

Research Article

Studying the role of yogic Pranayama in the management of Blood pressure

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Abstract

Yoga is an ancient science, in this *Pranayama* plays a very important role in astanga yoga. This study was undertaken to determine the effects of 2 Pranayama namely anulom-viloma and Bhramari for mental relaxation and their effects on blood pressure.

Aim: This study was conducted to understand the role of short-term practice of Pranayama in blood pressure.

Materials and Methods: This interventional study was conducted combined by the Department of Philosophy of Nature cure and also in the Department of Cardiology at Narayana Medical College and Hospital, Nellore. 30 subjects of 20 - 40 years age group, fulfilling the inclusion criteria underwent anuloma-viloma and Bhramari pranayama training for 3 months. Both Systolic and Diastolic blood pressure were performed before and after the Pranayama technique.

Results: This study showed increases parasympathetic dominance in basal heart rate and caused fall of both systolic as well as diastolic blood pressure by the reduction in sympathetic impulse on the cardiovascular system by the practice of anuloma-viloma and Bhramari Pranayama technique for 20 minutes duration.

Conclusion: The result of the current study 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.

Keywords: Anulom vilom Pranayama, Bhramari Pranayama, pulse rate, Blood pressure.

1. Introduction

According to JNC-7(Joint National Committee 1997) the definition of hypertension is SBP as 140mmHg or higher or DBP as 90mmHg or higher or both and is estimated that it is effecting approximately 1 billion worldwide Where as <120mm of Hg as SBP and <80mm of Hg as DBP is considered as normal blood pressure⁽¹⁾. It is estimated that the prevalence of hypertension in India is about 25% among urban adults and 10% in the rural areas. As per Epidemiological data support contribution of several dietary changes and other lifestyle-related factors are one of the cause in development of high blood pressure. Several clinical trials investigated the efficacy of non-pharmacological interventions and lifestyle modifications to reduce blood pressure⁽²⁾. Stress is one of such either in physical or mental form causing cardio vascular morbidity⁽³⁾. As per WHO stress is one of the major cause of disability and will become second leading cause by the year 2020⁽⁴⁾. Relaxation and stress relieving methods like yoga asana, Pranayama, meditation, have been shown to be capable of lowering blood pressure, since they had beneficial effects via cardiovascular reflex control system⁽⁵⁾. There has been evidence that slow and regular breathing, that is Pranayama technique for a certain time every day has been known to have effect over cardiovascular reflex control system⁽⁶⁻⁷⁾. A recent study on hypertension indicates that practice of slow and rhythmic pattern of breathing reduces high blood pressure and improves bar reflex sensitivity in hypertensive subjects⁽⁸⁾. Different types of breathing exercises have effect on autonomic balance for good by either decrease in sympathetic or increase in parasympathetic activity. In a study by Tells et al have demonstrated that breathing through right nostril known to have result of increase in sympathetic activity where as through left nostril it decreases⁽⁹⁾. A study conducted on Bhramari Pranayama has proved that regular practice of this Pranayama for 5 minutes induce **parasympathetic dominance** on cardiovascular system. Thus gave mental relaxation and reduction of stress levels in daily life⁽¹⁰⁾. The present study on Pranayama for lowering blood pressure is to bring internal awareness of breathing and therapeutic benefits of Pranayama over stress level by regular practice. This study was undertaken to determine the effects of 2 Pranayama namely anuloma-viloma and Bhramari for mental relaxation and their effects on blood pressure.

2. Study Protocol

2.1 Subjects

There were 30 volunteers with the ages ranging between 20-40 years. Based on the general physical examination all were found to be in normal health and none of them were taking medication. They practice 2 techniques of Pranayama namely anuloma viloma and Bhramari. They were observed and readings of their blood pressure were taken in each visit, up to 90 days.

2.1 Method and Design

Every participant was assessed in 2 types of practice namely Anulom viloma and Bhramari Pranayama. The study design was explained to participants and their signed informed consent was obtained. The Pranayama technique was clearly demonstrated and explained to the study participants. First, everyone has to sit comfortably in *Sukhasana* keeping the head, neck, and trunk straight, with eyes closed. All should keep the body still during the breathing practice. Then first **Anuloma-viloma** (Alternate nostril breathing) Pranayama practice the subject was asked to relax 5secs before starting and instructed to inhale through the left nostril while keeping the right nostril closed with the thumb of right hand. Retain the breath for a few seconds and exhale from the right nostril with the middle and ring fingers closing the left nostril. Then, once again inhale through the right nostril. Finally, exhale out through the left nostril while closing your right nostril with the thumb. This is one round anuloma-viloma Pranayama and practiced for **10 minutes**. Then observe the normal breathing pattern. Now **Bhramari Pranayama** first directed the study group to inhale deeply through both the nostrils maximum for about 5sec and then immediately the subjects were instructed to exhale slowly through both the nostrils for about maximum of 15sec keeping two index fingers on the external auditory canal. During exhalation the subject must chant the word “O-U Mamma” with a humming nasal sound mimicking the sound of a humming bee, so that the laryngeal wall and the inner walls of the nostril mildly vibrate. These steps complete one cycle of Bhramari Pranayama and should practice for 10 minutes continuously. The *Pranayama* was conducted in well-ventilated room. After 20 minutes of this breathing practice, subjects were instructed to do shavasana relaxation technique for 10 minutes and finally the blood pressure and pulse rate were recorded. After the breathing exercise the subjects were asked about their feeling.

2.2 Duration

Each subject is asked to practice Pranayama for a period of 20 minutes. That is each Pranayama of 10 minutes. For every 5 minutes they can relax for a few seconds and can continue the practice.

2.3 Parameter measurements

Pulse rate was measured by counting radial pulse for a minute. Then both Systolic and Diastolic blood pressures were measured with the auscultatory method by using sphygmomanometer and stethoscope.

2.4 Statistical analyses

All the values obtained before and after practice Bhramari and anuloma-viloma Pranayama.

3. Results

There were 30 healthy females selected as cases. The average height of study group was 5.31 feet and the average weight of cases was 47.16kgs, then average pulse rate measured was 74beats/minute. The baseline pulse rate, blood pressure and times taken to solve the arithmetic problems were comparable between both before and after practice of pranayama in the selected group of members. Among the cardiovascular parameters, a significant difference with p -value <0.01 in systolic blood pressure and diastolic blood pressure with p -value <0.01 in all cases following practice of anuloma viloma Pranayama (10mins) and Bhramari pranayama (10mins). Then followed by 10 minutes shavasana relaxation technique.

Results shown in table-1. This proves that involvement of cardiovascular reflex control system by increases the parasympathetic activity that is increase in vagal tone by practice of slow pace deep breathing pranayama anuloma viloma and Bhramari for a period of 20 minutes shows reduction in Systolic blood pressure on posture variation.

Table -1: Effect of anuloma viloma & Bhramari pranayama (10minutes each) on Blood pressure

Result	Systolic Blood Pressure (mm Hg)(Mean ± SD)	Diastolic Blood Pressure (mm Hg)(Mean±SD)	p -value
Before pranayama	123.60 ± 4.11	72.86 ± 6.07	<0.01
After pranayama	116.20 ± 2.48	66.40 ± 5.23	<0.01

4. Discussion

Pranayama is a type of yogic breathing exercise. Breathing is the important autonomic function that can be consciously controlled, through which we influence the involuntary nervous system, i.e. establishing the rhythms of breathing which influences the involuntary nervous system and is the key to bring the sympathetic and parasympathetic nervous system into harmony¹¹. so in this study by practicing both Anuloma-viloma and Bhramari pranayama for the 30 healthy volunteers parasympathetic dominance was more, it is significantly shows while monitoring their blood pressure regularly.

Slow pace *Bhramari* Pranayama and Anuloma-viloma Pranayama influence the heart rate and blood pressure through the parasympathetic dominance had been reported in our previous study¹¹. Most studies also reported that *Bhramari pranayama* produced gamma wave indicating parasympathetic dominance¹¹. Diastolic blood pressure depends upon peripheral resistance, and lung inflation has been known to decrease systemic vascular resistance¹². Then in the Skeletal muscle blood vessels sympathetic tone is reduced leads to excess vasodilatation by the stimulation of pulmonary stretch receptors causes reduction in peripheral resistance¹² and decreasing the diastolic as well as the mean blood pressure in our study. Vibration of the nasal /laryngeal mucous membrane during exhalation along with the humming of “O-U-Mmma” caused reflex apnoea by switching off inspiratory centre which causes bradycardia through chemoreceptor sinu-aortic mechanism¹².

During prolonged voluntary expiration intra-thoracic pressure increases and blood from the lungs is squeezed into the heart leading to an increase in stroke volume, baroreceptors in carotid sinus experiences more pressure and discharge more. The increased baroreceptors discharge inhibits the tonic discharge of the vasoconstrictor nerves and excites the vagus innervations of the heart producing Vasodilatation, a drop in blood pressure and cause bradycardia.¹³ Baroreceptor sensitivity can be enhanced significantly by practicing slow and rhythmic breathing. This in turn increase the vagal activity, so mild reduction in the heart rate as well as decreases both systolic and diastolic pressure by practice of this slow pace pranayama¹³. Decrease in diastolic pressure was so significant that as a result mean systolic blood pressure also decreased significantly (116 mmHg.). At the end of every yoga session the 30 volunteers got sense of well-being, felt calm and sleepy, this shows the effect of anuloma viloma and Bhramari pranayama on blood pressure by the parasympathetic stimulation.

Slow-pace Bhramari Pranayama (respiratory rate 3/minute) and anuloma-viloma pranayama exercise thus shows a strong tendency of improving or balancing the autonomic nervous system through enhanced activation of the parasympathetic system and thus can be practiced for mental relaxation and reduction of stress of daily life.

Figure.1. Systolic Blood pressure at each visit after pranayama technique.

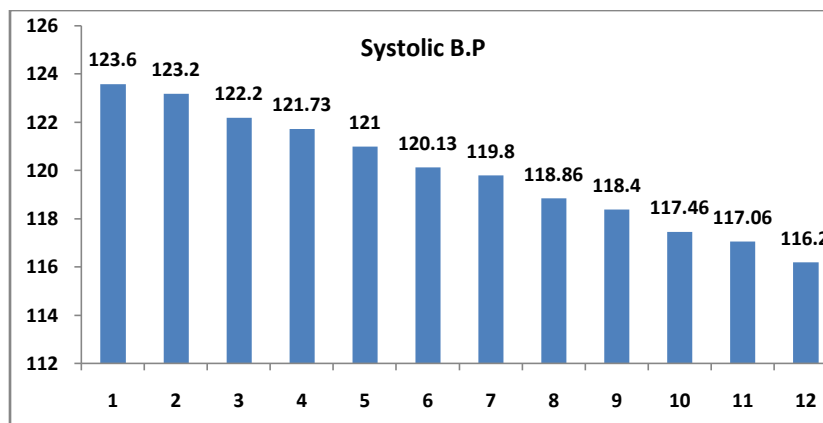
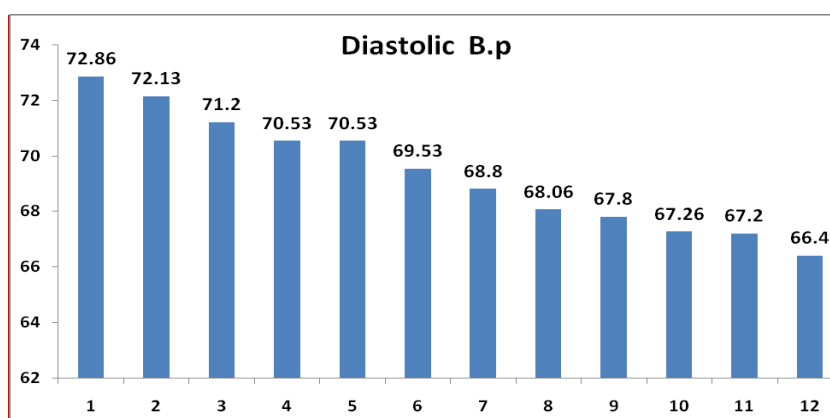


Figure 2. Diastolic blood pressure at each visit after pranayama technique.



5. Conclusion

It can be concluded 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 anuloma viloma 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.

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