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Effect of 6 months of yoga practice on quality of life among patients with asthma: A randomized control trial

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ABSTRACT

Introduction: As a holistic therapy, yoga has the potential to relieve both the physical and psychological sufferings of people with asthma. This study was conducted to assess the effectiveness of yoga therapy as an adjunctive tool in the management of mild to moderate asthma with the routine conventional care.
Methods: A total of 250 adult patients with mild to moderate (FEV1 > 60%) bronchial asthma were recruited from the respiratory medicine department and randomly allocated to either the yoga (intervention) group (n = 125) or control group (n = 125). All patients remained on their usual care, while the yoga group received an intervention based on yoga, in addition to usual care. The intervention consisted of 2-weeks supervised training on yoga followed by a closely monitored continuation of the practices at home for 6 months. Quality of life was assessed using Asthma Quality of Life Questionnaire (AQOL) at baseline, 3rd month and after the 6 months interval for both the group patients.
Results: The baseline characteristics were similar in both groups. Post-intervention, the yoga group (130.48 ± 12.43) showed better trends of improvement in total AQOL score than the control group (78.82 ± 4.37). In comparison to the various domains in AQOL such as symptoms ($P < 0.001$), functional limitations ($P < 0.001$), emotional functions ($P < 0.001$) and environmental stimuli ($P < 0.001$) also showed a significant improvement in yoga group compared to control.
Conclusion: This study shows that simple yoga practice is an effective tool for the enhancement in quality of life of asthmatic patients and can be practiced as an adjuvant therapy to regular conventional care for the better outcome of asthma.

1. Introduction

Asthma is a common chronic inflammatory disorder characterized by hypersensitivity of the airways and reversible, periodic airway obstruction [1]. It is a complex and multifaceted condition causing significant impairment of physical and psychosocial well-being in the affected individual. Typical symptoms of asthma include shortness of breath, wheezing, coughing, and chest tightness. In addition to physiologic dysfunction, several people with asthma also experience psychological distress in the form of anxiety, depression, and emotional disorders [2]. Globally, more than 300 million people have asthma and it is estimated that approximately 250,000 annual deaths are attributed to the disease [3]. Asthma is a chronic health problem in the community that usually encompasses the patient's entire life and may result in physical, emotional, and social limitations for patients. These limitations often impair quality of life in many different ways [4]. It has been documented that the impairment of quality of life in asthma patients is proportional to the severity of disease[5], and acquires more significance since traditional parameters such as lung function have a weak association with quality of life [6]. The classic treatment of asthma therefore includes combinations of inhaled corticosteroids and bronchodilators, allergen avoidance, lifestyle modification, and sometimes non-pharmacological methods (including breathing exercise, yoga, pranayama, and inspiratory muscle training) [7,8].

A number of non-pharmacologic methods are increasingly popular in the management of asthma in adults [9]. Yoga is one of the more popular non-pharmacologic methods and has been practiced all over the world for improved functioning of body and mind [10]. In recent years, more asthmatics are showing interest

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towards yoga due to its reputed physical and psychological benefits [11]. Several studies on the efficacy of a various form of breathing techniques in asthma have been conducted, which have reported some improvements among asthmatic patients, including reduction of symptoms, less beta-adrenergic use and reduced airway hyper-reactivity, improved lung function and improved quality of life [12,13]. Most of these studies have used breathing techniques as an intervention for asthma control but none of them have considered the practice of asana (posture) in a yoga context. With this limitation of previous studies in mind, the present study was conducted with an aim to assess the effect of yoga training with the combination of posture and breathing techniques on quality of life in patients with mild to moderate bronchial asthma.

2. Methods

2.1. Experimental design

The present study is a randomized controlled trial (RCT). The control group received conventional care whereas the yoga group received, in addition to conventional care, an intervention based on yoga which includes basic asanas (postures) and pranayama (breathing techniques). The subjects from both groups were on bronchodilators in the form of inhalers or inhaled corticosteroids depending on the judgment of the treating physician. The outcome measures were assessed in both groups at 0 months (baseline), 3rd and 6th month.

2.2. Subjects

The subjects were adult patients having mild or moderate bronchial asthma who came to the outpatient department of Respiratory medicine in Sri Ramachandra Medical hospital. Institutional Ethical clearance (IEC-NI/12/AUG/29/33) was obtained from the host institution for the current study and informed consent also exercised after explaining the detailed procedures of the study to the patients. The potential subjects went through a step-wise screening procedure. The inclusion criteria consisted of asthmatic patients of either sex and were aged between 21 and 60 years, who met Global Initiatives for Asthma (GINA) criteria, who had a minimum of two years since diagnosis and under medical treatment, who were not practicing yoga, were non-smokers, were able to understand either English or Tamil and were willing to participate in the study [14]. Subjects were excluded if they had severe airflow limitation (FEV1 < 60%), smokers, had a history of co-morbid illness (medical, neurologic and psychiatric, orthopedics), had associated chronic respiratory diseases such as tuberculosis, autoimmune lung diseases or if they practiced yoga or any other similar discipline.

2.3. Sample size

The sample size (power-0.8, n = 250) for this study was calculated based on the previous study reported by Sodhi et al. [15]. Of the 320 potential subjects screened, 70 did not meet the above-described eligibility criteria.

2.4. Randomization

All the participants (n-250) were randomly assigned to either the yoga group (n-125) or control group (n-125) using random computerized random allocation software version 1. Randomization was performed by one of the author who was not involved in any part of the assessment.

2.5. Blinding/masking

All participants were blind to their allocation into the yoga group and the control group treatments. The investigator who assessed the AQOL questionnaire was blind to the yoga and control group participants.

2.6. Yoga intervention

Yoga group subjects received 30 min of yoga training (Table 1) for a week under a trained yoga teacher and advised to practice at home daily once a day for 6 months. It consist of basic asanas (posture) like *bhujangasana* (cobra pose), *tadasana* (tree pose) and *gomukhasana* (cow face pose) for ten minutes and simple *pranayama* (breathing exercise), *nadi sudhipranayama* and *bhastrika pranayama* for ten minutes followed by relaxation (OM chanting and shavasana). A yoga checklist booklet was given to the subjects to assess the level of performance and monitor the practice. On regular visits to outpatient department (OPD) days, subjects were asked to show return demonstration and their doubts were clarified. During this period at 3rd and 6th months, subjects were assessed through yoga performance checklist for their level of practice on yoga techniques. Lacunas made during the practice were corrected and reinforced.

2.7. Outcome measured

Quality of life was measured by using a self-administered Asthma Quality of Life Questionnaire (AQOL) which is available in the bilingual form, i.e. English and Tamil [16]. The AQOL is a 32-item disease-specific questionnaire that has been validated to measure the problems that adult patients with asthma experience in their daily lives [17] and has also been validated on Indian population [18]. Subjects responded to each question on a 7-point scale (1 being maximum impairment; 7 being no impairment). The overall quality of life score is the mean score of all the 32 items. Thus the score may vary from 1 to 7. The 32 items were further grouped into four sub-domains: symptoms, activity limitation, emotional function, and reactivity to environmental stimuli. The score for each sub-domain was also calculated as the mean score for items pertaining to that sub-domain.

2.8. Statistical analysis

Data expressed as Mean ± SD. Paired, unpaired *t*-test and one-way ANOVA was used to compare the mean difference using R statistical software of the 3.2.3 version.

Table 1
Yogic techniques practiced by Yoga group.

Yoga technique	Duration (min)
Asana	
1. Bhujangasana	3
2. Tadasana	3
3. Gomukhasana	3
Pranayama	
1. Nadi sudhi pranayama	5
2. Bhastrika pranayama	5
Relaxation	
1. Meditation	4
2. Savasana	7
Total duration	30 min

Table 2
Frequency and Percentage distribution of Demographic variables among patients with asthma in the Yoga and Control group (N = 250).

Demographic variables	Yoga (n = 125) n (%)	Control (n = 125) n (%)	p- value
Age in years			
21–30	17(13.6)	16(12.8)	0.37
31–40	55(44)	53(42.4)	
41–50	25(20)	23(18.4)	
51–60	28(22.4)	33(26.4)	
Gender			
Male	70(56)	69(55.2)	0.623
Female	55(44)	56(44.8)	
BMI			
Normal	26 (20.8)	30 (24)	0.76
Overweight	53 (42.2)	55 (44)	
Obese	46 (36.8)	40 (32)	
Duration of Asthma (Yrs)			
<5	9(7.2)	8(6.4)	0.36
6–15	96(76.8)	93(74.4)	
>16	20(16)	24(19.2)	

3. Results

All the participants completed the baseline measurements; however two subject in the yoga group, and five subjects in the control group discontinued midway in the study. The results presented in this report are based on the data collected from only the 243 subjects who completed the study (yoga group, n = 123; control group, n = 120).

Table 2 describes the frequency and percentage distribution of demographic variables of asthma patients. Majority of them, 28 (22.4%) in the yoga group and 33 (26.4%) in the control group were in the age group of 31–40 years. With respect to the gender, 70 (56%) in Yoga group and 69(55.2%) in control group were males. In Table 3, symptoms, limitation of activities, emotional function and environmental domain of quality of life (AQOL) scores increased significantly in 3rd month ($P < 0.05$) and 6th month ($p < 0.0001$) in the yoga group compared to control group patients with asthma. Over all AQOL score (Fig. 1) also significantly ($P < 0.001$) increased in the yoga group patients compared to control group after 6 months of yoga practice. There was a slight improvement in the AQOL score for control group patients at 3rd month and 6th month but it's showed statistically insignificant ($P > 0.05$).

4. Discussion

The present study showed improvement in symptom score, activity limitation score, emotional function score, response to environmental stimuli and total quality-of-life score among patients with asthma after 6 weeks of yoga practice. The AQLQ scores showed an improvement over the period of 6-month in both groups. However,

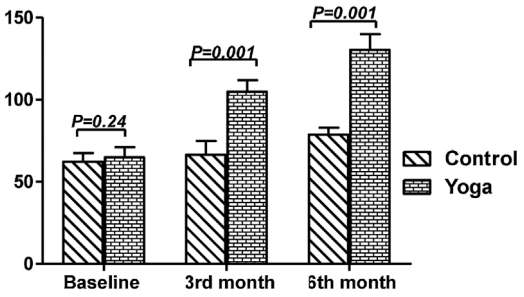

Fig. 1. Comparison of QOL score between control and yoga group.

the improvement was significant and achieved earlier in the yoga group compared to control group patients. The magnitude of the improvement was more among the patients that regularly practiced yoga along with standard medications. Previous studies in asthma patients using different yoga practices (mainly breathing techniques) also found with similar improvements [19–21]. Earlier studies on various forms of yogic breathing practice showed significant improvement in lung function, reduction of both day- and night-time asthma attack, decrease in use of rescue medications and improved quality of life scores [10,22,23]. A randomized control trial in mild to moderate asthma patients showed significant changes in biochemical profile and a marked reduction in symptoms score [24]. The primary goal of asthma treatment according to the Global Initiative for Asthma is to achieve optimal disease control, with minimal symptoms, have no limitations of physical activity, and have minimal need for rescue medications [25]. As such, the main objective of treatment in asthma is not simply managing the disease symptoms, but also maintaining better quality of life among asthmatics. The psychosomatic imbalance is the main issue which has been prominent in most of the asthma patients due to the symptoms of asthma such as breathlessness, limitation of activity, and fear [26,27].

In our study, 6 months of yoga practice combining *pranayama* (breathing) and *asanas* (postures) significantly improved the quality of life in patients with asthma. Improvements might be due to the efficiency of yoga practice along with standard medications because yoga has both physical and mental effects. Patients in the yoga group may get relief from psychosomatic symptoms (such as anxiety) associated with asthma attacks and symptoms. Yoga practices such as postures, breathing exercises or meditation can modify the autonomic nervous system towards parasympathetic (PNS) domination and reduce the sympathetic (SNS) activity in the body [28]. Patients with asthma often have high levels of distress, fear, anxiety - particularly in between the attacks. SNS activity will be more prominent in asthmatics and this stress can further exacerbate symptoms such as breathlessness [29]. Stress is significantly linked to asthma, both as a precursor or as an outcome [30,31]. Recent studies have reported strong associations between stress and asthma incidence, hospitalization and the use of asthma medication [32]. Therefore, interventions -

Table 3
Comparison of domain wise Mean Quality of Life scores during Baseline, 3rd month and 6th month between the Study and Control group (N = 243).

Quality of Life domains	Baseline		3rd month		6th month	
	Control n (125)	Yoga n-125	Control n-120	Yoga n-123	Control n -120	Yoga n-123
Symptoms	36.09 ± 4.80	38.09 ± 9.12	38.87 ± 8.04	56.87 ± 6.95*	42.17 ± 9.20	70.37 ± 7.62***
Activity Limitation	20.01 ± 4.21	28.1 ± 3.19	24.96 ± 5.76	54.96 ± 3.12*	32.16 ± 7.16	66.36 ± 4.80***
Emotional Function	10.05 ± 2.14	12.05 ± 3.34	12.53 ± 4.91	20.53 ± 6.91*	15.56 ± 3.73	28.56 ± 2.65***
Environmental Stimuli	16.27 ± 3.42	15.79 ± 3.93	20.32 ± 4.67	22.82 ± 4.47*	20.31 ± 4.17	25.31 ± 5.17***

*Compared with control group.
* $P < 0.05$.
*** $P < 0.001$.

such as yoga - aimed at reducing stress may have a positive impact on patient quality of life and disease course among asthmatics. In our study, improvement in AQOL is thought to be mainly due to reduction of stress levels, anxiety, depression and enhanced lung capacity resulting from yoga practice along with conventional care treatment. Regular yoga practice along with standard medications may be an ideal approach to the treatment and management of asthma.

5. Conclusion

This study suggests that simple yoga practice incorporating breathing and posture techniques may be an effective tool for the enhancement in quality of life of asthmatic patients and can be practiced as an effective adjuvant therapy to regular conventional care for asthma.

Declarations of any conflicts of interest

None.

References

[1] A.L. Miller, The etiologies, pathophysiology, and alternative/complementary treatment of asthma, Altern. Med. Rev. 6 (1) (2001) 20-.
[2] R.J. Adams, D. Wilson, A.W. Taylor, A. Daly, E.T. d'Espaignet, E. Dal Grande, et al., Psychological factors and asthma quality of life: a population based study, Thorax 59 (11) (2004) 930–935.
[3] S. Croisant, Epidemiology of Asthma: Prevalence and Burden of Disease. Heterogeneity in Asthma, Springer, 2014, pp. 17–29.
[4] R. Adams, M. Wakefield, D. Wilson, J. Parsons, D. Campbell, B. Smith, et al., Quality of life in asthma: a comparison of community and hospital asthma patients, J. Asthma 38 (3) (2001) 205–214.
[5] E. Juniper, Assessing asthma quality of life: its role in clinical practice, Breathe 1 (3) (2005) 192–204.
[6] J.R.C. Rosenzweig, L. Edwards, W. Lincourt, P. Dorinsky, R.L. ZuWallack, The relationship between health-related quality of life, lung function and daily symptoms in patients with persistent asthma, Respir. Med. 98 (12) (2004) 1157–1165.
[7] M. Partridge, M. Dockrell, N. Smith, The use of complementary medicines by those with asthma, Respir. Med. 97 (4) (2003) 436–438.
[8] A. Shaw, E.A. Thompson, D. Sharp, Complementary therapy use by patients and parents of children with asthma and the implications for NHS care: a qualitative study, BMC Health Serv. Res. 6 (1) (2006) 76.
[9] K.-L. E Hon, C. Ki Fung, A. KC Leung, T. Ngan-Ho Leung, D. KK Ng, Complementary and alternative medicine for childhood asthma: an overview of evidence and patents, Recent Patents Inflamm. Allergy Drug Discov. 9 (1) (2015) 66–79.
[10] Z.-Y. Yang, H.-B. Zhong, C. Mao, J.-Q. Yuan, Y.-F. Huang, X.-Y. Wu, et al., Yoga for asthma, Sao Paulo Med. J. 134 (4) (2016) 368-.
[11] P. Paudyal, C. Jones, C. Grindey, R. Dawood, H. Smith, Meditation for asthma: systematic review and meta-analysis, J. Asthma (August) (2017) 1–8.
[12] S. Singh, R. Soni, K. Singh, O. Tandon, Effect of yoga practices on pulmonary function tests including transfer factor of lung for carbon monoxide (TLCO) in asthma patients, Indian J. Physiol. Pharmacol. 56 (2012) 63–68.
[13] R. Nagarathna, H. Nagendra, Yoga for bronchial asthma: a controlled study, Br. Med. J. (Clin. Res. Ed.) 291 (6502) (1985) 1077–1079.
[14] J. Bousquet, T. Clark, S. Hurd, N. Khaltaev, C. Lenfant, P. O'byrne, et al., GINA guidelines on asthma and beyond, Allergy 62 (2) (2007) 102–112.
[15] V. Singh, A. Wisniewski, J. Britton, A. Tattersfield, Effect of yoga breathing exercises (pranayama) on airway reactivity in subjects with asthma, Lancet 335 (8702) (1990) 1381–1383.
[16] S.K. Chhabra, S. Kaushik, Validation of the asthma quality of life questionnaire (AQLQ-UK English version) in Indian asthmatic subjects, Indian J. Chest Dis. Allied Sci. 47 (3) (2005) 167.
[17] E.F. Juniper, G.H. Guyatt, D.H. Feeny, P. Ferrie, L.E. Griffith, M. Townsend, Measuring quality of life in children with asthma, Qual. Life Res. 5 (1) (1996) 35–46.
[18] E.F. Juniper, G. Guyatt, R. Epstein, P. Ferrie, R. Jaeschke, T.K. Hiller, Evaluation of impairment of health related quality of life in asthma: development of a questionnaire for use in clinical trials, Thorax 47 (2) (1992) 76–83.
[19] R. Manocha, G. Marks, P. Kenchington, D. Peters, C. Salome, Sahaja yoga in the management of moderate to severe asthma: a randomised controlled trial, Thorax 57 (2) (2002) 110–115.
[20] A.J. Bidwell, B. Yazel, D. Davin, T.J. Fairchild, J.A. Kanaley, Yoga training improves quality of life in women with asthma, J. Altern. Complement. Med. 18 (8) (2012) 749–755.
[21] R. Vempati, R.L. Bijlani, K.K. Deepak, The efficacy of a comprehensive lifestyle modification programme based on yoga in the management of bronchial asthma: a randomized controlled trial, BMC Pulm. Med. 9 (1) (2009) 37.
[22] S. Cooper, J. Oborne, S. Newton, V. Harrison, J.T. Coon, S. Lewis, et al., Effect of two breathing exercises (Buteyko and pranayama) in asthma: a randomised controlled trial, Thorax 58 (8) (2003) 674–679.
[23] T. Sathyaprabha, H. Murthy, B. Murthy, Efficacy of naturopathy and yoga in bronchial asthma—a self controlled matched scientific study, Indian J. Physiol. Pharmacol. 45 (1) (2001) 80–86.
[24] S. Agnihotri, S. Kant, S. Kumar, R.K. Mishra, S.K. Mishra, Impact of yoga on the biochemical profile of asthmatics: a randomized controlled study, Int. J. Yoga 7 (1) (2014) 17.
[25] T. Clark, C. Cagnani, J. Bousquet, Global Initiative for Asthma: Global Strategy for Asthma Management and Prevention, National Institutes of Health, Bethesda, MD, 2002, pp. 1–176.
[26] C.E. Thoresen, K. Kirmil-Gray, Self-management psychology and the treatment of childhood asthma, J. Allergy Clin. Immunol. 72 (5) (1983) 596–606.
[27] P. Lehrer, J. Feldman, N. Giardino, H.-S. Song, K. Schmaling, Psychological aspects of asthma, J. Consult. Clin. Psychol. 70 (3) (2002) 691.
[28] M. Kuppusamy, D. Kamaldeen, R. Pitani, J. Amaldas, P. Shanmugam, Effects of Bhramari Pranayama on health–a systematic review, J. Tradit. Complement. Med. 8 (1) (2018) 11–16.
[29] Mitani A. Asthma and Stress, Encyclopedia of Behavioral Medicine, Springer, 2013, pp. 140–142.
[30] M.A. Yonas, N.E. Lange, J.C. Celedón, Psychosocial stress and asthma morbidity, Curr. Opin. Allergy Clin. Immunol. 12 (2) (2012) 202.
[31] R.J. Wright, R.T. Cohen, S. Cohen, The impact of stress on the development and expression of atopy, Curr. Opin. Allergy Clin. Immunol. 5 (1) (2005) 23–29.
[32] N.H. Rod, T. Kristensen, P. Lange, E. Prescott, F. Diderichsen, Perceived stress and risk of adult-onset asthma and other atopic disorders: a longitudinal cohort study, Allergy 67 (11) (2012) 1408–1414.