



## Research Article

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### EFFECT OF BHASTRIKA PRANAYAMA ON “SHWASAN KARMA”

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#### ABSTRACT

Pranayama is a breathing technique that produces many systemic and psychological effects in the body, specifically on the respiratory system. It is also an art to control the life force of breath. The aim and objective are to assess effect of breathing exercise i.e., Bhastrika Pranayama on ‘Shwasan Karma’, in individuals practicing regularly for continuous 12 weeks. This study was designed to study the effects of Pranayama on the pulmonary function parameters. Pranayama is one of the best lifestyle modifications which have ever been devised in the history of mankind. It is an ancient yoga technique, a spiritual and physical practice which integrates the mind and body. Pranayama is a type of yogic practice which produces many systemic psycho-physical effects in the body, besides its specific effects on the respiratory functions. The study group consisted of 32 volunteers. The participants were asked to undergo Pranayama training for 30 min daily, for 3 months. The results showed statistically significant improvement in FVC, FEV<sub>1</sub>, PEF, MVV after pranayama. After analysing statistically results showed that, Shwasan Karma was significantly improved in individuals practicing Bhastrika Pranayama.

**Keywords:** Bhastrika pranayama, FVC, FEV<sub>1</sub>, PEF, MVV.

#### INTRODUCTION

Yoga is a science which has been practised in India from over thousands of years. Besides the spiritual achievements, the practice of Yoga is accompanied by a number of beneficial physiological effects in the body. Yoga and health go hand in hand. Yoga calms and relaxes the mind and it strengthens and tunes the body and brings them into harmony with each another. Pranayama is an art of controlling the life force of breath. It produces many systemic psycho-physical effects in the body, besides its specific effects on the respiratory functions.

In a present condition due to polluted air, many people are susceptible to different types of diseases in which Pranayama plays an important role to prevent and cure most of diseases. Various disorders are developed due to polluted air, to counter attack it Ayurveda has advised Pranayama as a mode of treatment. In Yogic science Pranayama is termed as an important Shuddhi Prakriya which is beneficial for the better functioning of Shwasan Sansthan. The functions of Shwasan Sansthan particularly Shwasan Karma is improved in persons suffering from respiratory disorders and even in normal healthy persons. Pranayama practices can be used as psycho-physiological stimuli to increase endogenous secretion of melatonin, which in turn, might be responsible for improved feeling of wellbeing. Pranayama is the best procedure for proper breathing and control over mind, as stated by various Acharyas.

“When the breath wonders, the mind is unsteady but when the breath is still, so mind still.”- Hathayog Pradipika.

According to an estimate our lungs take in 180-200 cubic inches of air. When a healthy man inhales, he takes in 30 cubic inches air and exhale the same amount. This is clear that around 150 cubic inches remains in the lungs all the time<sup>1</sup>. During long deep breath the person can inhale and exhale up to 100 cubic inches of air. Due to Pranayama, major part of the air present in the lungs active in the breathing cycle. If the residual air in the lungs gets purified, the food is digested properly, the body organs become strong and the body as a whole in cleaned.

Here it needs to be mentioned that short, incomplete and shallow respiration is generally fast and the person with fast rate of breathing does not live longer. The longer (deeper the breath) the breathing cycle and slower the rate of breathing, the longer is the life. This is the secret behind the long life of tortoise, which lives up to 200 years or even more. It takes three to five breaths in a minute. Pigeon, pigs and other animals takes 34-37 breaths per minute and live 10 to 12 years. Human takes 15 breaths in a minute and by practicing Pranayama they can increase the life span.

In the present study an attempt has been made to assess Shwasan Karma in individuals who are regular practicing Bhastrika Pranayama. There is a lot of literature available about ‘Yoga’ specially ‘Pranayama’ and its marvel effects, but criteria for its analysis is lacking. Specific values obtained by Spirometry (PFT) i.e., FVC (Forced Vital Capacity), FEV<sub>1</sub> (Forced Expiratory Volume in one second), PEF (Peak Expiratory Flow Rate) and MVV (Maximum Voluntary Volume) which assess the effect of Bhastrika Pranayama on Shwasan Karma. Therefore, an effort

has been made “To assess effect of Bhastrika Pranayama on “Shwasan Karma” study was conducted.

### Aim

To assess effect on “Shwasan Karma” in individuals practicing Bhastrika Pranayama regularly for continuous 3 months.

### Literary Review

Breath is the dynamic bridge between body and mind and Pranayama is one of the most important yogic practices<sup>2</sup>. The word Pranayama is comprised of two components: ‘Pṛaṇa’ and ‘Ayama’. Pṛaṇa means ‘vital energy’ or ‘life force’. Ayama is defined as ‘extension’ or ‘expansion’. Thus, the word Pranayama means ‘extension or expansion of the dimension of ‘Pṛaṇa’. In the Pranayama practices, there are four important aspects of breathing such as (1) Puraka (inhalation), (2) Rechaka (exhalation), (3) Antahkumbhaka (internal breath retention), and (4) Bahihkumbhaka (external breath retention)<sup>3</sup>.

In the other studies though both fast (Kapalabhati, Bhastrika and Kukkuriya Pranayama) and slow Pranayama (Nadishodhana, Savitri and Pranava Pranayama) were shown to be beneficial in reducing stress level, the beneficial effects on cardiovascular parameters was observed only after practicing slow Pranayama/breathing but not after fast Pranayama<sup>4</sup>/breathing<sup>5</sup> techniques.

The Pranayama is extensively explained in Hathयोग Pradipika, Gherand Samhita, etc. According to Hathयोग Pradipika and Yoga Pradipika Pranayama is of three types

- Rechaka Pranayama: The Pranayama in which exhalation of air through both the nostrils is called Rechaka Pranayama.
- Puraka Pranayama: The Pranayama in which inhalation of air through both the nostrils are called Puraka Pranayama.
- Kumbhaka Pranayama: The Pranayama in which air should be restricted as long as possible after inhalation or exhalation is called Kumbhaka Pranayama.

Kumbhaka are of eight kinds – 1) Suryabhedana 2) Ujayee 3) Sitkari 4) Shitli 5) Bhastrika 6) Bhramari 7) Murchha 8) Plavani

Hathयोग Pradipika and Gherand Samhita explained 8 types of Pranayama/Kumbhaka in detail out of them Bhastrika is the type which is said to be having a very outstanding effect on Shwasan Karma. Bhastrika Pranayama is mainly a combination of Kapalabhati and Ujayee. Rapid succession of forcible expulsion is a characteristic feature of Bhastrika Pranayama due to forcefully expulsion of air one may exhale out the hazardous particles and polluted air may partially nullified.

### Procedure and Advantages of Bhastrika Pranayama

The Padmasana is performed by crossing the feet and placing them on both the thighs. It is destroyer of all sins. The sins (Papas) are the ill effects. Binding the Padmasana and keeping the body straight, closing the mouth carefully, let the air be expelled through the nose. It should be filled up to the lotus of the heart, by drawing it in with force, making noise and touching the throat, the chest and the head. It should be expelled again and filled again and as before. In the same way, the air of the body should be moved sharply filling it through Surya Nadi when tiredness is experienced. (It is the right nostril known as Surya Nadi). The air should be drawn in through the right nostril by pressing the thumb against the left side of the nose, so as to close the left nostril and when filled to the full, it should be closed with the middle finger

and fourth finger (the one next to the little finger) and kept confined. Repeat the same procedure with left nostril

This Pranayama destroyer morbid Vata, Pitta and Kapha and increases the digestive power (the gastric fire). It quickly awakens the Kundalini, purifies the system, gives pleasure and is beneficial. It destroys phlegm and the impurities accumulated at the entrance of the Brahma Nadi. This Bhastrika should be performed plentifully, for it breaks the three knots (Three Granthis placed in the Sushumna), Brahma granthi (in the chest), Vishnu granthi (in the throat) and Rudra granthi (between the eyebrows) of the body<sup>6</sup>. According to Gherand Samhita, Let the Sadhaka perform this Bhastrika Kumbhaka thrice, he will never suffer any disease and will be always healthy.

### MATERIALS AND METHODS

#### Inclusion criteria

- Apparently healthy individuals.
- Age group 18-40 years irrespective of gender.
- Volunteers who are able to perform Pranayama daily for about 30 min.

#### Exclusion criteria

- History of respiratory tract diseases- e.g., T.B., COPD etc.
- Habits of tobacco chewing, smoking and alcohol consumption.
- Pregnant women.
- History of hyper-tension, coronary artery disease, musculoskeletal chest deformities, insomnia, epilepsy, mentally disturbed and ENT problems.

Duration of study: 3 months.

Sample Size – 32.

#### Methods

#### Procedure of Bhastrika Pranayama

Bhastrika Pranayama orientation and practice was conducted in presence of expert Yoga teacher.

Table 1: Yogic exercises used by the participants

Name	Duration
Prayer and Omkar recitation	5 min
Breathing exercises (Kapalabhati)	5 min
Pranayama (Bhastrika, Ujjayi, and Shavasana)	20 min
Total	30 min

SOP was based on procedure mentioned in Hatha Pradipika and Gherand Samhita.

For this study Spiro lab III was used as a tool. With the help of this instrument Pulmonary Function Test (PFT) reports were obtained. 4 parameters were used from observed values as a tool for completing the study. These parameters were 1) Forced Vital Capacity (FVC) 2) Forced Expiratory Volume in one second (FEV1) 3) Peak Expiratory Flow Rate (PEFR) and 4) Maximum Voluntary Ventilation (MVV). These parameters were measured on 1st day i.e., starting of study and then after at the end 3 months. Orientation and training program was organised for volunteers which included demonstration of warm up, Omkar Gunjan, Nadi Shuddhi Kriya and Bhastrika Pranayama. Informed written consent was obtained from them. Assessment of present status of

pulmonary functions volunteers with the help of spirometry was done and individually case record form was generated.

**Statistical Analysis**

Mean ± SD is the values obtained before and after Pranayama. Statistical analysis was performed using paired t-test to compare pre- and post-training values. P < 0.05 is considered as statistically significant.

**RESULTS**

For the present study 32 volunteers was selected

**Table 2: Distribution of volunteers according to age**

S. No.	Age group	Experimental group	
		Frequency	Percentage
1	20-25 years	12	37.5%
2	26-30 years	06	18.8%
3	31-35 years	04	12.5%
4	36-40 years	10	31.2%
Total		32	100%

There were 12 (37.5%) volunteers from age group 20–25 years, 06 (18.8%) volunteers from age group 26-30 years, 04 (12.5%) volunteers from age group 31-35 years and 10 (31.5%) volunteers from age group 36– 40 years registered for this study.

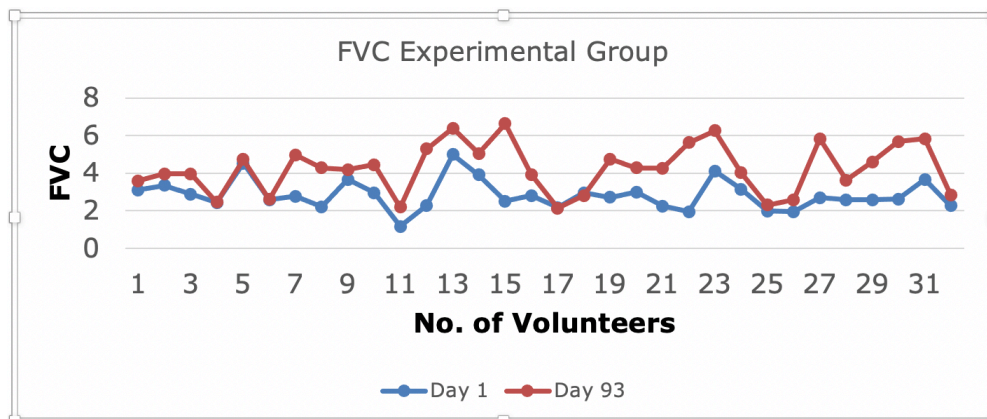
**Table 3: Distribution of volunteers according to gender**

S. No.	Gender	Experimental group	
		Frequency	Percentage
1	Male	15	46.9%
2	Female	17	53.1%
Total		32	100%

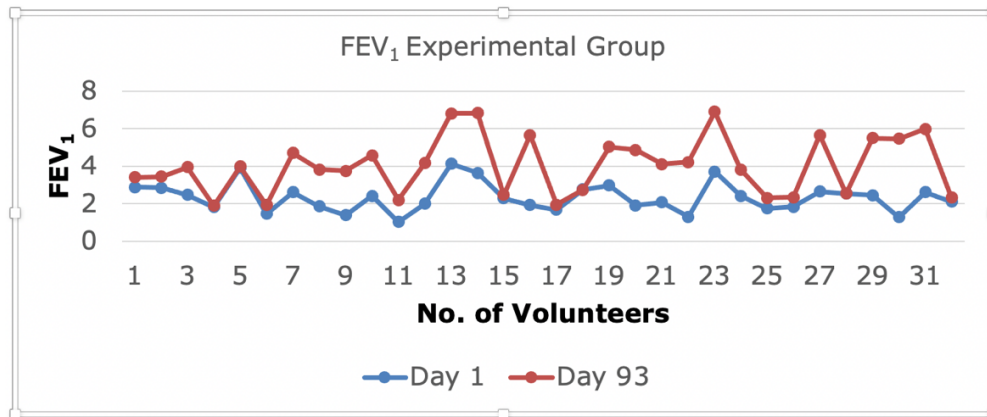
There were 15 (46.9%) male and 17 (53.1%) female volunteers registered for study.

**Table 4: Effect of Bhastrika Pranayama on Pulmonary functions**

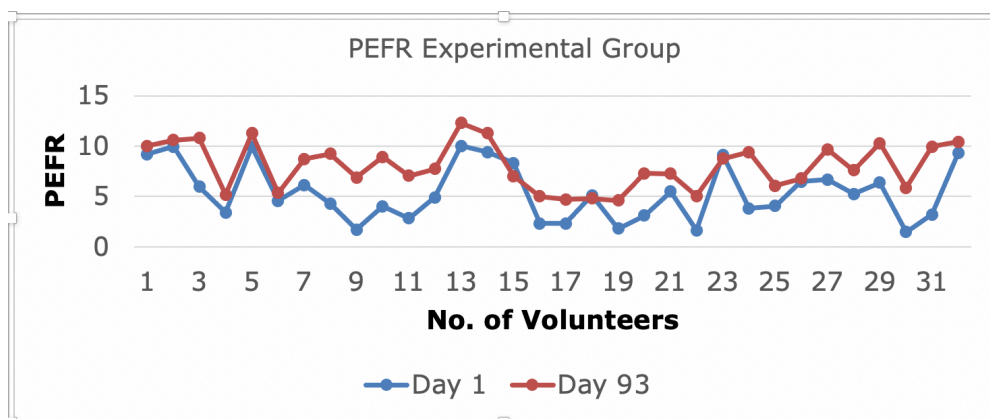
PFT	Day 1		Day 93		Z Value	P Value	% Change
	Mean	SD	Mean	SD			
FVC	2.84	0.79	4.25	1.30	-5.302	0.001	33.3
FEV <sub>1</sub>	2.34	0.77	4.05	1.54	-5.483	0.001	42.3
PEFR	5.39	2.78	8.00	2.27	-5.607	0.001	32.6
MVV	79.67	27.98	97.00	28.66	-4.259	0.001	17.9



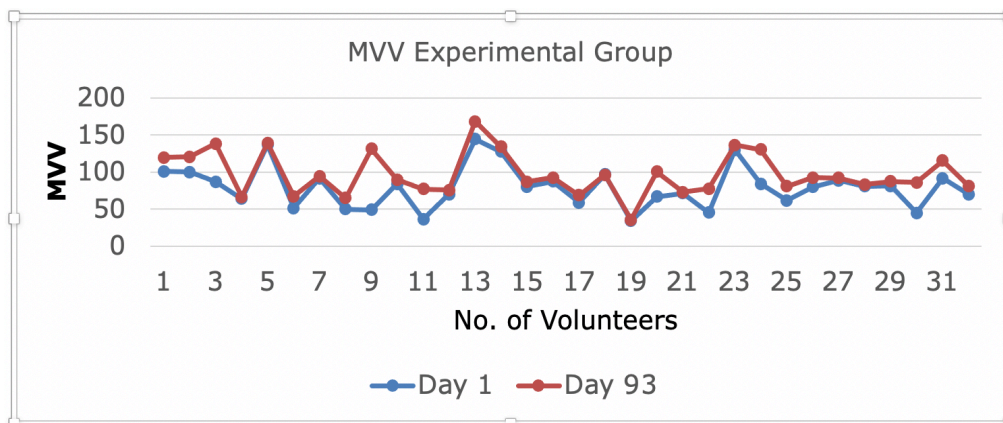
**Graph 1: Effect of Bhastrika Pranayama on Forced Vital Capacity (FVC)**



Graph 2: Effect of Bhastrika Pranayama on Forced Expiratory Volume in one second (FEV<sub>1</sub>)



Graph 3: Effect of Bhastrika Pranayama on Peak Expiratory Flow Rate (PEFR)



Graph 4: Effect of Bhastrika Pranayama on Maximum Voluntary Ventilation (MVV)

## DISCUSSION

Asthma is a condition with an increase in airway resistance, increased work of breathing, and decrease in respiratory volumes, flow rates, and lung hyperinflation<sup>7</sup>. Stress is an important precipitating factor of asthma<sup>8</sup>, and mind can be calmed by slow and deep breathing, which not only helps to distress<sup>9</sup> but also improves the individual's antioxidant status<sup>10</sup>. The changes in the inspiratory and expiratory pressure with Pranayama may be due to the alterations in the lung functions. In normal shallow breathing, lung spaces are not used, whereas Pranayama helps in using lung spaces with the help of respiratory muscle. Therefore, the peak expiratory flow rate is increased which might be an important reason for opening small airway in the lungs<sup>3</sup>.

Pranayama creates negative and positive pressures in thoracic compartment to improve its capacity and also increases the expiratory and inspiratory muscle performance<sup>11</sup>. During Pranayamic breathing, the lungs and chest get inflated and deflated to the fullest possible, this extent leads the muscles to work maximally which causes strengthening of respiratory muscles<sup>12</sup>. It is proved from different studies that breathing exercise helps in cleansing the secretions of air pipes and increases lung compliance<sup>13</sup>. When the lung compliances increased, breathing becomes comfortable and respiratory muscle strength is improved. Yoga Asanas and Pranayama improve the various lung volumes, lung capacities, and pressures in young adult.<sup>14</sup>

The present study has demonstrated a significant increase in FVC and FEV<sub>1</sub> in Experimental group. The improvement in vital capacity is due to increased progress of respiratory activity due to regular practice of Bhastrika Pranayama. Higher FEV<sub>1</sub> is due to better strengthening of respiratory muscle. Skeletal muscles control many vital elements of aerobic conditioning including lung ventilation. By the practice the respiratory apparatus is emptied and filled more completely and efficiently which is recorded in term of increased FVC.

The increase in FEV<sub>1</sub> might be due to significant increase in vital capacity. Although clear cut proof is lacking, the mechanism by which changes in respiratory functions occur are greater relaxation of respiratory muscles may be induced by supra spinal mechanism which increase expiratory reserve volume contributing to a rise in vital capacity. Lung inflation to near total lung capacity is a major physiological stimulus for release of surfactant and prostaglandin into alveolar spaces. This may cause increase in lung compliance and decrease in bronchiolar smooth muscle tone. Comparing males and females suggests that normal males on an average have a larger muscular thoracic cavity enabling them to force more air out of the lungs resulting in higher volumes of FEV<sub>1</sub>.

The present study has demonstrated a significant increase in PEFR in Experimental group. Bhastrika Pranayama breathing exercises volunteers to use the diaphragmatic and abdominal muscles tone more efficiently there by emptying and filling the respiratory organs (i.e., lungs) more efficiently and completely. Pranayama, with its calming result the mind can reduce and release emotional stresses thereby withdrawing the broncho-constrictor effect.

Bhastrika Pranayama may increase PEFR through following respiratory dynamic changes:

- By increasing respiratory muscle strength by breathing exercise.
- By cleaning of airway secretions.
- By using the diaphragmatic and abdominal muscle more for filling the respiratory machinery more efficiently and completely.
- Inhibiting the constrictor tone of bronchial smooth muscles by relaxing respiratory muscles.

The present study has demonstrated MVV is not significantly increase in Experimental group as compare to other parameters. Bhastrika Pranayama breathing exercises volunteers to use the abdominal and diaphragmatic muscles tone more efficiently there by emptying and filling the respiratory organs (i.e., lungs) more powerfully and completely. Pranayama, with its calming result the mind can reduce and release emotional stresses thereby withdrawing the broncho-constrictor effect.

## CONCLUSION

It can be stated that Bhastrika Pranayama (breathing technique/exercises) is beneficial for the better functioning of Shwasan Sansthan. The functions of Shwasan Sansthan

particularly Shwasan Karma is improved even in normal healthy volunteers in this study.

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