

Effect of Diaphragmatic Breathing Exercise Leaflet on Reducing Blood Pressure of Hypertensive Elderly: An Integrated Health Care Delivery System

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ABSTRACT---Hypertension or high blood pressure is a vascular problem which causes the supply of oxygen and nutrients carried by blood being blocked to the tissues. The results of the Baseline Health Research (Riskesdas) reported in 2014 showed an increase in the national prevalence of hypertension in people aged over 18 years by about 37.1%. From 2007 to 2015. This study uses a quasy-experimental method, using a comparative pre-test and post-test, on 64 aged people. The research subjects were observed by measuring the blood pressure before and after activity. Data analysis used paired T-test with an $\alpha = 0.05$. Significance based on p value <0.05 . From the results of studies that have been conducted most of the respondents' blood pressure after giving the Diaphragmatic Breathing Exercise Leaflet was at mild hypertension stages. Based on the results of the study shows that there is an effect of Diaphragmatic Breathing Exercise Leaflet on reducing the blood pressure of hypertensive elderly at an integrated health care delivery system in Talabiu Village, Woha District of Bima Regency.

Keywords---blood, breathing, elderly, exercise, leaflet, pressure.

I. INTRODUCTION

Hypertension or high blood pressure is a vascular problem which causes the supply of oxygen and nutrients carried by blood being blocked to the tissues. So that the heart has to work harder to fulfill the body's needs. If this condition lasts longer and settled, there arise symptoms called hypertension (Sustrani *et al.*, 2010). WHO reported and The International Society of Hypertension by The Joint National Committee in 2015 showed that worldwide, about 972 million people or 26.4% of people on Earth suffered from hypertension with a ratio of 26.6% men and 26.1% women. This figure is likely to rise to 29.2% in 2030. Of the 972 million people with hypertension, 333 million are in the developed countries and the remaining 639 were in developing countries, including Indonesia (WHO, 2015).

The results of the Baseline Health Research (Riskesdas) reported in 2014 showed an increase in the national prevalence of hypertension in people aged over 18 years by about 37.1%. From 2007 to 2015, the prevalence of hypertensive people showed an increase, so it is feared this figure has the potential to increase in the coming years (Depkes, 2015). Meanwhile, according to the Insurance and Social Security Healthcare (BPJS Kesehatan, 2015),

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in Indonesia, the cases of hypertension in 2014 ranged to 31.7%, which shows that more than 80.3 million Indonesians suffer from hypertension. Relaxation can also be regarded as appeasement with the concentrated breath for the returning condition (fitness) of the body to be better. Relaxation will reach calmness of mind, feelings, mentality and the formation of mental endurance in addition to physical endurance (Widiaastuti & Palupi, 2008; Widana *et al.*, 2020; Nyandra *et al.*, 2018). Non-pharmacological treatment is one of the stress controlling that can be done through relaxation training techniques (Fathoni *et al.*, 2018; Sandi *et al.*, 2017; Dalimartha *et al.*, 2008).

Relaxation techniques can be used to improving the quality of life, but it might not be enough to control actual hypertension. The relaxation technique itself is divided into two kinds, physical relaxation techniques, and mental relaxation techniques. As for those that included in physical relaxation techniques is the diaphragmatic breathing relaxation technique (National Safety Council, 2004). A diaphragmatic breathing relaxation technique is still the easiest method of relaxation. Diaphragmatic breathing is slowly, consciously, and deep breathing technique. This method involves the witting movement of the lower abdomen or abdominal area. The relaxation itself consists of reducing the amount of stimulation created by the five senses so that they resist the formation of stress responses, especially in the nervous system and hormones (National Safety Council, 2004).

According to the initial data that have been collected in Talabiu village, Woha district, Bima Regency, hypertension is included in the top 10 biggest disease groups. From 1730 of villagers of Talabiu, Woha district, Bima there are 154 elderly included in that disease group, it's the summary as follows: about 64 people suffering from Hypertension, Rheumatic 41, Cataract 5 people, 2 Asthma, Diabetes Mellitus 1, etc. 13. Hypertension is the most prevalent disease in Talabiu village, Woha. This is following the existing data of the Public Health Office of Bima regency in 2014 where there were 265 hypertension sufferers. In 2015 the number of hypertension sufferers increased to 306 people and in 2016 there were more 332 people.

Based on the description above, researchers are interested in researching the effectiveness of diaphragmatic breathing exercise leaflet on reducing the blood pressure of hypertensive elderly at an integrated health care delivery system in Talabiu village, Woha district of Bima Regency. This study purposed to know the effectiveness of diaphragmatic breathing exercise leaflet on reducing the blood pressure of hypertensive elderly at an integrated health care delivery system in Talabiu village, Woha district of Bima Regency.

II. REVIEW OF LITERATURE

A. Blood Pressure

Blood pressure is the result of the measurement of the pressure caused by blood in the walls of the arteries when blood in the heart is pumped throughout the body with systolic and diastolic measurements. Factors that also affect the blood pressure are peripheral resistance, cardiac output, blood volume, venous return, blood viscosity, and arterial wall elasticity. There are two types of blood pressure; systolic pressure which represents the highest pressure in the left ventricle during systole, and diastolic pressure which is the lowest pressure when the ventricle is filled during diastole. Both of these pressures type are measured indirectly in the brachial artery using a stethoscope and sphygmomanometer with the *Riester* brand and measurements are made in mm of mercury

pressure (mmHg). Typical blood pressure for young adults is 120/70 mmHg. Arterial blood pressure can be measured directly by using the arterial pressure transducer (Hayens *et al.*, 2009).

B. Normal Blood Pressure

Readings on blood pressure measurements consist of two readings, the first is in a higher number that is called systolic pressure, this pressure occurs when the throbbing heart muscle pumps blood to get out through the arteries. That number shows how strong the heart is pumping to push blood through the veins, while the second reading is in a lower number is called diastolic pressure, which is when the heart is resting to let the blood return to the heart. The figure shows how much the blood vessels resistance blood flow back to the heart (Sustrani, 2010; Keohin & Graw, 2017; Mustika & Sudiantara, 2019). The normal level of blood pressure varies throughout life. The Joint National Committee (1993) in Perry & Potter (2005), states that systolic and diastolic pressure can vary at various ages.

C. Blood Pressure Physiology

Blood pressure in the arterial system of the body is a good indicator of cardiovascular's health. Blood flow to the circulation system due to changes in pressure. Blood flows from the higher pressure areas to the low-pressure areas. Heart contractions push blood with high pressure to the aorta. The peak of maximum pressure when the injection occurs is called systolic blood pressure. when the ventricle relaxes, the blood that remains in the artery causing minimum pressure or called diastolic pressure. Diastolic pressure is the minimum pressure that urges the arterial wall at all times. Blood pressure illustrates the interrelations of cardiac output, peripheral vascular resistance, blood volume, blood viscosity and arterial elasticity (Perry & Potter 2005).

D. Hypertension Concepts

Hypertension or high blood pressure is a vascular problem which causes the supply of oxygen and nutrients carried by blood being blocked to the tissues where the blood pressure is more than normal. Often called a silent killer, it's because hypertension includes a deadly disease without any symptoms before an attack (Sustrani *et al.*, 2010).

E. Etiology

According to Zuraida *et al.* (2012), risk factors for hypertension include:

1) Obesity

The hallmark of hypertension sufferers. Although certain relations between hypertension and obesity is not yet known, it has been proven that heart-pumping power and blood volume circulation in obese patients with hypertension are higher than hypertensive patients with normal weight. Obesity or overweight where body weight reaches a body mass index >27 (body weight (kg) divided by the square of height (m)) is also one of a risk factor for hypertension.

III. STRESS

Allegedly through sympathetic nerve activity (nerves that work when we move). The increasing sympathetic nerve activity leads to increases in blood pressure intermittently (unpredictable). The relations between stress and hypertension is thought to be through sympathetic nerve activity, which can increase blood pressure gradually. If stress becomes prolonged it can cause high blood pressure.

IV. GENETIC

If a hypertension record is found in both parents, so then essential hypertension will be very large. Similarly, with monozygotic (one egg) when one of them is hypertensive. The role of genetic factors on the incidence of hypertension is evidenced by the discovery of the incidence that hypertension is more common in monozygotic twins than heterozygotes (different egg cells). A hypertensive patient has the genetic characteristics of primary hypertension (essential) if naturally left without therapeutic intervention, along with his/her environment, hypertension grew within about 30-50 years.

V. GENDER

Men are more likely to have the possibility of suffering hypertension than women. Based on gender it may also be influenced by psychological factors. Women are often triggered by unhealthy behavior (smoking, overweight), depression and low employment status. While men more concerned with work, such as feeling uncomfortable about work and unemployment status

VI. AGES

As we grew up, the possibility of suffering from hypertension is also greater. Certain kinds of non-infectious diseases such as cardiovascular, diabetes mellitus, and others are closely related to age. The older a person, the greater the risk of suffering the disease. At the age of >40 years, the more risk of suffering hypertension and diabetes diseases. Along with getting older, the risk of suffering hypertension is greater so that the prevalence among the elderly is quite high at around 40% with around 50% mortality over the age of 60 years.

F. Pathophysiology

The mechanism of hypertension in the body is controlled by baroreceptors, regulation of body fluids volume, the renin-angiotensin system, and autoregulation (Dalimartha *et al.*, 2008). According to the etiology of hypertension or high blood pressure, it can be caused by several things such as obesity, lack of exercise, genetic, excessive salt consumption, fatty, and high cholesterol foods, alcohols, smoking, kidney disease, drugs use and hormonal disorders (Setiawati & Bustami, 2008; Nyandra & Suryasa, 2019; Albán *et al.*, 2019). Someone in such a condition above will stimulate the release of the rennin and angiotensinogen hormone (Muhummadun, 2010). Rennin is produced by the kidneys. Angiotensinogen is a passive protein in the blood and produced by the liver. Rennin met with angiotensinogen to be converted into Angiotensin I (Muhummadun, 2010; Sulaeman *et al.*, 2018;

Sulaeman *et al.*, 2018). ACE (Angiotensin Converting Enzyme) found in the lungs, plays an important physiological role in regulating blood pressure (Muhummadun, 2010). Angiotensin I by ACE changed to Angiotensin II. Angiotensin II has a key role in raising blood pressure (Asdie, 2010; Mataram *et al.*, 2020; Estevez *et al.*, 2019).

G. Diaphragmatic Breathing Concepts

Diaphragmatic breathing is a relaxation technique that is most easily done with slow, conscious and deep breathing. Diaphragmatic breathing technique is the basis of all the breathing techniques of yoga breathing techniques (Pranayama). In it's simplest form, diaphragmatic breathing is slowly, consciously and deeply breathing. It is a sign of a deep sigh. Normal breathing frequency is 14-16 times/minutes, during intense exercise it's increasing to about 60 times/minutes. With diaphragmatic breathing, it can reduce the breathing frequency to 3-6 time/minutes (Widiaastuti & Palupi, 2008).

H. Purposes

According to Katamsi (2011), the technique used to reduce stress is the breathing technique. Because it's very good for changes so that the thought can easily be known. If it's felt properly, thoughts will appear and can be felt. The body will also be filled with oxygen, good energy so that the body becomes healthy. The purpose of breathing exercises is to:

- 1) Adjust the frequency and respiration pattern to reduce air trapping.
- 2) Fix the diaphragm function.
- 3) Improve mobility of the thoracic cage.
- 4) Improve alveoli ventilation to restore gas exchange without increasing respiratory burden.
- 5) Regulate and coordinate respiration speed so that breathing is more effective and reduces breathing burden.

I. Breathing Diaphragm Mechanism In The Body

According to the neurophysiological model by yoga breathing, it is assumed that the endocrine-effect by Hypothalamic-Pituitary-Adrenal (HPA) modulation which is important to fight and transmit human responses and survival. It could be very possible that diaphragmatic breathing is capable of releasing *prolactin*, *vasopressin*, and *oxytocin* through the *vagal afferents* into the hypothalamus and anterior pituitary. Oxytocin secretion is found to be low in deep depression and hypothesized to be elevated after treatment with breathing techniques in yoga. As prolactin is found to be elevated (Katamsi, 2011; Lestari *et al.*, 2016). Diaphragmatic breathing can help transport nitric oxide. It is a very powerful means to widen the channels of blood vessels and lungs, which is contained in a nasal pathway to the lungs and blood vessels to make it properly function. Taking a deep breath helps the lungs to elevate the oxygen saturation to 100% from 98%. Being able to release the tension with increased distribution of the lymphatic system that removes toxins from the body. Properly breathing could soothe emotional or mental, and be able to improve the quality of the brains (Twistiandayani & Widyasti, 2013).

J. The Benefits of Diaphragmatic Breathing

According to Twistiandayani & Widyasti (2013),

- 1) Smoothing out the circulatory system is very important in maintaining the balance of the body's biological system overall
- 2) Increased immune system (immune system) along with optimal blood circulation.
- 3) Helping to prevent infection in the lungs and other tissues in the body.
- 4) Stimulates the releasing of endorphins which have a soothing effect (relax) on the body, so it can help relieve stress, panic or nervousness.
- 5) Diaphragm muscle pressure that continues over time with regular frequency toward the lower organs of the chest cavity such as the stomach, intestines, and liver, gives a good "massage"-effect to these organs.

VII. METHOD

The research's type that conducted by researchers is quasy experiment research. Quasy-experimental research is research that uses a treatment aimed to assess any effect of action when compared with other actions. The research design is two groups *Pretest-Posttest Only Design* (pre-post-test for two groups) where the data collection using two groups, there is a comparison-group (control group) and an intervention group. The intervention group was given leaflets and *diagfarma* breathing exercises 3 times while the control group was given only leaflets.

The sampling technique in this study is *total sampling*. There are 100 populations, the entire population is sampled. The instruments of this study were Standard Operating Procedure (SOPs) for Diaphragmatic Breathing Exercise, sphygmomanometer, and observation sheet of the respondent's blood pressure, data collection for the intervention group before the research conducted was giving the group counseling and exercise of how to doing diaphragmatic breathing relaxation using leaflets, while in the control group only given leaflets. Before doing the intervention to the intervention group, researchers took the blood pressure measurements before doing the diaphragmatic breathing exercise, then researchers did it 3 times for 5 minutes. The researchers re-measured the blood pressure of hypertensive respondents after doing diaphragmatic breathing exercises using a sphygmomanometer and a stethoscope and noted the results on an observation sheet.

The data analysis of this study is the measurement of blood pressure that conducted twice, before the intervention (*pretest*) and after the intervention (*posttest*). To find out the effectiveness of diaphragmatic breathing exercise on reducing the blood pressure of hypertensive elderly, researchers used a statistical test, *Paired T-Test* which was used to see the comparison of blood pressure in hypertensive patients on *pre-test and post-test*, with the help of a computer program to compared data before and after the intervention with a significance level of $p \leq 0.05$ and a confidence level of 5%. If the calculation result of $p < 0.05$ it means that H_0 is rejected, which means that the diaphragmatic breathing exercise leaflet is effective on reducing the blood pressure of hypertensive elderly at an integrated health care delivery system in Talabiu Village, Woha District of Bima Regency. The hypertensive respondents were given diaphragmatic breathing exercises for 5 minutes 3 times. In this study, researchers give diaphragmatic breathing exercise treatment to the elderly respondents in Talabiu village, Woha district, Bima regency. After being given diaphragmatic breathing exercise treatment then the respondents observed and interviewed to see the changes in blood pressure, reduced or settled after 10 minutes. When conducting research, researchers previously submitted a request for permission from the village head of Talabiu village of Woha district of Bima regency to conduct the research. After receiving permission, then research being conducted by

emphasizing the ethical problems including the Approval Sheet (*Informed Consent*). This *Informed Consent* is given and explained to respondents who will be examined which was qualified by the inclusion criteria and are followed by the title and benefits of the study so that the respondent can understand the intents and purposes of the study. When the subject refuses, the researcher does not force and still respects the rights of the subject. (*Confidentiality*). The confidentiality of respondents' information is guaranteed by researchers; only certain data groups will be reported as results.

VIII. RESULT

After researching on 26 August to 30 September 2017 with a sample of 32 intervention groups and 32 control groups.

Table 1: Distribution of Respondents Based on Age at Talabiu village, Woha district, Bima regency

No	Ages (Years)	Category	Frequencies	Percentage (%)
1	36 – 45	Early Middle Age	0	0
2	46 – 55	Late Middle Age	0	0
3	56 – 65	Late Adulthood	46	71,9
4	> 65	Elderly	18	28,1
Total			64	100

Table 1 above based on the age of 64 respondents showed that the most distribution of respondents at Talabiu Village, Woha district, Bima regency are in the Late Adult (56 - 65 years) by about 46 respondents (71.9%), Elderly (>65 years) about 15 respondents (28.1%).

Table 2: Distribution of Respondents Based on Gender at Talabiu village, Woha district, Bima regency.

No.	Gender	Frequencies	Percentage (%)
1	Male	28	44
2	Female	36	56
Total		64	100

Table 2 above based on the gender of 64 respondents showed that the most distribution of respondents at Talabiu Village, Woha district, Bima regency are female respondents by about 36 people (56%) and male respondents as many as 28 people (44%).

Table 3: Distribution of Respondents Based on Education Level at Talabiu village, Woha district, Bima regency.

No	Education Level	Frequencies	Percentage (%)
1	No Formal Education	15	23
2	Elementary School	42	66
3	Junior High School	6	9
4	Senior High School	1	2
Total		64	100

Table 3 above based on the education level of 64 respondents showed that the most distribution of respondents at Talabiu Village, Woha district, Bima regency are respondents with Elementary School Level by about 42 people (66%), respondents with No Formal Education about 15 people (23%), respondents with Junior High School Level 6 people (9%), while the least number of respondents with Senior High School Level as much as 1 person (2%).

Table 4: Distribution of Respondents Based on Occupation at Talabiu village, Woha district, Bima regency.

No	Occupation	Frequencies	Percentage (%)
1	Unemployed	21	32,8
2	Entrepreneur	5	7,8
3	Labor/Farmer	38	59,4
Total		64	100

Table 4 above based on the occupation of 64 respondents that suffered from hypertension for 1 week period showed that the most distribution of respondents at Talabiu Village, Woha district, Bima regency areas Labor/Farmers who suffered from hypertension by about 38 (59, 4%) respondents, followed by 21 (32.8%), unemployed respondents. While the respondents who work as Entrepreneurs are at least 5 people (7.8%).

Table 5: Distribution of Respondents Based on Duration of Hypertension at Talabiu village, Woha district, Bima regency.

No	Duration of Hypertension	Frequencies	Percentage (%)
1	>6 month	45	70,3
2	<6 month	19	29,7
Total		64	100

Table 5 above based on the duration of hypertension of 64 respondents showed that the most distribution of respondents at Talabiu Village, Woha district, Bima regency are respondents that had hypertension with >6 months by about 45 (70.3%) respondents. While respondents that had hypertension with <6 months were about 19 (29.7%) respondents.

Table 6: Distribution of Respondents Based on Hypertension Record at Talabiu village, Woha district, Bima regency

No	Hypertension Record	Frequencies	Percentage (%)
1	Had Record	21	32,8
2	Had No Record	43	67,2
	Total	64	100

Table 6 above based on the hypertension record of 64 respondents showed that the most distribution of respondents at Talabiu Village, Woha district, Bima regency are respondents with a family that Had hypertension record by about 21 (32.8%) respondents. While respondents with a family that Had No hypertension record as many as 43 (67.2%) respondents.

Table 7: Distribution of Intervention Group Based on Hypertensive Respondent's Blood Pressure Before Giving the Leaflet and Diaphragmatic Breathing Exercise at Talabiu village, Woha district, Bima regency.

Variables	Intervention Group	
Decreased blood pressure in hypertensive patients.	N	%
Mean \pm SD	162.50 \pm 17.59	
	8	
Mild Hypertension: 140-159/90-99 mmHg	14	43.7
Moderate Hypertension: 160-179/100-109 mmHg	0	0
Severe Hypertension : $\geq 180/ \geq 110$ mmHg	18	56.3
Total	32	100

Table 7 above shows that from the 32 respondents that will be intervened, 14 (43.7%) respondents had Mild Hypertension and 18 (56.3%) respondents had Severe Hypertension.

Table 8: Distribution of Control Group Based on Hypertensive Respondent's Blood Pressure Before Giving the Leaflet and Diaphragmatic Breathing Exercise at Talabiu village, Woha district, Bima regency.

Variables	Control Group	
Decreased blood pressure in hypertensive patients.	N	%
Mean \pm SD	150.00 \pm 17.460	
Mild Hypertension: 140-159/90-99 mmHg	13	40.7

Moderate Hypertension: 160-179/100-109 mmHg	0	0
Severe Hypertension : ≥180/ ≥110 mmHg	19	59.3
Total	32	100

Table 8 above shows that from the 32 respondents that will be controlled, 13 (40.7%) respondents had Mild Hypertension and 19 (59.3%) respondents had Severe Hypertension.

Table 9: Distribution of Intervention Group Based on Hypertensive Respondent's Blood Pressure After Giving the Leaflet and Diaphragmatic Breathing Exercise at Talabiu village, Woha district, Bima regency.

Variables	Intervention Group	
Decreased blood pressure in hypertensive patients.	N	%
Mean ± SD	147.19±13.73	
	3	
Mild Hypertension: 140-159/90-99 mmHg	25	78.1
Moderate Hypertension: 160-179/100-109 mmHg	0	0
Severe Hypertension : ≥180/ ≥110 mmHg	7	21.9
Total	32	100

Table 9 above shows that from the 32 respondents that will be intervened, 25 (78.1%) respondents had Mild Hypertension and 7 (21.9%) respondents had Severe Hypertension.

Tabel 10: Distribution of Control Group Based on Hypertensive Respondent's Blood Pressure After Giving the Leaflet and Diaphragmatic Breathing Exercise at Talabiu village, Woha district, Bima regency.

Variables	Control Group	
Decreased blood pressure in hypertensive patients.	N	%
Mean ± SD	139.69±10.52	
	1	
Mild Hypertension: 140-159/90-99 mmHg	30	78.1
Moderate Hypertension: 160-179/100-109 mmHg	0	0
Severe Hypertension :	2	21.9

≥180/ ≥110 mmHg		
Total	32	100

Table 10 above shows that from the 32 respondents that will be controlled, 30 (94.0%) respondents had Mild Hypertension and 7 (6.0%) respondents had Severe Hypertension.

Table 11: The Mean Differences of the Blood Pressure of Hypertensive Patients in Control Group and Intervention Group Before and After Diaphragmatic Breathing Exercise

Group	N	Mean	SD	ρ
Intervention				
Blood Pressure of Hypertensive Patients <i>Pre-Post</i>	32	15.312	15.447	0.000
Control				
Blood Pressure of Hypertensive Patients <i>Pre-Post</i>	32	10.000	11.902	0.000

Table 11 shows that after being given a diaphragmatic breathing exercise leaflet, it can reduce blood pressure on hypertensive patients of the intervention group by 0.095%, as well as in the control group it can reduce blood pressure in hypertensive patients by 0.06%. The comparative test results using *Paired T-Test* obtained ρ value = 0.000 which mean that there is a difference between the Intervention Group and the Control Group, seeing from the difference value between the intervention group is greater than the difference value of the control group so it can be interpreted that the implementations of diaphragmatic breathing exercise leaflets is more effective on decreasing blood pressure in hypertensive patients.

Table 11: Hypothesis Testing Table of Hypertensive Patients' Blood Pressure Pre Test and Post Test Intervention and Control Groups.

	Blood Pressure of Hypertensive Patients on The Intervention Group <i>Pretest</i> and <i>Posttes</i>	Blood Pressure of Hypertensive Patients on The Control Group <i>Pretest</i> and <i>Posttes</i>
Z	-4.356 ^a	-3.751 ^a
ρ	.000	.000

Statistical tests were conducted to prove the hypothesis, which was to find out the effectiveness of giving diaphragmatic breathing exercise leaflet on reducing the blood pressure of hypertensive elderly at an integrated health care delivery system in Talabiu Village, Woha District of Bima Regency. The results of this study were analyzed using the Paired T-Test with the help of a computer program using the significance level $\alpha = 0.05$

IX. DISCUSSION

This chapter describes the result of existing research, after getting the results then find out whether there is a gap or not between theory and reality in the field about the relations of giving the diaphragmatic breathing exercise leaflet on reducing the blood pressure of hypertensive elderly. Statistical tests were conducted to prove the hypothesis, which was to find out the effectiveness of giving the diaphragmatic breathing exercise leaflet on reducing the blood pressure of hypertensive elderly in Talabiu village, Woha District, Bima Regency. The results of this study were analyzed using the Paired T-Test with the help of a computer program using the significance level $\alpha = 0.05$. So that the obtained results will be: if the p -value $< \alpha$, then H_0 is rejected, which means there is an effect of Diaphragmatic Breathing Exercise Leaflet on reducing the blood pressure of hypertensive elderly at an integrated health care delivery system in Talabiu Village, Woha District of Bima Regency. The results of this study are in accord with what was conducted by Hartati (2016), who stated that deep breath relaxation therapy effectively reduces blood pressure in hypertensive patients. Exactly like the results of research conducted by Wardani (2015), which stated that there is an effect of giving breathing relaxation techniques as an adjunction therapy on reducing blood pressure in patients with stage 1 hypertension.

The results showed that the diaphragmatic breathing exercise leaflet was effective in reducing the blood pressure of hypertensive elderly at an integrated health care delivery system in Talabiu Village, Woha District of Bima Regency. This is evidenced by the average of systolic blood pressure before being given diaphragmatic breathing exercise which was 157.05 mmHg and the average of systolic blood pressure after being given diaphragmatic breathing exercise which was 140.01 mmHg. The average of diastolic blood pressure before being given diaphragmatic breathing exercise was 87 mmHg and the average of diastolic blood pressure after being given diaphragmatic breathing exercise was 86 mmHg. There is a decrease in the respondent's blood pressure after being given diaphragmatic breathing exercise, which is that systolic blood pressure of 16.95 mmHg and diastolic blood pressure of 1 mmHg.

The results showed that the diaphragmatic breathing exercise leaflet can reduce blood pressure both systolic and diastolic. The method of this therapy can provide cardiopulmonary stretching (Izzo & Camilleri, 2008). Stimulation of stretches in the aortic arch and carotid sinus is received and passed on by the vagus nerve to the medulla oblongata (central cardiovascular regulation), and subsequently an increase in baroreceptor reflexes. Afferent impulses from the baroreceptors reach the heart center which will stimulate the parasympathetic nerve and blocks the sympathetic central nerve, thus becoming systemic vasodilation, decreasing heart rate and heart contraction. The stimulation of parasympathetic nerves to other parts of the myocardium leading to reducing contractility, the stroke volume produces a negative inotropic effect. This situation causes a decrease in stroke volume and cardiac output. In skeletal muscle, some of the vasomotor fibers release acetylcholine which causes dilatation of blood vessels and consequently makes blood pressure decrease (Muttaqin, 2009).

The reduction of blood pressure mechanisms on individuals who had done the diaphragmatic breathing exercise is very complex. Dhungel & Sohal (2013), concluded that there is a significant relationship between the nasal cycle, cerebral dominance, and autonomic activity. This nasal cycle has relations with cerebral dominance. When one of the nostrils dominates, the counter lateral hemisphere will be activated. Breathing using the diaphragm muscles associated with the left cerebral hemisphere causes to increase in the sympathetic nervous

system stimulation. Meanwhile, breathing through the left spinal and it's directly related to the right cerebral hemisphere which stimulates the work of the parasympathetic nerve so that the body will experience relaxation. Therefore, breathing with diaphragmatic breathing exercise can balance the activity of the sympathetic and parasympathetic nerves, to stabilize the blood pressure.

X. CONCLUSION

After conducting the statistical tests, it is shown that the Diaphragmatic Breathing Exercise Leaflet was effective in reducing the blood pressure of hypertensive elderly at an integrated health care delivery system in Talabiu Village, Woha District of Bima Regency.

XI. SUGGESTION

1) For Hospital

For the Hospital's Nursing Manager to establish diaphragmatic breathing relaxation techniques as one of the therapies to deal with elevated blood pressure (hypertension) due to cardiovascular system disorders in addition to antihypertensive therapy used in the management of hypertensive patients and to set the Standard Operating Procedure (SOPs) for Diaphragmatic Breathing Relaxation to improve the quality of health services.

2) For Nursing Services

To the clinical practitioners of nurses to be able to examine about diaphragmatic breathing relaxation techniques more advanced on reducing elevated blood pressure due to hypertension and by the results of this study with it's limitations so that these actions could be applied to clients and helps them to deal with discomfort of pain and use them in Roy's adaptation approach of nursing care.

3) For Educational Institutions

To the educational institutions to be able to list the oxygen therapy as learning material in clinical practice while still linked to the latest studies of nursing in the intensive care area.

4) For Patients

By the results of this study add patients' insights if there is sudden chest pain occurs to quickly seek help from the health services to get intensive care.

5) For Other Researchers

Further research needs to be done on the effects of diaphragmatic breathing exercise leaflet on reducing the blood pressure of hypertensive elderly at an integrated health care delivery system in Talabiu Village, Woha District of Bima Regency with a relatively longer observations time and with a greater number of respondents so that we can find out the effectiveness of diaphragmatic breathing relaxation techniques on reducing elevated blood pressure in hypertensive patients.

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