

Yoga for Bronchial Asthma: A Controlled Study

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Abstract : Fifty three patients with asthma underwent training for two weeks in an integrated set of yoga exercises, including breathing exercises, suryanamaskar, yogasanas (physical postures), Pranayama (breath slowing techniques), dhyana (meditation), and a devotional session, and were told to practice these exercises for 65 minutes daily. They were then compared with a control group of 53 patients with asthma matched for age, sex, type and severity of asthma who continued to take their usual drugs. There was a significantly greater improvement in the group who practiced yoga in the weekly number of attacks of asthma, scores for drug treatment, and peak flow rate.

This study shows 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.

INTRODUCTION

Yoga has been used to treat patients with asthma for over 50 years in yoga centers in India. Goyeche et al and several other workers have shown convincing evidence of the beneficial effects of yoga in patients with bronchial asthma. Most of these studies were short term, performed without controls, or qualitative but based on subjective judgments. Our earlier investigation clearly indicated the short term (two to four weeks) benefits of yoga, as established by standard controlled studies on large numbers of patients who underwent yogic training as outpatients. Prospective long term studies using standardized research procedures are however unavailable.

It is well known that the clinical course of a disease like chronic bronchial asthma is highly variable, being subject to many known and unknown factors. We carried out this long term study with matched controls to ascertain whether yoga could have lasting influence on the course of the disease.

PATIENTS AND METHODS

Table 1 shows details of 106 patients with established bronchial asthma satisfying the clinical criteria of Crofton and Douglas and Shivpuri that were included in this study. The age range was 9 - 47 years with a mean of 26.4 years. There were 15 women in each group. Fifty three pairs of patients matched for age, sex and type, severity, and duration of asthma were selected from a bigger group who came to our out patient clinic for yoga therapy. One from each pair was randomly selected for training in yoga, and the other served as control.

Although all 106 patients were equally motivated to take up yoga, the 53 randomly allocated patients willingly served as controls. They continued taking their usual drugs during the study.

All techniques of measurement, the length of each interview, and the people recording the data were the same for both groups. The yoga group attended a training programme of two and a half hours daily from 18.00 to 20.30 hours after work for two weeks. They were introduced to an integrated programme of the following selected yoga exercises.

Table 1 Details of Patients

	Control Group	Yoga Group
No. of patients*	53	53
Men	38	38
Women	15	15
Mean age(Range)*	26.41(9.42)	26.36(9.47)
Mean Severity Score for asthma (Range)*	1.45(0.3)	1.45(0.3)
No. with Seasonal asthma*	33	33
No. with Perennial asthma*	20	20
Mean weekly no. of attacks(Range)	3.55(0.7)	2.9(0.7)
Mean weekly Drug treatment (Range)	10.26(0.49)	6.22(0.21)
Mean Peak flow rate (liters/min)(Range)	290.1(60-580)	264.2(60-690)

*Group matched for these variables

Breathing exercises (5 minutes)- five types of rhythmic, comfortable breathing techniques associated with simple hand and body movements, Sithilikarana vyayama (Yoga exercises to loosen the joints) and suryanamaskar (five minutes).

Yogasanas- (a) General yogasanas (20 minutes). Simple physical postures (in the standing, sitting, prone, and supine positions), performed with smooth, comfortable bending movements and slow breathing procedures. The asana practices end with the subject maintaining the final posture with the body relaxed (b) Savasana (10 minutes). Deep relaxation to relax the muscles regionally followed by conscious slowing of breathing and calming of mind.

Pranayama (10 minutes)- Four types of special breathing techniques performed with comfortable, slow, deep breathing.

Meditation and devotional session (15 minutes)- slow mental chanting of the syllable "OM" leading to slowing of mental activity. The devotional session was meant to harness the emotions, resulting in a feeling of freedom.

Kriyas (weekly)- Traditional voluntary nose and stomach wash techniques (neti and vamaana dhouti) followed by Savasana.

Lectures and discussions - These were based on yoga philosophy and therapy. We instructed 53 patients to continue the 65 minutes of yoga daily during the follow up period. For the purpose of analysis those patients who stopped the practices or did not practise for more than 16 days each month were eliminated from the study. Although we continued to record their progress. Twenty five patients dropped out of the study: seven after six months of follow up, seven after 12 months, two after 18 months, four after 24 months, and five after 30 months. All patients reported for check ups at intervals of six months. The frequency of visits and the relationship between doctor and patients were the same for both groups.

At the initial interview patients were instructed to keep a diary. They were told to record each attack of airway obstruction, it's severity, and the dosage of the drugs they consumed. They continued to take prescribed bronchodilator drugs throughout the study. When they noticed an improvement or deterioratation in their asthma they were permitted to change their dosage as required, and they recorded this in their diaries. Any change in the brand of drug, however, was decided by the doctor. At each of the follow up visits information from patients diaries and from clinical examinations was recorded. The mean weekly number of attacks for each period of

follow-up was calculated severity of attacks was graded: 1=mild, but did not disturb sleep or daily routine; 2=moderate, disturbed sleep and daily routine and was relieved by oral drugs; 3=severe, required injection or admission to hospital. We obtained a score for drug treatment by calculating the mean number of bronchodilator tablets and injections taken each week for each period of follow up. None of the patients used inhalers. Peak expiratory flow rate was obtained by recording the best of three attempts on a mini Wright Peak flow meter.

RESULTS

Table II shows the results of the study. Comparison of the two groups using Student's t-test showed a highly significant improvement in the number of attacks per week and drug treatment scores in the patients who practiced yoga. Because of large fluctuations in the mean, the standard deviation was similar for the mean for many of the values in table II. A non-parametric median test with a X^2 evaluation was therefore used to determine significance. Table iii shows the results and confirms that there were highly significant differences in peak flow rate as shown by the non-parametric test

Table II : Results of Student's paired test for mean difference between values before and after 54 months follow up for the 2 groups of 53 patients.

Variable	Group	Mean(SD)		Mean (SD)		Significance of difference between Value.	Difference between Groups.
		Initial Value.	Final Value.	Initial & Final	Initial & Final		
No. of attacks of asthma/ Week	Control	2.9	(3.01)	2.1	2.7	2.578**	2.825**
	Yoga	3.55	(2.98)	0.83	2.49	4.827**	
Severity score.	Control	1.6	(0.75)	1.05	0.85	4.006**	0.369(NS)
	Yoga	1.47	(0.66)	0.75	0.8	5.016**	
Drug treatment Score	Control	6.22	(3.18)	7.9	9.9	0.556(NS)	3.152**
	Yoga	10.26	(13.16)	2.04	4.09	4.964**	
Peak flow rate	Control	264.2	(117.2)	290.8	12.2	4.065**	1.815*
	Yoga	260.2	(76.2)	362.6	107.6	7.386**	

* $P > 0.03$, ** $P < 0.005$.

Peak flow rate measured in only 50 control and 44 patients in yoga group.

Table III Median test with X^2 evaluation of - difference between yoga and control groups before and after 54 month follow up.

Variable	X^2 Value	
	Initial	Final
No. of attacks of asthma/ week	0.06	5.665*
Severity Score	0.149	1.89*
Drug Treatment Score	0.1004	4.56*
Peak flow rate	0.0448	3.87*

* $p < 0.01$

Table IV : Variations in mean Scores for drug treatments and peak flow rate after each Six Month Period of follow up

	Stopped	Reduced	No. Change	Increased
Control Group	23	9	7	14
Yoga Group	30	12	3	8

} $\chi^2 = 4.48^*$

**p < 0.01*

Table IV shows the number of patients who changed their drug treatment in both groups Yoga had a significantly beneficial effect ($p < 0.01$).

Table V shows the distribution of the initial and final mean values for drug treatment score and peak flow rate in the yoga and control groups over the months of follow up. In the yoga group the drug treatment score fell considerably and the peak flow rate increased (to a greater extent than that in the control).

Table V - Variations in mean Scores for drug treatment and peak flow rate after each Six Month Period of follow up.

		Periods of follow up							
Groups		1Mon	6 Mons	12 Mons	18 Mons	24 Mons	30 Mons	36 Mons	54 Mons
Mean drug									
Treatment	Control	10.26	2.875	10.66	0.666	1.875	14.5	7.0	9.0
Score	Yoga	6.22	0.428	5.444	7.0	1.166	1.20	2.0	3.11
Peak flow	Control	264.2	291.25	174.5	190	222.5	236.66	308.75	320.62
rate (L/min)	Yoga	290.1	371.64	339.375	236	372.5	370.0	110.0	348.78

DISCUSSION

As care was taken to match the two groups for age and sex and type, severity, and duration of asthma, we can attribute the improvement seen in the variables measured in the 53 patients in the Yoga group to the regular practice of yoga. The considerable reduction in their drug treatment score in contrast with a non-significant increase in intake of drugs in the control group strengthens this view, as do the significant differences between the groups in the number of attacks per week and peak flow rate.

McFadden clearly showed that the responsiveness of airways is noticeably increased in patients with asthma, who develop bronchoconstriction in response to smaller quantities of physical, chemical, and pharmacological stimuli than healthy subjects. A complex interplay of several factors namely, an inherent responsiveness of the smooth muscle to stimuli, an abnormality in autonomic nervous control, and a breakdown in airway defences may promote bronchial hyper-reactivity. Thus reducing the responsiveness of the tracheobronchial tree could benefit these patients considerably.

Abundant objective data now exist indicating that psychological factors can interact with the asthmatic diathesis to worsen or improve the course of the disease. The mechanisms of these interactions are complex and not well understood, but psychological factors may affect about half of all patients. Modification of vagal efferent activity seems to affect the calibre of airways. It has been shown that suggestion can actually decrease or increase the effects of pharmacological stimuli on the airway. The role of the psychic factor in inducing or prolonging attacks in acute exacerbations may vary from patient to patient and in individual patients from episode to episode.

Goyeche et al claimed that the psychosomatic imbalance is present in many, if not all patients with asthma¹. Suppressed emotion, anxiety, dependence, and extreme self consciousness may all be accompanied by generalised and localised muscle tension, including that of the voluntary respiratory musculature. This increased muscle tension may be a precipitating or concomitant factor that perpetuates and aggravates the asthmatic syndrome.

Yoga seems to stabilise and reduce the excitability of the nervous system. Transcendental meditation (a traditional yogic meditation technique) and Savasana have been clearly shown to be associated with reduced metabolic rate². Crisan showed a significant reduction in the level of anxiety after the practice of Pranayama, as evidenced by increased skin resistance and a reduction in pulse rate, urinary catecholamine concentration, Urinary cholinesterase activity, and anxiety scores¹². Several workers have found an increase in alpha synchrony in electroencephalograms taken during transcendental meditation, which points to its stabilising effect on the nervous system. Yoga clearly relaxes the muscles and this deep physical and mental relaxation associated with the physiological changes seen in our patients after daily yoga seems to have a stabilising effect on bronchial reactivity, thus making the vagal efferent less excitable.

In conclusion, the 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.

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