

Effectiveness of Pranayama on Heart Rate and Blood Pressure in Hypertension (Stage I)

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Abstract:

Background: Cardiovascular disorders were predominant in stage I Hypertension patients and it is the leading cause of mortality in the 21st century both in old age and in the active age group. There is a need for non-pharmacological intervention to reduce and manage the incidence of hypertension.

Methodology: This Experimental study includes 100 patients with Type I hypertension and not under medication. Between the ages 40-50 years were enrolled and participated in pranayama. Mercury sphygmomanometer, stethoscope, and Pulse oximeter were used to monitor the pre and post test results

Results: Statistical analysis was done by using students' test, which showed improvement in patients who received pranayama.

Conclusion: This study shows a relative improvement in the heart rate and blood pressure in 4 weeks of practicing pranayama

Keywords: Pranayama, Blood pressure, heart rate.

INTRODUCTION

Hypertension is the leading cause of mortality in the 21st century both in old age and in the active age group which can precipitate into cardiovascular diseases. Pharmacological intervention has been the choice of treatment so far. There is also a need for non-pharmacological intervention in managing the incidence of hypertension. Essential, or primary hypertension is a persistent elevation of blood pressure which is not caused by underlying cardiac, endocrine, or renal disease [1] Whole body exercise training has an important role to play in the management of hypertension [2, 3] reductions in resting blood pressure compared with those obtained by whole body exercise are also seen with the practice of yoga and meditation [5, 6] and a common feature of these techniques is slow and regular breathing [9, 10]. Furthermore, a number of randomized controlled studies have shown slow breathing to be effective in reducing blood pressure [6, 7, and 8] According to American College of Cardiology 2017 guidelines on Hypertension, classifies blood pressure rates as:

- **Normal:** Less than 120/80 mm Hg;
- **Elevated:** Systolic between 120-129 and diastolic less than 80;
- **Stage 1:** Systolic between 130-139 or diastolic between 80-89;
- **Stage 2:** Systolic at least 140 or diastolic at least 90 mm Hg;

Hypertensive crisis occurs when Systolic over 180 and/or diastolic over 120, with patients needing prompt changes in medication if there are no other indications of problems, or immediate hospitalization if there are signs of organ damage. It suggests that high blood pressure should be treated earlier with lifestyle changes and in some patients with medication – at 130/80 mm Hg rather than 140/90. Pranayama additionally help in lowering blood lactate concentrations and aid in the correct use of accessory

muscles by strengthening the diaphragm and the abdominal muscles [7] It has been proven that pranayama is an important component of active relaxation that can effectively reduce blood pressure and fatigue. Pranayama, one of the yogic breathing techniques can produce different physiological responses. Yogic techniques are known to improve physical and mental performances. Patanjali, the foremost exponent of yoga, in his Yoga Sutra describes- Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi as eight angas (parts) of yoga [7,8] Slow yogic breathings are accepted as one of the most practical relaxation techniques and hold a great deal of potential in the treatment of psychological and autonomic disorders [9,10]

METHODOLOGY

After getting ethical clearance cleared from SRM College of Occupational therapy, Information sheet has been circulated to the participants involved in the current study and after clear explanation about pranayama, the technique has been demonstrated to the participant and all the doubts were cleared properly. After getting signed from the consent form, the study has been set forth. This Experimental study involves Pre-test and Post-test study type and the participants were selected by Convenient sampling method. A total of 100 participants were completed the study and it took 6 weeks to complete and the study setting is SRM Medical College Hospital and Research Centre. Participants with Chest wall deformities, Recent surgical operation, Anti hypertensive drugs, Chronic smokers and Subjects with pulmonary complications were excluded from the study.

Pranayama was conducted in a cool, well-ventilated room (Temperature averages between 20-25°C), Participants will be directed to sit in a comfortable position (Sukhasan) with head, neck, and trunk erect and in a straight line and instructions were delivered that should be followed

carefully. Inspiration will be slow and deep followed by expiration. Pre-test & Post-test Blood Pressure and heart rate were documented.

DATA ANALYSIS

The obtained data were analyzed using the SPSS version 25 software compatible with windows. The statistical tool used in the study was student 't' test, independent 't' test

RESULTS

According to the **table 1**, there was a significant difference ($p < 0.05$) and improvement in mean values of blood pressure in participants belonging to regular practice of pranayama. **According to the table 2**, which has a significant value of **0.00**. Thus Table 1 and 2 shows there was a significant difference ($p < 0.05$) and improvement in mean values of heart rate and blood pressure followed by pranayama.

DISCUSSION

This study seeks to analyze the effectiveness of Pranayama on heart rate and blood pressure in elevated and stage one hypertensive subjects. About 100 subjects with elevated and stage one hypertension between ages 40-50 years (active age group) were administered

Pranayama. Comparing the pre-test and post-test mean values within the groups, there was a statistical difference ($p \text{ value} < 0.05$), depicting improve heart rate and blood pressure.

Pranayama, It concentrates or localizes the breathing pattern at the diaphragm thereby improving respiration or eupnea. Pranayama causes the valve of the descending aorta running through the aortic opening at the diaphragm to be patent leading to marked blood flow to the lower part of the body, as a results there is an increase in venous return from the lower part of the body to the systemic circulation resulting to fall in the cardiac output. This occurred due to baroreceptor reflex. The reflex is initiated by stretch receptors called baroreceptors or pressoreceptors, located at specific points in the walls of large systemic arteries. Signals from the aortic baroreceptors in the arch of the aorta are transmitted through the vagus nerves to the tractus solitarius of the medulla.^[10]

CONCLUSION

This study shows a relative improvement in the heart rate and blood pressure followed by pranayama in 6 weeks.

Table 1: Shows the Pre-test value and Post-Test value of Blood pressure

INTERVENTION	TEST	MEAN	N	SD	SEM	T	df	Sig.(2-tailed)
PRANAYAMA	PRE-TEST	125/85	100	13.5433	1.09876	7.0021	32	0.00
	POST-TEST	110/70	100	10.2345	0.76546			

Table 2: Showing the Pre-Test and Post-Test Value Of Heart Rate

INTERVENTION	TEST	MEAN	N	SD	SEM	T	df	Sig.(2-tailed)
PRAYANAMA	PRE-TEST	80.4	100	6.3454	.76463	3.454	32	0.00
	POST-TEST	72.5	100	2.5533	.34553			

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