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Dr. Veer Bhan Singh
Sr. Demonstrator, Dept. of
PSM, Govt. Medical College,
Bharatpur, Rajasthan, India

Dr. Ishaan Kalavatia
Assistant Prof., Dept. of
Physiology, Geetanjali Medical
College, Udaipur, Rajasthan,
India

Effect of Anuloma viloma pranayama on selected cardiovascular parameters in hypertensive patients

Dr. Veer Bhan Singh and Dr. Ishaan Kalavatia

Abstract

Background: Pranayama is well known breathing exercise which is known to be improving cardiac autonomic status. This effect mainly depends on type and duration of Pranayama for which it is carried out.

Objective: This study was undertaken to access the effect of Anulom- vilom pranayam on stage 1 Hypertensive patients.

Results: Both systolic and diastolic readings show significant decrease after yoga training as indicated by the significant p values in the last column. The SBP decreases from 143.86 ± 2.99 mmHg to 135.64 ± 0.60 mmHg and the DBP decreases from 89.08 ± 0.67 mmHg to 84.64 ± 0.59 mmHg.

Conclusion: Result of study showed that a significantly improved vagal tone and reduced sympathetic activity after pranayama trainings.

Keywords: Heart rate, Prayanama, blood pressure

Introduction

In the modern era, human beings are facing much stress in day-to-day life which leads to lifestyle diseases such as hypertension, diabetes mellitus, and psychiatric disorders. Yoga is one of the promotive, preventive as well as curative means for many such stress-related diseases^[1].

The term "yoga" and the English word "yoke" are derived from Sanskrit Root "yuj" which means union. Yoga is a psycho-somatic-spiritual discipline for achieving union and harmony between our mind, body and soul and the ultimate union of our individual consciousness with the Universal consciousness^[2]. It produces consistent physiological changes and have sound scientific basis^[3].

The classical techniques of Yoga date back more than 5,000 years. The whole system of Yoga is built on three main structures: exercise, breathing, and meditation. Breathing techniques are based on the concept that breath is the source of life in the body. Forth limb of ashtanga yoga is pranayama. Pranayama is mainly two words, 'prana' means breath and 'yama' means exercise. 'Prana' suggests the 'life force energy' and 'yama' stands for 'control', expansion/stretching. So the total meaning of 'Pranayama' is to set the control of life and modify 'prana' within the body. In this respect 'pranayam' can translated into 'breathe control'^[4].

Pranayam has three components-

1. Pooraka (Inhalation)
2. Rechaka (Exhalation)
3. Kumbhaka (Retention)

Whereas in kumbhaka there are two sorts, again antar kumbhaka (holding the breath after inward breathe) Bahya kumbhaka (holding the breathe after exhalation)^[5].

Hypertension. Is a common disorder affecting 15% of adult population in India, yet much progress has been made to prevent and control this disorder^[6]. Hypertension is more prevalent in urban than in rural areas. The reason could be the difference in heredity, smoking, body fat and life style of city dwellers and villagers. In majority of drug hypertension the cases, the actual cause of this disorder is unidentified it is called 'primary hypertension' or 'essential hypertension'.

Correspondence

Dr. Ishaan Kalavatia
Assistant Prof., Dept. of
Physiology, Geetanjali Medical
College, Udaipur, Rajasthan,
India

The other type is called secondary hypertension in which the causes may be renal, endocrine, neurological or mechanical [7-11].

There has been many studies to describe the effect of Pranayam over cardiovascular system. N. Victoria Devi *et al.* 2016 conducted a study for improve lifestyle and they observed the results after 3 months of yoga that statistically significant decrease in heart rate and blood pressure and improved autonomic functions in mild hypertensives [12].

(Chintamani D. Bodhe *et al.* Also observed decrease in lipid profile parameter except High density lipoprotein [13].

Study done for physiological benefit on 60 healthy individuals age of 17-20 years they performed Pranayam daily 10 weeks and found significant decrease in heart rate and systolic blood pressure due to reason of increased vagal tone, increased parasympathetic activity, decreased sympathetic activity, decreased in stress and relaxation of mind.

Study done on anulom vilom pranayam and Bhramari Pranayama and they conclude that Pranayama has beneficial effect on cardiovascular functions and cardiac autonomic reactivity, if practiced for a longer duration. In this study, we got the significant effect of anulom vilom and Bhramari Pranayama on systolic blood pressure and diastolic blood pressure. The demonstrated positive effect of therapeutic breathing and relaxation techniques on the cardiac vagal modulation and parasympathetic dominance. This significant result proved that practice of anuloma-viloma and Bhramari Pranayama gives good result to maintain normal blood pressure and also to reduce the stress level that we get in our day to day life [14].

Our study was aimed to find out the effect of anulom vilom Pranayam in cardiovascular parameter in hypertensive patients.

Material and Method

Sample size calculation: According to NFHS-4 the prevalence of Hypertension is 10% in (Rajasthan).

In present study 40 Stage I Hypertensive patients were taken, including both male and female, of age group 30 to 50 years. Ethical clearance was sought from the Institutional Ethics Committee, Patients were selected from

The subjects were divided into two groups one group was kept as control group who is not doing any type of Pranayam only taking medicines which is prescribed by physician. Another group was doing Anulom Vilom Pranayam with medicines.

Blood Pressure Classification	Systolic BP (mmHg)	Diastolic (mmHg)
Normal	<120	<80
Prehypertension	120-139	80-89
Stage I hypertension	140-159	90-99

Exclusion criteria

1. Having age less than 30 years or more than 50years.
2. Athletes, regular Pranayam practitioners and patients undergoing any other form of exercise.
3. Pregnant women.
4. Habits of tobacco chewing, smoking and alcohol consumption.
5. Having disease of Respiratory tract e.g. history of tuberculosis, chronic obstructive airway disease respiratory tract infections previous 6 weeks.
6. Performing Pranayam less than 5 days a week.

7. Having renal failure, coronary artery disease and musculoskeletal chest deformities.
8. Diabetes Mellitus and complication like diabetic nephropathy, Retinopathy, Neuropathy.
9. Patients suffering from both Hypertension and Diabetes Mellitus.
10. Patients suffering from Stage II Hypertension excluded in our study.

Study Desgin

It is an intervention study in which we compare the parameter between two group one is doing pranayam with medicines and another group is not doing any type of Pranayam only taking medicines.

Each subject were separately explain about the study procedure and his/her consent was taken. They practice Anulom Vilom Pranayama by a yoga trainer and practice specifically those exercises for 30 minutes session regularly for 3 months under supervision.

All procedure was done in sitting posture and before starting the Pranayam warm up session (yoga stretching) was done. All the subject were pre-and post-tested with Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP) and Heart Rate.

Parameters studied

- **Measurement of Blood Pressure:** Blood pressure was measured by Mercury sphygmomanometer (Diamond) with the indirect auscultatory method in the sitting position in the right arm with the help of Littman stethoscope. Before recording the blood pressure, subjects are allowed to rest for 5 minutes in a quiet room to reduce the anxiety. The onset of sounds is taken as indicative of systolic blood pressure and disappearance of sound as indicative of diastolic blood pressure.
- **Resting Heart Rate:** Lead II of the ECG was select for measuring heart rate (HR). Heart rate was record in supine position with the help of REM Vesta Electrocardiogram machine during normal quiet breathing for a period of 1 min. The average of R-R interval gives the Heart rate.

Statistical Analysis

Statistical analysis was done using SPSS 18 for windows. Paired „t“ test was used to analyze the quantitative data and to determine the p-values. A p-value of <0.05 was taken as significant and interpretations were made accordingly.

Results

We observed a statistically significant decrease systolic blood pressure and Diastolic blood pressure and heart rate after 3 months of yoga training in mild hypertensives (stage I).

Test parameter	Before yoga	After yoga	t test
Resting heart rate	75.2±0.34	69.30±0.25	0.000
Systolic BP	143.86±2.99	135.64±0.64	0.0005
Diastolic BP	94.08±0.67	90.64±0.59	0.000

Table shows that resting blood pressure is compared before and after three months of regular yoga training. Both systolic and diastolic readings show significant decrease after yoga training as indicated by the significant p values in

the last column. The SBP decreases from 143.86 ± 2.99 mmHg to 135.64 ± 0.60 mmHg and the DBP decreases from 89.08 ± 0.67 mmHg to 84.64 ± 0.59 mmHg.

Discussion

The results revealed that both yoga intervention and drugs treatment helped hypertensives but yoga intervention was more effective.

Blood pressure and Pulse rate is related with cardiovascular system, which is controlled by Autonomous nervous System (ANS). Pranayam accompanied by breath control increases cardiac output, decrease hepatic, renal blood flow and increases cerebral peripheral vessels blood flow^[15-16]. Right nostril breathing activates sympathetic nervous system and left activates parasympathetic. Alternate nostril breathing brings about balance in the Autonomous Nervous System^[17]. A Practitioner of Anulom-Vilom Pranayam not only tries to breathe, but at the same time, also tries to keep his/her attention on the act of breathing, leading to concentration. These acts of concentration remove his attention from worldly worries and de-stress him/her^[18-19]. In this relaxed state, parasympathetic nerve activity overrides sympathetic nerve activity^[20]. Therefore, the significant decline in systolic blood pressure in the Anulom-Vilom Pranayam practice could be largely due to better parasympathetic control over the heart. The practice of yoga increases baroreceptor sensitivity in hypertensives thereby restoring BP to normal levels^[21]. The meditation element of yoga also has an effect in lowering BP as it reduces anxiety and stress. Meditation has a balancing effect on autonomic nervous system^[22]. Controlled breathing exercise in the practice of yoga (pranayama) improves vagal activity and therefore decreases baseline heart rate and blood pressure^[23].

Conclusion

Based on our findings, it can be concluded that 3 months of yoga training has been found to be useful in improving in reducing Heart rate, Systolic blood pressure & Diastolic blood pressure in mild hypertensive (stage 1). It can be opined that regular practice of alternate nostril breathing, type of Pranayama causes parasympathetic predominance. Therefore, this simple exercise can be prescribed to hypertensive patients (with proper monitoring) along with the medical therapy.

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