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## Research Article

### Impact of Yoga on Severity of Bronchial Asthma, a Prospective Comparative Study.

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#### Abstract:

**Introduction:** Asthma is a common chronic inflammatory respiratory disease affecting about 300 million people worldwide. As a holistic therapy, yoga has the potential to relieve both the physical and psychological suffering of people with asthma, and its popularity has expanded globally. Yoga includes several techniques: physical postures (asanas), voluntarily regulated breathing (pranayama) and meditation.

**Materials and Methods:** Diagnosed patients of bronchial asthma, in the age group of 18-50 years, non-smokers, diagnosed with mild to moderate grades of disease, were recruited for the study. After a written informed consent, patients were randomized in two groups: Group A-Yoga group and group B-control group. Group A patients were trained in an integrated set of yoga exercises, including breathing exercises, suryanamaskar, yogasana (physical postures), pranayama (breath slowing techniques), dhyana (meditation) and were told to practice these exercises for 60 minutes daily and monitored weekly. Patients were counselled to maintain a diary record of number and severity of attacks, medication and doses used, record of their yoga exercises (group A patients) which was checked on weekly follow-up visits. Data at 4 weeks and 8 weeks follow-up were statistically analysed.

**Results:** Out of the total two hundred and six patients recruited for the study (Group A-92 and group B- 114), 23 and 39 were lost to follow-up or had poor record keeping/ irregular follow-up and were excluded respectively from the groups. Sixty best informants from each group were selected for final analysis. There was a significantly greater improvement in the group who practiced yoga in the weekly number of attacks of acute asthma, scores for drug treatment, and peak flow rate.

**Conclusion:** This study showed the efficacy of yoga in the long term management of bronchial asthma, but the physiological basis for this beneficial effect needs to be examined in more detail.

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**Keywords:** bronchial asthma, yoga and attacks of acute asthma

#### INTRODUCTION

Bronchial asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation causes an associated increase in 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 that is often reversible either spontaneously or

with treatment.<sup>1</sup> Yoga therapy readjusts the autonomic imbalance and controls the rate of breathing and thus alters various physiological variables. These changes are attributed to the decreased sympathetic reactivity and relaxation of voluntary inspiratory and expiratory muscles.<sup>2,3</sup> Thus yogic practices like pranayama may be useful in patients of perennial bronchial asthma with mild to moderate symptoms.<sup>4</sup> Various studies on the efficacy of pranayama and other

breathing techniques in asthmatics have been conducted. The present study was conducted to study the effect on diligently practiced Indian exercise form “Yoga” on this disease.

**AIM**

To assess the effect of yoga on severity of disease and PEFR in patients with bronchial asthma.

**MATERIALS AND METHODS**

The present study was conducted on non-smoking patients of either sex, in the age group of 18-50 years, diagnosed with mild to moderate grades of bronchial asthma and recruited from tertiary care centres in North India. After a written informed consent, patients were randomized in two groups: group A-Yoga group and group B-Control group. At start of the study period a history of various events in last 2 months for both the groups were recorded. Group A patients were trained in yoga by renowned yoga experts in integrated set of yoga exercises, including breathing exercises, suryanamaskar, yogasana (physical postures), pranayama (breath slowing techniques) and dhyana (meditation). Patients were counselled to maintain a diary of their record at home (Appendix 1) including the number and severity of attacks, medication and

doses used, record of their yoga exercises (group A patients). Group A patients had weekly combined yoga class with the trainers to monitor their technique and motivate for compliance. All patients (group A and B) had their diary record checked and confirmed by two blinded members of the study team, during weekly asthma clinic follow-up visits and data noted at the end of 4 weeks and 8 weeks follow-up. The attacks were graded in severity as mild, moderate and severe.

Grade 1-Mild - Did not disturb sleep or daily routine.

Grade 2-Moderate -Disturbs sleep and daily routine and relieved by oral drugs.

Grade 3-Severe - Required intravenous drugs or admission to the hospital.

Details of drug treatment included oral versus inhalational (inhaler/ rotacaps - number of puffs/ capsules/day), versus injectable bronchodilators and steroids. The data recorded included dosages, frequency and quality of control with therapy (decreased, stopped, remained same, increased)

Peak expiratory flow rate (PEFR) was estimated on the patients of both the groups at baseline, after 4 weeks and after 8 weeks. The pulmonary function tests were done on a computerized spirometer, MEDSPIROR.

**APPENDIX 1: SAMPLE OF WEEKLY DIARY RECORD**

	Yoga exercises Morning	Yoga exercises Evening	Number of Attacks per day	Severity of Attacks			Drugs and their doses
				Mild	Moderate	Severe	
Date: Day-1							
Date: Day-2							
Date: Day-3							
Date: Day-4							
Date: Day-5							
Date: Day-6							
Date: Day-7							

**Instructions-Please enter the record and tick the appropriate boxes.**

**Mild Attacks**-Did not disturbs sleep or daily routine.

**Moderate Attacks**-Disturbs sleep and daily routine and relieved by oral drugs.

**Severe Attacks**-Requires intravenous drugs or admission to hospital.

DATA ENTRY FROM DIARY RECORD	BASELINE	AFTER 4 WEEKS	AFTER 8 WEEKS
Mean number of attacks /week			
Mean severity of attack symptom grade			
Dosage of drugs			

The comparison of the pre and the post value across the study and the control group was done using repeated measures Analysis of Variance (R M ANOVA). Comparison of proportion showing clinically significant improvement after making adjustment of compounding factors like age, duration of disease were carried out by using logistic regression analysis.

**RESULTS**

Total of two hundred and six people were recruited for the study (Group A-92 and group B- 114), out of these 23 and 39 respectively were lost to follow-up or had poor record keeping/ irregular follow-up and were excluded and the sixty best informants were selected in each group for final analysis.

The “**number of attacks per week scores**”, showed a significant decline in Group A at both 4 and 8 weeks (p < 0.05 and < 0.01 respectively), while in group B the score increased over time. The difference in scores at 8 weeks between Group A and Group B was statistically significant (p < 0.05). (Table 1)

**Table 1: VARIATIONS IN MEAN SCORES OF NUMBER OF ATTACKS PER WEEK**

Period	Group A		Group B		t-value	p-value
	Mean	S.D.	Mean	S.D.		
Baseline	0.53	0.53	0.53	0.50	0.00	> 0.10, NS
4 Weeks	0.46	0.53	0.55	0.50	0.96	> 0.10, NS
8 Weeks	0.38	0.48	0.58	0.53	2.17	< 0.05, S

	Group A		Group B	
	Paired t-value	p-value	Paired t-value	p-value
Baseline vs 4 Weeks	1.66	< 0.10, NS	0.44	> 0.10, NS
Baseline vs 8 Weeks	3.23	< 0.01, S	1.14	> 0.10, NS
4 Weeks vs 8 Weeks	2.32	< 0.05, S	1.43	> 0.10, NS

The “severity of attacks score” showed a steady and significant decline in Group A from baseline to 4 weeks to 8 weeks, while scores in Group B showed an increase over time. The difference in scores at 8 weeks between Group A and Group B was statistically significant ( $p < 0.05$ ) (Table 2)

**Table 2: VARIATIONS IN MEAN SCORES OF SEVERITY OF ATTACKS**

Period	Group A		Group B		t-value	p-value
	Mean	S.D.	Mean	S.D.		
Baseline	0.70	0.77	0.78	0.80	0.56	> 0.10, NS
4 Weeks	0.58	0.72	0.80	0.80	1.58	> 0.10, NS
8 Weeks	0.50	0.70	0.83	0.83	2.35	< 0.05, S

	Group A		Group B	
	Paired t-value	p-value	Paired t-value	p-value
Baseline vs 4 Weeks	1.99	< 0.05, S	0.28	> 0.10, NS
Baseline vs 8 Weeks	3.23	< 0.01, S	0.77	> 0.10, NS
4 Weeks vs 8 Weeks	2.32	< 0.05, S	1.00	> 0.10, NS

The “dosage of drugs required score” during the study period were higher in Group B than in Group A, at all times, but the differences were statistically not significant ( $p > 0.10$  at all times). Group A scores showed a decline over time, which was statistically significant when compared between baseline and 8 weeks ( $p < 0.05$ ), while Group B scores showed an increase over time (Table 3)

**Table 3: VARIATIONS IN MEAN SCORES OF DOSAGE OF MEDICATION**

Period	Group A		Group B		t-value	p-value
	Mean	S.D.	Mean	S.D.		
Baseline	2.63	1.37	2.73	1.55	0.37	> 0.10, NS
4 Weeks	2.55	1.36	2.75	1.62	0.73	> 0.10, NS
8 Weeks	2.48	1.38	2.82	1.63	1.23	> 0.10, NS

	Group A		Group B	
	Paired t-value	p-value	Paired t-value	p-value

Baseline vs 4 Weeks	1.69	< 0.10, NS	0.38	> 0.10, NS
Baseline vs 8 Weeks	2.26	< 0.05, S	1.30	> 0.10, NS
4 Weeks vs 8 Weeks	1.43	> 0.10, NS	1.43	> 0.10, NS

The percentage of predicted PEFR was higher in Group A than in Group B at all periods of measurement, but the differences were statistically not significant. Group A subjects showed a statistically significant increasing trend in % PEFR over time, from 79.8 ± 10.8 % at baseline to 80.8 ± 10.2% at 4 weeks to 82.5 ± 10.2% at 8 weeks (p < 0.01 in all cases) while Group B subjects showed variable change in % PEFR (Table 4).

**Table 4: VARIATIONS IN PEAK EXPIRATORY FLOW RATE (PEFR) [% predicted]**

Period	Group A		Group B		t-value	p-value
	Mean	S.D.	Mean	S.D.		
Baseline	79.8	10.8	79.5	8.3	0.16	> 0.10, NS
4 Weeks	80.2	10.2	79.2	8.1	0.92	> 0.10, NS
8 Weeks	82.5	10.2	79.4	8.3	1.79	< 0.10, NS

	Group A		Group B	
	Paired t-value	p-value	Paired t-value	p-value
Baseline vs 4 Weeks	3.27	< 0.01, S	1.20	> 0.10, NS
Baseline vs 8 Weeks	7.40	< 0.01, S	0.55	> 0.10, NS
4 Weeks vs 8 Weeks	5.76	< 0.01, S	0.94	> 0.10, NS

**DISCUSSION**

Bronchial asthma causes severe impairment of the quality of life in patients suffering from the disease. Studies by Murthy et al<sup>4</sup>, Singh et al,<sup>5</sup> Kumar et al,<sup>6</sup> Jain et al,<sup>7</sup> Singh<sup>8</sup>, Nagarathna and Nagendra,<sup>2</sup> have all reported improvement of the various disease parameters in asthmatics with the use of pranayama and related controlled ventilation exercises.

Most of the studies have been based on patient recall for various disease associated events. The present study had a daily diary record of these parameters.

In the study by Nagarathna and Nagendra<sup>2</sup> the number of attacks of asthma / week showed significant improvement with scores declining from mean values of 3.55 ± 2.98 initially to 0.83 ± 2.49 finally in the yoga group as compared to 2.9 ± 3.01 to 2.1 ± 2.7 in the control group. In the same study, the reduction in the severity of asthma attacks scores however showed no significant difference between the yoga and control groups.

Symptom scores in the study by Murthy et al<sup>4</sup> showed significant reduction after 15 days breathing training in males and after 45 days training in females. The mean drug scores of patients requiring oral bronchodilators reduced significantly from their initial values of 2.71 ± 1.54 after breathing training, but patients on steroids as well as bronchodilators did not show any significant reduction in their dosage schedule.<sup>4</sup>

In a study by Singh et al<sup>5</sup>, compared with the baseline, inhaler use decreased more with PCL exerciser than with the placebo device, but the changes were small and the difference between

the two devices were not significant. The study by Nagarathna and Nagendra<sup>2</sup> also showed significant beneficial effect of pranayama on drug usage (p < 0.01) after a 54 months yoga training program. Cooper et al<sup>9</sup> showed bronchodilator use to be reduced in patients who practiced Buteyko breathing technique, but there was no change in those who practiced pranayama.

In the present study, the scores for “number of attacks per week” at baseline were comparable between the two groups (p > 0.10). Although the scores at 4 weeks also remained comparable, the difference at 8 weeks favored the Yoga group (p < 0.05). These patients also had a steady decline in the scores which was significant at 8 weeks as compared to the baseline (p < 0.01) as well as 4 weeks (p < 0.05). On the other hand, scores in Group B showed a steady increase over time, however, the increment was statistically not significant at any time, when compared within the group.

Similarly, the “severity of attacks” at baseline and at 4 weeks were comparable between the two groups (p > 0.10), but the difference at 8 weeks between Group A and Group B was statistically significant (p < 0.05).

The dosages of drugs required during the study period were higher in Group B than in Group A, at baseline, 4 weeks and at 8 weeks, but the differences were statistically not significant (p > 0.10 at all times). Group A’s drug dosages showed a steady decline over time, which was statistically significant when compared between baseline and 8 weeks (p < 0.05). On the other hand Group B had an increase over time, but the

differences in scores were statistically not significant.

Thus the severity and frequency of acute attacks of asthma had a significant improvement after pranayama training of 8 weeks, however, drug usage showed no difference between the Yoga practicing group and control group at 8 weeks. This, however, may have been different if the training period could have been increased, as evidenced in the study by Nagarathna and Nagendra<sup>2</sup> where 54 weeks of training showed significant reduction in drug usage.

However, this being a small study with a short follow-up and inclusion of only non-smokers with mild to moderate asthma is insufficient for making strong recommended for the whole asthma population at large.

## **CONCLUSIONS**

The ancient Indian exercise form (Yoga), used adjunctively with standard treatment, proved to be beneficial in reducing the number of asthma attacks, its severity and the dosages of medication required by them. This was further reinforced by the significant increase in the PEFr in patients who practiced yoga. Given the current trend to explore and to lean towards alternative therapeutic modalities, preferring nature over pharmacology, we wish to strongly recommend Yoga training for patients with asthma

Further studies with larger sample sizes and longer follow up should be undertaken and the effect of Yoga in asthmatics who smoke and in severe grades of asthmatics needs to be evaluated.

**CONFLICT OF INTEREST:** The authors declare no conflict of interest.

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