



## Effect of Yoga on Spirometric Value in Bronchial Asthma Patients

**Narendra gupta**

Assistant Professor, Department of Physiology, Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India. \* Corresponding author

**Amit kumar**

Assistant Professor, Department of pulmonary medicine, Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India.

**H.S.JOSHI**

Professor and Head, department, of Community medicine.

**Devendra kumar sharma**

yoga instructor B.P.ed, P.G.D.Y.ed.

### ABSTRACT

**Introduction:** Bronchial asthma is most common cause of missed school days in children i.e. 10.2 million and 3 million missed working days for adults annually. Efficient and safe asthma control will not only reduce the economic burden but also side effects of drugs because it reduces the doses of drugs. As little work has been done on beneficial effect of yoga on pulmonary function test in Bareilly.

**Objective:** Thus the objective of this study is to find out the effect of yoga on the Bronchial asthma.

**Material and Method:** 50 cases of bronchial asthma practicing yoga forms the study population and 50 bronchial asthma patients not practicing yoga will form the control group. Sample is selected via Simple random technique.

**Result:** study group compared with the subject of control group after two month of yoga p value of FVC (0.001), FEV1 (0.001), FEV1/FVC (0.012) PEFR (0.001) was significant statistically. (Table 1 to 4) In our study the subjects of study group compared with the subject of control group after three month of pranayama p value of FVC (0.001), FEV1 (0.001), FEV1/FVC (0.001) PEFR (0.001) was significant statistically.

**Discussion:** The cases were instructed by trained yoga instructor to perform anulomaviloma & kapalbhathi Bhramari pranayama Suryanamaskar yoga regularly for 3 months & then dynamic lung function parameter FVC, FEV1, FEV1/FVC, PEFR, was recorded before & after yoga and observation were studied by applying student t-test & evaluated statistically.

**Conclusion:** yoga has additive beneficial effect along with medication in bronchial asthma patients. So yoga can be used for respiratory Rehabilitation.

**KEYWORDS :** Yoga, bronchial asthma, pulmonary function test, FVC, FEV1, FEV1/FVC PEFR.

### Introduction:

Bronchial asthma is most common cause of missed school days in children i.e. 10.2 million and 3 million missed working days for adults annually. Efficient and safe asthma control will not only reduce the economic burden but also side effects of drugs because it reduces the doses of drugs. As little work has been done on beneficial effect of yoga on pulmonary function test in UP. Nagarathna R *et al.*, (10) "An integrated approach of yoga therapy for bronchial asthma: a 3-54 month prospective study." (1986); 23(3): 123-37. Nagendra HR *et al.*, (17) "Yoga for bronchial asthma: a controlled study." (1985) Oct 19; 291(6502): 1077-9. Chen TL *et al.*, (18) "The effect of yoga exercise intervention on health related physical fitness in school-age asthmatic children" (2009) Apr; 56(2): 42-52. The present study is planned to compare pulmonary function tests in Bronchial asthma patients under treatment practicing yoga (study group) and not practicing yoga (Control group).

### Material and method:

Present study had conducted in the rohilkhand medical college from October 2014 to March 2015 with the ethical committee clearance. Patient selected in OPD of T.B and chest. Sample size has been calculated using the formula (cochran 1973).  $q = \frac{1-p}{p}$  Where p is the incidence of bronchial Asthma Therefore, 50 cases of bronchial asthma practicing yoga forms the study population and 50 bronchial asthma patients not practicing yoga will form the control group. Sample is selected via Simple random sample technique. pulmonary function test were carried out using MIER spirometer. The data collected was analyzed by SPSS v21.0.0.0 64 bit edition.

**Inclusion Criteria** i) Case of either sex of age between 20-55 yrs. ii) Bronchial asthma patients practicing yoga with medical treatment. iii)

Bronchial asthma patients under medical treatment but not practicing yoga.

**Exclusion Criteria:** Case unwilling to participate in study. ii) History of cigarette smoking, hypertension, diabetes and chronic chest infections like T.B. (X-ray and sputum examination done, if needed) and chest deformity.

### Education and Methods:

Study schedule having factors as age, sex, weight and height etc. Pulmonary function testing known as spirometry, is the measurement of lung function, specifically by measuring the volume and speed of air that can be inhaled and exhaled. Results are given in both raw data (liters, Liters/sec) and percent predicted. A detailed personal and family history will be recorded. The subject will be familiarized with the instrument and it's working so that subject cooperates well and without any apprehension. After recording age, sex, height in cm and weight in kg., the subject will be made to sit comfortably on a chair and asked to first take 3-4 normal breathes through the mouth-piece of spirometer. Then subject asked to take slow and deep inspiration then instructed to blow out forcefully and rapidly through the trails, the highest of the three test readings will be taken as final reading. The pulmonary function tests in control and study population of bronchial asthma patients has been measured with computerized multifunctional spirometer and prints containing all information have been collected. In yoga various yogic exercise is performed which are Anuloma-viloma and kapalbhathi Bhramari pranayama Suryanamaskar. Then we taught the subject the yoga effective in bronchial asthma is Anuloma-viloma and kapalbhathi Bhramari pranayama Suryanamaskar.

**Bhramari pranayama:** In this technique, the ears are closed with thumb, index finger is on forehead and rest three is on the base of nose touching eyes. The patient was asked to breathe-in and -out through nose while humming "OM" like a bee for 10 min.

**Suryanamaskar:** pretraining was given for 7 days by a yoga trainer and the performance of suryanamaskar was analyzed using performance chart. The participants were trained to perform suryanamaskar in a slow manner so that each of the 12 poses could be held for duration of 30 s. Each round took 6 min to complete and five rounds were performed in 30–40 min.

**Anuloma-Viloma K/As Alternate Nostril breathing:**( a) Inhale through left nostril, closing the right with the thumb, to the count of 4. (b) Hold the breath, closing both nostrils to the count of 16. (c) Exhale through the right nostril, closing the left with the ring and little finger to the count of 8. (d) Inhale through the right nostril, closing the left nostril with ring and little finger to the count of 4. (e) Hold the breath, closing both nostrils, to the count of 16. (f) Exhale through the left nostril, keeping the right closes with the thumb, to the count of 8.

**KapalbhatiYoga**

Also known as breath of fire is used as a 'Cleaning breathing exercise'. The technique uses a of forced exhalation with the premise of ridding of lower lungs of stale air allowing the intake of O2 rich air, thereby purifying the body. All these yoga done in vajrasana or padmasana, keeping back straight and one or both hand in gyana mudra. In between or after practice, subject lie in shavasana for 1 -2 min, according to need. Then we take respiratory parameter through spirometer after the end of session of yoga at end of first month, at end of second month and at end of third month. The following parameter will be recorded Forced Vital Capacity (FVC), Forced Expiratory Volume in Time (FEV1), Forced expiratory volume /Forced vital capacity ratio (FEV1 /FVC)PEFR. The necessary information will be collected on final schedules and will be transferred on the standard predesigned classified tables as per objective. Statistical tests and other analysis for drawing inferences will be applied as per need.

**Table 1: Changes in FVC on Comparing Study Group with Control Group with Duration of yoga**

Parameter FVC	Study Group (Mean ± SD)	Control Group (Mean±SD)	p
At Ist Visit	78.4 ±5.32	81.4± 5.71	0.436
After 1month	92.68 ± 4.7	93.15± 5.9	0.540
After 2 month	100.6±5.83	94.4± 5.67	<0.001
After 3 month	101.3±5.12	94.65 ± 5.55	<0.001

**Table 2: Changes in FEV1 on Comparing Study Groupwith Control Group with Duration of yoga**

Parameter FEV1	Study Group (Mean ± SD)	Control Group (Mean ± SD)	p
At Ist Visit	59.66± 6.43	60.5±5.91	0.854
After 1month	74.08± 6.42	74.05± 6.53	0.881
After 2 month	80.88± 5.25	74.35± 6.58	<0.001
After 3 month	82.62± 5.33	75235± 6.53	<0.001

**Table 3: Changes in FEV1/FVC RATIO on Comparing Study Group with Control Group with Duration of yoga**

Parameter FEV1/FVC	Study Group (Mean ± SD)	Control Group (Mean ± SD)	p
At Ist Visit	70.85±5.63	71.9± 6.41	0.012
After 1month	82.15 ±6.25	85.55± 6.23	0.124
After 2 month	88.63 ± 6.45	85.75±6.11	0.012
After 3 month	90.65 ± 6.10	85.9± 6.25	<0.001

**TABLE 4:Changes in PEFR on Comparing Study Group with Control Group with Duration of yoga**

Parameter PEFR	Study Group (Mean ± SD)	Control Group (Mean ± SD)	p
At Ist Visit	68.5 ± 18.2	57.4 ± 19.4	0.012
After 1month	75.5 ± 19.5*	58.2 ± 22.0	0.014
After 2 month	80.3 ± 20.6‡	56.3 ± 25.2	<0.001
After 3 month	84.0 ± 20.2	56.2 ± 22.0	<0.001

**Result:**

Finding of the present study was summarized and concluded as follows FVC, FEV1, FEV1/FVC PEFR, are improved both study and control group, on comparing study and control group after 1 month of yoga. FVC, FEV1, FEV1/FVC PEFR, are improved in study group, not in control group, on comparing study and control group after 2 month of yoga. FVC, FEV1, FEV1/FVC PEFR, are improved in study group, not in control group, on comparing study and control group after 3 month of yoga. In our study the subjects of study group compared with the subject of control group after one month of yoga p value of FVC (0.540), FEV1 (0.881), FEV1/FVC (0.124) PEFR(0.014) was insignificant statistically. (Table 1 to4) In our study the subjects of study group compared with the subject of control group after two month of pranayama p value of FVC (0.001), FEV1 (0.001), FEV1/FVC (0.012)PEFR (0.001)was significant statistically. (Table 1 to 3) In our study the subjects of study group compared with the subject of control group after three month of pranayama p value of FVC (0.001), FEV1 (0.001), FEV1/FVC (0.001) PEFR(0.001) was significant statistically. (Table 1 to 4).

**Discussion**

The probable reason for the observation in the present study could be explained as anuloma and viloma are deep breathing at slow rate causes decrease dead space and increase alveolar ventilation, as depth of breathing is far more effective in elevating alveolar ventilation. Thus increasing alveolar ventilation leads to increase maximum ventilation and vital capacity. Bhramari pranayama Suryanamaskarthe compliance of the lung thoracic system increases and the airway resistance decreases as a result, hence forceful expiration becomes more efficient. The improvement in FVC could be attributed to increase in development and strengthening of respiratory musculature in regular yoga practitioners.[13] Yogic breathing maneuver including suryanamaskarinflate lung near to total lung capacity, which helps in releasing lung surfactant and prostaglandins into alveolar spaces, increasing lung compliance In kapalbhati pranayama as pulmonary pressure continue to increase resulting in an adequate driving force to propel the blood to the uppermost part of lung where oxygen is more, these results in more perfusion of lungs from top to bottom and improve the ventilatory functions of lungs. In this study after three months yoga practice significant increase in FVC, FEV1 PEFR, these finding are consistent with other studies Fludge T *et al.*, (3). By consistently performing a variety of asana muscles of the thoracic cavity are constantly being recruited. This recruitment may lead to greater musculature and thereby result in improved FVC SabinaA *Betal.*, (14). Similar observations were made by Satyaprabha *et al.*, (15), they concluded that during pranayama, the compliance of the lung thoracic System increases and the airway resistance decreases. Anulom and vilom is characterized by slow and deep inhalation and prolong exhalation causes efficient use of intercostals and diaphragmatic muscle this trains the respiratory muscles to get emptied and filled more completely

**Conclusion:**

yoga has additive beneficial effect along with medication in bronchial asthma patients. Soyoga can be used for respiratory Rehabilitation.

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