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The Effectiveness of Instrumental Music Therapy and Self-Hypnosis on Decreasing Blood Pressure Level among Hypertension Patients

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Abstract. Heart and blood vessel disease, including hypertension, are the highest cause of death in the world. Instrumental music and self-hypnosis are choices to achieve a relaxed state and cause stable blood pressure. The study aimed to determine the effectiveness of instrumental music and self-hypnosis therapy to decrease the blood pressure of hypertensive patients. This study employed a quasi experimental design, pre-test and post-test with non-equivalent control group Forty-six patients were recruited and allocated in the experimental group and the control group. The experimental group received the standard pharmacological therapy and combination instrumental music and self-hypnosis therapy. While the control group received the standard pharmacological therapy. Data were analyzed using a paired t-test and independent sample t-test. The results showed significant decrease in systolic blood pressure after instrumental music and self-hypnosis therapy (p = 0.001) and a significant decrease in diastolic blood pressure after the administration instrumental music and self-hypnosis therapy (p = 0.005). Researchers recommend the use of instrumental music and self-hypnosis therapy to reduce the blood pressure of hypertensive patients

Keyword: Instrumental music therapy; self-hypnosis; blood pressure level; hypertension

INTRODUCTION

Cardiovascular disease is a disease caused by impaired heart and blood vessel function, such as coronary heart disease, heart failure, hypertension, and stroke. Heart and blood vessel disease is the highest cause of death in the world. Globally it is estimated that 17,7 million people die in 2015 due to cardiovascular disease. The cause of death is estimated at 7.4 million due to coronary heart disease and 6.7 million due to stroke and constitutes 31% of the causes of all deaths. More than three-quarters of deaths (82%) due to cardiovascular disease occur in low and middle-income countries. Hypertension, diabetes mellitus, and hyperlipidemia are risk factors for cardiovascular disease (1,2) (1, 2).

Cardiovascular disease is ranked first as the main cause of death by non-communicable disease (63% of all deaths) in Indonesia. Data from the Basic Health Research (Riskesdas) 2013 showed that the prevalence of hypertension diagnosed by health workers based on interviews increased from 7.6% in 2007 to 9.5% in 2013. The prevalence of hypertension in Indonesia obtained by measurement to≥18 years old patients was as much as 25.8%, while the prevalence in West Sulawesi Province was 31.43%, this prevalence was far below the national target (3).

Management of hypertension can be done with pharmacological and non-pharmacological therapy. Pharmacological therapy uses drugs or compounds that can affect the patient's blood pressure, while non-pharmacological therapy is therapy without using drug agents (4,5). The first step that must be taken in dealing with hypertension is non-pharmacological therapy such as lifestyle modification, stress and anxiety management (6).

Some recommended lifestyle modification strategies are weight loss, reduced salt intake, exercise, reduced alcohol consumption and smoking cessation (7). Stress management can be done through relaxation techniques and biofeedback. This management could reduce blood pressure in the short and long term (5,8). It was consistent with previous study mentioned that slow deep breathing technique may decrease blood pressure in patients with primary hypertension (9-10).

Therapy using transcendental meditation and medical hypnosis also significantly results in a decrease in blood pressure and can be used as therapy non-pharmacological to help control blood pressure. The effectiveness of hypnotherapy has been proven, and the use of hypnosis in Indonesia as a therapy has been carried out in several areas, including midwifery, dentistry, anesthesia, psychiatry, and psychology. Hypnosis is safe to use, reduces the burden of purchasing drugs, and is effectively used in chronic pain if conventional therapy is ineffective (13).

Scientific evidence shows hypnotherapy can overcome hypertension, asthma, insomnia, management of acute and chronic pain, anorexia, Nervosa, overeating, smoking, and personality disorders. A previous study showed that hypnosis therapy also decreased the blood pressure level among primary hypertension (14). Hypnosis therapy can also reduce pain sensation in patients after orthopedic surgery (15).

In principle, hypnosis is a method of persuasive communication that is used to make cognitive, attitudes and behavior changes by entering sub-conscious regions in the human mind. Relaxation conditions that occur due to treatment with hypnosis can trigger changes in brain waves, in hypnosis conditions the brain will enter the alpha until theta wave, in this situation the mind becomes very relaxed, the frequency of waves becomes more rhythmic and orderly so it stimulates the increase of neurotransmitters such as endorphins, GABA, encephalin and several other neurotransmitters that function to reduce anxious conditions while creating a relaxation effect (16). Self-hypnosis is a technique to do hypnosis by giving suggestions to yourself. According to (17), all mental training techniques contain elements of hypnosis. Self-hypnosis is one of the most effective ways to use hypnosis in one's personal life (18).

In addition to hypnosis, instrumental music therapy can also lower blood pressure which rhythmic stable music can provide a regular rhythm in the heart's working system and stimulate

the workings of the brain. Listening to music with good harmony will stimulate the brain to carry out the process of analyzing songs, increase the body immunity and affect the work system of hormones that give balance to heart rate and pulse (19). Research done by Saing (2007) mentions that music can lower blood pressure and also mentions the classic instrumental music therapy can decrease blood pressure in stroke patients. Listening to instrumental music is also a choice to achieve a relaxed state so that it will reduce stress and depression experienced (20). Music will stimulate the hypothalamus, giving rise to a feeling of calm that will affect the production of endorphins, cortisol, and catecholamine in the mechanism of regulating blood pressure. Music stimulation can activate the limbic system associated with emotion, when the limbic system is activated the individual becomes relaxed, besides music can also stimulate the body to produce molecules nitric oxide (NO). This molecule works on blood vessel tone which can reduce blood pressure also mentions the classic instrumental music therapy can decrease blood pressure in stroke patients (21).

Instrumental music as one of the complementary therapies, can be an alternative choice, because it is the sound of nature, without the lyrics, making it more easily accepted by the client. Giving instrumental music as an alternative to relaxation techniques is expected that patients with hypertension can achieve a relaxed, emotional state and their blood pressure becomes stable. The combination of instrumental music therapy and self-hypnosis is designed as a therapy using the power of suggestion that will immediately relax the condition of the client so that it can be more comfortable in a short amount of time. The expected impact is relaxed and decreased blood pressure, improves physical recovery, and alleviates the client's psych emotional response. Research conducted by Purnomo, Zulkipli, and Pulungan (2018), also mentions there is a decrease in blood pressure in hypertensive patients given a combination of instrumental music therapy and self-hypnosis without drug administration.

OBJECTIVE

The study aimed to determine the effectiveness of instrumental music and self-hypnosis therapy to decrease the blood pressure of hypertensive patients.

METHOD

This study used a quasi experimental design, pre-test and post-test with non-equivalent control group. This study used a sampling technique where samples were taken based on consecutive sampling conducted in July-September 2017. The target population in this study were patients diagnosed with hypertension at the Regional General Hospital (RSUD) of Mamuju Regency who was hospitalized.

The sample in this study were hypertensive patients who had been diagnosed and treated at the Mamuju District Hospital. A total sample of 46 people, consisting of intervention groups 23 subjects and control groups 23 subjects and during the study, there were no subjects who dropped out. There are also inclusion criteria in this study; patients who have been diagnosed with hypertension, aged over 18 years, can read and write, are willing as respondents in the study and can speak Indonesian. While the inclusion criteria are patients who experience hearing loss and who experience dementia.

In this study using observation sheets of instrumental and self-hypnosis blood pressure measurement. Each group numbered 23 people. The instrumental and self-hypnosis music therapy given is instrumental music recording with self-hypnosis modified by Henrikus (2014). Instrumental music and self-hypnosis are carried out for three days and given for 13 minutes 44 seconds in one measurement. Digital calibration measuring instrument calibrated. How to measure sheets Observations agreed with systolic blood pressure and diastolic inside unit millimeter air mercury (mmHg). differences in systolic blood pressure in the control group and the intervention group.

This research has been stated as ethical conduct from the Makassar Health Polytechnic Health Research Ethics Commission no. 264 / KEPK-PTKMKS / VI / 2017 and research recommendations at the Kesbangpol Kab. Mamuju no. 070/255 / VII / 2017 / BKBP.

Data analysis was performed by univariate analysis by displaying the distribution and percentage of each variable. Then bivariate analysis was performed using the paired t-test to determine blood pressure before and after the intervention. Independent sample t-test to determine the effectiveness of instrumental music therapy and self-hypnosis to decrease blood pressure in hypertensive patients with a confidence level of 95% (α 0.05). Data were analyzed using the SPSS program for windows version 16

RESULTS

Respondents' characteristic

Table 1 presented the characteristics of respondents among the intervention and the control group. The results showed that the characteristics of the most respondents were 60-65 years old, as in the control group were 11 people (47.8%), and the intervention group was 10 people (43.4%). Based on gender, most respondents were men, in the control group were16 (69.6%) and the intervention group was 13 people (56.5%). Based on the family history, most respondents had a history of non-hypertensive parents, in the control group were 15 people (57.7%), and the intervention group was 17 people (87.5%). Likewise, the history of hypertensive siblings, the majority of respondents had non-hypertensive siblings, in the control group 19 people (84.6%), the intervention group was 15 people (57.7%). Based on smoking history, respondents who were active smokers in the control group were 13 people (56.5%) and passive smokers were 13 people (56.5%), whereas in the intervention group most were not active smokers 16 people (69.6%) and not passive smokers 15 people (57, 7%)

Table 1. Respondents' characteristic among experiment and control group

Respondents Characteristics	Control Group		Intervention Group	
	n	%	n	%
Age				
45-50	8	34.7	6	26.0
50-55	4	17.4	7	30.4
60-65	11	47.8	10	43.4
Gender				
Male	16	69.6	13	56.5
Female	7	30.4	10	43.5
Family histori of hypertensive				
Yes	8	42.3	6	25.5
No	15	57.7	17	89.5
Hypertensive siblings				
Yes	4	15.4	8	42.3
No	19	84.6	15	57.7
Smoking history				
Active smoker	13	56.5	7	30.4
No	10	43.5	16	69.6
Passive smoker				
Yes	13	56.5	8	42.3
No	10	43.5	15	57.7

Mean difference of blood pressure level within the experimental group and the control group before receiving the intervention

The results found that the average systolic blood pressure among the intervention group was 156 mmHg, while the control group was 137,782 mmHg. The highest blood pressure in the intervention group is 200 mmHg and the lowest limit is 110 mmHg in the intervention group and the control group.

The results of data analysis found that the mean diastolic blood pressure of respondents in the intervention group was 97.826 mmHg higher than the mean of the control group which was 89,565 mmHg. The highest blood pressure in the intervention group is 120 mmHg and the lowest limit is 70 mmHg in the control group

Table 2. Mean difference of blood pressure level before receiving the intervention among the experimental group and the control group

Variables	group	Mean	Median	SD	Min-Maks
Systolic pressure	experimental	156	160	21.687	110-200
	Control group	137.782	140	20.641	110-180
Diastolic pressure	experimental	97.826	100	11.264	80-120
	Control group	89.565	90	9.283	70-100

Mean difference of blood pressure level within the experimental group and the control group after receiving the intervention

The results found that the mean systolic blood pressure among respondents in the intervention group was 140 mmHg. The mean of systolic blood pressure among the control group was 126 mmHg. The highest blood pressure in the intervention group is 180 mmHg and the lowest limit is 100 mmHg in the control group.

The results of data analysis found that the mean diastolic blood pressure of respondents in the intervention group was higher at 90 mmHg than the average of the control group that was 88.26 mmHg. The highest blood pressure is in the intervention group which is 120 mmHg and the lowest limit is 70 mmHg in the intervention group and the control group.

Table 3. Mean difference of blood pressure level within the experimental group and the control group after receiving the intervention

Variables	Group	Mean	Median	SD	Min-Maks
Systolic pressure	experimental	140	140	17.58	110-180
	Control group	126	120	19.244	100-160
Diastolic pressure	experimental	90	90	12.421	70-120
	Control group	88.26	90	9.84	70-100

Mean difference of systolic blood pressure level within the experimental group and the control group before and after receiving the intervention

Table 4 described the mean difference of systolic blood pressure level within the experimental group and the control group before and after receiving the intervention. The results found that there is not significance different within the experimental group and the control group before and after receiving the intervention.

Table 4. Mean difference of systolic blood pressure level within the experimental group and the control group before and after receiving the intervention

Variables	Group	Mean±SD (pre-test)	Mean±SD (post-test)	p-value
Systolic pressure	Control group	135.78 ± 20.64	126± 19.244	0.001
Systolic pressure	Experimental group	156± 21.68	140±17.580	0.001

Mean difference of diastolic blood pressure level within the experimental group and the control group before and after receiving the intervention

Table 5 described the mean difference of diastolic blood pressure level within the experimental group and the control group before and after receiving the intervention. The results found that there is not significance different among the control group before and after receiving the intervention. Whereas among the experimental group showed there is a significant difference on diastolic blood pressure level before and after receiving the intervention.

Table 5. Mean difference of diastolic blood pressure level within the experimental group and the control group before and after receiving the intervention

Variables	Group	Mean±SD (pre-test)	Mean±SD (post-test)	p-value
Diastolic pressure	Control group	89.57± 9.28	90±12.431	0.418
Diastolic pressure	Experimental group	97.83± 11.62	90± 12,431	0.005

DISCUSSION

Characteristic of respondents

Based on age in this study showed that the age of 60-65 years is more dominant experiencing hypertension. Some research that was done before proven that blood pressure increased along with the increasing age. This is because the elasticity of blood vessel walls decreases with increasing age (22). A theory stated that with increasing age, the heart and blood vessels undergo structural and functional changes. Changes occur in the elasticity of the arteries such as atherosclerosis (hardening of the arterial wall) and the inability of the tissue to repair itself or replace tissue damage so that the body's organs can no longer maintain normal functions and cannot survive infection and repair damage (24).

A previous study also stated that there was a significant relationship between age (60-90 years) with blood pressure (25). The high level of hypertension is in line with increasing age caused by changes in the structure of large blood vessels, so that blood vessels become narrower

and blood vessel walls become stiff, as a result, it is increasing systolic blood pressure (26). This study showed that the most gender experienced hypertension was men. Gender influence the occurrence of hypertension, at a young age under 60 years, men suffer from hypertension more than women. Men are thought to have a lifestyle that tends to increase blood pressure compared to women. The prevalence of hypertension in women increases after entering menopause. After age 65, some studies found out that the incidence of hypertension in women is higher than that of men due to the influence of the hormone estrogen which can protect women from cardiovascular disease (22, 27). Fall prevention becomes the main focus of nurses regarding indicators of patient safety targets, including reducing the risk of injury caused by fall events. The technology used can reduce the number of patients falling and improve the quality of health.

Based on family history, this study showed more respondents with non-hypertensive parents and siblings. Family history of hypertension is a risk factor for hypertension. Individuals who have a family history of hypertension have a risk of hypertension 14.378 times greater than individuals without a family history of hypertension (28). Hypertension can be inherited to offspring through genes, but this is not always the case. Although there is evidence that shows that high blood pressure is genetically related, it is still difficult to determine the exact risk level of the disease (29). Based on smoking history in this study, most respondents were active and passive smokers. Smoking habits can increase the risk of hypertension because nicotine contained in cigarettes can cause calcification in the blood vessel walls. Nicotine and carbon dioxide contained in cigarettes will damage the endothelial layer of arteries, the elasticity of blood vessels decreases so that blood vessels become stiff and disrupt blood flow, causing blood pressure to increase (30).

Effectiveness of instrumental music therapy and self-hypnosis

Patients who received pharmacological therapy showed a significant decrease in systolic blood pressure, but not in diastolic blood pressure. Pharmacological therapy given is Captopril 12.5 mg/kg BW, this drug serves to inhibit enzymes that produce Angiotensin II and maintain bradykinin which functions to dilate blood vessels so that it can reduce blood pressure within 60-90 minutes after oral administration (31). These control group showed a lower decrease of systolic and diastolic blood pressure compared to the intervention group. The decrease in systolic blood pressure in the control group was 11.78 mmHg, while in the intervention group it was 16 mmHg. This can be caused by the effects of pharmacological therapy that runs on its own without being supported by the improvement of muscle relaxation and increased oxygen consumption which can help decrease vascular tone. The insignificant decrease in blood pressure can also be caused by unstable emotional factors from the patient, thus affecting the process of blood pressure reduction which is slower than in the treatment group which given instrumental music therapy and self-hypnosis.

A previous study showed that music can also stimulate the hypothalamus to produce a calm feeling that will affect endorphin, cortisol and catecholamine production in the mechanism of blood pressure reduction (21). It was consistent with another study mentioned that music played in stroke patients will be accepted by the hearing system including the tympanic membrane, malleus, incus, stapes, vestibule, and cochlea. The ear converts sound waves from the outside into action potentials in the auditory nerve. Sound is sent as an impulse to the auditory cortex in the primary auditory cortex of the Brodmann 41 area in the superior part of the temporal lobe. Then the signal is continued in the temporal lobe cortex as an auditory association area, neuro-hormonal signals are received by the amygdala, then in the amygdala, the signal is transmitted to the same cortex area, which is auditory association cortex to the hippocampus, septum, thalamus, and hypothalamus (33).

If the purpose of relaxation has been achieved, then the action of the hypothalamus will adjust and a decrease in sympathetic and parasympathetic activity. The sequence of physiological effects, signs of symptoms, and emotional disturbances that occur will decrease. Music stimulation in the hypothalamus will affect the anterior pituitary with a decrease in CRF production, thus affecting the decrease in ACTH production. A decrease in ACTH will reduce cortisol levels produced by the adrenal cortex. Decreased cortisol affects the decrease in blood pressure, heart rate, and breathing frequency (33,34).

Listening to music is one of the psychological rehabilitation activities that aims to produce a response that can overcome emotional disturbances experienced by sufferers (21). Giving instrumental music therapy can affect the mood of respondents better so the mood becomes calmer and more comfortable. Before the intervention, some respondents complained of dizziness, heaviness feeling on the neck, and has sleeping problems and often awake at night. These are in accordance with symptoms mentioned that the patients might experience headache, easily angry, insomnia and anxiety, visual disturbances, difficulty concentrating, nocturia and dependent edema due to increased capillary pressure. After being given instrumental music therapy and self-hypnosis, some respondents said their feelings became calmer, pain in the head and the neck is reduced, and the gentle music made respondents sleepy (35).

This result is in line with the previous study suggested that giving music therapy can reduce sleep problems, relax, and eliminate unpleasant feelings (36). Listen a music with soft and soothing rhythm with 60-80 beats can make the body rhythm decreases adjusting to the music. This situation also affects decreasing sympathetic nerve response which decreases vital signs such as heart rate, breathing, needs oxygen, and blood pressure. During this process, the decrease in noradrenaline hormone inside body circulation is believed to increase rest and calm so it may improve sleep quality (37).

The brain that has been influenced by the suggestion will command the central nervous system to directly stimulate the Reticular Activating System to reduce its performance so that it has an impact on serotonin release from specific cells in the pons and brainstem namely Bulbar Synchronizing Regional (BSR). When the client's condition relaxes, the RAS activation then decreases and the BSR will take over causing the client to fall asleep (38-39).

In a relaxed condition, stimulation of alpha waves occurs in the brain, lungs and respiratory system can maximize oxygen uptake from the outside environment, accompanied by an increase in the effectiveness of the use and exchange of gas in the body tissues. Increased oxygen in the blood vessels lumen will also cause a decrease in the stiffness of the blood vessel wall, thereby smoothing the flow of circulation. The results of the study reinforce the theoretical concept that there is a significant relationship between instrumental music therapy and self-hypnosis with a decrease in systolic and diastolic blood pressure in hypertensive patients. Significant reduction in blood pressure in the intervention group, of course, has a positive effect on patients with hypertension because it can prevent further negative impacts.

CONCLUSION

The combination of pharmacological therapy with neat instrumental music and self-hypnosis effectively lowers the blood pressure of hypertensive patients. This therapy can be used as a complementary therapy by nurses to decrease blood pressure in hypertensive patients. This therapy is easy to implement and the negative effects caused to patients are also very small.

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