



## Research Article

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### IMPACT OF SHORT TERM TRAINING OF ANULOM VILOM PRANAYAM ON BLOOD PRESSURE AND PULSE RATE IN HEALTHY VOLUNTEERS

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#### ABSTRACT

In present scenario, Yoga is becoming most popular science due to its positive effect on health. To achieve preventive, curative and rehabilitative aspects of health, Yoga draws the attention of large group of people. Prana (energy) and Ayam (to expand or control) form the word Pranayam. Pranayam is a technique to control or expand the energy in body. Practice of Pranayam has been known to modulate cardiac autonomic status with an improvement in cardio-respiratory functions. Keeping this in view, the present study designed to determine whether Anulom- Vilom Pranayam followed by Shawasan has immediate effect on pulse rate, systolic and diastolic blood pressure. Thirty normal healthy subjects aged between 17-20 years, volunteered for this study. All the selected physiological parameters were measured before and after performing 'Anulom – Vilom Pranayama' followed by Shawasan for four weeks. Experimental group showed a significant decline in Systolic Blood Pressure ( $p < 0.021$ ). On other hand there was no significant change in Diastolic Blood Pressure and pulse rate, though it showed slight decrease. Our study indicates that, short-term training of 'Anulom- Vilom Pranayam' shows significant decrease in Systolic Blood Pressure. Control of breathing process to make it deep and prolong by doing alternate nostril breathing with slow and rhythmic manner brings about balance in autonomous nervous system. In addition, practice of Anulom-Vilom pranayama for short-term duration could get better parasympathetic control over the heart.

**Keywords:** Anulom-Vilom Pranayam, Shawasan, Systolic and Diastolic Blood Pressure.

#### INTRODUCTION

According to Ayurveda, health is "Prasanna aatmedriya manah, swastha ityabhidheeyate"<sup>1</sup> which implies "Serenity of Atma (Soul), Mind and Body means Health". Pranayama is an effective way of achieving this health or improve upon the existing health. This technique is an important component of yoga. In present scenario Yoga draws the attention of large group of people due to its positive effect on health. The Pranayam, which is an integral part of Yoga, energizes and balances the different systems of our body and controls the mind and other senses. Prana (energy) and Ayam (to expand or control) form the word Pranayam. So it is a technique to control or expand the energy in body<sup>2</sup>. It is a technique to change or control the normal breathing process to make Purak (inhalation), Kumbhak (retention) and Rechak (exhalation) deep and prolong.

With the help of Anulom-Vilom Pranayam (Alternate Nostril breathing exercise), which is a controlled breathing one can achieve positive effects on body and mind. It leads to the integration of the state of Prana- the vital functionary mechanism of the body and ultimately restoring the state of health. Yoga writings use a variety of terms for this Anulom Vilom Pranayam, including nadi shodhanam, nadi suddhi and sukha purvaka<sup>3</sup>. It has also called as Alternate nostril breathing. Anulom – Vilom is so named because, initially inspiration and expiration is done with one direction and again with opposite direction. Actually, it is a combination of Suryabhedan and Chandrabhedan Pranayam, because when the inspiration done by left nostril and expiration by right it is called Chandrabhedan and if it is done in opposite way then called Suryabhedan<sup>4</sup>. The technique of Anulom Vilom

Pranayam used, which mentioned in Gherand Samhita as Samanu (concentration of mind on specific point)<sup>5</sup>.

#### Objectives

The objectives of the present study were

- To see the effect of Anulom Vilom Pranayam on Pulse rate.
- To observe the changes in Systolic and Diastolic Blood Pressure.

#### MATERIAL AND METHODS

##### Selection of subjects

Total 30 subjects (medical students of I BAMS of MG Ayurved College, DMIMS Deemed University, India) selected for the study. The students volunteered themselves after an orientation session in classroom. None of the subjects had been engaged in yoga practice in the past nor were they doing any physical exercise prior to this study period. Detail history taken to rule out any personal health problems and their chronic diseases. Subjects excluded if they had a medical disease, they currently suffer from any infections, allergies or inflammatory responses and they had ever been taking major psychotropic medications, smokers or alcoholics. The institutional (Datta Meghe Institute of Medical Sciences, Deemed University, India) Ethics committee approved the protocol for this study on 19/2/2011 with Ref. No. DMIMSU(DU)/IEC/2011-12/168. The details of the study was explained to the subjects, their signed informed consent was taken and they were assessed, using a questionnaire before the onset of the study.

**Study Design**

The study included 30 students and randomized into two groups.

**Group A (N =15) – Experiment Group**

This Group was given the training, which included Omkar in Padmasan / Sukhasan - 5 minutes  
Anulom-Vilom Pranayam (Alternate Nostril breathing exercise) - 15 minutes  
Shavasan - 5 minutes.

**Group B (N =15) – Control Group**

At the same time this group was asked to sit in Sukhasan position for same duration with closing their eyes for meditation.

This lasted for 4 weeks with consistent daily 25 min session and conducted continuous six days in a week with Sunday as a relaxing day. Subjects served as their own control. Data on physical characteristics such as age, height and weight was obtained.

**Parameters Studied**

- Pulse
- Systolic Blood Pressure (SBP)
- Diastolic Blood Pressure (DBP)

**Methodology**

- All parameters were recorded prior to start of training and at the end of 4 weeks course. The students were in college building for Yoga training at 8 am sharp every day.
- Pulse - The pulse recorded after a rest for 10 minutes in right radial artery by palpatory method.
- Systolic Blood Pressure
- Diastolic Blood Pressure - Systolic and diastolic Blood Pressure recorded in sitting position by auscultatory method. (Sphygmomanometer Diamond make).
- At the end of 4 weeks course, opinion of all subjects were also assessed by a questionnaire.

Descriptive and comparative analyses was performed by using the Statistical test. Parametric data expressed as means ± SD. The paired ‘t’ test was used to compare these cardiovascular parameters before and after Pranayam course separately between control subjects and experimental group. Probability value of <0.05 was considered statistically significant.

**OBSERVATION AND RESULTS**

Group A – Experimental Group

Group B – Control Group

**Table 1: Group wise Males and females participation**

Sex	Male	Female	Total
Group A	04(26.66 %)	11(73.33 %)	15(100 %)
Group B	04(26.66 %)	11(73.33 %)	15(100 %)
Total	08(26.66 %)	22(73.33 %)	30(100 %)

**Table 2: Anthropometric distribution of the study subjects**

Sex		Age	Height	Weight
Female	N =22			
	Mean	18.25	156.4167	44.2500
	Std. Deviation	0.7538	6.5912	2.9571
	Std. Error of mean	0.2176	1.8848	2.9571
Male	N =08			
	Mean	18.50	168.60	50.76
	Std. Deviation	1.1671	7.2140	12.2042
	Std. Error of mean	0.2132	1.3171	2.2282
Total	N =30			
	Mean	18.428	163.1190	46.2013
	Std. Deviation	1.0625	6.9030	12.8946
	Std. Error of mean	0.1639	1.3739	1.9896
	Minimum	17.00	145.00	39.00
	Maximum	22.00	184.00	61.00

**Table 3: SBP, DBP and pulse rate in experimental group at pre and post test (N=15)**

	Group	Mean	Std. Deviation	Std. Error Mean
SBP	Pre Test	114.26	7.36	1.90
	Post Test	110.46	9.58	2.47
DBP	Pre Test	67.73	6.83	1.76
	Post Test	66.66	5.69	1.46
Pulse Rate	Pre Test	73.53	10.39	2.68
	Post Test	72.40	9.44	2.43

**Table 4: Paired sample test in experimental group**

	Paired Differences				t	df	p-value	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower				Upper
SBP	3.80	5.68	1.46	0.65	6.94	2.589	14	0.022*S,p<0.05
DBP	1.06	8.03	2.07	-3.38	5.51	0.514	14	0.615NS,p>0.05
Pulse Rate	1.13	5.87	1.51	-2.12	4.38	0.747	14	0.468NS,p>0.05

**Table 5: SBP, DBP and pulse rate in control group (N=15) at pre and post test**

	Group	Mean	Std. Deviation	Std. Error Mean
SBP	Pre Test	117.86	9.239	2.96
	Post Test	118.57	9.19	2.47
DBP	Pre Test	72.53	12.56	2.76
	Post Test	71.33	11.20	1.46
Pulse Rate	Pre Test	80.33	7.21	3.68
	Post Test	80.6	6.06	2.43

**Table 6: Paired sample test in control group**

	Paired Differences				t	df	p-value	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower				Upper
SBP	7.1	-4.0	1.74	-1.65	6.94	2.143	14	0.110, NS, p>0.05
DBP	1.06	1.20	1.66	-2.38	3.31	2.144	14	0.461, NS, p>0.05
Pulse Rate	5.4167	1.15	2.94	-1.06	5.38	2.144	14	0.616, NS, p>0.05

**Table 7: SBP, DBP and pulse rate in both groups at pre and posttest**

	Group	Mean	Std. Deviation	Std. Error Mean
SBP – Pre Test	Experimental	114.26	7.36	1.90
	Control	117.86	9.23	2.96
SBP- Post Test	Experimental	110.46	9.58	2.57
	Control	118.57	9.19	2.47
DBP -Pre Test	Experimental	67.73	6.83	1.76
	Control	72.53	12.56	2.76
DBP -Post Test	Experimental	66.66	5.69	1.36
	Control	71.33	11.20	1.46
Pulse -Pre Test	Experimental	73.53	10.39	2.77
	Control	80.33	7.21	3.68
Pulse -Post Test	Experimental	72.40	9.44	3.41
	Control	80.60	6.06	2.43

**Table 8: Paired sample test in both group**

	t-test for Equality of Means			
	t	df	p-value	Mean Difference
SBP-Pre Test	2.0555	28	0.259 NS, p>0.05	3.60
SBP-Post Test	2.0481	28	0.021* S, p<0.05	7.80
DBP-Pre Test	2.073	28	0.207 NS, p>0.05	4.80
DBP-Post Test	2.079	28	0.165 NS, p>0.05	4.67
Pulse-Pre Test	2.052	28	0.647 NS, p>0.05	6.80
Pulse-Post Test	2.048	28	0.271 NS, p>0.05	8.20

The study revealed that predominantly female participation of 73.33 % in the study (Table 1). The average age of subjects was 18.5, height 163cm and weight in Kg was 46 (Table 2). After comparing the pre and post values of Pulse rate, Systolic and Diastolic Blood Pressure the experimental group showed the Systolic Blood Pressure pre value of 114 which declined to 110 post value (Table 3). This result was statistically significant (P- 0.022) (Table 4). Although, the mean values of Diastolic Blood Pressure and Pulse showed a slightly decrease, the results were not statistically significant. Control group showed the mean pre value of Diastolic Blood Pressure 72.53 which declined to 71.33 post value (Table 5). However, the result was not statistically significant (Table 6). After comparing the both groups (Table 7) with paired 't' test it showed that Anulom Vilom Pranayam followed by Shawasan produced a significant decrease in SBP (p<0.021) (Table 8). On other hand there was no significant change in DBP and pulse rate, though it showed slightly decrease.

## DISCUSSION

Blood Pressure and Pulse rate is related with Cardio Vascular System, which is controlled by Autonomous nervous System (ANS). Pranayam accompanied by breath control increases cardiac output, decreases hepatic, renal blood flow and increases cerebral peripheral vessels blood flow. Heart rate varies with single thought and thoughtless condition<sup>6,7</sup>. Right nostril breathing activates sympathetic nervous system and left activates parasympathetic. Alternate nostril breathing brings about balance in the Autonomous Nervous System<sup>8</sup>. Being Pranayama an art of control of breathing, a practitioner of Anulom- Vilom pranayama 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. This stress free state of mind evokes relaxed responses<sup>9, 10</sup>. In this relaxed state, parasympathetic nerve activity overrides sympathetic nerve activity<sup>11</sup>. Therefore, the significant decline in systolic blood pressure in the Anulom- Vilom pranayama

practice could be largely due to better parasympathetic control over the heart.

Diastolic blood pressure mainly varies with the degree of peripheral resistance<sup>12</sup> and heart rate. It shows a decline. It is justified via inflammation of lungs which decreases systemic vascular resistance. This response is initiated by pulmonary stretch receptors which bring about withdrawal of sympathetic tone in skeletal muscle blood, vessels leading to wide spread vasodilatation thus decreasing peripheral resistance<sup>13,14</sup>. But the change is not observed to be significant in the present study suggests that 'Anulom- Vilom Pranayama' might have no any immediate effect on peripheral vascular resistance or it has some roles, but it may need practice for prolong period.

The short-term training of Anulom- Vilom Pranayam in our study show significant effect on Systolic Blood Pressure and shows good positive effect on digestive power and mental freshness. The results found that few minutes daily practice of Anulom- Vilom Pranayam helps to distress humans at their work places and also help in maintaining better physical and mental health.

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