

# The Effect of Neuromuscular Taping and Deep Breathing Exercise Reduce High Blood Pressure in Hypertension Patients

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**Abstract:-** Hypertension is an abnormal increase in blood pressure in the arteries continuously over a period of time. This occurs when the arterio-arterioles constrict. The constriction of the arterioles makes it difficult for blood to flow and increases the pressure against the artery walls. Hypertension increases the workload of the heart and arteries which, if continued, can cause damage to the heart and blood vessels. The purpose of this study was to prove the reduction of high blood pressure in the combination of Neuromuscular Taping and Deep Breathing Exercise. The type of research used is experimental research with a pre and post test research design. The results of the Wilcoxon Signed Rank statistical test showed that there was no difference in systolic pressure after the intervention was seen from the pre-test and post-p-value of 0.063, as well as diastolic pressure there was no difference in the effect of the intervention seen from the results. pre-test and post-test p-value 0.157. Thus it can be concluded that based on the results of the study, slow deep breathing and neuromuscular taping both have an effect, but there is no difference in the effect on reducing blood pressure in patients with hypertension.

**Keywords:-** Hypertension, Deep Breathing Exercise, Neuromuscular Taping.

## I. INTRODUCTION

Hypertension or high blood pressure is a deadly disease that is often suffered by most people in the world today. Although hypertension cannot directly kill the sufferer, it can trigger the occurrence of other diseases that are classified as deadly and the most devastating killer disease that is often a scourge in some people living in urban areas has spread to rural areas. Almost a third of this number is caused by complications from it. (1) (2) (3).

Hypertension is a systolic pressure (blood pressure when the heart contracts) 140 mmHg and a diastolic pressure (blood pressure when the heart expands) 90 mmHg which is obtained through two consecutive measurements to establish the diagnosis of hypertension (4).

Hypertension was higher in women, namely 35.5%, while patients with hypertension were 34.3%, although the difference was not too large. This happens because in women, as women get older, namely the premenopause period, they tend to have higher blood pressure due to decreased levels of estrogen. The hormone estrogen can protect women from cardiovascular disease. The onset of

hypertension usually does not stand alone there are several factors that may have an effect. The theory explains that the occurrence of hypertension is caused by several factors that influence each other, where the main factors that play a role in pathophysiology are genetic factors and at least three environmental factors, namely salt intake, stress, and obesity (5).

Excessive salt consumption, lack of exercise, smoking, alcohol consumption heredity, gender, age, race, obesity and psychosocial stress are the causative factors that affect changes in the structure and function of aging arteries such as cholesterol buildup in blood vessels. Large vessels become inelastic. Endothelial dysfunction, and decreased nitric oxide release causes blood vessel stiffness to increase heart rate, arterial pulsation increases, SBP (Systolic Blood Pressure) increases and DBP (Diastolic Blood Pressure) decreases. The left ventricle works harder and harder and causes its walls to thicken. Left ventricular filling slows down due to atrial contraction with increasing age. The atrial contribution to LV (Left Ventricular) filling, results in an increase in the size of the LA (Left Atrium), to maintain LV end-diastolic volume. Cardiac output is lower and peripheral vascular resistance is higher in the elderly with hypertension than in the young. Stiffness in the aorta also negatively affects myocardial perfusion, and SBP increases (6).

Management of hypertension is based on the pillars of standard medication and lifestyle changes which include stress management, activity pattern regulation, nutrition intake regulation, alcohol consumption avoidance, and smoking habits. The current management of hypertension with drugs has progressed, but many reports say that patients who come to the hospital will come back complaining that their blood pressure has not decreased significantly despite treatment (7). A healthy lifestyle is generally very beneficial in reducing the risk of developing cardiovascular problems. In patients with grade 1 hypertension, without other cardiovascular risk factors, the strategy of adopting healthy lifestyle habits is the initial stage of management, which should be followed for at least 4-6 months in an attempt to lower blood pressure.

Physiotherapy interventions in hypertension can be in the form of neuromuscular taping and deep breathing exercise as an effort to apply relaxation techniques. Slow deep breathing is one of the relaxation methods that can increase baroreflex sensitivity. Baroreflex will activate the parasympathetic system which results in vasodilation of blood vessels, decreased cardiac output and will result in decreased blood pressure. Deep and slow breathing will

increase oxygen levels in the body and stimulate the body's chemoreceptors, which will result in a vasodilation response in blood vessels and a decrease in vascular pressure so that blood pressure drops. (8).

Neuromuscular Taping is the specific application of an elastic adhesive tape to the surface of the skin by an eccentric stimulation technique resulting in decompression and dilation of the covered area which is used for therapeutic purposes. In rehabilitation, Neuromuscular Taping is applied using a protocol designed to reduce blockage of body fluids, increase circulation of blood vessels and lymph nodes, reduce heat overload, and improve tissue homeostasis, reduce inflammation and hypersensitivity of pain receptors. Eccentric application of Neuromuscular Taping the skin improves the function of muscle, tendon, nerve, and lymphatic tissues. Neuromuscular Taping with eccentric technique will affect flexibility and improve movement coordination in patients with decreased muscle coordination. Application of Neuromuscular Taping is able to stimulate mechanoreceptors in the skin (9).

**II. RESEARCH METHOD**

The type of research used is a quasi-experimental research with a pre and post test research design without a control group design, involving one group of subjects with Deep Breathing Exercise and Neuromuscular Taping treatment. Blood pressure was checked before and after being given treatment 8 times for 1 month. This research was carried out at the UPT Pelayanan Sosial Tresna Werdha Husnul Khotimah on 31 July to 31 August 2020. The population in this study were all elderly people in the UPT Pelayanan Sosial Tresna Werdha Khusnul Khotimah Pekanbaru and the sample in this study was elderly people with hypertension totaling 7 people. The sampling technique used in this study is a cluster sampling technique, namely the selection of samples refers to groups with certain characteristics that have met the inclusion criteria.

In this study, the sample consisted of 7 people, treated with deep breathing exercise and Neuromuscular Taping and Deep Breathing Exercise. Before being given treatment, the sample was examined first using a sphygmomanometer and a stethoscope, this became an initial assessment as a comparison of treatment results. This research was conducted for 1 month, with 8 treatments. Ethics in this study pays attention to informed consent, respondent confidentiality, and respondent security. To find out the significance of the effect of Deep Breathing Exercise and Neuromuscular Taping on reducing high blood pressure in patients with hypertension at UPT Social Services Tresna Werdha Husnul Khotimah Before and after treatment, normality test was carried out using Wilcoxon 2 Related, homogeneity test using One Way ANOVA, for bi-variate test. The statistical test used is Mann Whitney U Test.

**III. RESULTS AND DISCUSSION**

The criteria for respondents can be seen based on the distribution group of sample data given Slow deep breathing and Neuromuscular Tapping based on sex, age, height, weight, body mass index, systolic, diastole, before and after

test. The results of the sample homogeneity test analysis are presented in Table 1 below:

Characteristics	Homogeneity Test	
	Levene statistic One Way Anova	
	Mean ± SD	P
Sex	1.600 ± 1	0.230
Age	0.106 ± 1	0.750
Height	0.420 ± 1	0.841
Weight	2.089 ± 1	0.174
BMI	4.563 ± 1	0.054
Sistol Pre	0.000 ± 1	1.000
Diastol Pre	57.600 ± 1	0.034

Table 1: Homogeneity Test Analysis

Based on table 1, the characteristics of respondents are based on sex, age, height, weight, BMI, systolic, diastole, based on the homogeneity test with a value of  $p > 0.05$ , which means that the variants are not the same or not homogeneous.

Data Distribution Variabel	Shapiro-Wilk (P. Sig)	Conclusion
Systolic Blood Pressure (Pretest)	0,482	Normal
Diastolic Blood Pressure (Pretest)	0,001	Tidak Normal
Systolic Blood Pressure (Posttest)	0,001	Tidak Normal
Diastolic Blood Pressure (Posttes)	0,000	Tidak Normal

Table 2: Normality Test Analysis

The test for normality of data distribution in this study used the Shapiro-Wilk test, which is a technique that allows researchers to assess the probability of obtaining a real frequency difference (observation) with the expected frequency. The results of the calculation of the normality test for the distribution of the systolic blood pressure variable obtained  $p = 0.482$ . It turns out that  $p > 0.05$ ; it is concluded that there is no difference in the frequency of observations with the frequency of expectations; which means that the initial systolic blood pressure data is normally distributed.

Blood Pressure	Mean	p
Systolic Pre dan Post	2,50	0,063
Diastolic Pre dan Post	1,50	0,157

Table 3: P Value Pre and Post Test

Based on table 3, there was no difference in systolic pressure after the intervention, seen from the pre-test and post-p-value of 0.063, as well as diastolic pressure, there was no difference in the effect of the intervention, seen from the pre-test and post-test p-values of 0.157.

Slow deep breathing is one of the relaxation methods. The effect of slow deep breathing is included in one of the relaxation methods. The effect of slow deep breathing can increase baroreflex sensitivity. Baroreflex will activate the parasympathetic system which results in vasodilation of blood vessels, decreased cardiac output and will result in decreased blood pressure. Deep and slow breathing will increase oxygen levels in the body and stimulate the body's chemoreceptors which will result in a vasodilation response of blood vessels and a decrease in vascular pressure so that

blood pressure drops. Deep Breathing Exercise is done 3 times per minute for 10 minutes.

Meanwhile, in the Slow Breathing Training Research Reduces Resting Blood Pressure and the Pressure Responses to Exercise Physiological Research (Jones et al., 2015) regarding the slow deep breathing response to the modification of the central nervous system that controls resting blood pressure and the pressure response to muscle contraction against hand grip exercises. Although it is uncertain, it is believed that slow deep breathing exercises can affect changes in the central mechanism that regulates blood pressure responses, supported by the acute effect of slow deep breathing which can increase baroreflex sensitivity in patients with heart failure and hypertension. It is also possible that the increased sensitivity of the baroreflex as a result of training could more effectively counteract the increase in blood pressure in response to hand exercise.

Based on Berek's research (2015) Effectiveness Of Slow Deep Breathing On Decreasing Blood Pressure In Primary Hypertension: A Randomized Controlled Trial Of Patients In Atambua, East Nusa Tenggara, that slow deep breathing exercises can reduce systolic blood pressure and diastolic blood pressure, which decreases systolic blood pressure is more significant in the condition of primary hypertension. Slow deep breathing breathing exercises can improve autonomic function by changing sympathetic and parasympathetic activity. This breathing exercise can increase parasympathetic tone, decrease sympathetic activity, improve cardiovascular and respiratory function, and reduce the effects of stress. The findings of this study also show that apart from considering the effectiveness of slow deep breathing, it is also necessary to pay attention to the importance of sodium intake in daily life by managing a low-salt diet according to hypertension conditions.

Based on the research that has been done, it is found that slow deep breathing and neuromuscular taping both have an effect, but there is no difference in the effect on reducing blood pressure in patients with hypertension.

Neuromuscular taping using a decompressive method is able to create wrinkle that is activated through movement, this wrinkle will cause the skin to lift so as to provide space between the skin and the underlying tissue. NMT will stimulate the skin surface by activating mechanoreceptors located on the surface of the skin, using a control gate will pass through large diameter (A beta) and small (A delta and C) nerve fibers, these fibers will gather at the level of the agalatinous substance of the spinal cord. If a pain stimulus and a mechanical stimulus such as that produced by Neuro Muscular Taping are transmitted simultaneously, the transmission of the pain stimulus will be inhibited as a result

of the action of the stimulus provided by the A beta fibers on inhibitory neurons in the agelatinous substance.

Shah et al (2018), in their research stated that the neuromuscular taping technique can reduce blood pressure in patients with systemic hypertension. Neuromuscular taping was applied symmetrically on the back, between C1 and T2, of seven hypertensive patients for 5 to 7 days. Cardiovascular autonomic parameters were assessed at baseline and at the end of the study. Taping was associated with a decrease in mean arterial pressure ( $p=0.001$ ), mean systolic blood pressure ( $p<0.01$ ), mean arterial pressure. diastolic pressure ( $p < 0.01$ ) and vagal tone of the heart at rest ( $p = 0.063$ ).

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