



TO STUDY THE PULMONARY FUNCTION TESTS, IN BRONCHIAL ASTHMA PATIENTS BEFORE AND AFTER PRANAYAMA

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ABSTRACTS

Background: Asthma is a chronic (long-term) lung disease that inflames and narrows the airways by spastic contraction of the smooth muscle in the bronchioles, which partially obstructs the bronchioles and causes recurring periods of wheezing, chest tightness, shortness of breath, and coughing. About 300 million people are suffering from asthma globally and about 10% of it belongs to India. Asthma is, therefore, also associated with oxidative-antioxidative imbalance in the body and might have a psychosomatic origin. **Objective:** The aim of present study was to investigate whether regular practice of Pranayama for three months can reduce severity and duration of attacks and

significant qualitative improvement and pulmonary function tests. **Material and method:** The present study included 30 Male Asthmatic patients 18 to 60 years of age. Then all patients were subjected for pulmonary function test by computerised spirometer “**Spiroexcel PC Based Pulmonary Function Test**”, They underwent Anulom-Vilom Pranayama, for the duration of 12 weeks. Then again underwent pulmonary function test, was measured which was found to be significantly improved. Statistically by using student, “t” test. **Result:** Regular practice of Pranayama for 3 months significantly improved pulmonary function tests. **Conclusion:** We concluded that the regular practice of pranayama, slowly reduces the constriction of bronchial tube and increases, the capacity of bronchial tubes to a great extent and subsequently gradually asthma can be cured. Hence they are essence of the life.

KEYWORDS: Asthma, Pranayama, Pulmonary function test.

INTRODUCTION

Asthma is a chronic (long-term) lung disease that inflames and narrows the airways by spastic contraction of the smooth muscle in the bronchioles, which partially obstructs the bronchioles and causes recurring periods of wheezing, chest tightness, shortness of breath, and coughing.^[1,2] About 300 million people are suffering from asthma globally^[3,4,5] and about 10% of it belongs to India.

Chronic inflammation plays a major role in the pathogenesis of asthma, and it has long been recognized that many of the inflammatory cells that are involved in mediating these processes reach the lung via the blood. In asthma, the dominant peripheral blood leukocyte found in the airway is the eosinophils^[6,7] and the degree of eosinophils involvement is correlated with various markers of severity including symptoms^[8], loss of lung function^[9] and with airway Hyper-responsiveness. In asthma, the presence of neutrophils and eosinophils in the airway is broadly reflected by increased numbers of these cells in peripheral blood^[10,11,12], active oxygen species, released from eosinophils, alveolar macrophages, and neutrophils, seem to play a key role in asthma. They may directly contract airway smooth muscles; stimulate histamine release from mast cells and mucus secretion.^[13] Asthma is, therefore, also associated with oxidative-antioxidative imbalance in the body and might have a psychosomatic origin. Attack of asthma involves both physical and psychological factors. Physical and psychological stresses can induce a wide range of immunological alteration in the cell mediated and humoral immunity.^[14] Stressors may influence the immune function via their impact on neuroendocrine, autonomic and central nervous system.^[15] Non pharmacological methods like yogic asanas, pranayama, and meditation should be encouraged to control the modifiable risk factors by increasing pranayama, and meditation by increasing parasympathetic activity and decreasing sympathetic activity and provides significant improvements in respiratory functions.

After the effects of three months of pranayama yoga practice on lung functions test in asthmatic patients, the pulmonary indicators such as FVC, FEV1, FEV1/ FVC, PEF, R of intervention group significantly improved with p value < .01 to .001. Hence, practicing pranayama yoga is beneficial to patients with bronchial asthma to increase muscular efficiency and reduce perceived exertion and has profound effect on the autonomic nervous system.^[16.- 24 and 25]

MATERIAL AND METHODS

Study group were selected from clinic of consultants of medicine Department of our institution. The study comprised of 30 asthmatic male Patients. age 18 to 60 year, presenting with airway hyper-responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing at night or in the early morning. etc were screened and selected from general population. Careful detailed history was taken and thorough clinical examination with routine investigation was done.

The study protocol was explained to the subjects and written consent obtained. Approval by ethical committee of S.S. Medical College, Rewa, M. P., was obtained. All the patients were clinically examined to rule out any systemic diseases. All patients were non-alcoholic and non-smokers. They were taking anti asthmatic drugs, and they were not practicing any known stress relieving or relaxation technique previously.

Inclusion criteria

1. Patients not doing yoga practices previously.
2. Patients of mild to moderate bronchial asthma, who are diagnosed by consultant of medicine at their clinic; and who are on regular follow up.

Exclusion Criteria

1. Patients with severe asthmatic attack since they can not sit comfortable to attend the yoga practice;
2. Major psychiatric illnesses, having History of Coronary artery diseases, Acute Myocardial infarction, Valvular heart disease, hypertension, active Pulmonary tuberculosis Acute respiratory illness, autoimmune lung diseases, Chest injuries, Acute severe illness and Neuro-muscular disorders.

Written informed consent was taken after explaining the procedure of test. Then patients were subjected for pulmonary function test by computerised spirometer “**Spiroexcel PC Based Pulmonary Function Test, (Medicaids)**” in Department of Physiology.

The various parameters measured are as follows:

Forced expiratory volume in 1 second (FEV1)

Forced vital capacity (FVC)

Maximum voluntary ventilation (MVV)

Mid forced expiratory flow (EFE)

All the 30 patients of study group were trained under the guidance of a certified “yoga” teacher for 15 days in the Deptt of Physiology. They carried out “Anulom-Vilom Pranayama” 60 times or 20 minutes, twice a day for three months,

After 3 month of Anulom-Vilom Pranayama, all patients were again subjected for pulmonary function test and record the FEV1, FVC, MVV and FEF. The data was analyzed statistically by using statistical software Graph Pad in Stat vs. 3.10 and MS Excel (2003). Statistical analysis of BP, and pulse rate and rate of respiration were done using student „t” test and $p < 0.01$ was considered as significant.

RESULTS

Our results showed that “pranayama” causes significant increase in pulmonary function test such as FEV1, FVC, MVV and FEF. The study comprised of 30 asthmatic male Patients. age 18 to 60 year, They carried out “ Anulom-Vilom Pranayama” 60 times or 20 minutes, twice a day for three months and they were subjected to pulmonary function test such as FEV1, FVC, MVV and FEF. 3month before and after 3 month of anulom-vilom pranayama. The statistical analysis was carried out using student t” test. It was observed that the all parameters of pulmonary function test such as FEV1, FVC, MVV and FEF were statistically more significantly altered.after pranayama (Table-1,2).

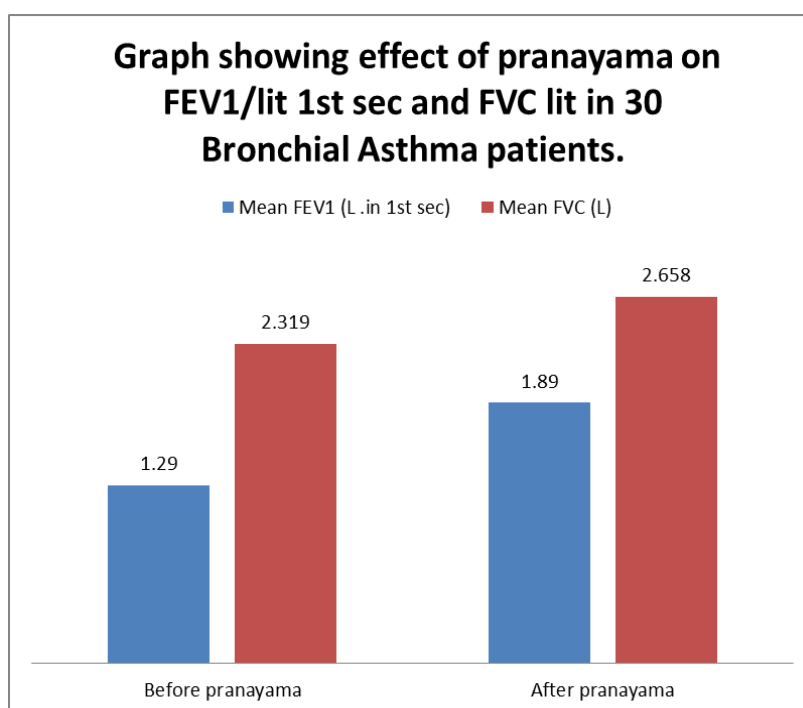
1. Before Pranayama, the Mean FEV1 (L.in 1st sec) was 1.29 ± 0.295 lit 1st sec and after pranayama was significantly increased to 1.89 ± 0.595 lit 1st sec ($p < .000$).
2. Before Pranayama, the Mean FVC was 1.29 ± 0.295 lit and after pranayama, **the** Mean FVC was $2.658 \pm .695$ lit, significantly increased to ($p < .000$).
3. Before Pranayama, the Mean MVV (L)/min was 37.03 ± 24.58 lit/min and after pranayama was 36.63 ± 20.27 lit/min, significantly increased ($p < .000$).
4. Before Pranayama, the Mid Expiratory Flow lit /min was. 642 ± 1.279 lit/min and after pranayama was 2.968 ± 1.327 lit/min, significantly increased ($p < .000$).

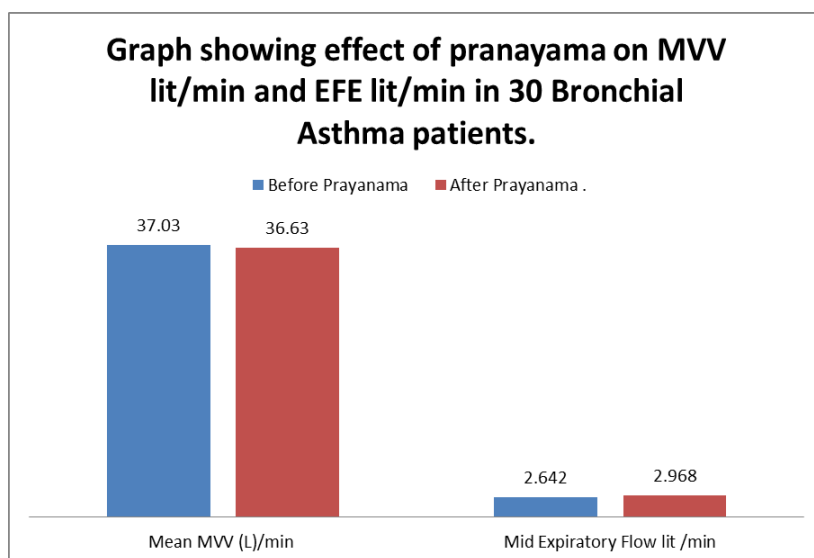
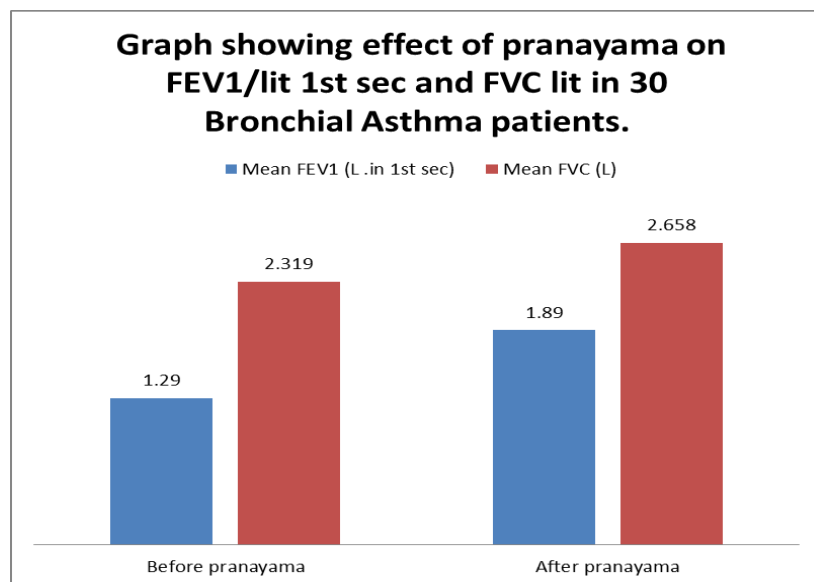
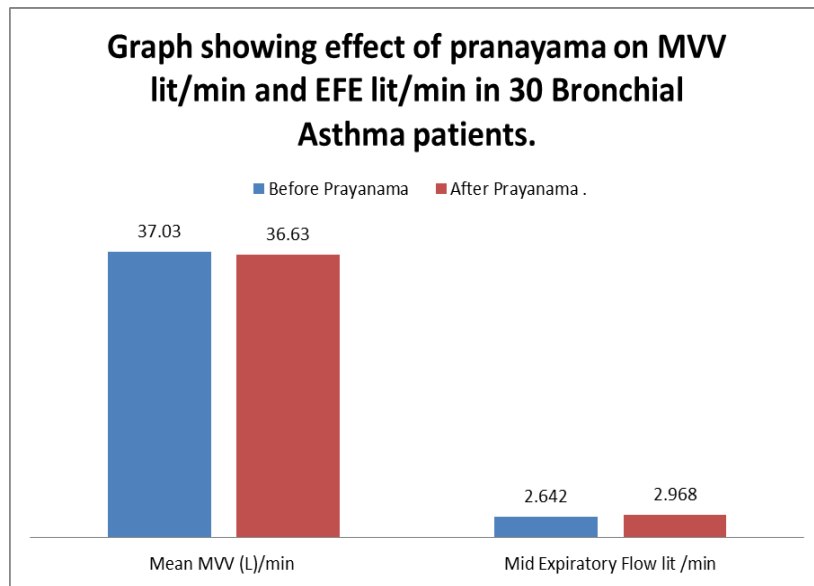
Table No. 1: Table Showing Mean FEV₁, FVC in Male Bronchial Asthma Patients Before and After Prayanama with their Mean Value, Standard Deviation and P-value.

S.No.	Parameters	<i>Before Prayanama</i>	<i>After Prayanama</i>	P value
		Mean Value With S. D.	Mean Value With S. D.	
01	Mean FEV1 (L.in 1 st sec)	1.29 ±0.295	1.89 ±0.595	<0.000
02	Mean FVC (L)	2.319 ±.6565	2.658 ±.695	<0.000

Table No. 2: Table Showing Mean Mean MVV (L) Mid Expiratory Flow (25-75%) and in Male Bronchial Asthma Patients Before and After Prayanama with their Mean Value, Standard Deviation and P-value.

S.No.	Parameters	<i>Before Prayanama</i>	<i>After Prayanama</i>	P value
		Mean Value With S. D.	Mean Value With S. D.	
01	Mean MVV (L)/min	12.88 ±1.214	36.63 ±20.27	<0.000
02	Mid Expiratory Flow lit /min	14.06 ± 1.263	2.968 ±1.327	<0.000





DISCUSSION

The present study “To study the Pulmonary Function Tests in Bronchial Asthma patients before the Pranayama and after Pranayama” was carried out in the department of physiology, S. S. M. C. Rewa (M.P.). The study included 30 Bronchial Asthma patients, age ranged from 18 to 60 yrs. out of which all were males. Thorough clinical examination with routine investigation was done. All the 30 patients carried out Pulmonary function test before pranayama and then carried out pranayama 20 minutes or 60 times, twice a day regularly for 3 months then again carried out Pulmonary function test after 3 month of pranayama.

Forced expiratory volume in the 1st second (FEV₁)

In present study, the mean forced expiratory volume in one second was found to be in all asthmatic patients before Pranayama 1.29 ± 0.295 lit /sec and after Pranayama FEV₁ was 1.89 ± 0.595 lit/sec. There was a significant increase in FEV₁ due to effect of Pranayama. with a p value of <0.000 , which is statistically highly significant. (*Table No.1*).

Forced Vital Capacity (FVC)

In present study, the mean Forced Vital Capacity (FVC) was found to be in all asthmatic patients before Pranayama 2.319 ± 0.6565 lit and after Pranayama FVC was 2.658 ± 0.695 lit. There was a significant increase in FVC due to effect of Pranayama. with a p value of <0.000 , which is statistically highly significant. (*Table No.1*).

Maximum Voluntary Ventilation (MVV)

In present study, the mean Maximum Voluntary Ventilation (MVV) /min was found to be in all asthmatic patients before Pranayama 12.88 ± 1.214 lit / min and after Pranayama MVV/min was 14.06 ± 1.263 lit. There was a significant increase in MVV due to effect of Pranayama. with a p value of <0.000 , which is statistically highly significant. (*Table No.2*).

Mid Forced Expiratory Flow (FEF 25% -75%)

In present study, the mean Mid Forced Expiratory Flow (FEF 25% -75%) lit/min was found to be in all asthmatic patients before Pranayama 2.642 ± 1.279 lit/min and after Pranayama, FEF was 2.968 ± 1.327 lit/min. There was a significant increase in FEF due to effect of Pranayama. with a p value of <0.000 , which is statistically highly significant. (*Table No.2*).

Chitharanjan Rao, Avinash Kadam, Aarti Jagannathan, Babina, Raghavendra Rao, Nagendra (2014)^[20] tested the efficacy of a onemonth inpatient naturopathy and yoga programme for

patients with asthma. Retrospective data of 159 bronchial asthma patients was analyzed for FVC, FEV1, MVV and PEFr on admission, result revealed significant increase in FVC, FEV1, MVV and PEFr from admission till the date of discharge and also in the follow-up at 36th month ($p < 0.0035$).

Khue Ai Thi Hoang, Hung Manh (2015^[26]) conducted a study to assess the effects of pranayama yoga practice on lung functions in patients with bronchial diseases. This is a controlled trial study. Intervention group practiced ujjayi, bhastrika, kapalabhati, anulomaviloma, bhramari pranayama and meditation and were asked to practice in home for another three months. After three months of yoga practice, breath indicators such as FVC, FEV1, FEV1/ FVC, PEFr of intervention group significantly improved with p value $< .01$ to 001 in comparison with the previous three months of the control group. Hence, practicing pranayama yoga is beneficial to patients with bronchial asthma.^[27,19,21,28,29,30]

CONCLUSION

Non pharmacological methods like yogic asanas, pranayama, and meditation should be encouraged to control the modifiable risk factors by increasing parasympathetic activity and decreasing sympathetic activity and provides significant improvements in cardiovascular parameters and respiratory functions. It can thus be concluded that these results would justify the incorporation of yoga as part of our life style in prevention of hyper-reactivity to stress related disorders and age-related cardiovascular complications. "In a tension-filled society, yoga, pranayama, and meditation alone will bring solace from problems and hence they are essence of the life".

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