

A Comparative Study Of Effect Of Yoga And Drugs On Pulmonary Functions And Inflammation In Bronchial Asthma

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Abstract: Background: Bronchial asthma is one of the most common chronic diseases in the world. Pharmaceutical interventions like using inhalational bronchodilators and corticosteroids have grown like anything. These have a multisystem deleterious effect on body. Yogic exercise has been used to treat patient with asthma for over 50 years. The present study was an attempt to include yogic exercise into treatment modality of asthmatic patients and compare the Pulmonary Function Tests (PFTs) and inflammatory changes. Method: 71 patients with bronchial asthma taken and were randomized into two groups; Pranayama Group And Drug Group. Pranayama Group contained 37 subjects and DRUG GROUP contained 34. PFTs and Absolute Eosinophilic Count (AEC) were performed in all the subjects at baseline and after 6 weeks. The parameters were compared by using Paired t- test. Statistical analysis was done by using SPSS 16.0 software. Result: After 6 weeks, PRANAYAMA GROUP subjects showed a significant increase in percent predicted Forced Expiratory Volume in the first second (FEV1), Forced Vital Capacity (FVC) and FEV1/FVC% as compared to Drug Group. AEC showed significant decrease in eosinophil count in Pranayama Group as compared to Drug Group which showed insignificant increase. Conclusion: The yoga breathing exercise used adjunctively with standard drugs significantly improves pulmonary functions and inflammation in patients with Bronchial asthma.

Key Words: Bronchial asthma, Inflammation, Pranayama, Pulmonary functions

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Introduction: Bronchial asthma is one of the common chronic diseases in the world. It is estimated that 300 million people are affected worldwide¹. According to the GINA, a definition of Asthma is given as; "Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation is associated with airway hyper-responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread, but variable airflow obstruction within the lung that is often reversible either spontaneously or with treatment"².

Asthma is a chronic inflammatory disease of the airways that is characterized by increased responsiveness of the tracheobronchial tree to allergens or irritants that cause acute bronchoconstriction³. Along with that it presents with varying degrees of airway inflammation in every patient with asthma. Airway inflammation is persistent even though symptoms are episodic^{4,5} This is due to release of mediators from activated mast cells, eosinophils, T lymphocytes, etc.

Pharmaceutical interventions are used more rampantly in the treatment of asthma. It is both costly and produces various unwanted side-effects in the patients. Breathing exercises if done regularly and properly can control asthma. Pranayama is an effective breathing technique that is commonly used. If done regularly under proper guidance, this simple measure will be effective.

The aim of this study was to witness the influence of Pranayama on subjects with chronic bronchial asthma on standard therapy when compared to those who are only on standard therapy. The objective of this study was to see the effect of Pranayama on pulmonary function and inflammation in chronic bronchial asthma.

Materials and Method: This study was conducted at Department of Physiology and Department of Pulmonary Medicine in VSS Medical College, Burla. The study was conducted after receiving approval from the Institutional Ethics Committee of VSSMC, Sambalpur University, Burla.

The study was a Randomised Controlled Trial with two different groups, consisting of adult patients with persistent, chronic asthma who have met the

inclusion and exclusion criteria for the same. Initially the patients were stabilized on drugs till no further symptomatic improvement occurred. The study subjects were allocated to two groups; the PRANAYAMA GROUP that included those who practiced Pranayama along with standard care and the DRUG GROUP who received only standard care.

Inclusion criteria included i) Cases of Bronchial asthma confirmed by the Physician/Chest Physician as mentioned in diagnostic criteria and ii) With symptoms of asthma persisting for at least 6 months despite optimum therapy. Exclusion criteria included I) History of smoking within the last 1 year, II) Acute infection or infections within the past 6 weeks and III) Patients with serious systemic illness – Hepatic, Renal, Cardiac or CNS diseases. IV) Patients with cardiovascular diseases including hypertension.

71 subjects with chronic bronchial asthma attending the OPD of Pulmonary Medicine, VSS MC, were taken. They were allotted into two groups: DRUG GROUP and PRANAYAMA GROUP, with 34 and 37 subjects respectively. All were males with no significant difference in mean age and BMI. Initially they were stabilized on drugs till no further symptomatic improvement occur. The DRUG GROUP continued the same medicine that they had been using and the PRANAYAMA GROUP were taught to perform one simple Pranayama, Bhastrka, daily, along with the normal medication. DRUG GROUP was taken as control.

The participants of both the groups underwent Spirometric test by help of SPIROLAB-II SPIROMETER, CIPLA, INDIA. The FEV1, FVC and FEV1/FVC% were measured. AEC was also found out by direct method by using Pilot fluid.

The PRANAYAMA GROUP performed the Bhastrika for 15 min daily for 6 weeks. The subjects inhaled and exhaled forcefully at a ratio of 1:1 for 15-20 min with a rest after every 1 min. After 6 weeks, Spirometric test and AEC were again done to find out the changes.

Significance was found out by using Paired t- Test. Statistical analysis was done by using SPSS 16.0 software. $p < 0.05$ was taken as significance.

Result: The findings of the two groups at baseline and after 6 weeks of treatment have been shown in the table and the comparison was shown in the graph. p was calculated by using Paired t-Test.

Fig 1: Change in FEV1 in the study groups between baseline and after 6 weeks

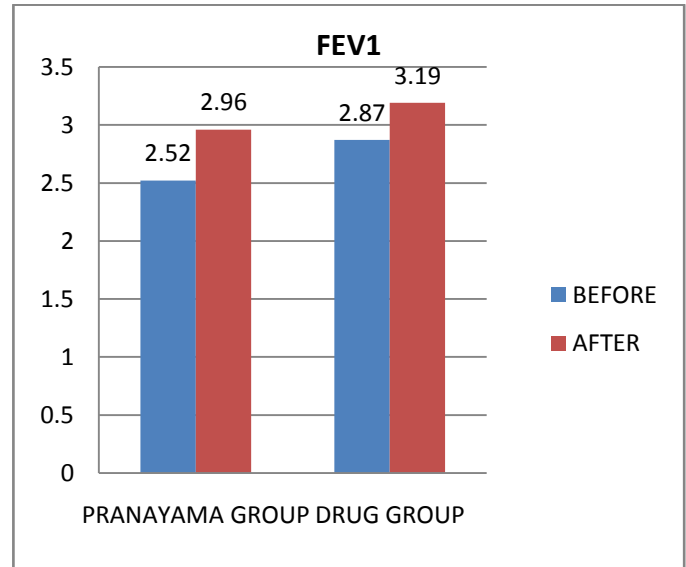
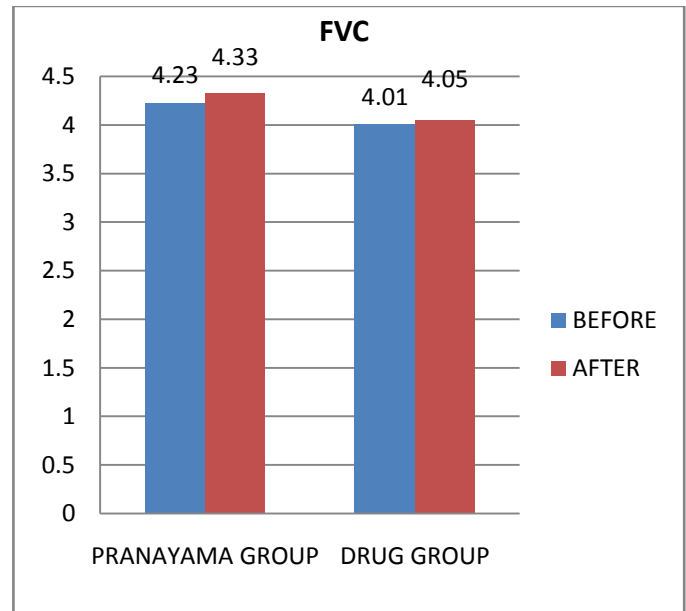


Fig 2: Change in FVC in the study groups between baseline and after 6 weeks



Discussion: Drug therapy alone cannot give long term control for bronchial asthma. Many of Complementary and Alternative medicine (CAM) are used to control asthma. Yoga is one important branch of CAM. Pranayama and asana bring about a correct balance between the sympathetic and

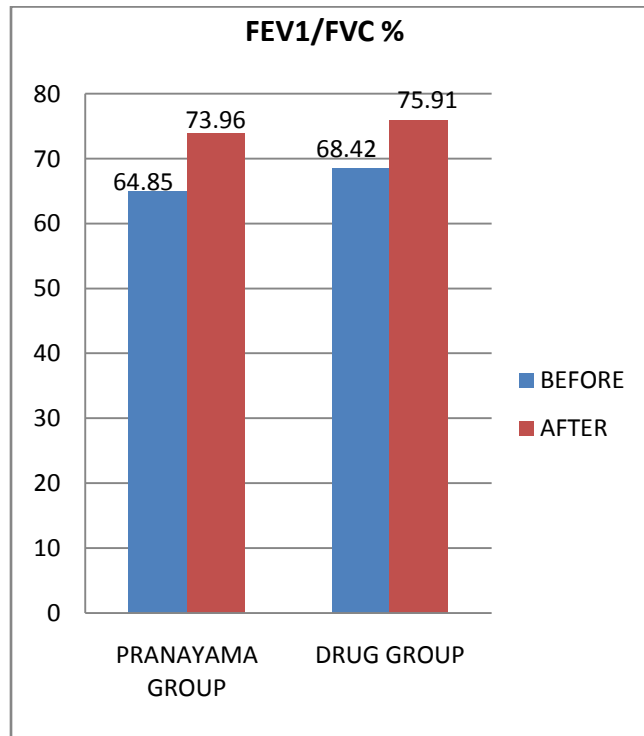
parasympathetic nervous system^{6,14}. Though yoga bring about a Parasympathetic dominance, Pranayama like Bhastrika has a slight Sympathetic stimulatory effect^{7,8}. It also cause airway smooth muscle relaxation, so long term use of this technique will mask the vagal imbalance that cause bronchoconstriction. The mechanism of pulmonary

function changes was mentioned in work of Nagarathna et al¹⁵ who had suggested that yoga techniques reduce psychological over activity and emotional instability, thus enhancing immunity.

Table 1: The findings of the two groups at baseline and after 6 weeks of treatment

	Parameter	Baseline	Post Intervention	Mean Difference	Std Dev	P
PRANAYAMA GROUP (n=37)	FEV1(Lit)	2.52	2.96	-0.44	0.13	0.001
	FVC(Lit)	4.23	4.33	-0.1	0.05	0.04
	FEV1/FVC(%)	64.85	73.96	-9.11	3.04	<0.001
	AEC	325.28	239.32	85.96	81.74	<0.001
DRUG GROUP (n=34)	FEV1(Lit)	2.87	3.19	-0.32	0.45	0.01
	FVC(Lit)	4.01	4.05	-0.04	0.01	0.001
	FEV1/FVC(%)	68.42	75.91	-7.49	10.66	<0.001
	AEC	311.82	334.62	-22.8	104.87	0.214

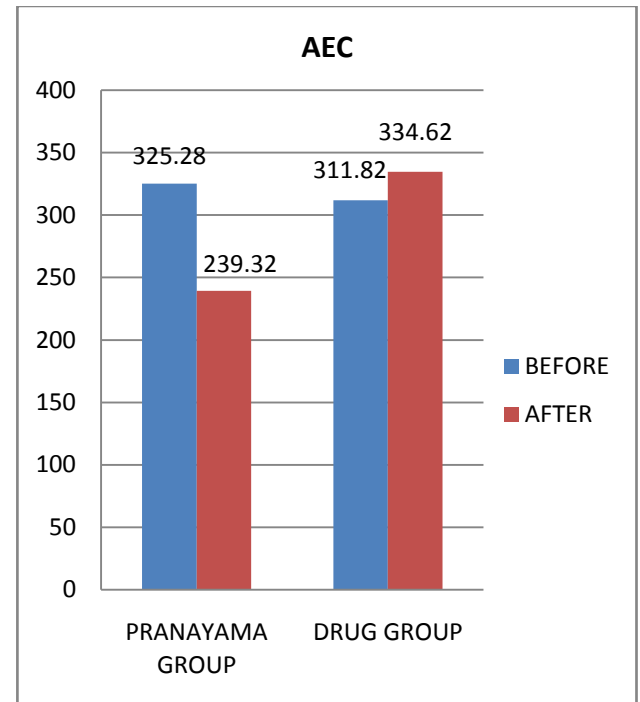
Fig 3: Change in FEV1/FVC % in the study groups between baseline and after 6 weeks



Before the study, all the subjects in both the groups were matched for age, sex and BMI. All the subjects were under routine treatment and had their parameters FEV1, FVC and FEV1/FVC% at baseline. The AEC was also measured. There was an improvement in Spirometric finding after 6 weeks.

FEV1 increased by 16.3% in PRANAYAMA GROUP in comparison to DRUG GROUP where the increase is 11.2%. My study matched with the study of Murthy et al⁹, Joshi et al¹⁰. In PRANAYAMA GROUP FVC increased by 2.2% and in DRUG GROUP, by 0.9%. Similar findings were also found by the studies of Murthy et al⁹, Joshi et al¹⁰, Kumar et al¹¹.

Fig 4: Change in AEC in the study groups between baseline and after 6 weeks



The FEV1/FVC in PRANAYAMA GROUP increased by 13.5% where as in DRUG GROUP, by 11.8%. This finding coincided with the study of Kumar et al ¹¹, Kalpana et al ¹².

The AEC was seen to be reduced significantly in PRANAYAMA GROUP by 22% where as in DRUG GROUP it was found to be increased by 6%. The study by Satyaprabha TN et al ¹³, Kalpana et al ¹².

Conclusion: The study clearly showed that 6 weeks of Pranayama produced improvement in spirometric findings i.e. FEV1, FVC and FEV1/FVC which was even better than using routine therapy alone. Reduction in inflammation is seen only in those doing Pranayama as AEC showed significant decrease after 6 weeks in PRANAYAMA GROUP than in DRUG GROUP. Inflammation in DRUG GROUP remained high as AEC is increased. Thus it is strongly recommended that these breathing exercises be used as an adjunctive therapy in the treatment in the amelioration of chronic bronchial asthma and bring a better control over the condition of patient.

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