

EFFECT OF COMPLETE MIND-BODY THERAPY ON PULMONARY FUNCTION TEST IN ASTHMA PATIENTS ATTENDING OPD OF SMS HOSPITAL, JAIPUR.

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ABSTRACT

Background: Asthma is becoming a substantial burden to people causing a reduced quality of life due to physical, psychological and social effects. Yoga is considered best complementary and alternative medicine by the National Institutes of Health. The aim of our study is to see the effect of yoga in asthma patients in and around Jaipur city. **Materials and Methods-** The study was conducted on 108 stable diagnosed bronchial asthma patients randomly divided in study and control group (54 in each group of 18 to 40 years of age) of either sex. The study group was given yoga practice (asana, pranayaam, cleansing technique and meditation) for 8 weeks under the guidance of trained yoga instructor and asked to continue their medication. The pulmonary function test (FVC, FEV1, FVC/FEV1 ratio, PEFr and FEF 25-75%) was recorded at baseline and after 8 weeks of duration. The paired 't' test and unpaired 't' test was used for data analysis. **Results-** There was statistically significant improvement ($P < 0.001$) in PFT parameters (forced vital capacity (FVC), forced expiratory volume in 1st sec (FEV1), FEV1/FVC ratio, peak expiratory flow rate (PEFR) and FEF(25-75%) after 8 weeks of yoga practices in study group but no significant improvement in control group. **Conclusion-** The present study demonstrated that complete mind body approach with regular asana, pranayaam, cleansing technique and meditation lead to significant improvement in pulmonary function in bronchial asthma patients and acts as additive effect in treatment of asthma along with medication.

Key words. Yoga, Asthma, Pulmonary function test.

INTRODUCTION:

India is a vast country and has immense geographical, racial, economical, religious and socio-political diversity. Hence there are obvious differences in prevalence of disease in India. (1)

Asthma includes a wide range of heterogeneous phenotypes that differ in etiology, presentation

and patho-physiology. Asthma is a chronic disease that cannot be cured but medicines and life style changes can help to control the symptoms. (2)

The area in North West region has medium prevalence of asthma. Asthma prevalence is

increasing globally by 50% every decade. It is estimated that there may be additional 100 million persons with Asthma by 2025. (2, 3)

Globally, the economic cost that is associated with Asthma exceed those of tuberculosis and HIV/AIDS combined.(4) The economic cost of Asthma is considerable both in terms of direct medical costs (such as hospital admissions because of repeated asthma attack and cost of pharmaceuticals) and indirect medical costs (such as time lost from work and premature death).(2)

Asthma is a disease whose presence can be seen from dates back of the time of Hippocrates, (5) who is '*the father of medicine*', noted a condition of "deep and heavy breathing". Asthma is an ancient 'Greek word' which means "panting", "gasping" or inflamed "tight feeling in the chest". (6)

Definition of asthma: According to GINA guideline 2014 asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation.(7)

Bronchial asthma is a stress disease that may be induced by various stressors. These are:- (8)

- (a) Physical stressors: Changes in temperature, humidity, and atmospheric pressure, and especially influence of air conditioning and chills.
- (b) Chemical stressors: Smoking, exhaust gas, alcohol, and drugs.
- (c) Biological stressors: Microbes (bacteria, viruses, etc.), pollen, and foods.

(d) Psychological stressors: Anxiety, fear, anger, hatred, inferiority complex, guilt, and psychological stimuli that cause these emotions.

(e) Social stressors: School entrance examinations, employment, reassignment, promotion, retirement, marriage, divorce, housing loan, and legal problems.

Yoga is originated in India over 4000 years ago. (9) The word 'Yoga' is a Sanskrit word 'Yuj' which means 'to join'. According to Patanjali, called the "father of Yoga", each individual is a composite of matter (prakriti) and spirit (purusha). He said "Yogah Chitha Vritti Nirodhah" which means "Yoga means controlling the activities of the mind". (10)

Yoga involves complete mind-body fitness. It not only involves combination of muscular activity but also internally directed mindful focus on awareness of the self, the breath, and the energy. (11)

MATERIALS AND METHODS.

A randomized controlled interventional study was conducted in Upgraded department Of Physiology, SMS Medical College, JAIPUR. Total 108 subjects of 18 to 40 years age group of either sex with written informed consent with an established diagnosis of asthma by department of pulmonary medicine SMS hospital Jaipur (Diagnosed as per GINA Guideline 2006) were taken in study. The subjects included in study were randomly divided in study and control group with 54 subjects in each group, Taking at least one drug (inhaled β -agonists, methylxanthines, anticholinergics, inhaled corticosteroids) and stable medication dosing for the past one month. The patients who are Smokers, chronic medical condition that required

treatment with oral or systemic corticosteroid in the past month, medical condition that contraindicate exercise, With a concomitant lung disease or practiced yoga or any other similar discipline during 6 months preceding the study, Pregnant female and Unstable medical condition & if subject is not cooperative were excluded from study

After screening and fulfillment of inclusion and exclusion criteria, detailed history and physical examination was done.

The pulmonary function tests were performed at baseline and after 8 weeks in study group and control group both with computerized spirometer (vitalograph model number 6800 pneumotrac version 1.12) (manufacturer: vitalograph, Ennis, Ireland. Buckingham England, Hamburg Germany, Kansas City U.S.A.) (Guidelines of American Thoracic Society for spirometry was followed) in the division of Allergy and Pulmonary Medicine, department of medicine SMS Medical college & hospital Raipur. Which included the percent predicted values of forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), the ratio FEV1/FVC, average forced expiratory flow rate during the expulsion of 25–75% of FVC (FEF_{25-75%}) and peak expiratory flow rate (PEFR).

The yoga training was given to study group in the department of physiology SMS medical Table 1.

college Jaipur in the morning at 8:00 AM to 9:00 AM for 5 days/week for 45-60 min daily, depending upon completion of set of exercises for a total duration 8 weeks. The program consisted of practical sessions on asanas (postures), pranayamas (breathing techniques), kriyas (cleansing techniques), meditation and shavasana (a relaxation technique). All postures were performed for 2-10 minutes adding 2 minutes per week. The control group was not given yoga practice. Both groups were asked to continue their medication.

The paired and unpaired 't'-test was used to see the results

RESULTS-

The percentage predicted values of FVC, FEV1, FEV₁/FVC ratio, PEFR and FEF_{25-75%} were taken. The result showed highly significant ($p \leq 0.001$) improvement in pulmonary function test parameters (FVC, FEV₁, FEV₁/FVC ratio, PEFR and FEF_{25-75%}) in study group after 8 weeks of yoga intervention while control group did not show any significant improvement. There was significant improvement in study group as compare to control group after 8 week of comparison in pulmonary function test parameters (FVC, FEV₁, FEV₁/FVC ratio, PEFR and FEF_{25-75%}).

Parameters	Groups	Pre	Post	Mean change	p-value*
FVC	Study	70.2 ± 12.2	81.8 ± 11.1	11.6 ± 8.6	<0.001 (HS)
	Control	71.7 ± 9.6 [#]	73.2 ± 12.8 ^{\$}	1.43 ± 11.79 [£]	0.378 (NS)
FEV1	Study	54.9 ± 9.5	71.7 ± 13.6	16.9 ± 10.8	<0.001 (HS)

	Control	55.9 ± 8.2 [#]	57.5 ± 12.2 ^{\$}	1.61 ± 8.55 [£]	0.172 (NS)
FEV1/FVC	Study	0.65 ± 0.07	0.74 ± 0.08	0.09 ± 0.09	<0.001 (HS)
	Control	0.62 ± 0.14 [#]	0.66 ± 0.06 ^{\$}	0.03 ± 0.19 [£]	0.095 (NS)
PEFR	Study	41.9 ± 11.3	56.7 ± 15.2	14.8 ± 11.7	<0.001 (HS)
	Control	44.1 ± 11.4 [#]	46.8 ± 13.1 ^{\$}	2.72 ± 10.66 [£]	0.066 (NS)
FEF25-75%	Study	27.4 ± 9.2	42.7 ± 15.9	15.3 ± 13.5	<0.001 (HS)
	Control	26.5 ± 7.2 [#]	28.0 ± 10.3 ^{\$}	1.5 ± 7.4 [£]	0.148 (NS)

shows P-value > 0.001 at beginning (pre) between study group and control group. \$ Shows p-value > 0.001 after 8 weeks (post) between study group and control group. £ Shows p-value > 0.001 of mean change between study group and control group. * shows p-value of intra-group comparison at beginning and after 8 weeks by paired 't' test. #,\$ and £ shows p-value by unpaired 't' test for inter-group comparison.

DISCUSSION

The present study showed highly significant ($p \leq 0.001$) improvement in pulmonary function test parameters (FVC, FEV₁, FEV₁/FVC ratio, PEFR and FEF_{25-75%}) in study group after 8 weeks of yoga intervention.

Yogic breathing creates more negative pressures in both abdominal and thoracic cavity during inspiration and moves the diaphragm more than its normal excursions and helps in efficient movement of diaphragm which further creates more negative pressure leading to improvement in vital capacity. Yoga removes undue tension from the skeletal muscle, which helps the thorax to relax even better than before. **(12, 13)**

Kapalbhati pranayama involve isometric contraction and expansion of abdominal and intercostals muscles, which improve the strength of the intercostals muscles. **(14, 15)**

Pranayaam causes stimulation of pulmonary stretch receptors by inflation of the lung and reflex relaxation of smooth muscles of larynx

and tracheo bronchial tree, due to which the airway caliber become modulated and airway resistance is reduced.**(16, 17)** Which further improves pulmonary function parameters.

Pranayaam reduces the mast cell degranulation as the frictional stress from air flowing through narrowed airways damaging the airway mucosa and thereby perpetuating airway inflammation and airway obstruction. At high air flow rates, high values of the frictional stress could damage the airway wall, especially during episodes of cough, and particularly when the mucosa is inflamed and friable as it occur in the asthma patients. **(18)** The slow and gentle breathing in some of the pranayamas (breathing practices in yoga) may reverse this process **(19)** by reducing the frictional stress, and thereby stabilizing the mast cell degranulation. Olness et al **(20)** also demonstrated the inhibition of mast cell activation by conditioned relaxation techniques such as relaxation-imagery in children having migraine.

Breathing is automatically regulated by bulbopontine respiratory control mechanisms in which the dorsal and ventral group of neurons located in the medulla and the pneumotaxic center and the apneustic center located in the pons. Which are further modified by suprapontine mechanisms in the conscious being. While the basic respiratory rhythm in normal situations is maintained by the impulses discharged from the dorsal group of neurons, the pneumotaxic center indirectly controls the duration of inspiration and helps in relaying suprapontine impulses which promote voluntary inspiration and expiration. (18, 19) Due to daily practice of pranayama the basic activity of the bulbopontine complex is modified in such a way as to slow down its rhythm. Thus after continuous practice of pranayama for few weeks, the bulbo-pontine complex is adjusted to the new pattern of breathing which is slower than its basal rhythm and by voluntarily prolonging the phase of inspiration and expiration, the respiratory muscles are stretched to their full extent. Hence the respiratory apparatus is able to work to their maximal capacity represented by increased chest wall expansion and lung volumes. (20, 21)

Yoga stabilizes and reduces excitability of the nervous system. Transcendental meditation (a traditional yogic meditation technique) and Savasana reduces metabolic rate. (21) It is seen that there is an increase in alpha synchrony in electroencephalograms taken during transcendental meditation, which points to its stabilising effect on the nervous system. So Yoga clearly relaxes the muscles, and this deep physical and mental relaxation is associated with the physiological changes seen after daily yoga seems to have a stabilising effect on bronchial reactivity, thus making the vagal efferents less excitable. (21)

After analyzing the results of present study, it can be stated that our finding is consistent with the results of Nagendra H.R et al, (22)^{Vempati} et al, (23) Singh et al, (24) Reena Kaur et al. (25)

CONCLUSION

Yoga decreases muscle tension and airway resistance and hence acts as additive effect along with medication in improvement of asthma patients.

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