

## Effect of Training Rhythmic Breathing on the Blood Pressure of Hypertensive Patients

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### Abstract

**Introduction:** Hypertension increases under vehement excitement and stress. Rhythmic breathing is a way of controlling the stress. Hence, this study was carried out to determine the effect of training rhythmic breathing on the blood pressure of hypertensive patients.

**Methods:** The present research is a post- and pre-semi-experimental study. The research community include all hypertensive patients higher than 140/90 mm at Zabol Amir Al-Momenin Hospital, Zabol, Iran. The sample size consists of 32 people who selected by means of available sampling. Data analysis was done on SPSS® and by means of paired sample T-test, independent T-test and Pearson correlation coefficient.

**Findings:** The results show that average systolic pressure before intervention was  $154.84 \pm 39$  and after intervention was  $131.87 \pm 18.65$  in that there was a significant statistical difference between the post intervention and pre-intervention ( $P < 0.05$ ). the average diastolic pressure before intervention was  $94.33 \pm 9.61$  and after intervention was  $70.13 \pm 64.34$  in which there was not a significant difference between the post-intervention and the pre-intervention ( $p > 0.05$ ). In other words, there is a positive and significant relationship between the training rhythmic breathing and the blood pressure of hypertensive patients.

**Conclusion:** According to the results, it can be stated that the level of blood pressure can be contorted by training rhythmic breathing among hypertensive patients.

**Keywords:** Rhythmic breathing; Blood pressure; Hypertensive patients

### Introduction

Hypertension is viewed as one of the most chronic diseases worldwide [1]. WHO estimated that nearly 600 million people are afflicted with hypertension [2]. The outbreak of hypertension is 22.0% in Iran [3]. Control and evaluation of vital symptoms are the roles of nurses. Among these symptoms, hypertension holds a specific place [4]. It is defined as a force that is applied to each unit of vein's wall by means of blood [5]. Hypertension occurs when the blood pressure increases inside veins and squeezes the veins which are the result of

high cardiac output [6]. When the systole pressure is equal or larger than 140 mmHg and the diastole pressure is equal or larger than 90 mmHg, a person has hypertension [7-9].

Hypertension can lead to cardiovascular diseases; hear failure, stroke and kidney failure [10]. Thus, to protect the general health, it is necessary that prevention and control of blood pressure be taken [3].

Dangerous and predictive factors of hypertension include inheritance, high weight, improper diet, alcohol consumption, less physical activity, socio-mental and environmental factors [11] and psychological factors [8]. The psychological factors can be named such as stress [8], and excitement [12]. Stress is the result of uncontrollability of undesirable conditions which turn into the physiological reactions [13]. Severe excitement and stress provoke the autonomic system and release of catecholamine in blood and as the result blood pressure increases [14]. The researchers measured the blood pressure of candidates in various situations. Based on their findings, the people had the highest blood pressure in the stressful conditions and the blood pressure decreased as the stress and excitement decreased [15].

Since far, various medical and non-medical treatments have been conducted for this disease [16]. Many researchers believe that combined treatment based on behavioral methods entail more effects as compared to the administration of drug solely in reducing the hypertension [17]. In the medical treatment, two classes of medicines such as diuretics and beta-blockers are used; but these medicines possess side effects such as decrease in potassium, and increase in glucose, sodium and urea [18]. The non-medical treatments include biofeedback, music therapy, yoga, distraction, relaxation, guided visualization [19], deep breathing and progressive muscle relaxation [14] which causes the stress reduction and blood pressure decrease as well [17]. In this respect, Hamid [20] carried out a research in 2013 on 60 essential hypertensive patients and she concluded that training immunization against stress causes the reduction of inefficient views and hypertension [20]. Hamidi et al. conducted a research on 55 hypertensive elderly. They showed that using non-medical methods such as relaxation techniques can access the control of stress, anxiety, and prevention of side effects such as hypertension among the elder people [21].

Rhythmic behavior is a method of distraction to cope with the stress which the nurse can play a role in training it and has various types. McCaffery explained some of it including 'he and who', staring at an object and counting 2, 3 and 4 when inhaling and exhaling, blowing a straw inside a full-water glass and slow breathing with disciplined rhythm [22].

A person has fast and shallow breathing when he is stressful [23] and executing rhythmic behavior increases the depth of breathing. In fact, breathing is the exchange of oxygen and CO<sub>2</sub> between cells and external environment [14] and this method helps the exchanges. The advantages of these methods can be mentioned as non-invasiveness, safeness, no undesirable sensitive side effects, possibility of long-term use and simplicity of technique [24].

Since the rhythmic breathing reduces the stress [14] and consequently the blood pressure [17], and is easy to use on the other hand and the patient can use it anywhere and since there are a few studies in case of rhythmic pressure for reducing hypertension, thus this work has been conducted to determine the effect of training

rhythmic breathing on the blood pressure of hypertensive patients at Zabol Amir Al-Momenin Hospital, Zabol, Iran, in 2015.

## Methods

The present research is a post- and pre-semi-experimental study. The statistical community includes all hypertensive patients higher than 140/90 mmHg at Zabol Amir Al-Momenin Hospital. The sample size consists of 32 people who selected by means of available sampling.

The inclusion criteria include having hypertension background more than one year by doctor's approval [25], above 18 years old, non-exposure to intensive stimulation, no use of strong food, coffee, drugs and mind-blowing drinks half an hour before intervention [26], no difficulty in hearing; the exclusion criteria include the intention of not willing to cooperate at each stage of study. After having permission of hospital's permission, the patients give permission to cooperate in the study after explaining the objective of research so that the ethical considerations are observed. Since the patients are assured of confidentiality with the information, the extra data are taken from the nurses and patients. To measure the blood pressure, the subjects were located in the mild silent environment [27]. Then, the blood pressure was measure by sphygmomanometer which possesses validity and its reliability was confirmed with 0.75 correlational coefficient by measuring blood pressure of 10 subjects by major and control sphygmomanometer. In this way, the patient was sitting and, while the arm was placed at the heart, the armband was put 3 fingers above the elbow. The armband's air was emptied 2-3 mmHg per second [26]. Systolic and diastolic blood pressures by sphygmomanometer from right arm, with control distance and average were the criterion. The first phase of Kortotkoff sound was considered as systolic blood pressure and the fifth phase of Kortotkoff sound (no sound) was considered as the diastolic pressure [27]. After 30 s, blood pressure was measured for second time [26]. After that, the rhythmic breathing was trained in the following way. The patients closed their eyes. They counted 1, 2, 3 and inhales through nose; counted 1, 2, 3 and held their breath; counted 1, 2, 3 and exhaled through mouth. All subjects in the intervention group was told to only focus on the inhalation and exhalation. Then, the intervention group was told to do the rhythmic breathing for 28 min every four minutes and each time for 1 min according to the training [28]. Then, blood pressure re-measured. This process was repeated for four days.

Data analysis was done on SPSS®-22 and by means of paired sample T-test, independent T-test and Pearson correlation coefficient. The confidence coefficient was 95%.

## Results

In the present study, 53.1% [17] of participants were women and 46.9% [15] of them were men. The average age of men was  $52.17 \pm 11.8$  and of women was  $50.26 \pm 9.93$  which there was not a significant difference between the average age of men and women (Table 1).

Index Demographic Information		Frequency	Frequency Percentage (%)
Gender	Female	17	53.1
	Male	15	46.9
Education	Illiterate	6	18.75

	Primary	8	25
	Secondary	13	40.62
	High-School	3	23.43
	University	2	15.62
House	Owned	28	87.5
	Rented	4	12.5
Women's Occupation	Housewife	15	45.87
	Employed	0	0
	Resigned	2	6.25
Men's Occupation	Worker	3	9.37
	Employed	3	9.37
	Free Job	5	15.62
	Resigned	4	12.5
Insurance	Yes	28	87.5
	No	4	12.5
Economic Condition	Poor	4	12.5
	Medium	15	45.87
	Good	3	9.37

**Table 1:** Frequency distribution and percentage of hypertensive patients based on demographic information.

The results of present study showed that the average systolic pressure was  $154.84 \pm 39$  before intervention and  $131.87 \pm 18.65$  after intervention which represents a significant difference between the systolic pressure before and after intervention ( $P < 0.05$ ). The average diastolic pressure was  $94.33 \pm 9.61$  before intervention and  $70.64 \pm 13.34$  after intervention which represents that there is not a significant difference between the average diastolic pressure before and after intervention ( $P > 0.05$ ) (Table 2).

Blood Pressure	Before Intervention	After Intervention	Paired T-Test	P
Systolic	$154.84 \pm 39$	$131.87 \pm 18.65$	0.001	0.00
Diastolic	$94.33 \pm 9.61$	$70.64 \pm 13.34$	0.11	0.15

**Table 2:** Comparing average blood pressure before and after intervention.

## Discussion

This research demonstrated that training rhythmic breathing can be one of ways to cope with stress. Jabalameli et al. [11] confirms by saying that: excessive physiological arousal is created in the stressful situations and increases the secretion of norepinephrine and epinephrine hormones and raises the blood pressure. Overall, using various techniques of stress management such as relaxation,

diaphragm breathing and rhythmic breathing causes that the physical tension and physiological signs as well as reduction in secretion of norepinephrine and epinephrine hormones and consequently reduces the blood pressure considerably [11]. Rhythmic and deep breathing fills the alveolus with air maximally and results in 1) expanding muscle, 2) reducing anxiety, 3) eliminating inappropriate patterns of respiratory muscle activity, 4) reducing breathing speed and 5) reducing respiration activity [14]. In the stressful and threatening conditions, the veins of visceral organs are contracted; when the veins are contracted, the pressure gets higher so that it does not allow the blood reach the muscle and in this was hypertension comes out. By expansion of visceral organs and stress reduction, the heart functions normally again and the blood pressure reaches its normal condition [18]. Analyzing the effectiveness of training immunization against the stress on the inefficient views and reduction of blood pressure, Hamid resulted that training immunization against the stress significantly reduces the blood pressure of hypertensive patients [20]. In this regard, Bahramkhani et al. analyzed the effectiveness of muscle progressive relaxation on the perceived stress of essential hypertensive patients and concluded that the muscle progressive relaxation can reduce the systolic and diastolic blood pressure among the hypertensive patients [15]. Furthermore, Gholafshani analyzed the effectiveness of muscle progressive relaxation on hypertension among the elder heart failure patients and found that executing muscle progressive relaxation for three days twice a day can reduce the systolic and diastolic blood pressure significantly among the intervention group in contrast to the control group [29]. Wallace investigated the effect of relaxation and biofeedback methods on the reduction in blood pressure over a clinical study on 240 patients and observed that biofeedback and relaxation significantly decrease the blood pressure [30].

## Conclusion

Based on the results and easily utilization of rhythmic breathing everywhere, using this method is recommended among hypertension patients.

## References

1. Kaplan MS, Hugué N, Feeny DH, McFarland BH (2010) Self-reported hypertension prevalence and income among older adults in Canada and the United States. *Social science & medicine* 70: 844-849.
2. Samiei Siboni F, Alimoradi Z, Sadegi T (2013) Impact of corrective life style educational program on controlling stress, anxiety, and depression in hypertensives. *Journal of Birjand University of Medical Sciences* 19: 1-9.
3. Sedaghat Z, Zibaeinejad MJ, Fararouei M (2015) Adherence to Healthy Lifestyle among Hypertensive Patients and Its Association with Anthropometric Measures Iran *J Health Educ Health Promot* 3: 232-241.
4. Khalili H, Faghih S, Vashani B (2009) The effect of seated crossed-leg position on the reading of blood pressure in patients with hypertension *Journal of Sabzevar University of Medical Sciences* 15.
5. Guyton AC, Hall JE (2009) *Text book of Medical Physiology*, Tehran 3rd edtn, P: 25.
6. Abdullahi Sh, Mehrazadwh M, Sudanese M (2013) The effect of happiness training on blood pressure in patients with hypertension and happiness. *New findings in Psychology Journal* 7: 69-79.
7. Alijani F, Noorbakhsh M, Shalamzari HQ (2011) The effect of 8 weeks aerobic exercise on blood pressure and blood sugar in patients with hypertension and diabetes mellitus independent. *J Sports Sci* 2: 29-42.
8. Kalthornia-Golkar M, Banijamali Sh, Bahrami H, Hatami HR, Ahadi H (2014) Effectiveness of Mixed Therapy of Stress Management Training and Spiritual Therapy on Level of Blood Pressure, Anxiety and Quality of Life of High Blood Pressure Patients. *J Clin Psych* 6: 1-11.
9. Bayat Z, Khazai AA, Gholipour AR, Ngarstany HR, Madani FR (2015) The effect of 8 weeks aerobic exercise on blood pressure in hypertensive type 2 diabetic women. *J Res Biol Sci Sport* 4: 51-58.
10. Mularcik KA (2010) Self-efficacy toward health behaviors to improve blood pressure in patients who receive care in a primary care network. *The Ohio State University*.
11. Jabalamei SH, Doost HTN, Maulvi H (2009) The effectiveness of cognitive-behavioral stress management intervention on quality of life and blood pressure in patients with hypertension. *J Med Sci* 15: 88-89.
12. Baharvand B, Namdari M, Ghaffarzadeh M (2009) The role of stress on the rise of blood pressure.  *Lorestan Univ Med Sci J* 10: 93-97.
13. Avanjani FSI, Afshar M, Bagheri AH (2007) The effect of respiratory training with lobes accumulated in patients with chronic obstructive pulmonary disease. *University of Medical Sciences and Health Services martyr Sadoughi* 4: 61-67.
14. Nobahar M, Asgari MR, Mohammed HB, Soleimani M, Vafaei AA (2011) *The Complete Book of Medical Surgical Nursing Brvnr- Lachman Fyps-*. Wise Publications human Hydjy, Tehran. 3rd edtn P:9-617.
15. Bahramkhani M, Ali Pour A, Bozorgi MJ, Ghazi KB (2012) Effectiveness of Progressive Relaxation Training on perceived stress in patients with essential hypertension. *Journal of Clinical Psychology* 3: 77-89.
16. Kheirabadi GH, Bagherian-Sararoudi R, Masaeli N, Zonary R (2012) Comparison of depression rates between subjects with and without hypertension. *Special psychosomatic disorders* 9.
17. Hasanvand SH, Saeed SS, forouzi M, Alizadeh SM, Hagedoost AA (2011) The effect of back massage on patients with essential hypertension, blood pressure and radial pulse *Clinic heart specialist clinic and Bymarstanshhd day Ashaier. Lorestan University of Medical Sciences Journal* 12: 63-69.
18. Tarkhan M, Safarinia M, Sima PK (2012) Effectiveness of Group Stress Inoculation Training on the Systolic and Diastolic Blood Pressure and Life Quality of Hypertension in women. *J Health Psych* 11.
19. Aghebati N, Mohammadi E, Esmaeil ZP (2010) The effect of relaxation on anxiety and stress of patients with cancer during hospitalization. *Iran J Nurs* 23: 15-22.
20. Hamid N (2013) The effect of Stress Inoculation Training(SIT) on Dysfunctional Attitudes and Primary Hypertension. *J Kerman Univ Med Sci* 20: 405-417.
21. Hamidi S, Ahmadi F, Asghar M (2007) Investigation on anxiety and stress relaxation techniques in elderly patients with high blood pressure. *University of Medical Sciences* 8: 45-51.
22. Borzou SR, Fehlegary GH, Turkmen B (2003) Survey effect of rhythmic breathing on the intensity of pain in the post

- orthopedic surgery patients. *Sci J Kurdistan Univ Med Sci* 6: 6-10.
23. Borzou SR, Akbari S, Falahinia GH, Mahjub H (2013) Effect of Rhythmic Breathing on Pain Intensity during Insertion of Vascular Needles in Hemodialysis Patients. *J Clin Nurs Midwifery* 19: 6-14.
  24. Lalegani HA, Esmaili SA, Safdari A (2014) The effects of breathing techniques on pain intensity of burn dressing- A clinical randomized trial. *J Clin Nurs Midwifery* 2: 61-68.
  25. Farahmandy M, Fallahzadeh MH, Hashiani HAA, Hadi Z (2011) Assessment of risk factors for cardiovascular disease in Shiraz University of Medical Sciences headquarters staff. *Knowledge & Health Journal* 5: 150.
  26. Mohtasham GH, Hosni MRM, Daemi M, Hakima H, Sahbaee F (2015) Comparison of measuring blood pressure in patients with heart Society of America. *Journal of Medical Council of Islamic Republic of Iran* 32.
  27. Mohammadi N, Parviz S, Peyravi H, Hosseini AF (2010) Effect of Endotracheal Suctioning Education for Nurses on Patients' Hemodynamic Parameters 25: 18-25.
  28. Pour AM, Moghaddam MB (2016) The effect of rhythmic breathing on the cardiorespiratory parameters in Acute Coronary Syndrome patients admitted at CCU. *Journal of Sabzevar University of Medical Sciences* 23: 376-384.
  29. Golafshani A, Gharooni M, Faghieh S, Esmaeli H (2007) Effect of Progressive Muscle Relaxation on Hypertension of Aged With Myocardial Infarction. *Iran J Ageing* 2: 352-357.
  30. Najafian J, Hashemi MG (2009) Comparison and comparison of the effect of two methods of biofeedback-relaxation in controlling blood pressure in patients with mild hypertension. *Journal of Tabriz University of Medical Sciences* 57: 76.