because men are more prone to stress, fatigue and uncontrolled eating patterns. But women are also more susceptible to hypertension after menopause.

Another factor that can be controlled is lifestyle, people whose having an unhealthy lifestyles greatly affect hypertension, unhealthy lifestyles includes rarely exercising, consuming foods high in salt, high in fat, high cholesterol, alcohol consumption, excessive body weight, and stress is a factor of the occurrence of hypertension [5].

Blood pressure identification after progressive muscle relaxation techniques were carried out in the intervention group and control group at primary care in Mataram.

Based on the results of the study, it was found that after progressive muscle relaxation, the respondent's blood pressure is decreased and varied. Blood pressure in the intervention group and the control group after being given therapeutic are presented in table 4 in the intervention group with normal hypertension categorized as many as 3 respondents (21.4%), high normal as many as 9 people (64.3%) and categorical stage 1 (mild) amounted to 2 people (14.3%). The data showed in the respondents' blood pressure grade after being given progressive muscle relaxation techniques and while the comparison group (control) in stage 1 hypertension experienced no change in stage 1 was 5 people (38.45%), and stage 2 hypertension (moderate) was 2 respondents (61.54%). In the intervention group, there is a decrease in hypertension grade from stage 2 to stage 1 and normal can be caused by the provision of progressive muscle relaxation techniques.

According to Evelyn (2011) journal in a book entitled Book of Anatomy and Physiology for Paramedics, systolic blood pressure is produced by the heart muscle which pushes the contents of the ventricles into the artery that has been tense. During diastolic arteries still expand because peripheral resistance of the arterioles prevents all blood from flowing into the tissues. Thus blood pressure depends in part on strength and volume in the arteriole wall. This contraction is maintained by the vasoconstrictor nerve, and is controlled by the vasomotor center in the media oblongata. Blood pressure changes slightly along with physiological changes in motion, such as during physical exercise, when there is a mental change due to anxiety and emotion.

This was also reinforced by Triyanto's statement [3] in the book Nursing Services for Hypertension Patients Integratedly said that relaxation techniques produce integrated physiological responses and also interfere with parts of consciousness known as "benson re-

laxation response". Relaxation responses are thought to inhibit the autonomic nervous system and central nervous system and increase parasympathetic activity characterized by decreased skeletal muscle tone, cardiac muscle tone and impaired neuroendocrine function.

In order to benefit from the relaxation response, when using a relaxing technique in the form of tape. This tool will help patients focus attention (concentration) on the release of muscle tension in each of the main body muscles while feeling respiratory rhythm. Relaxation therapy is a self-management technique that is based on the way the sympathetic and parasympathetic nervous systems work. Relaxation techniques are increasingly being done because they are proven to be effective in reducing tension and anxiety, progressive relaxation research has been done quite a lot. Progressive relaxation therapy has proven effective in lowering blood pressure in hypertension patients.

Relaxation techniques produce integrated physiological responses and also interfere with parts of consciousness known as "benson relaxation responses". Relaxation responses are thought to inhibit the autonomic nervous system and central nervous system and increase parasympathetic activity characterized by decreased skeletal muscle tone, cardiac muscle tone and disruptive neuroendocrine function. In order to get benefit from the relaxation response, when carrying out this technique requires a quiet environment, a comfortable position and can use a tape or records of relaxation exercises. This tool will help patients focus on the release of muscle tension in each of the main body muscles while feeling the rhythm of breathing [3].

Statistical tests showed that the average of blood pressure with muscle relaxation technique counted as many as 152.44 mmHg and blood pressure with progressive muscle relaxation technique therapy was 142.14 mmHg. The average of blood pressure shows a decrease of 10.30 mmHg. The p-value obtained by 0,000, which is smaller than $\alpha = 0.02$, and it means that there is a progression at primary care in Mataram. Whereas in the control group, average blood pressure at the beginning of the examination was 159.00 mmHg while and at the end of the inspection was 157.58 mmHg. The p-value obtained by 0.431, which is greater than $\alpha = 0.02$, it can be concluded that the control group has no change or no influence.

The results of the study were also strengthened by a statement from Endar Sulis Tyani, Wasisto Utomo, and Yesi Hasneli N (2015) in a journal entitled "Effectiveness of progressive muscle relaxation on blood pressure in patients with essential hypertension", which stated the results of the study showed an average blood pressure in the experimental group before progressive muscle relaxation is given, the systolic was 156.60 mmHg and the diastole was 94.47. While the results of the average blood pressure after progressive muscle relaxation was 146.53 mmHg and diastole 88.20 mmHg, the average blood pressure in the experimental group decreased by 10.07 mmHg and diastole 6.27 mmHg. The results of the t test dependent on the mean of systolic blood pressure before and after the intervention in the experimental group showed p value of 0.001 and the mean of diastolic blood pressure before and after the intervention in the experimental group showed a p value of 0.000, the p value < α (0.05), meaning that there were significant differences in the mean systole and diastole blood pressure before and after the intervention was given to the experimental group, whereas the independent t-test results in the mean systole blood pressure after intervention in the un-intervened experimental and control group showed p value of 0,000 and average blood pressure of diastole after intervention in the experimental group and controls that were not intervened showed p value of 0,000. So, it can be concluded that progressive muscle relaxation is effective in reducing blood pressure in patients with essential hypertension.

The results were also supported by Suratini's statement (2013) in a journal entitled the effect of progressive relaxation on blood pressure reduction which states that progressive relaxation can reduce systolic blood pressure by 4.7 mmHg but not significant (pv = 0.054), while diastolic blood pressure decreased by 3.3 mmHg and meaningful (pv = 0.02), while transedental meditation can reduce systolic blood pressure by 10.7 mmHg (pv < 0.0003) and diastolic blood pressure by 6.4 mmHg (pv = 0.0005). From the results of the study, it can be concluded that there is an effect between progressive relaxation on the level of systolic and diastolic blood pressure in the elderly with p = 0.017 and p = 0.001 ($\alpha = 0.05$).

From the description above it can be known that progressive muscle relaxation techniques affect the reduction of blood pressure in hypertension patients, so that hypertension sufferers can apply and carry out progressive muscle relaxation techniques regularly as one of the complementary therapies in blood pressure reduction [6-22].

Conclusion

The conclusions in this study indicate that there is an effect of progressive muscle relaxation techniques on decreasing blood pressure in hypertension patients and it is hoped that the results of this study can be used as a reference for researchers and health workers in overcoming hypertension.

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