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Study of effect of pranayam and relaxation response on pulmonary function tests in adults with mild asthma

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Abstract
Background: Asthma management is a complex process influenced by multiple interacting factors. Among India's 1.31 billion people, about 6% of children and 2% of adults have asthma.
Objectives: To study the effect of diet, exercise, pranayam and RR on respiratory parameters in patients of mild asthma.
Methodology: 60 mild asthma patients in the age group of 20-60 years, including both sexes and taking antiasthma treatment since 5 to 10 years will be recruited for the study.
Result: Significant finding (p=0.0001) was found in the FVC and FEV1/FVC values in the pranayam group. On multiple comparision findings of IRV was significant. On using Tukey test for multiple comparision, significant finding between control and pranayam was found for IRV value. Similarly significant finding for IRV was found when Relaxation response and pranayam was compared.
Conclusion: It can be concluded that Pranayam can be used as a supplement with routine medications for the management of mild adult asthmatics.

Keywords: pranayan, relaxation response, mild asthma

Introduction

Among India's 1.31 billion people, about 6% of children and 2% of adults have asthma. Most people do not have health insurance and there is a wide gap in healthcare facilities for rich and poor [1]. Asthma management is a complex process influenced by multiple interacting factors. Most patients with asthma have mild or moderate disease and can be managed in primary care, with currently available medications, most can be treated effectively [2, 3]. The long term goal of asthma treatment is to achieve control of symptoms and maintain normal activity levels [4]. Guidelines for asthma diagnosis and management have previously focused on the assessment and classification of symptom severity, airflow limitationand lung function variability [5]. Revised in 2006, the asthma management guidelines issued by the Global Initiative for Asthma (GINA) proposed a new classification of asthma based on the level of control rather than the severity of the underlying disease process [6].

Several studies have demonstrated the use of healthcare resources, the level of lifestyle impairment and quality of life are all strictly linked to the level of asthma control: the better the control, the less impairment, the lower the use of healthcare resources, and the higher the quality of life [7, 8].

Due to the medication burden in treating asthma, there has been increasing interest in the role of lifestyle interventions as adjuncts or alternative treatments for people with asthma. Interventions that have been tested in studies of varying quality include meditation, yoga, massage therapy and acupuncture [9].

Aim

To study effect of Pranayam and Relaxation Response on pulmonary function tests in adults with mild asthma**.**

Objective

1. To study the effect of pranayam on respiratory parameters in patients of mild asthma.
2. To study the effect of relaxation response (RR) on respiratory parameters in patients of mild asthma.
3. To compare the effects obtained in study with that in controls.

Methodology

Settings- Department of Physiology, Jawaharlal Nehru Medical College, Wardha.

Research design- This will be interventional pre and post study.

Participant- 60 asthma patients in the age group of 20-60 years, including both sexes and taking antiasthma treatment since 5 to 10 years will be recruited for the study. Mild asthma patients will be selected for the study.

Inclusion criteria

1. Symptoms of wheeze.

2. Breathing difficulties in the last 12 months.
3. Diagnosis of mild asthma.
4. Asthma medication occasionally or regularly in the last 12 months.
5. History of allergic asthma and IgE sensitization to inhalant allergen like cat, dog, horse and / or house-dust mite, timothy grass, birch, mugwort and/ or mold.
6. Age group between 20-60 years.

Exclusion criteria

1. Age less than 20 years and more than 60 years.
2. Persistent asthma cases.
3. Severe asthma cases.
4. Major comorbidities like Coronary heart disease Diabetes, Essential and secondary hypertension, Dyslipidemia.
5. Asthma patients on cancer therapy.
6. Patients not consenting to the intervention.

Sampling procedure- Purposive sampling.
Sample size- 60 with 20 in each group.
Data collection tools- Respiratory parameters namely TV, ERV, IRV. FVC and FEV1/FVC.

Method

This research study had 2 groups namely study and control. 40 patients with asthma was allocated to the intervention/ study group and 20 patients with asthma was in control group. Study group was further divided into 2 groups namely Study 1&Study 2 Study group 1 Practiced specific pranayam. Study 3 group practiced only RR. Control group had no intervention. Control group- They are sex and age matched group who will be on their regular anti-asthma medication only. Patients of all the groups will be on their routine antiasthma medication. Study 1 group- This group of 20 asthma patients will be subjected to intervention for 3 days with 1 hour duration of work out.

The schedule will be as follows

1st day- orientation to the disease through video programme and lectures.

2nd day-Explanation of pranayam namely anulom vilom, kapalbhati and breath holding. 3rd day- Practice of pranayan. To perform 10 minutes twice a day for 3 times a week. Study 2 group will be subjected to intervention for 3 days with 1 hour duration of work out.

The schedule of intervention will be as follows

1st day- - orientation to the disease through video programme and lectures.
2nd day- Explanation of Relaxation Response techniques in form of guided imagery techniques.
3rd day- performance of guided imagery techniques.
The workout was done in 3 steps.
Step 1- One week prior to the intervention all pretest namely TV, ERV, IRV, FEV1, FEV25-75, PEFR was done.
Step 2- intervention was given.
Step 3- 3 months later (after intervention is given) the post test namely TV, ERV, IRV, FEV1, FEV25-75, PEFR was done.
Data collection process was recorders and Medicare system for recording and analyzing lung function values.
All subjects performed 3 repeated maximal expiratory flow volume measurements.The highest values of forced vital capacity (FVC) and FEV1/FVC was extracted and used for analysis in accordance with the standard criteria. **Study duration was** 2 years.

Variables

This information was obtained from the baseline questionnaire namely sex, mothers age at birth, parental allergic disease and parental smoking.

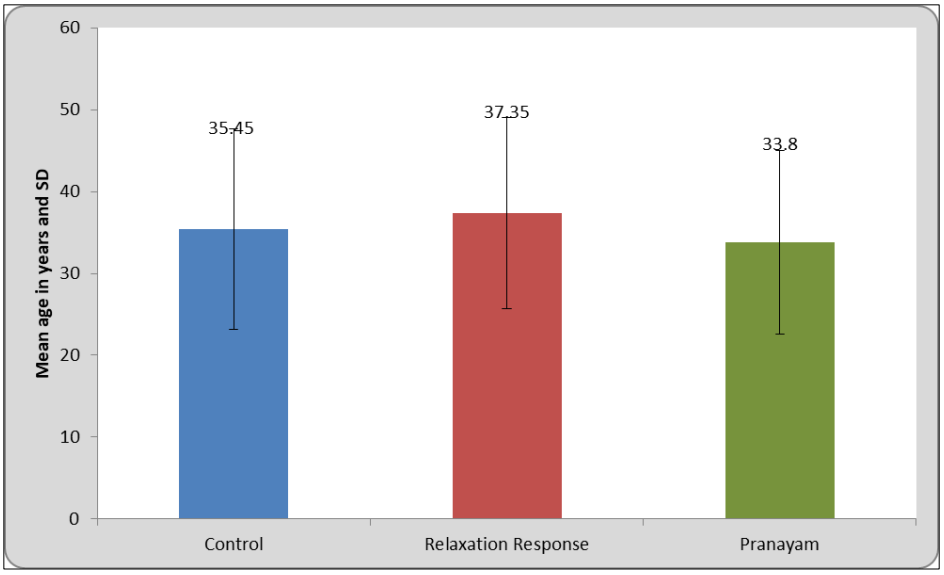
Analysis Plan

Baseline characteristics of subjects and change in respiratory parameters to the conclusion at 12 weeks was analyzed. Statistical analysis was done by using descriptive and inferential statistics using students paired test and Multiple Comparison Tukey test. P=0.0001 was considered as level of significance.

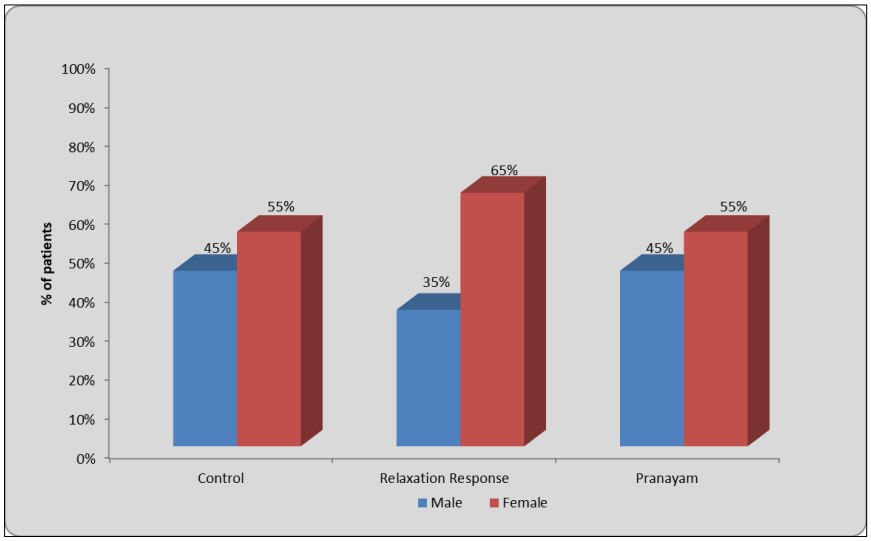
Observation

Table 1: Comparison of demographic characteristics in three groups

Group	Control (n=20)	Relaxation Response(n=20)	Pranayam (n=20)
Mean age in years	35.45±12.26	37.35±11.64	33.80±11.21
Age range	22-58 yrs	22-57 yrs	20-58 yrs
Gender			
Male	9(45%)	7(35%)	9(45%)
Female	11(55%)	13(65%)	11(55%)



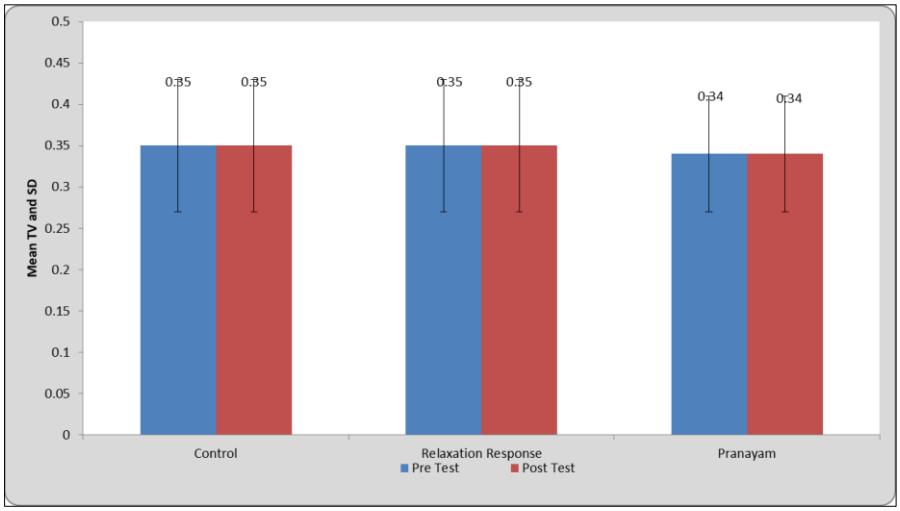
Graph 1: Comparison of mean age in three groups



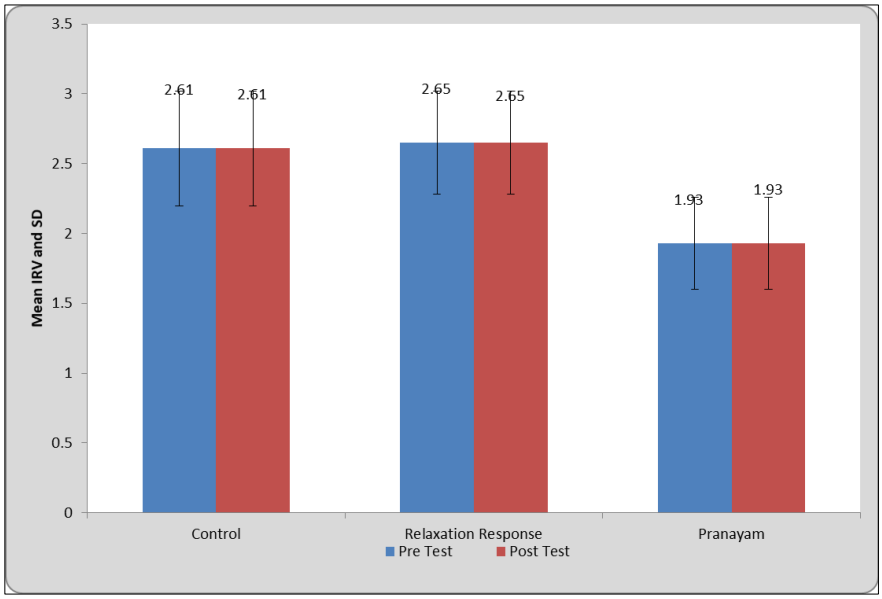
Graph 2: Distribution of patients according to gender in three groups

Table 3: Comparison of parameters in three groups at pre and post test Student's paired t test

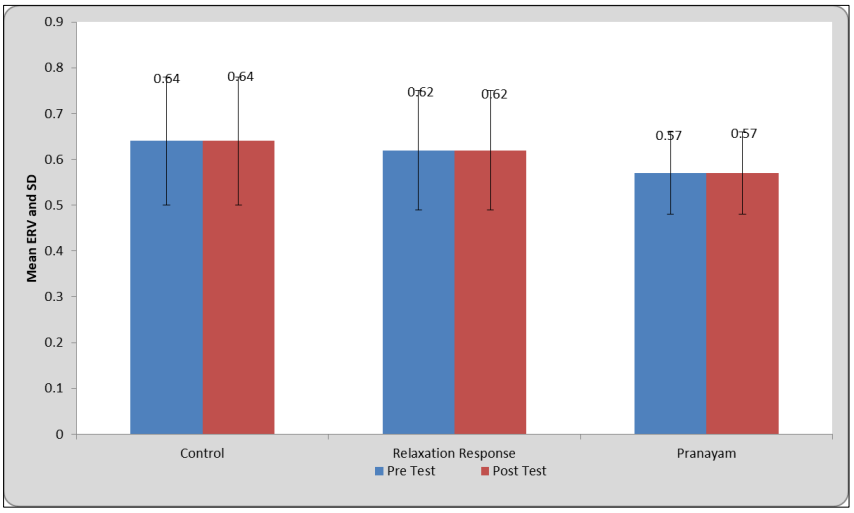
Parameters	Group	Pre Test	Post Test	Mean Difference	t-value	p-value
TV	Control	0.35±0.08	0.35±0.08	-	-	-
	Relaxation Response	0.35±0.08	0.35±0.08	-	-	--
	Pranayam	0.34±0.07	0.34±0.07	-	-	
IRV	Control	2.61±0.41	2.61±0.41	-	-	-
	Relaxation Response	2.65±0.37	2.65±0.37	-	-	-
	Pranayam	1.93±0.33	1.93±0.33	-	-	-
ERV	Control	0.64±0.14	0.64±0.14	-	-	-
	Relaxation Response	0.62±0.13	0.62±0.13	-	-	-
	Pranayam	0.57±0.09	0.57±0.09	-	-	-
FVC	Control	3.60±0.68	3.60±0.68	-	-	-
	Relaxation Response	3.43±0.60	3.49±0.55	0.06±0.23	1.26	0.22,NS
	Pranayam	3.02±0.38	3.29±0.41	0.27±0.25	4.76	0.0001,S
FEV1/FVC	Control	0.58±0.07	0.58±0.07	-	-	-
	Relaxation Response	0.57±0.07	0.57±0.07	0.001±0.004	1.00	0.33,NS
	Pranayam	0.56±0.08	0.58±0.08	0.021±0.01	5.29	0.0001,S



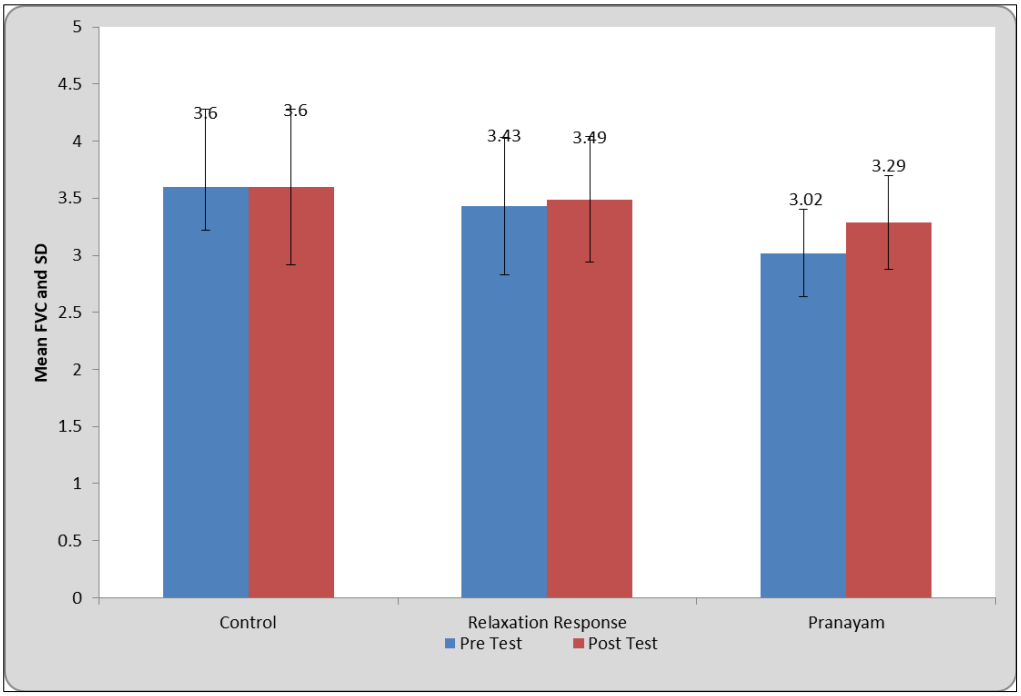
Graph 3: Comparison of TV in three groups at pre and post test



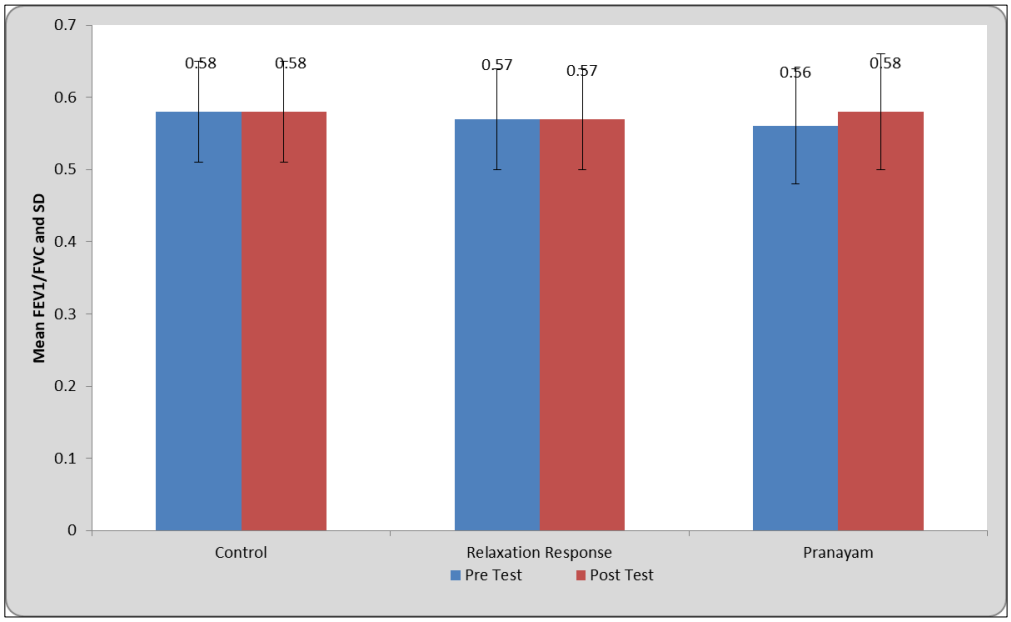
Graph 4: Comparison of IRV in three groups at pre and post test



Graph 5: Comparison of ERV in three groups at pre and post test



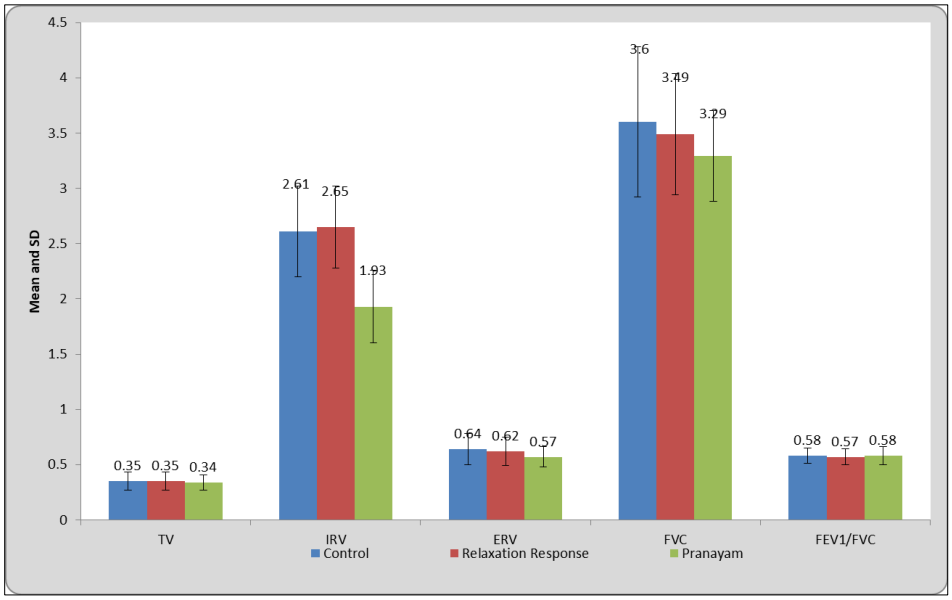
Graph 6: Comparison of FVC in three groups at pre and post test



Graph 7: Comparison of FEV1/FVC in three groups at pre and post test

Table 8: Comparison of TV in three groups at post test Multiple comparison: Tukey Test

Parameters	Control	Relaxation Response	Pranayam	F-value	Multiple Comparison		
					Control Vs Relaxation Response	Control Vs Pranayam	Relaxation Response Vs Pranayam
TV	0.35±0.08	0.35±0.08	0.34±0.07	0.091 P=0.93,NS	0.99,NS	0.92,NS	0.93,NS
IRV	2.61±0.41	2.65±0.37	1.93±0.33	23.18 P=0.0001,S	0.94,NS	0.0001,S	0.0001,S
ERV	0.64±0.14	0.62±0.13	0.57±0.09	1.55 P=0.21,NS	0.86,NS	0.20,NS	0.45,NS
FVC	3.60±0.68	3.49±0.55	3.29±0.41	1.56 P=0.21,NS	0.82,NS	0.19,NS	0.48,NS
FEV1/FVC	0.58±0.07	0.57±0.07	0.58±0.08	0.16 P=0.85,NS	0.90,NS	0.99,NS	0.85,NS



Graph 8: Comparison of parameters in three groups at post test

Discussion

In our study significant finding (p=0.0001) was found in the FVC and FEV1/FVC values in the pranayam group. On multiple comparision findings of IRV was significant. On using Tukey test for multiple comparision, significant finding between control and pranayam was found for IRV value. Similarly significant finding for IRV was found when Relaxation response and pranayam was compared.

In line with our study there are few studies on the effect of pranayam on pulmonary function tests in mild asthma adult patients. However no specific studies could be obtained on relaxation response in this regard.

In a study by Gülyeter Erdoğan Yüce *et al* it was found that the pranayama group had significantly higher ACT score, overall AQLQ score, and subscale scores than the relaxation group ($p < 0.05$). However, there was no significant difference between the groups in terms of PFT parameters and peak expiratory flow values ($p > 0.05$). Pranayama was applied to the pranayama group for 20 min once daily for 1 month, and relaxation was applied to the relaxation group similarly in addition to the standard treatment. They concluded that Pranayama improved asthma control and asthma-related quality of life in people with asthma, but it did not show a significant difference in PFT values. [10]

Savita singh *et al* conducted a study i to compare pulmonary functions and diffusion capacity in patients of bronchial asthma before and after yogic intervention of 2 months. Sixty stable asthmatic-patients were randomized into two groups i.e group 1 (Yoga training group) and group 2 (control group). Each group included thirty patients. Lung functions were recorded on all patients at baseline, and then after two months. Group 1 subjects showed a statistically significant improvement (P<o.oo1) forced vital capacity (FVC), forced expiratory volume in 1st sec (FEV1), peak expiratory flow rate (PEFR), maximum voluntary ventilation (MVV) and slow vital capacity (SVC) after yoga practice. The pulmonary function tests were assessed prior to yoga training and at the end of 2 months of yoga. They concluded that reduction in psychological hyper-reactivity and emotional instability achieved by yoga can reduce efferent vagal reactivity, which has been recognised as the mediator of the psychosomatic factor in asthma. [11] In a study of The assessment of effects of yoga on pulmonary functions in asthmatic patients: A randomized controlled study by Shruti Agnihotri *et al* it was found that yoga can be an adjuvant therapy along with standard medical treatment for the better management of asthma. They found no significant changes were found in spirometric variables in "the control group" during the course of the study. In contrast, "the yoga group" got significantly better improvement in spirometric variables. The study was carried out in mild-to-moderate persistent asthma ($FEV_1 > 60\%$) patients aged between 12 years and 60 years. The study had total of 276 subjects who satisfied the inclusion criteria were allocated into two groups on the basis of a computer-generated random number table. They were divided into the following two groups - Yoga group who received yogic intervention for 6 months along with standard medical treatment and control group who received only standard medical treatment. One hundred and twenty-one subjects of the yoga group and 120 subjects of the control group completed the study successfully. Comparison of pre and post spirometric changes occurred in the yoga group and control group at the third month and sixth month respectively. Significant decrease of 4.07% was noted in FEV_1/FVC from 71.52 ± 5.29 to 68.61 ± 6.78 ($P = 0.0002$) in the yoga group in comparison to the control group. There was no significant difference found in FVC. [12] Ritu Soni *et al* conducted study on thirty diagnosed patients of moderate asthma (n=15) as well as COPD (n= 15) in the age group 18-60 years of either sex were selected from medicine

outpatient department of GTB hospital, Delhi. Subjects performed pranayama for 21 days at an average 30 minutes daily. Pulmonary function tests of all the subjects were evaluated prior to yoga training (pranayama and meditation) and after 2 month of yoga. The pulmonary function parameters recorded by using computerized medisoft instrument (HYPAIR compact) were compared and statistically analyzed. Study results- Pulmonary functions FVC, FEV1, FEV1%, SVC, PEFR, MVV, FEF25-75%, and TLCO showed a statistically significant improvement after 2 months of yoga training. [13].

This study is similar to a study by S Cooper *et al* which suggests that Buteyko breathing technique can improve symptoms and reduce bronchodilator use in patients of asthma, but lung functions does not change significantly [14]. Similar study was reported by Behera D [15], who studied the effect of yoga on COPD patients and showed that lung function parameters improved after yoga practice.

A Huntley *et al* conducted a a systematic review on Relaxation therapies for asthma and found that There is some evidence that muscular relaxation improves lung function of patients with asthma but no evidence for any other relaxation technique. Four independent literature searches were performed on Medline, Cochrane Library, CISCOM, and Embase. Only randomised clinical trials (RCTs) were included. Fifteen trials were identified, of which nine compared the treatment group with the control group appropriately. Five RCTs tested progressive muscle relaxation or mental and muscular relaxation, two of which showed significant effects of therapy [16].

Pranayama may have psychophysiological benefits y increasing the patients sense of control over stress and thus aids in reducing their autonomic arousal factors. Yoga stabilizes autonomic equilibrium with a tendency towards parasympathetic dominance rather than stress- induced sympathetic dominance. Yoga therapy readjusts the autonomic imbalance, controls the rate of breathing and relaxes the voluntary inspiratory and expiratory muscles, which results in decreased sympathetic reactivity [17, 18].

Conclusion

It can be concluded that Pranayam can be used as a supplement with routine medications for the management of mild asthma in adults.

Limitations

Individual studies are, necessarily, constrained by the need to focus on specific concepts and simple studies which can be observed withen the boundaries of a single study.

Our study will be limited as effects will not be seen in other grades of severity of asthma but this limit will not be hamper appropriate care.

Consent

A written informed consent was taken from all the subjects after screening through the inclusion and exclusion criteria.

Ethical Approval

As per international standard or university standard written ethical was taken by the author.

Competing Interests

Author has declared that no competing interests exist.

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