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Effectiveness of Warm Water Foot Soak and Benson Relaxation Techniques Combination in Reducing Blood Pressure of Hypertensive Patients

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ABSTRACT

Hypertension is called a silent killer because of its uncertain symptom. Therefore, early detection efforts are needed such as regular blood pressure check and effective management. This study aimed to determine the effectiveness of warm water foot soak and Benson relaxation techniques combination in reducing blood pressure as a medical treatment to the hypertension patients. This was a quasi-experiment study with one group pre and post-test design. The sample number of the study was 30 primary hypertension patients of Gambesi Community Health Centre of Ternate City working area. The result showed that there was a significant difference between pre (162.53±16.90mmHg) and post (154.33±19.06mmHg) systolic blood pressure mean, p-value was 0.000, systolic blood pressure mean at first 30 minutes after post-test was 146.00±18.49 mmHg (p=0.000), second 30 minutes was 139.93±15.98 mmHg (p=0.000), third 30 minutes was 136.33±14.06 mmHg (p=0.000) and fourth 30 minutes was 133.47±14.59 (p=0.000). There was a significant difference between pre (95.10±9.65mmHg) and post (90.00±9.47mmHg) diastolic blood pressure mean, p-value was 0.003, post diastolic blood pressure mean at first 30 minutes was 86.00±7.70 mmHg (p=0.000), second 30 minutes was 86.73±7.06 mmHg (p=0.000), third 30 minutes was 84.40±5.64 mmHg (p=0.000) and fourth 30 minutes was 83.47±5.38 (p=0.000). It could be concluded that combination of warm water foot soak and Benson relaxation techniques is effective to reduce blood pressure of hypertensive patient.

Keywords: warm water foot soak; Benson Relaxation;blood pressure

INTRODUCTION

Hypertension is blood pressure raised more than the standard (WHO, 2013). Raised blood pressure causes heart difficult to pump the blood. If it continues and uncontrolled, it could result heart attack, heart enlargement even heart failure. High blood pressure causes development of blood pressure to form bulge (aneurysm) which is prone to rupture, if it is occurred in the brain blood vessels it could causes stroke. The others complication could be blindness, kidney failure and cognitive disorder.(1)

It is worrying because it has been a global health problem. According to World Health Organization (2013) cardiovascular contribute to around 17 million deaths every year to the world and 9.4 of it caused by hypertension. The result of Riset Kesehatan Dasar (Basic Health Research) in 2013 suggested that Hypertension has highest prevalence of all disease, it was about 25.8%. Survei Indikator Kesehatan (Sirkesnas) in 2016 result suggested that the prevalence of hypertension increased to be 32.4% (Detik, 2017). The prevalence of hypertension is determined by behavior and metabolic factor. Behavior factors of

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hypertension were high fat and salty food consumption, alcohol consumption, smoking and poor stress management. Metabolic factor could be obesity, diabetes mellitus and blood lipid raised.

In medic, hypertension is called silent killer because of its uncommon symptom. Therefore, early detection efforts are needed such as regular blood pressure check and effective management either pharmacologically or non- pharmacologically to prevent its complication. Many non-pharmacologically efforts to reduce patient's blood pressure such as reduce high fat and salty food, do not smoke, do not drink alcohol, manage stress properly, warm water soak etc. (2). Non-pharmacological treatment is an independent nursing intervention practiced by nurse to reduce blood pressure of hypertension patient.

Warm water soak and Benson Relaxation is one of non-pharmacological effort to reduce blood pressure (2,3). Principle of water warm soak causes vasodilatation of peripheral blood vessel that resulting peripheral resistance reduction, eventually blood pressure also go down.

Benson relaxation is relaxation technique that focused on belief patients or belief factor (4). Benson relaxation technique is a stress management to treat hypertension patient (3).

Water warm foot soak and Benson relaxation technique is an easy non-pharmacological treatment independently practiced either by patient or health professional. Based on these descriptions, we interested to conduct research about effectiveness of warm water foot soak and Benson relaxation technique combination to reduce blood pressure of hypertension patient.

LITERATURE REVIEW

Hypertension is a condition in which systolic blood pressure is 140 mmHg or higher and diastolic blood pressure is 90 mmHg or higher (WHO, 2013). Its causes are divided into primary and secondary hypertension (Kowalak, 2003). Primary hypertension also called essential hypertension where the exact determinants of blood pressure raising are unknown (idiopathic), it could be triggered by age, obesity, stress, sex, smoking behavior, alcohol consumption and hyperlipidemia. While secondary hypertension's determinant could be recognized. Secondary hypertension happened as a complication of a certain disease, such as chronic kidney disease .

To prevent the complication, many efforts could be conducted either pharmacologically of non-pharmacologically. Pharmacologically effort is a treatment with anti-hypertension medicine. While non-pharmacologically ways could be regular exercise, weight monitoring, low salt diet, low fat diet, vegetable and fruit intake, no smoking, no alcohol consumption and relaxation therapy. (5) .

METHODOLOGY

This was a quasi-experiment with one group pre and post test design and aimed to determine effectiveness of warm water foot soak and Benson relaxation technique combination to reduce blood pressure of hypertension patient.

Subject of the study was hypertension patient of Gambesi Community Health Centre of Ternate City working area, inclusion criteria of the study were those whose systolic blood pressure is ≥140 mmHg or diastolic blood pressure is ≥90 mmHg, primary hypertension patient (essential) and voluntarily to be the study's subject. The sample number of the study was 30 hypertension patients and sampling method was purposive sampling.

Data collection started in November 2018. Before data collected, subject was instructed to rest for ±10 minutes, and blood pressure measured before intervention. After that, application of warm water foot soak and relaxation technique for 20 minutes. Then, blood pressure measure in every 30 minutes four times (first 30 minutes, second 30 minutes, third 30 minutes and fourth 30 minutes).

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Procedure of warm water foot soak and Benson relaxation technique combination as follow:

- Prepare 40oC warm water and pour into bucket
- Create a quiet environment
- Sit in a comfortable position
- Put the foot slowly into bucket filled with warm water until the foot damped to ±10cm above ankle.
- Cover the bucket with towel to maintain the water temperature.
- Eyes closed
- Relaxing all body's muscles
- Inhale slowly and deeply, after that exhale while talk to your heart based on your belief and repeat it.
- Practice it for 20 minutes
- Remain sit until a minute, think another thing and open eyes.
- Lift the feet up and dry them with towel.

This study was qualified ethically based on letter of statement NO.29/EC/KEP-TJK/X/2018 from Ethic Committee of Tanjung Karang Health Polytechnic (Komisi Etik Poltekkes Kemenkes Tanjung Karang).

RESULT

Table 1 showed distribution of subject study based on sex, 16.7% was male and 83.3% was female.

Table 1. Distribution of Subject Based on Sex

Sex	n	%
Male	5	16.7
Female	25	83.3
Total	30	100

Table 2 showed distribution of subject based on some characteristics namely average of age was 50.60 years old, long suffered hypertension was 2.57 years old, height was 157.7 cm, weight was 61.77 kg and body mass index (BMI) was 24.99.

Table 2. Descriptive Analysis of Subject of Study

Sex	Mean	SD
Age	50.60	±13.17
Long suffered hypertension	2.57	±1.55
Height	157.17	±4.29
Weight	61.77	±9.94
BMI	24.99	±3.91

Table 3 suggested the result of statistical analysis by using *Wilcoxon* test (α=0.05) of 30 hypertension patients, it could be concluded that there was a significant mean difference of systolic blood pressure between pre and post test, first 30 minutes, second 30 minutes, third 30 minutes and fourth 30 minutes after application of warm water foot soak and Benson relaxation technique combination.

Table 3. Analysis of Pre and Post Systolic Blood Pressure

Analysis	Pre		Post		
	Mean	SD	Mean	SD	P
Sistolic pre-post 0	162.53	±16.90	154.33	±19.06	0.000
Sistolic pre-post 1	162.53	±16.90	146.00	±18.49	0.000
Sistolic pre-post 2	162.53	±16.90	139.93	±15.98	0.000
Sistolic pre-post 3	162.53	±16.90	136.33	±14.06	0.000
Sistolic pre-post 4	162.53	±16.90	133.47	±14.59	0.000

Table 4 suggested the result of statistical analysis by using *Wilcoxon* test (α=0.05) of 30 hypertension patients, it could be concluded that there was a significant mean difference of diastolic blood pressure between pre and post test, first 30 minutes, second 30 minutes, third 30 minutes and fourth 30 minutes after application of warm water foot soak and Benson relaxation technique combination.

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Table 5 showed statistical analysis result of Mean Atrial Pressure (MAP) pre and post by using Wilcoxon (□=0.05) of 30 subject of study, it could be concluded there was a significant difference of Mean Atrial Pressure (MAP) pre and post, first 30 minutes, second 30 minutes, third 30 minutes and fourth 30 minutes after application of warm water foot soak and Benson relaxation technique combination.

Table 4. Analysis of Pre and Post Diastolic Blood Pressure

Analysis	Pre		Post		
	Mean	SD	Mean	SD	P
Diastolic pre-post 0	95.10	±9.65	90.00	±9.47	0.000
Diastolic pre-post 1	95.10	±9.65	86.00	±7.70	0.000
Diastolic pre-post 2	95.10	±9.65	86.73	±7.06	0.000
Diastolic pre-post 3	95.10	±9.65	84.40	±5.64	0.000
Diastolic pre-post 4	95.10	±9.65	83.47	±5.38	0.000

Table 5. Analysis of Pre and Post *Mean Atrial Pressure (MAP)*

Analysis	Pre		Post		
	Mean	SD	Mean	SD	P
MAP pre-post 0	117.58	±10.38	11.44	±10.96	0.000
MAP pre-post 1	117.58	±10.38	106.00	±10.00	0.000
MAP pre-post 2	117.58	±10.38	104.47	±8.31	0.000
MAP pre-post 3	117.58	±10.38	101.71	±7.26	0.000
MAP pre-post 4	117.58	±10.38	100.12	±7.12	0.000

Figure 1 illustrated that systolic blood pressure of hypertension patient decreased gradually until fourth 30 minutes after experienced warm water foot soak and Benson relaxation technique. Diastolic blood pressure also decreased slowly but at second 30 minutes after treatment increased but decreased then until fourth 30

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minutes after combination of warm water foot soak and Benson relaxation technique therapy. While, average of *Mean Atrial Pressure (MAP)* decreased gradually until fourth 30 minutes after combination of warm water foot soak and Benson relaxation technique therapy.

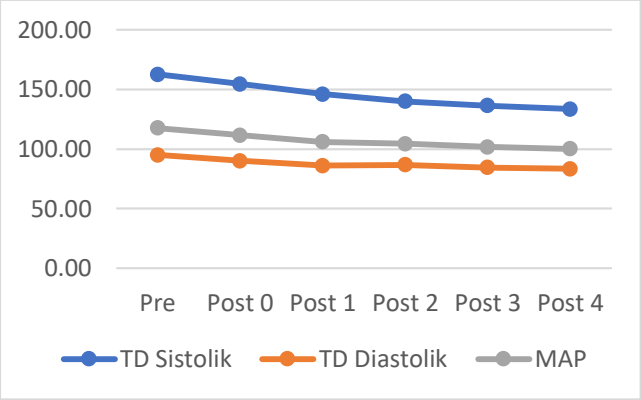

Figure 1. Graphic of Blood Pressure Average and Analysis of Pre and Post Mean Atrial Pressure (MAP)

DISCUSSION

Hypertension is a condition that blood pressured raised more than the standard.(1) Blood pressure raised as cardiac output and peripheral resistance also raised. Cardiac output raise as a result of a condition in which heart rate has increased, stroke volume has increased or both. Whereas peripheral resistance increased due to factors that increase blood viscosity or which decrease lumen size of blood vessel, especially arteriole.(6)

The study resulted that warm water foot soak combined with Benson relaxation technique is effective to decrease patient's blood pressure. It is demonstrated by decrease of systolic as well as diastolic blood pressure gradually until fourth 30 minutes after experience the therapy. This is an effort to decrease peripheral resistance and cardiac output of patient in order to reduce patient's blood pressure.

Principle of water warm soak is conduction or heat transfer from water to the body. It could increase elasticity, peripheral blood pressure vasodilation, blood flow and reduce muscle tension.(7,8) Soaking in warm water causes arterioles vasodilation that impact to peripheral resistance decrease and heart workload decrease which is leading blood pressure to go down. The same as Destia's research (2) on 21 hypertensive patients who were treated with warm water soak, their pre-treatment systolic blood pressure average was 152.8 mmHg and diastolic was 97.1 mmHg, while post-treatment systolic and diastolic average was 133.7 mmHg and 85.2 mmHg, respectively and p-value was 0.000.

Benson relaxation is one of efforts in managing stress, because stress is one of blood pressure triggers. Stress in human either physically or psychologically will stimulate hypothalamus and directly activating sympathetic nerves system, secreting Corticotropin Releasing Hormone (CRH) to stimulate the release of Adrenocorticotropic Hormone (ACTH) and cortisol as well as vasopressin. Sympathetic stimulation will stimulate medulla adrenal secreting epinephrine that causes renal afferent arteriolar vasoconstriction so that blood flow to the kidney decrease. This will trigger kidney to secret renin and activate Renin Angiotensin Aldosterone System (RAAS).(6) Renin is an enzyme that is synthesized, stored, and released by kidney's juxtaglomerular cells as responses to the increase in central nerve system activity or decrease in blood pressure, extracellular fluid volume, or extracellular sodium concentration.(9) Released renin will flow to the blood circulation as an enzyme to convert inactive plasma proteins called angiotensin to angiotensin I and subsequently converted to angiotensin II. This occurs almost entirely in the lungs which is catalyzed by Angiotensin Converting Enzyme (ACE). Angiotensin II regulate blood pressure well both short term and long term. Angiotensin II is a strong vasoconstrictor, especially arterioles. Narrowed arterioles increases peripheral resistance of arterioles that contribute to blood

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pressure increase. Angiotensin II also stimulate aldosterone secretion by the adrenal cortex causing sodium and water retention in the kidneys, causing blood volume and blood pressure increased. (6,9,10)

Benson relaxation technique plays a role in maintaining parasympathetic nerve activity and reducing sympathetic nerve activity. This will maintain body's balance through psychoneuroimmunology mechanism that regulates the body's physiological activities.(11,12) Increase of parasympathetic nerves could reduce heart workload by releasing acetylcholine neurotransmitter and reduce hormone secretion caused by stressed in order to reduce blood pressure.(10) Sukarmin reseach (3) on 30 patients which are divided to two groups (intervention and control by using pre and post-test-controlled design) showed that there was a significant effect of Benson relaxation on systolic and diastolic of study group. In contrast to control group.

This study result indicated that warm water soak combined with Benson relaxation is effective to reduce blood pressure of hypertensive patient which is recommended to apply for hypertension treatment as non-pharmacological ways that is easily carried out independently by the patient or health professional assistance.

Some limitation experienced during the study i.e. difficult to control subjects because they are human with their own characteristics. Stress level was not assessed, so it could not precisely measure how effective Benson relaxation can reduce stress of hypertensive patient. Another limitation is researcher only measured until fourth 30 minutes after therapy, so the effect on blood pressure reduction ends remain unknown.

CONCLUSIONS

It could be concluded that combination of warm water foot soak and Benson relaxation techniques is effective to reduce blood pressure of hypertensive patient. Blood pressure gradually reduced until fourth 30 minutes after application of warm water foot soak combined with Benson relaxation technique.

RECOMMENDATION

The result of the study has contribution to hypertension patient as non-pharmachological effort by combining warm water foot soak with Benson relaxation technique. It could practice independently by patient with or without health professional assistance. Health professional could show or assist hypertensive patient to do therapy as non-pharmacological effort in hypertension management.

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