



EFFECTIVENESS OF DEEP BREATHING EXERCISE ON BLOOD PRESSURE AMONG PATIENTS WITH HYPERTENSION

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ABSTRACT

The prevalence for hypertension in India was 29.8% and about 33% urban and 25% rural Indians are hypertensive. In this modern world, stress is increasing in everyone's life which also a major contributing factor for hypertension. Hypertension can be treated by pharmacological and non-pharmacological methods. Deep breathing exercise is one of the exercise and relaxation technique which helps to decrease the blood pressure and maintain their health in optimal state. The aim of the study is to determine the effectiveness of deep breathing exercise on blood pressure among patients with hypertension. A research design adopted for this study was quasi-experimental design with the sample size of 30 in experimental group and 30 in control group. Sample was selected by using convenient sampling technique. Deep breathing exercise was given for experimental group and control group received the routine care. Their blood pressure was measured by sphygmomanometer before as well as after the intervention in both groups. Data were analyzed by using descriptive and inferential statistics. Deep breathing exercise was found to be effective in reducing both systolic and diastolic blood pressure at the level of $p < 0.05$. The study findings concluded that deep breathing exercise will reduce the blood pressure and improve the quality of life of the patient and also Continuous practicing deep breathing exercise can reduce medicine usage there by it can be used routinely as a complementary method of treatment for hypertension.

KEY WORDS: Blood pressure, hypertension, deep breathing exercise, systolic blood Pressure diastolic blood pressure, hypertensive patients



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INTRODUCTION

Blood pressure is the pressure exerted on the walls of the arteries during ventricular systole and diastole which is affected by factors such as cardiac output, blood vessel elasticity, volume, velocity, viscosity of the blood and peripheral resistance.¹ Essential hypertension accounts for 90 to 95% of all types hypertension. There are many risk factors for essential hypertension such as advance in age, sex and family history of hypertension, obesity, atherosclerosis.² Centres for Disease Control and Prevention 2013, has stated that hypertension is a widespread health problem and is called the “ silent killer ” because it often has no warning signs or symptoms, and many people don't realize they have it.³ Hypertension is a major contributing factor of cardiovascular diseases and it may leads to many complications such as stroke, retinopathy, coronary artery disease and renal failure.⁴ The prevalence for hypertension in India was 29.8% and about 33% urban and 25% rural Indians are hypertensive.⁵ In this modern world, stress is increasing in everyone's life which also a major contributing factor for hypertension. Hypertension can be treated by pharmacological and non-pharmacological methods. Pharmacology method involves antihypertensive drugs and non-pharmacological intervention includes salt restriction, dietary modification, fat restriction, avoidance caffeine, smoking and alcohol, yoga, exercise and relaxation technique .^{2,4} Deep breathing exercise is one of the exercise and relaxation technique which increases blood and oxygen flow to the brain to function in its optimal state. During deep breathing exercise on inhalation the belly, lower ribcage, and lower back all expand thus drawing the diaphragm down deeper into the abdomen, and retract on exhalation, allowing the diaphragm to move fully upward toward the heart and also while the diaphragm moves downward it massages the liver, stomach and other organs and tissues below it, and upward to massage the heart. Combined with the outward and inward movements of belly ribcage and lower back help to massage and detoxify our inner organs and promote blood flow and peristalsis, and pump the lymph more efficiently through our lymphatic system.⁶ Slow breathing improves vagal activity and therefore decreases baseline heart rate and blood pressure. This is associated by improving vagal tone and by decreasing sympathetic discharge. Improvement in both sympathetic and parasympathetic reactivity may be the mechanism that is associated in those practicing the slow breathing exercises.⁷ Slow breathing increases baroreflex sensitivity and reduces sympathetic activity and chemoreflex activation, it suggest a potentially beneficial effect in hypertension; where, baroreflex is the system in the body that regulates blood pressure by controlling heart rate, strength of heart contractions, and diameter of blood vessels. Slow breathing reduces blood pressure and enhances baroreflex sensitivity in hypertensive patients.⁸ oneda Deep breathing increases blood and oxygen flow to the brain to function in its optimal state. It creates a connection between mind and body that can lead to greater self-awareness, mindfulness and clear thinking, improves circulation, which improves heart health, energy levels and helps the body eliminate toxins, as well as reduces stress.⁹

Hence, practicing deep breathing exercise influence autonomic functions and has therapeutic benefit to hypertensive patients.¹⁰ By considering the mentioned benefits of breathing exercise on hypertension investigators interested to examine the effectiveness of deep breathing exercises on hypertension as a non-pharmacological complementary approach to treat hypertensive patients.

MATERIALS AND METHODS

Research Design

Quantitative approach - Quasi experimental research design

Variables

Dependent variable: Blood pressure among patients with hypertension

Independent variable: Deep breathing exercise

Setting of the study:

The study was conducted at Saveetha Medical College and Hospital

Population

The target population of the study was patients with hypertension

Sample

Patients with hypertension who were admitted in Saveetha Medical College and Hospital and met the inclusion criteria

Sample size

The sample size was 30 in experimental group and 30 in control group

Sampling technique

Sample was selected by using convenient sampling technique

Criteria for selection of samples

Inclusion criteria

- Patients who had increased blood pressure from 130/90 mm Hg to 160/100 mm Hg.
- Both sexes of male and female aged between 40- 60 years.
- Those who were willing to participate in the study.

Exclusion criteria

- Patients who were unconscious.

Description of the tool

The Tool consist of three parts

Part-1: Demographic data.

Part-2: Sphygmomanometer

Part 3: Deep Breathing exercise

DATA COLLECTION PROCEDURE

As per the reference SCON/SU/235/2016, the permission was obtained from Institutional ethical committee, Saveetha University, Chennai. Prior to data collection informed consent was obtained from the subjects after explaining the purpose of the study.

Demographic variables and blood pressure was assessed for both experimental and control group. Deep breathing exercise was given for experimental group twice a day for 10 days and control group received only

routine care. Post test blood pressure was measured by using sphygmomanometer and stethoscope at the end of 10th day for both the group. The data were analysed by using descriptive and inferential statistics.

RESULTS

Table 1
Describes the distribution of frequency and percentage of demographic variables among patients with hypertension in experimental and control group.

S.NO	DEMOGRAPHIC VARIABLE	EXPERIMENTAL GROUP		CONTROL GROUP	
		FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
1.	Age in years				
	a)21-30	-	-	-	-
	b)31-40	-	-	-	-
	c)41-50	22	73.3%	24	80%
	d)50 and above	8	26.6%	6	20%
2.	Duration of hospitalization				
	a) < 1 week	12	40%	18	60%
	b) < 2 week	14	46.6%	8	26.6%
	c) < 3 week	4	13.3%	4	13.3%
	d) more than a month	-	-	-	-
3.	Duration of hypertension				
	a) < 1 month	-	-	-	-
	b) < 1 year	12	40%	14	46.6%
	c) < 5 year	14	46.6%	10	33.3%
	d) more than 5 years	4	13.3%	6	20%

The above table reveals that majority of them were belongs to the age group of 41-50 years in both experimental group and control group and had

hypertension less than 5 years in experimental group and less than a year in control group

Table II
Frequency and percentage of distribution of pre test level of hypertension in experimental group and control group.

Level of hypertension (mm of Hg)	Experimental group		Control group	
	Frequency	Percentage	Frequency	Percentage
Pre-Hypertension	26	86.67%	22	73.33%
Stage I hypertension	4	13.33%	8	26.67%

The table II reveals that out of 30 samples in the experimental group 26 (86.6%) were in pre-hypertension and 4 (13.3%) were in stage-I hypertension with mean score of systolic blood pressure is 136.6 and SD was 8.99 and Mean score of diastolic blood pressure was 95.33 with 7.06 SD. In control group

22(73.3%) were in pre- hypertension and 8 (26.6%) were in stage-I hypertension. The mean score of systolic blood pressure was 135.33 with 6.38 SD and mean score of diastolic blood pressure was 94.66 with 6.39 SD.

Table III
Frequency and percentage of distribution of post test level of hypertension in experimental group and control group.

Level of hypertension (mm of Hg)	(Experimental group)		(Control group)	
	Frequency	Percentage	Frequency	Percentage
Normal	6	20%	-	-
Pre-hypertension	22	73.33%	22	73.33%
Stage I hypertension	2	6.67%	8	26.67%

The above table reveals that out of 30 samples in the experimental group 6 (20%) were normal, 22 (73.3%) were in pre- hypertension and two (6.7%) were in stage-I hypertension with mean score of systolic blood pressure is 126.7 and SD was 9.75 and Mean score of diastolic blood pressure was 87.33 with 9.78 SD. In

control group 22 (73.3%) were in pre- hypertension and 4(26.6%) were in stage-I hypertension with mean score of systolic blood pressure is 134.8 and SD was 6.38 and Mean score of diastolic blood pressure was 94.33 with 6.76 SD

Table IV
Determine the effectiveness of deep breathing exercise on level of blood pressure among patients with hypertension in experimental group.

	EXPERIMENTAL GROUP			
	Pre test	Post test	Pre test	Post test
	Systolic BP	Diastolic BP	Systolic BP	Diastolic BP
MEAN	136.6	95.33	126.67	87.33
SD	8.99	7.06	9.75	7.98
't' test	t=1.580		t=0.0294	

Above table reveals that the calculated 't' value for systolic blood pressure in experimental group was $t=1.580$ which is found to be statistically significant at $p<0.05$ level. Then the calculated 't' value for diastolic blood pressure was $t=0.0294$ which is found to be statistically significant at $p<0.05$ level. So the deep breathing exercise was effective on blood pressure among patients with hypertension in experimental group.

DISCUSSION

Diet and exercise are fundamental elements to control blood pressure. Although many complementary therapies are promoted for the treatment of hypertension, few are truly therapeutic. The present investigation examined the effect of deep breathing exercise intervention on the reduction of blood pressure among hypertensive patients. Present study findings reveal that practicing deep breathing exercise twice a day for 10 days leads to significant reduction in systolic blood pressure. Numbers of studies related to the effects of breathing exercise in reduction of blood pressure undertaken and which proven the positive effect. Matayan et.al had conducted a fast and slow breathing exercise interventional study with 60 samples for 3 months and the findings reveal that BP decreased longitudinally over a 3-month period with both interventions.⁷ Dr.Labilaet.al had conducted a study to assess of slow deep breathing exercise on blood pressure among newly diagnosed patients with essential hypertension at government general hospital in Cairo,

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Egypt with 60 samples based on the findings of the study he concluded that, his study has proven that practising slow deep breathing exercise daily for one weeks 4 times a day for 10 minutes has significantly reduces blood pressure of the patients newly diagnosed with hypertension.¹¹ Grassman E et.al had conducted a study by Using a new technology BIM (Breathe with Interactive Music), hypertensive patients were guided towards slow and regular breathing and reported that breathing exercise guided by the BIM device for 10 min daily is an effective non-pharmacological modality to reduce BP.¹² These study findings are accordance with the present study.

CONCLUSION

The study findings concluded that deep breathing exercise is one of the non -pharmacological, cost effective methods to use in reducing the blood pressure among patients with hypertension **and** improve the quality of life of the patient. and also Continuous practicing of deep breathing exercise can reduce medicine usage thereby it can be used routinely as a complementary method of treatment for hypertension. Deep breathing exercise will reduce the side effects of.

CONFLICT OF INTEREST

Conflict of interest declared none.

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