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## Effect of 6 weeks of yogic practices and therapeutic exercise on FEV1/FVC percentage of person with chronic obstructive pulmonary disease

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### Abstract

**Objective:** The purpose of the study was to find out the effect of 6 weeks of yogic practices and Therapeutic exercise on FEV1/FVC Percentage of person with chronic obstructive pulmonary disease.

**Methods:** For the purpose of this study 45 male from Varanasi those who are suffering from COPD (chronic bronchitis) and under treatment process of same at S.S. hospital, IMS, B.H.U was selected purposively as the subject of the study. The age of subjects was ranged between 40 to 50 years. For the study pre test – post test randomized group design was used and involving 45 subjects who were grouped purposively into three groups (15 each). The first 15 subjects were considered as control group, second 15 subjects were considered as experimental group A (Yogic practices) and third 15 subjects were considered as experimental group B (Therapeutic exercise). FEV1/FVC Percentage was measured by pulmonary function test or Total lungs function test and scores was recorded in liters.

**Statistical technique:** The data which was obtained from subject was analyzed statistically by the application of analysis of covariance (ANCOVA). The obtained “F” ratio was tested at .05 level of significance.

**Results & Conclusion:** The results of the study showed that there is significant effect of 6 weeks of yogic practices and Therapeutic exercise on FEV1/FVC Percentage. It is concluded that yoga practices have better effect for improvement of COPD patients in relation to FEV1/FVC Percentage compare to therapeutic exercise.

**Keywords:** Yogic practices, therapeutic exercise, FEV1/FVC Percentage & pulmonary function test

### Introduction

Yoga Philosophy is one of the six systems of Hindu Philosophy which exist in India. Unlike so many other philosophies of the world, it is a philosophy that is wholly practical. Yoga is an exact science based on certain immutable Laws of Nature. It is well known to people of all countries of the world interested in the study of Eastern civilisation and culture, and is held in awe and reverence as it contains in it the master-key to unlock the realms of Peace, Bliss, Mystery and Miracle. Even the philosophers of the West found solace and peace in this Divine Science. Jesus Christ himself was a Yogi of a superior order, a Raja-Yogi indeed. The founder of the Yoga Philosophy was Patanjali Maharshi, who was not only a Philosopher and a Yogi, but a Physician as well. He is said to have lived about three hundred years before Jesus Christ. Patanjali defines Yoga as the suspension of all the functions of the mind. As such Yoga, which does not deal with these three aspects of the subject, viz., mind, its functions and the method of suspending them, can be safely laid aside as unreliable and incomplete. The word Yoga comes from the Sanskrit root “Yuj” which means “to join.” Yoga is a science that teaches us the method of joining the individual soul and the Supreme Soul. It is the merging of the individual will with the Cosmic or Universal Will. Yoga is that inhibition of the functions of the mind which leads to the absolute abidance of the soul in its own real nature of Divine Glory and Divine Splendour. It is the process by which the identity of the individual soul and the Oversoul is established by the Yogi. In other words, the human soul is brought into conscious communion with God. Yoga is the Science of sciences that disentangles the individual soul from the phenomenal world of sense-objects and links with the Absolute, whose inherent attributes are Infinite Bliss, Supreme Peace, Infinite Knowledge and unbroken Joy.

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DeLateur defined therapeutic exercise as the prescription of bodily movement to correct impairment, improve musculoskeletal function, or maintain a state of well-being. It may vary from highly selected activities restricted to specific muscles or parts of the body, to general and vigorous activities that can return a convalescing patient to the peak of physical condition.

COPD is a disease state characterized by chronic airflow limitation with or without airway hyper reactivity. Chronic obstruction must be documented before a diagnosis of COPD is made. The obstruction can be caused by chronic bronchitis or by emphysema on forced exhalation, a patient with COPD does not empty the lungs to normal levels. As a result, the functional residual capacity (FRC) and the residual volume (RV) are increased. Exercise induced tachypnea can then increase the amount of air trapped, a phenomena called dynamic hyperinflation. The severity of exercise induced dyspnea correlates well with the degree of hyperinflation. As the lungs become more and more inflated, the diaphragm is displaced downward, increasing the amount of pressure required to move air, and decreasing the capacity of the diaphragm to generate pressure. Treatment of COPD consists of bronchodilators, antibiotics, airway clearance and nutritional therapy.

**Methodology**

For the purpose of this study 45 male selected from Varanasi those who are suffering from COPD (chronic bronchitis) and under treatment process of same at S.S. hospital, IMS, B.H.U was selected purposively as the subject of the study. The age of subjects was ranged between 40 to 50 years. For the study

pre test – post test randomized group design was used and involving 45 subjects who were grouped purposively into three groups (15 each). The first 15 subjects were considered as control group, second 15 subjects were considered as experimental group A (yogic practices) and third 15 subjects were considered as experimental group B (Therapeutic exercise).

Control Group	O		O
Pranayama Group	O	T1	O
Therapeutic Group	O	T2	O

O = Observation, T = Treatment

FEV1/FVC Percentage was measured by pulmonary function test or Total lungs function test and scores was recorded in liters. The experiment group was taken 6 weeks yogic practices and Therapeutic exercise, in this training program, Pranayama (Kapalbhati Pranayam, Anulom-Vilom Pranayam, Ujjayi Pranayam, Bhramari Pranayam & Bhastrika Pranayam) and therapeutic exercise (Diaphragmatic Breathing, Segmental Breathing, Posterior Basal Expansion, Pursed-Lip Breathing, Positive Expiratory Pressure Breathing, Respiratory Resistance Training, Inspiratory Resistance Training, Incentive Respiratory Spirometry & Glossopharyngeal Breathing) performed by subjects with the help of experts. The data which was obtained from subject was analyzed statistically by the application of analysis of covariance (ANCOVA). The obtained “F” ratio was tested at .05 level of significance.

**Findings**

**Table 1:** Descriptive Statistics of Experimental and Control group in relation to FEV1/FVC Percentage

		N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Pre Test	Yoga Group	15	63.70	10.14	2.61	50.00	78.95
	Therapeutic Group	15	62.77	11.54	2.97	42.63	82.35
	Control Group	15	67.45	12.62	3.26	50.00	100.00
Post Test	Yoga Group	15	68.03	7.03	1.81	55.71	84.29
	Therapeutic Group	15	63.82	6.86	1.77	51.36	74.74
	Control Group	15	65.50	11.53	2.97	49.50	93.75

Table 1 clearly indicates that the mean and standard deviations of FEV1/FVC Percentage at different groups (yoga group, therapeutic group, and control groups). The observed mean and standard deviation of pre test, FEV1/FVC Percentage of yoga group 63.70+10.14, Therapeutic group 62.77+11.54 & control group 67.45+12.62; and Post test, FEV1/FVC Percentage of yoga group 68.03+7.03,

Therapeutic group 63.82+6.86, & Control group 65.50+11.53 are respectively.

The data are further analyzed with the help of analysis of variance to find out the significance difference between means of pre-test and post test of yoga group, therapeutic group and control group in relation to FEV1/FVC Percentage. The results are presented in the table no 2.

**Table 2:** Analysis of Variance of Comparison of Means of yogic practices, Therapeutic exercise and Control Group in relation to FEV1/FVC Percentage

	Source of variance	Sum of Squares	df	Mean Square	F	Sig.
Pre Test	Between Groups	184.428	2	92.214	0.699	.503
	Within Groups	5538.943	42	131.880		
	Total	5723.371	44			
Post Test	Between Groups	134.989	2	67.494	0.882	.422
	Within Groups	3215.152	42	76.551		
	Total	3350.141	44			

Table 2 revealed that, the pre test obtained ‘F’ value of 0.699 is found to be insignificant at 0.05 level, which is clearly indicated that there are no significant difference and explains the random assignment of subjects to yoga group, Therapeutic exercise group and control group is quite successful.

In relation to post test, significant difference is found among yoga group, Therapeutic exercise group and control group pertaining to FEV1/FVC Percentage, since obtained ‘F’ value of 0.882 is found insignificant at 0.05 level.

**Table 3:** Adjusted post test means of yogic practices, Therapeutic exercise and control group in relation to FEV1/FVC Percentage

Groups	Mean	Std. Error
Yoga Group	68.660	1.144
Therapeutic Group	65.055	1.155
Control Group	63.650	1.148

From the table 3, it is revealed that mean of yoga group is

68.660 with the standard error of 1.144 and mean of therapeutic exercise group is 65.055 with the standard error of 1.155, whereas the mean of control group is 63.650 with the standard error of 1.148. The data are analyzed and the results pertaining to analysis of co-variance among yoga group, Therapeutic exercise group and control group of COPD person in relation to FEV1/FVC Percentage for pre test -post test respectively and the results are presented in table 4.

**Table 4:** Analysis of Covariance of Comparison of Adjusted post test means of yogic practices, Therapeutic exercise and Control Group in relation to FEV1/FVC Percentage

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power
Contrast	198.290	2	99.145	5.061	.011	0.198	10.123	0.790638
Error	803.187	41	19.590					

Table 4 revealed that, the obtained 'F' value of 5.061 is found significant at 0.05 levels. This result indicates that the treatment (yoga and therapeutic) is given to subjects has increase FEV1/FVC Percentage of subjects, but which treatment group is better to other treatment group, LSD post

hoc test is applied.

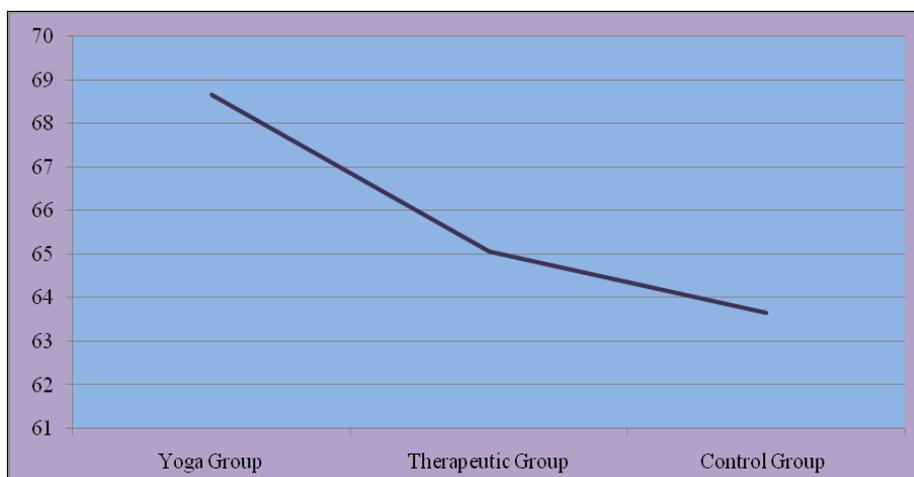
The Partial Eta Squared value (0.198) indicated that 19.8% effects of training (Yoga and Therapeutic training) on FEV1/FVC Percentage.

**Table 5:** LSD Post-hoc Test for the comparison of paired means of yogic practices, Therapeutic exercise group and Control Group in relation to FEV1/FVC Percentage

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Control	yoga	-5.011*	1.632	.004
	therapeutic	-1.405	1.640	.397
yoga	therapeutic	3.606*	1.617	.031

It is evident from table 5 that significant difference is found between adjusted final mean scores of control group & yoga group and yoga group & therapeutic group. The no significant difference is found between adjusted final mean score of control group and therapeutic group. It is evident yoga program have effect on FEV1/FVC percentage of subjects,

after comparison of mean scores of yoga group, therapeutic exercise group and control group, yoga group have higher mean compare to therapeutic exercise group and control group, which is indicate that yoga is better exercise program for the improvement of FEV1/FVC percentage of subjects.



**Fig 1:** The Graphical representation of mean scores of yoga group, therapeutic exercise group and control group in relation to FEV1/FVC Percentage

**Discussion of Findings**

Rehabilitation programs for patients with chronic obstructive pulmonary disease (COPD) have existed for more than 30 years. The American College of Chest Physicians in 1974 defined pulmonary rehabilitation and described aspects of care for patients with respiratory impairments. The American Thoracic Society incorporated these into an official position statement in 1981.1 More recently, the 2006 American Thoracic Society and the European Respiratory Society Statement on Pulmonary Rehabilitation stated, "Pulmonary rehabilitation is an evidence-based, multidisciplinary, and

comprehensive intervention for patients with chronic respiratory diseases who are symptomatic and often have decreased daily life activities. Integrated into the individualized treatment of the patient, pulmonary rehabilitation is designed to reduce symptoms, optimize functional status, increase participation, and reduce health care costs through stabilizing or reversing systemic manifestations of the disease." Most of the research available has addressed the benefits of rehabilitation for patients with COPD while neglecting rehabilitation outcomes for patients with other chronic respiratory diseases such as restrictive lung

diseases, spinal and chest deformities, neuromuscular conditions that lead to respiratory failure, pulmonary vascular diseases, and those that affect the very obese. Early research in the area of pulmonary rehabilitation focused on the lack of improvement, as documented by pulmonary function testing, or the failure to reverse the natural progression of the disease process.

In the present study, there is significant effect of yoga and therapeutic exercise program on FEV1/FVC percentage. Significant difference between the adjusted means of the control group and yoga group on the data of FEV1/FVC percentage during post testing. No significant difference between the adjusted means of the control group and therapeutic exercise group on the data of FEV1/FVC percentage during post testing. Significant difference between the adjusted means of the yoga group and therapeutic exercise group on the data of FEV1/FVC percentage during post testing.

In the study by Kumar AK, Kumari GK, Kumari GD (1985) the % FEV1/FVC was shown to significantly improve after pranayama training only in male subjects. In the present study, yoga group subjects showed an increasing in % FEV1/FVC after 6 weeks of yogic exercise, whereas therapeutic exercise group showed no improvement in % FEV1/FVC after 6 weeks of therapeutic exercise. Yoga training may improve exercise capacity, prevent lung function decline, improve quality of life, and reduce dyspnea in patients with COPD.

### Conclusions

It is concluded that there is significant effect of yogic practices and therapeutic exercise on FEV1/FVC percentage of person with chronic obstructive pulmonary disease.

### Practical Applications

The results of this study provide insight into yoga and therapeutic exercise program for improvement of FEV1/FVC percentage of COPD patients. However COPD patients are suffering from breathing problem in during period of disease. This research paper provides better knowledge for improvement of COPD patients through therapeutic exercise program.

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