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## EFEKTIFITAS SLOW BREATHING TRAINING DALAM MENURUNKAN TEKANAN DARAH PADA PASIEN HIPERTENSI

*(Effectiveness of Slow Breathing Training on Decreasing Blood Pressure in Patient with Hypertension: A Systematic Review)*

Rischar Beni Riswanto<sup>1</sup>, CH.R. Yeni Suryandari<sup>2</sup>, Nur Hidayatin<sup>2</sup>

<sup>1</sup>Stikes Bhakti Mulia Kediri, Kediri, Indonesia

<sup>2</sup>Fakultas Keperawatan, Universitas Airlangga, Surabaya, Indonesia

### RIWAYAT ARTIKEL

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### KONTAK PENULIS

Rischar Beni Riswanto  
[rischar.beny.riswanto-2019@fkip.unair.ac.id](mailto:rischar.beny.riswanto-2019@fkip.unair.ac.id)  
Fakultas Keperawatan,  
Universitas Airlangga

### ABSTRAK

**Latar Belakang:** Hipertensi diketahui sebagai masalah kesehatan utama di seluruh dunia yang menyebabkan berbagai penyakit jantung yang mengancam jiwa. Semakin tinggi tingkat tekanan darah dalam jangka panjang, semakin besar kemungkinan terjadinya komplikasi hipertensi. Latihan pernapasan lambat merupakan salah satu terapi non farmakologis yang dapat digunakan untuk mengontrol atau menurunkan tekanan darah dan memperkuat otot pernapasan. Review sistematis ini untuk menganalisis efektivitas latihan nafas lambat dalam tekanan darah pada pasien hipertensi.

**Metode:** Pencarian literatur melalui Scopus, Pubmed, Proquest, Science Direct, dan EBSCO. dengan 5 tahun terakhir (2014-2019). Kriteria untuk dimasukkan dalam ulasan ini adalah sebagai berikut: studi yang melibatkan hipertensi, usia 18 tahun ke atas, pasien yang telah atau masih menerima latihan pernapasan lambat. Kata kunci dalam ulasan ini adalah Pernapasan Lambat, Tekanan Darah, dan Hipertensi.

**Hasil:** Ada 10 jurnal yang terpilih. Total responden dalam ulasan ini adalah 1.757 pasien hipertensi yang mendapat terapi pernapasan lambat. Latihan pernapasan lambat memberikan banyak manfaat bagi penderita hipertensi. Subjek dengan hipertensi, pra hipertensi dan obat antihipertensi diberikan intervensi nafas lambat yaitu menghirup nafas sebanyak  $\leq 10$  nafas / menit dilakukan selama  $\geq 5$  menit. Latihan ini dilakukan pada  $\geq 3$  hari / minggu; total durasi intervensi  $\geq 4$  minggu; Latihan nafas lambat menurunkan tekanan darah saat istirahat, rata-rata menggunakan latihan nafas lambat ini, tekanan darah turun 10 -15 mmHg pada sistol dan diastole. Secara keseluruhan, latihan pernapasan lambat menurunkan SBP sebesar -5,62 mmHg [-7,86, -3,38] dan DBP sebesar -2,97 mmHg [-4,28, -1,66].

**Kesimpulan:** Latihan pernapasan lambat memberikan banyak manfaat bagi pasien hipertensi. Khusus untuk penderita hipertensi sistolik terisolasi. Terapi non farmakologi ini dapat dilakukan oleh individu secara mandiri dalam mengontrol laju pernafasan sehingga dapat mencapai kecepatan nafas baik saat inspirasi maupun ekspirasi. Latihan pernapasan lambat juga dapat membantu meningkatkan sensitivitas barorefleks, kemudian memengaruhi penurunan tekanan darah.

### Kata Kunci

*slow breathing*; tekanan darah; hipertensi

### ABSTRACT

**Background:** Hypertension is recognized as a major health problem throughout the world leading to various life-threatening heart diseases. The higher the level of blood pressure in the long run, the more likely there is a complication of hypertension. Slow breathing exercises is one of non-pharmacological therapies that can be used to control or reduce blood pressure and strengthening of breathing muscles. This systematic review is to analyze the effectiveness of slow breathing training in blood pressure in patients with hypertension.

**Methods:** Literature search is through Scopus, Pubmed, Proquest, Science Direct, and EBSCO. with the last 5 years (2014-2019). Criteria for inclusion in this review are as follows: studies involving hypertension, ages for 18 years and over, patients who have received or are still receiving slow breathing exercises. Keyword in this review was Slow Breathing, Blood Pressure, and Hypertension.

**Results:** There are 10 journals chosen. Total respondents in this review were 1757 hypertensive patients who received slow respiratory therapy. Slow breathing training provides many benefits for hypertensive patients. Subjects with hypertension, pre-hypertension and antihypertensive drugs, were given slow breathing intervention that is inhaling as much as  $\leq 10$  breaths / minute carried out for  $\geq 5$  minutes. This exercise is carried out at  $\geq 3$  days / week; total duration of intervention  $\geq 4$  weeks; Slow breathing training reduces blood pressure at rest, the average using this slow breathing exercise, blood pressure drops 10 -15 mmHg in systole and diastole. Overall, slow breathing exercises decreased SBP by -5.62 mmHg [-7.86, -3.38] and DBP by -2.97 mmHg [-4.28, -1.66].

**Conclusion:** Slow breathing training provides many benefits for hypertensive patients. Especially for patients with isolated systolic hypertension. This non-pharmacological therapy can be carried out by individuals independently in controlling the breathing rate so that they can reach breathing speed both during inspiration and expiration. Slow breathing exercises can also help increase baroreflex sensitivity, then affect blood pressure reduction.

#### **Keywords**

slow breathing; blood pressure; hypertension

#### **Kutip sebagai:**

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## **1. INTRODUCTION**

Hypertension is one of cardiovascular disease that increases the incidence in adolescents to the elderly (Yang, Wu, & Wang, 2017). With a prevalence rising to over 60% in older age groups, hypertension is recognised as a major health problem throughout the world leading to a range of life threatening cardiovascular diseases (Jones, Sangthong, Pachirat, & Jones, 2015). The higher the long-term level of blood pressure, the greater the chances of hypertension complications, such as myocardial infarction, renal failure, stroke, and heart failure (Lloyd-jones, 2018). These complications are among the common and leading causes of morbidity and mortality throughout the globe (Li, Chang, Zhang, & Chai, 2013). It is also a major cause of death and disability (Cernes and Zimlichman, 2017).

The World Health Assembly had a target to reduce the incidence of hypertension called non-communicable disease (NCD). Based on the results of the study, at 1975 the number of adult with hypertension increase from 594 million to 1.13 billion in 2015 (Appel, 2013). The increase occurred in most countries that have low and medium income levels (Zhou et al., 2017).

Based on data from Basic Health Research (RISKESDAS) in Indonesia regarding the prevalence of hypertension based on the results of blood pressure measurements in populations >18 years of age there was an increase in prevalence from 2013 to 2018, based on data obtained in 2013 the prevalence of hypertension based on the results of blood

pressure measurements in populations with age > 18 years by 25.8%. Whereas in 2018 it increased to 34.1% prevalence of hypertension in Indonesia. This data show that hypertension is a major health problem that need to be controlled and reduced.

One of the most Reason to control blood pressure in hypertension because hypertension can lead to various risk factor diseases such as diseases or disorders of the kidney, heart failure, stroke and also myocardial infarction (Wolff et al., 2016). Based on the results of the study an individual suffering from hypertension has a greater risk of cardiovascular disease for each increase in systolic blood pressure by 20 mmHg and an increase in diastolic blood pressure of 10 mmHg above the normal value of blood pressure (Dhungana et al., 2018),

While there is a range of pharmaceutical treatments available there is also a need for non-pharmaceutical interventions (Bakris & Sorrentino, 2018), partly because they are more affordable in the developing world, but also because they offer the prospect of addressing the underlying problem rather than just the symptom (Jones et al., 2015). Slow breathing exercise is a non-pharmacological therapy that can be used to help control or reduce blood pressure and can be used to increase one's respiratory muscle strength (Ubolsakka-Jones, Tongdee, & Jones, 2019).

A breathing training programme that resulted in a reduction in blood pressure, an increase in inspiratory muscle strength, lung capacity would be of considerable advantage to people with hypertension (Ubolsakka-Jones, Tongdee, Pachirat,

& Jones, 2018). While slow breathing training has been found to be effective in reducing blood pressure, the mechanism of this action is not understood. Consequently, the aim of the present study was to discuss whether a slow breathing training programme which was primarily designed to reduce blood pressure has advantage of improving lung function and respiratory muscle strength in people with hypertension.

## 2. METHOD

Systematic review is to discuss the effectiveness of slow breathing training on blood pressure in patients with hypertension. A literature search is carried out in several databases such as Scopus, Pubmed, Proquest, Science Direct, and Ebsco. The following key words were used alone or in combination: slow breathing, slow load breathing hypertension, blood pressure. English-only articles. Once all articles were found, duplicate articles were removed. The use of limited year is 5 years (2014-2019) and English-only articles.

Criteria for inclusion in this review are as follows: (1) studies involving hypertension (2) ages for 18 years and over (3) patients who have received or are still receiving slow breathing exercises.

Criteria for exclusion included the following: (1) studies that did not have information hypertension; (2) language were used is not English, and (3) more than time limitation September 2014 to 2019.

## 3. RESULT

Total articles that used in this review were using the randomized controlled trial, quantitative, qualitative, experimental study. And the research were taken place in USA, China, Spain, Korea and Taiwan. A total of 10 articles are met the inclusion criteria for this review.

Total respondents in this review are 1757 hypertension patients who received slow breathing therapy. There is 10 jurnal received slow breathing training.

The results of the 10 research articles are significant in reducing blood pressure, anxiety and improving lung function with slow breathing treatments or interventions. The article also mentioned that the decrease was significantly with the duration of slow breathing 8 times / minute rather than 16 times per minute. Slow breathing by combining slow breathing with handgrip exercise and isometric hand grip, acupuncture can also be very significant results in lowering blood pressure both systolic and diastolic. And in the article it is said that slow breathing is more effective than regular breathing exercises.

## 4. DISCUSSION

Modified Slow Breathing Training is one of the non-pharmacological therapies that can be used to help lower blood pressure. Non-pharmacological

therapy is a breathing exercise therapy that has been modified and can be carried out by individuals independently in controlling the respiratory rate so that it can reach breathing speed both at the time of inspiration and expiration in accordance with what has been recommended. Based on the results of previous studies show that slow breathing training is carried out every day independently at home for 8 weeks with a frequency of 60 breaths per day in accordance with the instructions of the slow breathing training program in the form of breathing inspiration during 4 seconds and then followed by expiration breathing for 6 seconds proved to be more effective in lowering blood pressure when compared to just doing regular deep breathing exercises. Besides being able to help lower blood pressure, slow loaded breathing training has other benefits, it can increase lung capacity and respiratory muscle strength (Ublosakka-Jones, Tongdee, Pachirat, & Jones, 2018).

Slow breathing exercises can also help in increasing the sensitivity of baroreflex, but it is important to consider the frequency of breathing when breathing exercises (Cernes. & Zimlichman, 2017). Breathing exercises with a frequency of 15 times per minute will not produce an increase in baroreflex sensitivity. Baroreflex is a reflex produced by blood pressure sensors that are in the aortic arteries and carotid arteries. Baroreflex has a role in changing the ups and downs of a person's blood pressure. Baroreflex sensitivity level will affect a person's blood pressure. Increased baroreflex sensitivity can help to reduce blood pressure in a person or individual with hypertension (Cernes and Zimlichman, 2017).

The slow breathing training protocol is carried out with a breathing pattern with a cycle of inspiration time: total inspiration time of 0.4 seconds with a total breathing time of 10 seconds (Jones et al. 2010). The subject rested for 5 seconds after 6 breathing patterns, carried out for 30 minutes. Slow breathing exercise is done twice a day, every day for 8 weeks. Slow breathing does not cause serious problems in the muscles of inspiration, because there is no burden of inspiration. Slow breathing exercises produce peripheral adaptations that may occur with aerobic exercise. The mechanism is slow breathing training modifying several aspects of blood pressure center control (Gaur, 2018). Lehrer et al (2006) have shown slow breathing training can increase baroreflex gain which can stabilize heart rates that affect blood pressure (Ublosakka-Jones *et al.*, 2015)

Subjects with hypertension, pre- hypertension and antihypertensive drugs, were given slow breathing intervention that is inhaling as much as  $\leq 10$  breaths / minute carried out for  $\geq 5$  minutes. This exercise is carried out at  $\geq 3$  days / week; total duration of intervention  $\geq 4$  weeks; Slow breathing training reduces blood pressure at rest, perhaps by modifying central autonomic control. Systolic

changes (SBP) and diastolic blood pressure (DBP), heart rate, and

/ or reduction in the dose of anti-hypertensive drugs. Of the 103 citations that were eligible for full text review, 17 studies were included in the meta-analysis. Overall, slow breathing exercises decreased SBP by -5.62 mmHg [-7.86, -3.38] and DBP by -2.97 mmHg [-4.28, -1.66]. Slow breathing shows a slight decrease in blood pressure. This may be biased intensively for the first treatment that makes sense for patients with hypertension and low-risk pre-hypertension who do not start treatment. (Chaddha 2019)..

## 5. CONCLUSION

Slow breathing training provides many benefits for patients with hypertension. Especially for patients with isolated systolic hypertension. This non-pharmacological therapy can be carried out by individuals independently in controlling the respiratory rate so that it can reach breathing speed both at the time of inspiration and expiration. Slow breathing exercises can also help in increasing the sensitivity of baroreflex, then affect the decrease in blood pressure.

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