

THE EFFECTIVENESS OF DIAPHRAGMATIC BREATHING EXERCISE SLOW DEEP BREATHING MUSICAL THERAPY AND FOOT MASSAGE THERAPY ON REDUCING HIGH BLOOD PRESSURE IN HYPERTENSIVE PATIENS. LITERATURE REVIEW

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ABSTRACT

Hypertension is a cerebral vascular disorder where the cerebral blood vessels are narrowed and cause a minimum supply of oxygen and nutrients to brain tissue or blockage. This literature study applied the PICOT framework with Google Scholar, Scien Direct and Scopus databases. It showed a correlation between the effectiveness of diaphragmatic breathing exercise, slow deep breathing, musical therapy, and foot massage therapy in reducing blood pressure in hypertensive patients of about 80%. In addition, the research proved that diaphragmatic breathing exercise, slow deep breathing, musical therapy, and foot massage therapy effectively reduced blood pressure in hypertensive patients. Through this literature review, slow deep breathing interventions, musical therapy, and foot massage therapy significantly reduced blood pressure, and Diaphragmatic Breathing interventions apart from lowering blood pressure can also reduce anxiety and stress.

Keywords: diaphragmatic; hypertension; massage; musical; slow deep

INTRODUCTION

Hypertension is a group of non-communicable diseases that is very common and easy to detect in the community (Wulandari & Puspita, 2019). Systolic blood pressure increasing to more than 140 mmHg and diastolic blood pressure increasing to more than 90 mmHg are symptoms of hypertension (Harsismanto et al., 2020). Hypertension management can be done using a pharmacological approach by giving antihypertensives. However, giving it for an extended period will impact drug addiction and result in harmful side effects for the patients (Andri, 2021). Additionally, Non-pharmacological approaches include diaphragmatic breathing exercises, slow deep breathing, musical therapy, and foot massage exist as an alternative.

METHOD

This study employs a Literature Review from several journals/articles using case studies, case reports, and cohort studies published from 2019 to 2022. The inclusion criteria used the PICOT framework, which focused on populations, interventions, and comparisons of interventions with the populations being hypertensive patients.

RESULTS AND DISCUSSION

Table 1.
Journal Characteristics

Journal	Year	n	%
<i>Scopus</i>	2020	1	10
<i>Science Direct</i>	2019,2021	3	30
<i>Goggle Scholar</i>	2020,2021, 2022	6	60

Based on table 1, it shows that Scopus has 1 article (10%), Goggle Scholar has 6 articles (60%) and Science Direct has

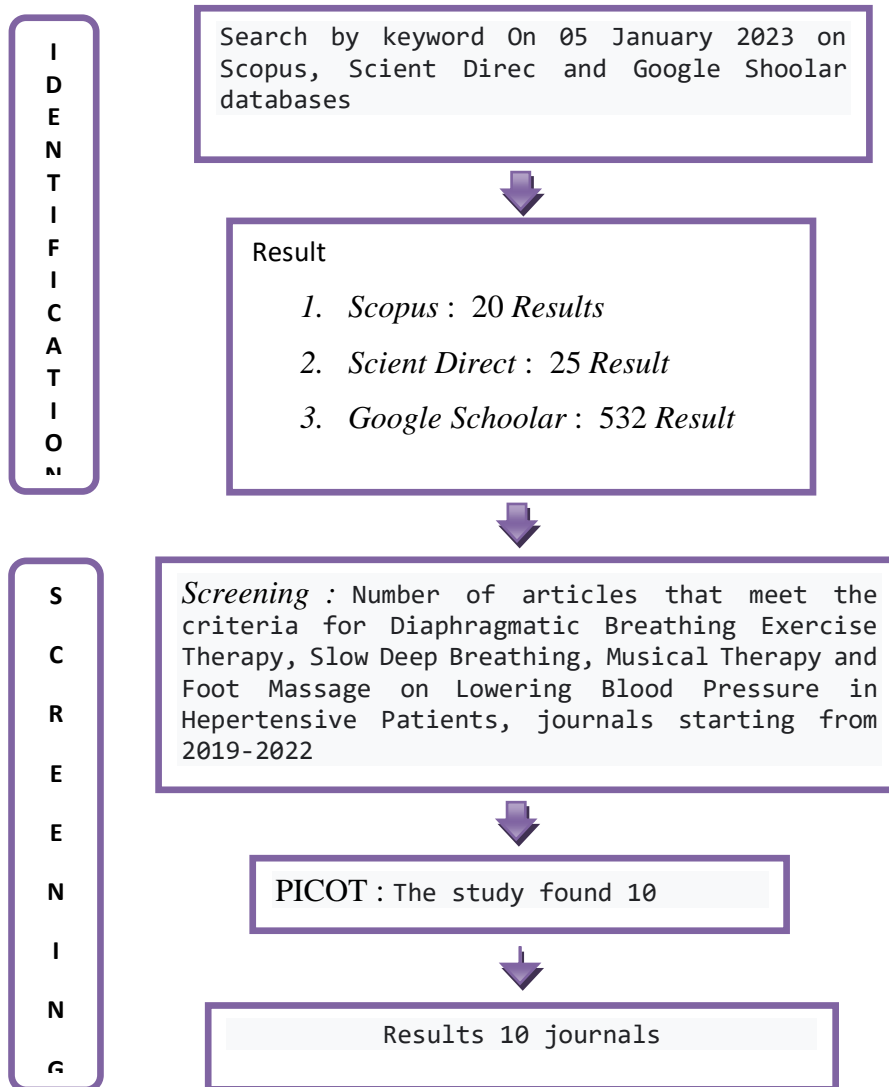


Figure 1. Article Search Flow

Table 3.
Factors Affected

No.	Influenced Factors	Influence	Empirical Sources
1	Blood pressure, anxiety and stress	There is an effect of giving the diaphragm breathing relaxation technique on blood pressure	Saputra <i>et al</i> (2020) accessed from <i>Google Scholar</i>
2	Blood pressure	There is an effect of slow deep breathing exercise on	Andri <i>et al</i> (2021) accessed from <i>Google Scholar</i>
3	Blood pressure	blood pressure reduction in hypertensive patients	Aswad <i>et al</i> (2020) accessed from <i>Google Scholar</i>

No.	Influenced Factors	Influence	Empirical Sources
4	Blood pressure	There is an effect of slow deep breathing and music therapy on blood pressure in hypertension sufferers.	Susanti <i>et al</i> (2021) accessed from <i>Google Scholar</i>
5	Blood pressure	There is an effect of slow deep breathing on systolic and diastolic blood pressure in hypertension sufferers	Niswah <i>et al</i> (2022) accessed from <i>Google Scholar</i>
6	Blood pressure	There is an influence of Music Therapy in Lowering Blood Pressure.	Damping <i>et al</i> (2021) accessed from <i>Google Scholar</i>
7	Blood pressure and anxiety	There is an influence of Music Therapy in Lowering Blood Pressure.	Corbett <i>et al</i> (2021) accessed from <i>Science Direct</i>
8	Blood pressure	There is an effect of giving the diaphragm breathing relaxation technique on blood pressure	Katherine Ka-Yin Yau, Alice Yuen Loke (2021) accessed from <i>Science Direct</i>
9	Blood pressure	There is an effect of slow deep breathing on reducing blood pressure in people with hypertension	Chaddha <i>et al</i> (2019) accessed from <i>Science Direct</i>
10	Blood pressure	There is an effect of Foot Massage Therapy on reducing blood pressure in hypertension sufferers	Kotruchin <i>et al</i> (2020) accessed from Scobus

Table 4.
 Description of the Results of the Literature Review

No.	Title, Author and Year	Purpose	Sample	Method	Results
1.	Effect of giving diaphragmatic breathing relaxation techniques on blood pressure (Saputra et al, 2020)	This study aims to determine the effect of therapy relaxation of diaphragmatic breathing against blood pressure	Case Report	The sample in this study amounted to 30 people.	This study found a therapeutic effect diaphragmatic breathing relaxation of blood pressure, anxiety and stress
2.	Effect of slow deep breathing exercise on reduction of blood pressure	The purpose of this study was to find out the effect of slow	Case Report	The sample in this study amounted	There is an effect of slow deep breathing exercise therapy on blood pressure

	in hypertensive patients (Andri et al, 2021)	deep breathing exercise on blood pressure reduction in hypertensive patients.		to 30 people	.
3.	The effectiveness of slow deep breathing and music therapy on blood pressure in hypertension sufferers. (Aswad et al, 2020)	Research aims to determine the effect of slow deep breathing and music therapy on blood pressure in hypertension sufferers.	Case Report	The sample in this study amounted to 15 people	there is a difference in blood pressure before and after slow deep breathing relaxation and music therapy on blood pressure in hypertension sufferers
4.	Effect of slow deep breathing on systolic and diastolic blood pressure in hypertension sufferers (Susanti et al, 2021)	The purpose of this study was to determine slow deep breathing on systolic and diastolic blood pressure in patients with hypertension	Case Report	Rivew's literature: 5 articles	slow deep breathing can be given as a companion therapy to hypertensive patients in lowering blood pressure
5.	Effect of Lowering Blood Pressure in Hypertensive Patients with Foot Massage Therapy: Case Study (Niswah et al, 2022)	Knowing the effect of lowering blood pressure in Hypertensive Patients with Foot Massage Therapy: Case Study	Case Report	The sample in this study amounted to 3 people	There is an effect of reducing blood pressure in hypertensive patients with foot massage therapy: a case study
6.	Effects of Music Therapy in Lowering Blood Pressure. (Awalin et al, 2021)	This study aims to determine the effect of Music Therapy on Lowering Blood Pressure.	Case Report	Rivew's literature: 15 articles	There is an effect of music therapy on lowering blood pressure
7.	Brief report : Musical Improvisation skills can	The purpose of this study was to explain the effect of music	Case Report	The sample in this study amounted	Music therapy affects the reduction of anxiety

	combat labile hypertension (Corbett et al, 2021)	therapy on hypertension		to 30 people	
8.	Effects of diaphragmatic deep breathing exercises on prehypertensive or hypertensive adults: A literature review (Katherine Ka-Yin Yau. <i>et al</i> , 2019)	This study aims to see the effect of diaphragmatic deep breathing relaxation exercises on blood pressure in hypertensive patients	Case Report	Rivew's literature: 13 articles	The difference in the mean values of systolic and diastolic blood pressure before and after being given diaphragmatic deep breathing relaxation on the blood pressure of hypertensive patients
9.	Device and non-device-guided slow breathing to reduce blood pressure: A systematic review and meta-analysis (Ashish Chaddha, <i>et al</i> , 2019)	This study aims to see the effect of slow deep breathing relaxation on lowering blood pressure	Case Report	Rivew literature: 17 articles	There is a significant difference in the average respondent's diastolic blood pressure before and after administration of slow deep breathing relaxation
10.	The effects of foot reflexology on blood pressure and heart rate: A randomized clinical trial in stage-2 hypertensive patients (Praew Kotruchin MD, PhD <i>et al</i> , 2020)	The purpose of this study was to prove the effect of foot reflexology on reducing blood pressure	Case Report	Rivew's literature: 47 articles	There is an effect of foot massage intervention on reducing blood pressure

Diaphragmatic Breathing Exercise on Lowering Blood Pressure in Hypertension Patients

The diaphragmatic breathing relaxation technique is easy for hypertensive patients to maintain stable vital signs, such as increasing SpO₂ and lowering blood pressure. This technique is used slowly and consciously with deep breathing involving conscious movement of the lower abdomen to increase pulmonary ventilation and improve oxygenation. Adequate oxygen demand is also expected to improve the growth of vascular endothelium. These Endothelial cells secrete substances that are very important in causing vasodilation of blood vessels. This material is an endothelium-derived relaxing factor (EDRF) identified with nitric oxide (Kang, 2014, as cited in Catela, 2019). This is in line with Khullar (2012), which found that endothelial growth can be improved when a person has sufficient oxygen intake. Tissue vasodilatation, including blood vessels, occurs due to the sufficient oxygen demand in the body. Vascular structure, regeneration of vascular endothelial cells, regulation of platelets, the role of fibrinolytic, mechanism of inflammation through chemical mediator releases, immune system, regulation of white blood cells, attachment of platelets to surfaces, and regulation of vascular permeability can be maintained properly if endothelial conditions are well awake. *Nitric Oxide* (N.O.) is secreted by the endothelial cells of the blood vessels. This chemical compound is a strong vasodilator that can cause vasodilation of blood vessels; vasodilation makes blood vessels more elastic and creates more space inside the blood vessels, which lowers blood pressure.

Slow Deep Breathing on Lowering Blood Pressure in Hypertension Patients

Slow deep breathing interventions that can affect the positive part of the medulla are linked to the relaxation of the nervous system, which can affect the mechanism of lowering blood pressure and the cerebral cortex. Regular breathing exercises can improve physical and mental health. Slow deep breathing can affect the modulation of the cardiovascular system, which increases fluctuations in breathing frequency intervals, decrease blood pressure, and increase baroreflex effectiveness (Nurachmah & Gayatri, 2010, as cited in Aswad, 2020). Slow deep breathing exercises in people with hypertension will cause the extension of fibres during relaxation, decrease brain activity, and decrease transmission of nerve impulses to the brain and other body functions. The characteristic of the relaxation response is marked by decreased pulse rate, decreased blood pressure, and number of breaths. Slow and deep breathing can increase oxygen levels and stimulate the body's chemoreceptors. Stimulation of the body's chemoreceptors lowers vascular pressure so that blood pressure drops, resulting in a vasodilation response in blood vessels.

Musical Therapy on Lowering Blood Pressure in Hypertension Patients

Music therapy aims to improve physical and mental quality with sound stimulation consisting of organized melody, rhythm, harmony, timbre, shape, and style. Classical music, instrumental music, *keroncong* music, and traditional Sundanese harp flute and *gamelan* music are all examples of music therapy that can be used. Each type of music has a certain potential to affect a person's psychological condition (Damping, 2021). Music can reduce tension and promote relaxation in people under stress because it is the ability to stimulate the release of endorphins and serotonin (Djohan, 2006, as cited in Awalin, 2021). According to Suryana (2012), listening to music for 10-30 minutes can relax and stimulate the body to produce *Nitric Oxide* molecules which can activate blood vessels to reduce blood pressure. These findings were also reinforced by Nurrahmani (2012), who found that by listening to classical music, the limbic system will be activated and relaxed a person, which lowers blood pressure and causes the body to produce Nitric Oxide molecules; these molecules work on vascular tone so that they can reduce blood pressure.

Foot Massage on Lowering Blood Pressure in Hypertension Patients

Foot massage intervention is very useful in strengthening the heart function of hypertension patients. Foot massage can increase relaxation and prevent the risk of decreased cardiac output, as evidenced by the improvement in blood pressure and pulse frequency in the three study subjects. Several points on the feet can be used to reduce high blood pressure through massage, including point 7 (neck), which is located on the sole at the base of the thumb, point 10 (shoulder), located on the sole under the little toe, point 11 (trapezius muscle) located under the base of the index, middle, and ring fingers, point 33 (heart) on the sole of the left foot, longitudinal 2-3-4, transversal 2 (Hendro & Ariyani, 2015). Massage movements on the skin, muscle, connective, and periosteum can stimulate receptors in these areas. Afferent nerves carry impulses to the central nervous system, which then produce endorphins, and provide feedback by releasing acetylcholine and histamine through afferent nerve impulses for the body to act through the reflex mechanism of blood vessel vasodilation; this will reduce sympathetic nerve activity and increase parasympathetic nerve activity. Increased parasympathetic nerve activity causes a decrease in heart rate and pulse rate. It activates a relaxation response, decreases sympathetic nerve activity, increases arteriolar and venous vasodilation, reduces peripheral vascular resistance, and lowers blood pressure (Marley, 2010).

CONCLUSION

The findings of this study indicate that musical therapy, foot massage, and slow, deep breathing interventions are more effective at lowering blood pressure. In addition to lowering blood pressure, diaphragmatic breathing exercises also help people feel less stressed and anxious.

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