

## **The Effectiveness of Practicing Pranayama Yoga on Some Respiratory Indicators in Patients Suffering from Bronchial Disease**

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### **Abstract**

Bronchial asthma is considered as a large burden of disease cross the world wasting billions of dollars each year. Using drug for treatment is not only expensive but also causes many adverse health affect. The study aims to assess the effects of pranayama yoga practice on lung functions in patients with bronchial diseases. This is a controlled trial study. After three months of yoga practice, breath indicators such as FVC, FEV1, FEV1/FVC, PEFr of intervention group significantly improved with p value < .01 to .001 in comparison with the previous three months of the control group. Practicing pranayama yoga is beneficial to patients with bronchial asthma.

**Keywords:** Practice, pranayama yoga, respiratory, asthma

## Introduction

Bronchial asthma is one of the respiratory diseases, which is usually seen in children and elderly. Bronchial asthma is considered as a burden of disease all over the world which costs billion dollars each year. Bronchial asthma is a chronic disease which has a high rate of death. Medical intervention is very expensive and has bad side-effects.

Yoga is a form of physical activity which consisting of various postures (asana) and breathing and medication techniques (pranayama) (Nayak & Shankar, 2004), has been shown to have therapeutic benefits for individuals with a wide range of health conditions, including hypertension (McCaffrey, Ruknui, Hatthakit, & Kasetsoomboon, 2005) and stress in patients with type-2 diabetes (Gorden, et al., 2008). Yoga also is beneficial to release headache, insomnia, and depression (Rimington, Davies, Low, & Pearson, 2001) and fear of falling (Schmid, Puymbroeck, & Koceja, 2010).

Yoga is an ancient discipline designed to bring balance and health to the physical, mental, emotional, and spiritual dimension of the individual. Yoga is often depicted metaphorically as a tree and comprises eight aspects of “limb”: yama (universal ethics), niyama (individual ethics), asana (physical postures), pranayama (breath control), pratyahara (control of the senses) dharana (concentration), dyana (meditation), and samadhi (bliss) (Iyengar, 1976).

The number of people practicing yoga in Vietnam increased significantly in the recent year (Hoàng T.A. Khuê, 2009). According to Hoàng, 66% of 2953 people in Vinh city practiced yoga. Yoga also is well perceived as a therapeutic intervention. Despite its popularity and positive physiologic effects, however, yoga has not been widely recognized in efforts to prevent and treat major chronic health conditions. The purpose of this study is to assess the effectiveness of practicing pranayama Yoga to some respiratory indexes in patients suffering from bronchial disease.

## Materials and Method

This study was carried out on 50 patients diagnosed to contact with bronchial asthma within more than a year. Patients were recruited from out-patients at general hospital of Nghe An Province, Vietnam. Patients aged from 18 to 50 contacted three levels of bronchial asthma: milk level (level 1), average level (level 2) and serious level (level 3).

Sample size was calculated as following:

$$n = \frac{2xCx(1-r)}{(ES)^2} = \frac{2x7.85x(1-0.8)}{(0.3333)^2} = 28; n=25 \text{ collected for each group.}$$

*C is constant, r is correlative factors and ES is effect size.*

Fifty patients were divided into two groups: Intervention (yoga) group included twenty-five patients, was conducted to practice yoga pranayama in three months. Control was informed not to do any new exercise program, but still maintain daily activities.

### ***Exclusion criteria***

+ Patients with tuberculosis, diabetes, coronary arteries disease, respiratory infection. Patients who do exercises regularly, or do exercise within six months before intervention; smoker, pregnancy and lactation.

Patients were informed general information of yoga and they agree to sign the consent form to be samples of this study.

### ***- Measurements of respiratory indicators***

+ Frequency of breath (breathing rate/minute)

+ Measurements of lung functions by Sibelmed computer-connecting with software W20. Parameters determined: Peak expiratory flow rate (PEFR; liter/minute), Forced Expiratory Volume in the first second (FEV1; liter), force vital capacity (FCV1; liter)

### ***- Intervention protocol***

Intervention group practiced pranayama yoga 30 minute/day included: Ujjayi pranayama, Bhastrika pranayama, Anuloma – Viloma pranayama, Kapalbhathi pranayama, Bahaya pranayama, Bhramari pranayama, and meditation OM. In the first two weeks, patients practices yoga at Bai Mai Yoga Center, Vinh city. After that, patients practiced at home in the morning in three months. Patients had to come to the Yoga once each week to give report about their health status.

Patients in both groups were told to keep nutritious eating regime, sleep enough 97-8 hours/day). Patients had to take daily notes about their health problem inform researchers.

### ***- Statistical analysis***

Pre and post comparison was used to assess the differences between the two groups.  $P < 0.05$  was considered to be statistically significant. Before applying the *t*-test the normal distribution of the data was controlled. Epi Info software was used to analyse data.

## **Findings**

### **Characteristics of study samples**

There is one patient in intervention group dropped out because of travelling, and then 24 patients remained. There are no significant differences in age between two research groups. Similarly, there are no differences in *time of contacted disease* and *time of giving up smoking*.  $P$ -value  $> 0.05$  proved the comparisons.

**Table 1.** Characteristics of Samples

Items	Intervention (Yoga) (n=24)	Control (n=25)	p
Average age	47,56 ± 8,72	46,98 ± 10,23	>0.05
Quantity (male/female)	17/7	16/9	
Time of contracted disease	9,31 ± 7,50	9,88 ± 7,16	>0.05
Smoker in the past	14	15	
Time of giving up smoking prior to intervention	6,11 ± 3,25	5,76 ± 2,89	>0.05

**Table 2.** Changes of Respiratory Indicators in Both Groups after Three Months Yoga Training

Indicators	Time of test	Control group (n=25) (a)	Intervention group (n=25) (b)	Pa-b
FVC (liter)	Baseline (1)	2.46 ± 0.48	2.50 ± 0,42	> 0.05
	After 3 months (2)	2.48 ± 0.51	3.03 ± 0,49	< 0.001
	P <sub>1-2</sub>	>0.05	<0.001	
FEV <sub>1</sub> (liter)	Baseline (3)	2.08 ± 0.44	2.11 ± 0.47	> 0.05
	After 3 months (4)	2.07 ± 0.42	2.33 ± 0.40	< 0.01
	P <sub>2-3</sub>	> 0.05	< 0.01	
FEV <sub>1</sub> /FVC	Baseline (5)	76.21 ± 3.09	76.96 ± 4.17	> 0.05
	After 3 months (6)	76.88 ± 3.11	80.66 ± 4.83	< 0.001
	P <sub>5-6</sub>	> 0.05	< 0.001	
PEFR (liter/second)	Baseline (7)	5.77 ± 1.77	5.82 ± 1.81	> 0.05
	After 3 months (8)	5.68 ± 1.35	6.25 ± 1.40	< 0.001
	P <sub>7-8</sub>	> 0.05	< 0.001	

Results of table 3.2 showed the values of breathing frequency (beat/minute), peak expiratory flow rate (PEFR – liter/second), forced expiratory volume in the first second (FEV<sub>1</sub> – liter) of both research groups: intervention and control groups.

It can be observed from table 3.2 that all data of control groups such as FVC, FEV<sub>1</sub>, PEFR did not change ( $P > 0.05$ ). Whereas, data of intervention group showed clear changes. The values of FVC, FVC<sub>1</sub>, FVC<sub>1</sub>/FVC, PEFR have significantly changed. After three months of Yoga training, in comparison with Control group, all indicators of Intervention groups were significantly improved with the level of  $P < 0.01$  to  $0.001$ , respectively.

## Discussion

The present study showed a significant improvement in respiratory indicators for patients contacted bronchial asthma. Previous studies have reported that yoga is beneficial people with cancer in managing symptoms such as fatigue, insomnia, mood disturbance, and stress, and improving quality of life (Distasio, 2008). Most yoga practices emphasize the importance of breathing and breathe regulation (Sarawati, 2002). However, over-breathing can lead to somatic symptoms, typically hyperventilation. Yoga practice may modify anxiety by the effect on breathing through muscle relaxation, and by hence modifying the mental state to induce feelings of well-being (Kozasa, et al., 2008).

Bronchial asthma often appears when patients have problems of health, or weather changes, allergy, cold, and stress. Bronchial asthma caused reduction of respiratory functions, difficult to breath, or wheezing (Duong & Nguyen, 2002). In previous studies showed that breathing techniques in cooperation with simple poses are beneficial to enhance pulmonary functions such as forced vital capacity, forced expiratory volume in the first second, and peak expiratory flow rate of patients with bronchial asthma (Nagartha & Nagendra, 1985; S. Singh, Singh, Tandon, & Soni, 2012). The results of this study is concurrent with study of Saxena

that Yoga exercise can improve breathing and function of pulmonary (Saxena & Saxena, 2009). This can be observed in this study that after 3 months of pranayama yoga training, indicators represented for respiratory functions strongly improved, FVC increased from 2.50 to 3.03 liters, FEV1 increased significantly with  $P < 0,01$ . Respiratory quotient FEV1/FVC increased and breathing frequency decreased after 3 month of pranayama yoga training.

In addition, previous studies have shown that yoga practice can lead to improvements in hand-grip strength (Madanmohan, Thombre, & Balakumar, 1992), muscular endurance (Ray, Hegde, & Selvamurthy, 1986), flexibility (Gharote & Ganguly, 1979) and maximal oxygen uptake ( $VO_{2max}$ ) (Balasubranmanian & Pansare, 1991). Moreover, decreases in percent body fat (Bera & Rajapurkar, 1993) and increases in forced vital capacity and forced expiratory volume in first second (Joshi, Joshi, & Gokhale, 1992). It is supposed that the mechanism of improvement in respiratory indicators may due to the characteristics of Pranayama yoga in collaboration of breathing techniques, exhale and inhale. The cause of appearing asthma is stress (Erskine & Shoneel, 1971). Breathing techniques of Anuloma – Viloma Pranayama, Bahaya Pranayama, Bhramari Pranayama are useful to alleviate stress and reduce attack of asthma. The results of this study are also concurrent with the results of several studies (Erskine & Shoneel, 1971; V. Singh, Wisniew, Britton, & Tatters, 1990; Sodhi, Singh, & Dandona, 2009), in which there are increases in FEV1 and PEFr. After three months of yoga training, patients, who contacted bronchial asthma at level three, remarkably reduced and stopped asthma after the third month.

### **Conclusion**

After three months with yoga training, patients suffering from bronchial asthma showed improvements in some respiratory indicators such as FVC, FVC1, FVC1/FVC, PEFr. Pranayama yoga is beneficial to improve pulmonary functions of patients contacted with bronchial asthma.

### **Implication**

This study focused on patients who contacted with bronchial asthma. Other population should be observed such as frail population. The effects of yoga for people with diabetes and other chronic diseases have been documented elsewhere. However, empirical and controlled trial studies should be widely carried out. In the future, yoga program should be compared to other sport or recreational activity programs to see the less biased effects.

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