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Implementation of Breathing Exercises at Home in Hypertension Patients in Adults Aged 36-45 Years

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***Abstract*—** Hypertension is one of the diseases of the cardiovascular system that has high mortality and morbidity rates. High blood pressure in hypertensive patients can be treated with pharmacological and non-pharmacological therapy. One of the non-pharmacological therapies is deep breathing relaxation therapy. This study aims to determine the effectiveness of deep breathing relaxation therapy on reducing blood pressure in patients with hypertension. The sample in this study were patients with hypertension in Kelurahan Jawa, RT 19 and RT 26 Samarinda as many as 40 respondents. The design of this study was to use a Cluster-randomized trial design by conducting a cluster randomized controlled trial with a 1:1 community-based intervention and control group. The results of the study above show that the systolic blood pressure value before being given deep breathing relaxation therapy was 160.451 mmHg and the systolic blood pressure after being given deep breathing therapy was 130 mmHg. And the diastolic blood pressure before being given deep breathing therapy was 98 mmHg and the diastolic blood pressure after being given deep breathing therapy was 84.35 mmHg. In this study, the confidence level taken was 95% with 5% (0.05). Based on statistical analysis using paired sample T-test, the systolic blood pressure value was 0.001. This means that the value is smaller than 5% (0.05) so that H0 is rejected, which means that there is an effect of deep breathing relaxation therapy on reducing blood pressure in people with hypertension. The average systolic blood pressure value after being given deep breathing relaxation therapy was 30.46 mmHg and the average diastolic blood pressure after being given deep breathing relaxation therapy was 84.35 mmHg. There was a decrease in the respondents' blood pressure after being given deep breathing relaxation therapy, namely systolic blood pressure of 130 mmHg and diastolic blood pressure of 84.35 mmHg. Based on statistical analysis using paired sample T-test with a confidence level taken at 95% with 5% (0.05), the diastolic blood pressure value was 0.001 and the diastolic blood pressure value was 0.001. This shows that deep breathing relaxation therapy is effective in lowering blood pressure in hypertensive patients. This study recommends that deep breathing relaxation therapy is effective in lowering blood pressure (systolic and diastolic) in hypertensive patients.

***Keywords*—** Implementation**,** Adults**,** Relaxation, Deep Breathing, Blood Pressure, Hypertension

I. INTRODUCTION

According to the joint national committee on prevention, detection, evaluation and treatment of high blood pressure VII/JNC 2003 hypertension is a condition where systolic blood pressure is ≥140 mmHg and diastolic pressure is ≥90 mmHg. Blood pressure is divided into systolic blood pressure and diastolic blood pressure. The phenomenon of hypertension in Indonesia is 9.5%, diagnosed by health workers or taking medication is 9.4%, indicating that many hypertension patients still use pharmacological therapy. In addition to pharmacological therapy, non-pharmacological therapy can lower high blood pressure in hypertension patients (Gonidjaya et al, 2021). One non-pharmacological therapy that can lower blood pressure is deep breathing relaxation therapy (Meles et al, 2004; Widjaya et al, 2018).

Deep breathing relaxation is a respiratory or breathing exercise by regulating breathing activity, both tempo, intensity and rhythm which is slower and deeper so that it can affect the mental attitude and body to relax (Mangapi et al, 2022; Khomsah & Wulan, 2023). Deep breathing relaxation is breathing with a slow frequency and slowly, rhythmically and comfortably by closing the eyes when inhaling (Lu et al, 2015). The effect of this therapy is distraction or diversion of attention. High blood pressure is still a major challenge in Indonesia (Fatmawati & Ibrahim, 2017). Hypertension is a major health problem with data obtained from document studies, most people with hypertension consume antihypertensive drugs (Khanal et al, 2021). The several recommended therapies, relaxation is one way to lower blood pressure in hypertension (Neupane et al, 2016; Ogedegbe et al, 2015; Mitsungnern et al, 2021). Relaxation is a self-management technique based on how the sympathetic and parasympathetic nervous systems work. Relaxation methods consist of several types, including progressive muscle relaxation, diaphragmatic breathing, and deep breathing relaxation. The deep breathing relaxation technique that is carried out will stimulate the emergence of nitric oxide which will enter the lungs and even the brain center which functions to make people calmer so that high

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blood pressure will decrease (Setyawan, A. B., & Masnina, R. (2018).).

Deep breathing relaxation is breathing in the abdomen with a slow frequency and slowly, rhythmically, and comfortably by closing the eyes while breathing. The effect of this therapy is distraction or diversion of attention.

II. METHODS

Research design is used in this study used a cluster-randomized trial by conducting a cluster randomized controlled trial with a 1:1 Community-Based Intervention and control group. The subjects of this study were a research population of 40 adults aged 36-45 years in RT 19 and RW 26, Jawa sub-district, Samarinda city. The criteria in this study are with the inclusion criteria; 1. Aged ≥36 years, 2. Able to speak Indonesian well, 3. Have a history of uncontrolled hypertension 140/90 mmHg and are currently undergoing antihypertensive treatment. Exclusion criteria; 1. Angina, 2. Heart failure, 3. Kidney failure, 4. Cerebrovascular disease, 5. Pregnancy, 6. Neoplasm, 7. Blindness, 8. Deafness Research management procedures (Ola et al, 2023):

1. Recruitment of participants with 2 groups (1:1) intervention group and control group
2. Intervention; 1. Participants whose names have been registered as suffering from hypertension aged 36-45 years, 2. Receive door to door/house to house breathing exercise intervention and available standard care. Nurses/researchers provide deep breathing techniques during the 2-week intervention period. Sessions are conducted during the first and second weeks.

III. RESULTS AND DISCUSSION

Implementation of the study. Intervention group. A. Home visits; 1. Nurses visit patient's home door to door each patient, 2. After participant registration, 3. Nurses discuss with patients. B. Deep breathing technique; 1. Nurses provide deep breathing technique, 2. Each session 15-20 minutes. Control Group: Only receive regular care.

Table 1. Distribution of frequency aggregate adult's respondent age 36-45 years old

Characteristics	Intervention		Control		Total	
	n	%	n	%	n	%
36 Years Old	3	15%	4	20%	7	17,5%
37 Years Old	1	5%	0	0%	1	2,5%
38 Years Old	0	0%	1	5%	1	2,5%
39 Years Old	0	0%	1	5%	1	2,5%
40 years Old	3	15%	1	5%	4	10%
41 Years Old	0	0%	3	15%	3	7,5%
42 years Old	2	10%	2	10%	4	10%
43 Years Old	4	20%	0	0%	4	10%
44 Years Old	1	5%	2	10%	3	7,5%
45 years Old	6	30%	6	30%	12	30%
Total	20	100	20	100	40	100

Summary of Age Distribution in Intervention and Control Groups

Total Participants: 40
Intervention Group: 20 (50%)
Control Group: 20 (50%)
Age Breakdown:

1. 36 Years Old:
   a) Intervention: 3 (15%)
   b) Control: 4 (20%)
   c) Total: 7 (17.5%)
2. 37 Years Old:
   a) Intervention: 1 (5%)
   b) Control: 0 (0%)
   c) Total: 1 (2.5%)
3. 38 Years Old:
   a) Intervention: 0 (0%)
   b) Control: 1 (5%)
   c) Total: 1 (2.5%)
4. 39 Years Old:
   a) Intervention: 0 (0%)
   b) Control: 1 (5%)
   c) Total: 1 (2.5%)
5. 40 Years Old:
   a) Intervention: 3 (15%)
   b) Control: 1 (5%)
   c) Total: 4 (10%)
6. 41 Years Old:
   a) Intervention: 0 (0%)
   b) Control: 3 (15%)
   c) Total: 3 (7.5%)
7. 42 Years Old:
   a) Intervention: 2 (10%)
   b) Control: 2 (10%)
   c) Total: 4 (10%)
8. 43 Years Old:
   a) Intervention: 4 (20%)
   b) Control: 0 (0%)
   c) Total: 4 (10%)
9. 44 Years Old:
   a) Intervention: 1 (5%)
   b) Control: 2 (10%)
   c) Total: 3 (7.5%)
10. 45 Years Old:
   a) Intervention: 6 (30%)
   b) Control: 6 (30%)

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c) Total: 12 (30%)

Overview:

1. The age group with the highest representation in both groups is 45 years old (30%).
2. The intervention group has a higher percentage of participants aged 36 and 43, while the control group features 41 as their most populated age.
3. The age range of 42 years old is evenly represented between both groups (10% each).

This summary highlights the distribution of age in each group, giving an overall view of participant demographics.

Table 2 Distribution of aggregate gender frequency of respondents aggregate adults aged 36-45 Years old

Characteristics	Intervention		Control		Total	
	n	%	n	%	n	%
Man	2	10%	12	60%	14	35%
Female	18	90%	8	40%	26	65%
Total	20	100	20	100	40	100

Overview:

1. The intervention group consists of 2 males (10%) and 18 females (90%).
2. The control group has 12 males (60%) and 8 females (40%).
3. In total, there are 14 males (35%) and 26 females (65%) among the 40 participants.

This summary effectively illustrates the gender distribution between the intervention and control groups for adults aged 36-45. Summary of Age Distribution of Adults Diagnosed with Hypertension (Aged 36-45)

Table 3 Frequency distribution of age old diagnosed with hypertension aggregate respondents' Aggregate adults aged 36-45 years old

Characteristics	Intervention		Control		Total	
	n	%	n	%	n	%
1-5 Years	12	60%	12	60%	24	60%
6-10 Years	7	35%	7	35%	14	35%
>11 Years	1	5%	1	5%	2	5%
Total	20	100	20	100	40	100

Overview:

1. Among the intervention group, 60% (12 respondents) were diagnosed with hypertension within 1-5 years, 35% (7 respondents) within 6-10 years, and 5% (1 respondent) beyond 11 years.
2. The control group shows identical proportions: 60% (12 respondents) diagnosed within 1-5 years, 35% (7 respondents) within 6-10 years, and 5% (1 respondent) beyond 11 years.
3. Overall, 60% of the total respondents (24 individuals) were diagnosed within 1-5 years, 35% (14 individuals) within 6-10 years, and 5% (2 individuals) beyond 11 years.

This summary provides a clear view of the distribution of diagnosis duration for hypertension among adults aged 36-45 in both intervention and control groups. Table 4 shows the average systolic blood pressure values after deep breathing relaxation therapy was given.

Table 4. The Average systolic blood pressure values after deep breathing relaxation therapy.

Blood Pressure (mmHg)		Mean	Difference	Value
Systolic	Before intervention is given	160,451	30,46	0,001
	After being given intervention	130		
Diastolic	Before intervention is given	98	13,65	0,001
	After being given intervention	84,35		

Interpretations:

1. Systolic Pressure:
   a) The average systolic blood pressure before the intervention was 160.45 mmHg.
   b) The average systolic blood pressure after the intervention was 130.00 mmHg.
   c) The mean difference (reduction) is noted as 30.46 mmHg, which is significant as indicated by the p-value of 0.001.
2. Diastolic Pressure:
   a) The average diastolic blood pressure before the intervention was 98.00 mmHg.
   b) The average diastolic blood pressure after the intervention was 84.35 mmHg.

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c) The mean difference (reduction) is noted as 13.65 mmHg, with a p-value of 0.001 suggesting that this change is also statistically significant.

Overall, both the systolic and diastolic blood pressures showed significant reductions after the deep breathing relaxation therapy, indicating its potential effectiveness in lowering blood pressure levels.

The results of the study above show that the systolic blood pressure value before being given deep breathing relaxation therapy was 160.451 mmHg and the systolic blood pressure after being given deep breathing therapy was 130 mmHg. And the diastolic blood pressure before being given deep breathing therapy was 98 mmHg and the diastolic blood pressure after being given deep breathing therapy was 84.35 mmHg. In this study, the confidence level taken was 95% with 5% (0.05). Based on statistical analysis using paired sample T-test, the systolic blood pressure value was 0.001. This means that the value is smaller than 5% (0.05) so that H0 is rejected, which means that there is an effect of deep breathing relaxation therapy on reducing blood pressure in people with hypertension. The average systolic blood pressure value after being given deep breathing relaxation therapy was 30.46 mmHg and the average diastolic blood pressure after being given deep breathing relaxation therapy was 84.35 mmHg. There was a decrease in the respondents' blood pressure after being given deep breathing relaxation therapy, namely systolic blood pressure of 130 mmHg and diastolic blood pressure of 84.35 mmHg. Based on statistical analysis using paired sample T-test with a confidence level taken at 95% with 5% (0.05), the diastolic blood pressure value was 0.001 and the diastolic blood pressure value was 0.001.

This means that there is an effect of deep breathing relaxation therapy on reducing blood pressure in hypertensive patients. The results of the study showed that deep breathing relaxation therapy can lower blood pressure, both systolic and diastolic pressure.

The deep breathing relaxation technique is a type of treatment in which the nurse teaches the client how to take deep breaths, slow breaths (holding inspiration to the maximum) and how to exhale slowly. Apart from reducing muscle tension, this deep breathing relaxation technique is also useful for increasing lung ventilation and increasing oxygen levels in the blood. The aim of deep breathing relaxation techniques is to increase alveolar ventilation, maintain gas exchange, increase the effectiveness of coughing, and reduce both physical and emotional stress, which means it can reduce pain levels and reduce anxiety. Relaxation is an activity that can help overcome stress. The deep breathing relaxation technique is a form of treatment in which the nurse teaches the client how to take deep breaths, slow breaths (holding inspiration to the maximum) and how to exhale slowly. Apart from reducing pain levels, this deep breathing relaxation technique can also increase lung ventilation and increase oxygen levels in the blood.

Successful relaxation techniques can reduce heart rate, lower blood pressure, reduce tension headaches, relieve muscle tension, improve well-being, and reduce symptoms of stress in people dealing with a variety of conditions.

IV. Conclusion

This study demonstrates that deep breathing relaxation therapy is effective in reducing blood pressure in hypertensive adult patients (aged 36–45 years). Based on statistical analysis using the paired sample T-test, this therapy significantly decreased the average systolic blood pressure by 30.46 mmHg (from 160.45 mmHg to 130 mmHg) and the average diastolic blood pressure by 13.65 mmHg (from 98 mmHg to 84.35 mmHg). These results were achieved through a community-based intervention involving home visits and training in deep breathing techniques over a two-week period.

Deep breathing relaxation therapy not only helps lower blood pressure but also reduces physical and emotional stress, improves lung ventilation, and enhances blood oxygenation. This study suggests that deep breathing relaxation therapy can serve as a simple, safe, and effective non-pharmacological alternative for managing hypertension, particularly in improving patients' quality of life.

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