

## Assessment of the Quality of Life in Patients with Bronchial Asthma, Before and After Yoga: a Randomised Trial

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### ABSTRACT

Yoga which is used as an adjunct treatment for bronchial asthma is gaining popularity throughout the world. The objective of this study was to assess the effect of yoga on quality of life in patients with bronchial asthma.

120 non-smoking male and female patients of asthma in the age group of 17-50 years were randomized into two groups i.e. Group A (Yoga group) and Group B (control group). All patients remained on their prescribed medication, but Group A patients practiced yoga breathing exercises for 8 weeks. Asthma Quality of Life Questionnaire (AQLQ) and diary record was used to assess quality of life, number and severity of asthmatic attacks, and the dosage of the medication required at baseline and after 8 weeks.

Group A subjects showed a statistically significant improvement in “symptoms”, “activities” and “environmental” domains of AQLQ at 8 weeks ( $p < 0.01$ ) and significant reduction in daily number and severity of attacks, and the dosage of medication required at 4 and 8 weeks ( $p < 0.01$ ) compared to the baseline.

Yoga breathing exercises used adjunctively with standard pharmacological treatment significantly improved quality of life in patients with bronchial asthma.

**Keywords:** Asthma; Quality of life; Yoga

### INTRODUCTION

Bronchial asthma is a chronic inflammatory disease of the airways associated with an airway-hyperresponsiveness leading to recurrent episodes of wheezing, breathlessness, chest tightness and coughing particularly at night or in the early morning.<sup>1</sup> One of

the aetiopathogenic features of asthma is an increased vagal tone.<sup>2,3</sup> Yoga training can readjust the autonomic imbalance, 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>4,5</sup>

Various studies on the efficacy of breathing techniques in asthma have been conducted. Studies by Nagarathna and Nagendra,<sup>6</sup> Singh et al.,<sup>7</sup> Murthy et al.,<sup>8</sup> Jain et al.,<sup>9</sup> Singh V<sup>10</sup> and Kumar et al.<sup>11</sup> have reported improvement in various disease parameters in

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asthmatics with the use of yogic breathing exercises.

With this background in mind, the present study was undertaken with an aim to assess the outcome of yoga training on quality of life in patients with bronchial asthma.

## MATERIALS AND METHODS

The present study included 120 male and female patients, diagnosed with bronchial asthma. The study was conducted in the Department of Medicine and Physiology, Christian Medical College and Hospital, Ludhiana, India. The patients were recruited from the above mentioned hospital and from the yoga camps organized in Ludhiana. The Institutional Ethical Committee approved this study. Written and informed consent were obtained from all the participants.

Non-smokers in the age group of 17-50 years with well controlled asthma on oral bronchodilator and inhalers were included. All patients remained on their prescribed treatment during the study.

Patients with a history of tuberculosis, chronic obstructive airway disease (COPD), diabetes, renal failure, coronary artery disease and musculoskeletal chest deformities, respiratory tract infections within the previous 6 weeks and engagement in any regular exercise/training were excluded.

Patients were randomized in the following two groups, Group A (Yoga training group) and Group B (Control group) using Permuted Block Randomization. To minimize the effect of environmental influences, Group A and Group B enrolment ran simultaneously.

Yogic exercises used by the patients included deep breathing exercises, kapalabhati (cleaning breath), bhastrika (rapid and deep respiratory movements like that of the bellows), ujjayi (loud sound producing pranayama) and sukha purvaka pranayama (easy comfortable breathing). Each yoga training session was of 45 minutes duration per week under the supervision of a trained instructor. Patients were instructed to practice at home, 45 minutes twice daily on all days of the week for a period of 8 weeks. The subjects also maintained a diary record of each day of the yoga practice.

In both groups, patients were interviewed with the Asthma quality of life questionnaire (AQLQ)<sup>12</sup> at baseline i.e. during the initial visit after enrollment and at 8 weeks after the baseline. This questionnaire measured the quality of life in asthmatic patients across

**Table 1. Asthma Quality of Life Questionnaire (AOLQ) Domains**

Domain	Number of Questions
Symptoms	12
Activities	11
Environment	5
Emotions	4

four domains (Table 1). There was a range of scores<sup>1-7</sup> for each question and 32 questions were asked. Score 1 was the worst and score 7 was the best. The score for each domain was calculated from their respective questions and recorded. The total score was obtained by adding the scores from all the domains.

Patients in both groups were instructed to keep a diary and maintain a record of the number, severity of events of airway obstruction and the dose of drugs consumed each day. The patients were asked to bring their diary records at each visit. Apart from that, Group A subjects were also required to keep a record of yogic exercises performed by them twice daily. Severity of the attacks was classified as mild (when it did not disturbed sleep or daily routine), moderate (when it disturbed sleep and daily routine and was relieved by oral drugs) and severe (when intravenous drugs or admission to the hospital was required)

## Statistical Analysis

The data were recorded at two time periods and chi-square test was used in two-by-two tables. 'P' value of 0.05 was taken as cut off for the measure of significance.

## RESULTS

The mean age of subjects in Group A was 38.77±9.92 years (range 20 to 50 years) and in Group B was 35.55±10.62 years (range 17 to 50 years). The number of male subjects was 34 in Group A and 37 in Group B. Mean duration of disease was 7.70±5.54 years in Group A and 6.57±4.32 years in Group B. The differences between the mean ages, gender and severity of disease in the two groups were statistically not significant.

Symptoms, activities and environmental domain of quality of life (QOL) scores increased significantly in Group A and at 8 weeks, mean Group A score was significantly higher than mean Group B score. Emotional domain QOL scores increased in both the

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groups at 8 weeks, with increase in Group A being statistically significant. Total QOL scores was increased significantly at 8 weeks in Group A and the mean Group A score was significantly higher than the mean Group B score at 8 weeks (Table 2).

As per the patients "diary records", the scores for "number of attacks per week" at baseline were comparable between the two groups. While the scores at 4 weeks also remained comparable between the two groups, difference in "number of attacks per week scores at 8 weeks was statistically significant.

The decline in Group A which was significant at 8 weeks as compared to the baseline and 4 weeks, while the scores in Group B showed an increase over time (Table 3).

The difference in the patients' "severity of attacks score" at 8 weeks between Group A and Group B was statistically significant. There was a steady and significant decline in the severity of attacks score in Group A from baseline to 4 weeks to 8 weeks, while scores in Group B showed an increase over time (Table 3).

**Table 2. Variations in mean scores over time in all the domains.**

Parameters	Scores in Symptom Domain				Comparison within the group at different time periods		Comparison between the groups at different time periods	
	Group A		Group B		Group A	Group B	Baseline	8 Weeks
Time	Baseline Mean±SD	8 Weeks Mean±SD	Baseline Mean±SD	8 Weeks Mean±SD	Paired t-value p-value	Paired t-value p-value	Paired t-value p-value	Paired t-value p-value
Symptoms Domain	50.55±6.90	55.63±7.29	50.72±5.87	50.65±8.48	11.95 <0.01	0.08 > 0.10	0.15 > 0.10	3.45 < 0.01*
Activities Domain	46.87± 5.97	51.43±6.52	47.12±5.94	47.17±7.77	10.28 <0.01 *	0.03 > 0.10	0.22 >0.10	3.25 < 0.01 *
Emotional Domain	16.37±2.99	19.00±3.58	17.30±3.69	17.80±4.13	9.95 <0.01 *	1.26 > 0.10	1.52 > 0.10	1.70 < 0.10,
Environment Domain	13.82±3.27	16.58±3.54	14.42±3.60	14.67±3.91	9.52 <0.01 *	1.28 > 0.10	0.96 > 0.10	2.80 < 0.10*
Total Scores	127.60±17.06	142.65±19.36	129.55±17.60	130.05±21.92	12.44 <0.01*	0.30 > 0.10	0.62 > 0.10	3.34 < 0.01 *

**Table 3. Variations in mean scores per week from diary record.**

Parameters	Time	Group A		Group B		t-value	p-value
		Mean	S.D.	Mean	S.D.		
Number of Attacks	Baseline	0.53	0.53	0.53	0.50	0.00	> 0.10
	4 weeks	0.46	0.53	0.55	0.50	0.96	> 0.10
	8 weeks	0.38	0.48	0.58	0.53	2.17	< 0.05*
Severity of Attacks	Baseline	0.70	0.77	0.78	0.80	0.56	> 0.10
	4 weeks	0.58	0.72	0.80	0.80	1.58	> 0.10
	8 weeks	0.50	0.70	0.83	0.83	2.35	< 0.05*
Dosage of Medication	Baseline	2.63	1.37	2.73	1.55	0.37	> 0.10
	4 weeks	2.55	1.36	2.75	1.62	0.73	> 0.10
	8 weeks	2.48	1.38	2.82	1.63	1.23	> 0.10

Table 4. Comparison of number of attacks, severity of attacks and dosage of drugs per week from diary record.

From Diary Record	Comparisons within the group at different time periods	Group A		Group B	
		Paired t-value	p-value	Paired t-value	p-value
Number of Attacks	Baseline vs 4 Weeks	1.66	< 0.10	0.44	> 0.10
	Baseline vs 8 Weeks	3.23	< 0.01*	1.14	> 0.10
	4 Weeks vs 8 Weeks	2.32	< 0.05*	1.43	> 0.10
Severity of Attacks	Baseline vs 4 Weeks	1.99	< 0.05*	0.28	> 0.10
	Baseline vs 8 Weeks	3.23	< 0.01*	0.77	> 0.10
	4 Weeks vs 8 Weeks	2.32	< 0.05*	1.00	> 0.10
Dosage of Drug required	Baseline vs 4 Weeks	1.69	< 0.10	0.38	> 0.10
	Baseline vs 8 Weeks	2.26	< 0.05*	1.30	> 0.10
	4 Weeks vs 8 Weeks	1.43	> 0.10	1.43	> 0.10

As per the patients “diary records”, the “dosage of drugs required score” during the study period was higher in Group B than in Group A, at all times, but the differences were not statistically significant (Table 4). Group A scores showed a decline over time, which was statistically significant when compared between the baseline and at 8 weeks, while Group B scores showed an increase over time (Table 4).

## DISCUSSION

Asthma is associated with increase in airway resistance, decrease in forced respiration volumes and flow rates, hyperinflation of the lungs and increased work of breathing.<sup>1,13</sup>

Breathing re-training is being increasingly used throughout the world by many patients with asthma.<sup>4,14</sup> Yoga stabilizes autonomic equilibrium with a tendency towards parasympathetic dominance rather than stress-induced sympathetic dominance. Yoga therapy thus readjusts the autonomic imbalance, controls the rate of breathing which results in decreased sympathetic reactivity and relaxation of voluntary inspiratory and expiratory muscles.<sup>4,5</sup> Yoga increases respiratory efficiency, balances activity of opposing muscle groups and slows dynamic and static movements.

Various studies on the effects of yoga in asthmatics have considered varying grades of the disease. Singh et al.<sup>7</sup> in their study included patients with mild to moderate grades of asthma while Nagarathna and Nagendra<sup>6</sup> included patients with all grades of bronchial asthma. In the present study, the patients with only mild to moderate grades of asthma were included.

The mean duration of disease in this study was low probably due to the inclusion of mild and moderate asthmatics, and the exclusion of severe asthmatics in which progression of disease may have caused the duration of disease to increase.

Different studies have used different quality of life scoring systems in assessing the effect of yogic breathing exercises on the lifestyle of asthmatics. In these different scoring systems, the domains considered also did not correspond with each other. Girodo et al.<sup>15</sup> reported better scores in the ‘symptoms’, ‘attack intensity’, ‘attack duration’ and ‘physical activity’ domains of QOL scores in asthmatics who underwent rehabilitation exercises with deep diaphragmatic breathing than in those who underwent physical education training. The difference between the two groups was however statistically significant only for the ‘physical activity’ domain. The study showed that asthmatic patients could benefit substantially from an exercise program that strengthened abdominal, dorsal and oblique muscles and that emphasized the use of these muscles in diaphragmatic respiration. Manocha et al.<sup>16</sup> in their study on the management of moderate to severe asthma with sahaja yoga observed that the major impact of yoga was on the “mood” subscale. In addition, the “breathlessness” subscale tended to reflect greater benefit from the yoga intervention than the “social” or “concerns” subscales.

In the present study, the mean AQLQ in all the four domains were comparable at baseline between the two groups. Scores in Group B in all the domains showed no significant change from baseline values to those at 8 weeks. Symptoms, activities and environmental domain

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scores increased significantly at 8 weeks in Group A and at 8 weeks, mean Group A score was significantly higher than mean Group B score.

In the “emotional” domain, both groups showed increase in mean scores at 8 weeks as compared to their baseline scores. While the increase in Group A was statistically significant, it was not statistically significant in Group B.

The mean scores in this domain in the two groups at 8 weeks showed no statistically significant difference. In the “environmental” domain scores were increased significantly at 8 weeks in Group A and mean Group A score was significantly higher than mean Group B score at 8 weeks.

The mean total asthma quality of life scores were comparable at baseline between the two groups. Scores in Group B showed no significant change from baseline values to those at 8 weeks. Total QOL scores increased significantly in Group A and at 8 weeks, mean Group A score was significantly higher than mean Group B score (Table 2).

In the present study, all the patients of both the groups maintained diary records regarding the daily number of attacks, severity of attacks and the dosage of medication required. Other authors have also used patient’ recall methods. In the present study, the scores for “number of attacks per week” at baseline were comparable between the two groups. While the scores at 4 weeks also remained comparable between the two groups, the difference between this diary record score at 8 weeks between Group A and Group B was statistically significant. In Group A, there was a steady decline in the scores, which was significant at 8 weeks as compared to the baseline as well as compared to the score at 4 weeks. On the other hand, scores in Group B showed a steady increase over time. The increments, however, were not statistically significant at any time, when compared within the group (Table 3).

Similarly for the mean “diary record scores” on the “severity of attacks” at baseline and at 4 weeks were comparable between the two groups but the difference between this diary record score at 8 weeks between Group A and Group B was statistically significant. In Group A, there was a steady decline in the scores which was significant at 4 weeks as compared to the baseline as well as at 8 weeks as compared to the score at 4 weeks, and at 8 weeks as compared to baseline. On the other hand, scores in Group B showed a steady increase over time. The increments, however, were not

statistically significant at any time, when compared within the group (Table 4).

The mean “diary record scores” as regards the dosage 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 not statistically significant. Group A scores showed a steady decline over time, which was statistically significant when compared between baseline and 8 weeks. On the other hand, Group B scores showed a steady increase over time, but the differences in scores were not statistically significant (Table 4). Thus in our study the “diary record scores” for number of attacks per week, severity of asthma attacks as well as requirement of drugs showed significant improvement after pranayama training of 8 weeks. However, drug usage showed no difference between the pranayama training group and control group at 8 weeks.

We concluded that yoga breathing exercises, used adjunctively with standard pharmacological treatment in patients with bronchial asthma, significantly improved quality of life scores, especially ‘symptoms’, ‘activities’ and ‘environmental’ domains as well as the patients’ own assessment of number of asthma attacks per week, the severity of the attacks and the dosages of medication required by them.

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