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## Effect of 6 weeks of yogic practices and therapeutic exercise on force vital capacity 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 force vital capacity 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 pretest–posttest 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). Force vital capacity 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 Force Vital Capacity. It is concluded that Therapeutic exercise have better effect for improvement of COPD patients in relation to force vital capacity compare to yogic practices.

**Keywords:** yogic practices, therapeutic exercise, force vital capacity & pulmonary function test

### Introduction

COPD is a disease state characterized by chronic airflow limitation with or without airway hyperreactivity. 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.

Ipratropium bromide is the most effective bronchodilator in the therapy of patients with COPD and it should be used regularly (rather than prn). Patients with reversible bronchospasm benefit from an inhaled  $\beta_2$  agonist as needed. The administration of 12 hour release theophylline at bedtime results in therapeutic serum theophylline levels at 2 or 4 am, when the airflow obstruction usually worsens prednisone is not as effective as previously regarded. Oral prednisone (40 mg for two weeks) improves FEV1 in only 10% patients and is associated with serious side effects. Consider a trial of prednisone therapy (40 mg for two weeks) in those patients who do not improve with maximal doses of bronchodilators and monitor any changes in FEV1. Patients who benefit from prednisone (greater than 15% improvement over the baseline FEV1) might benefit from inhaled corticosteroids at a daily dose of 1 mg.

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This dose can be achieved with 20 puffs per day of beclomethasone, 10 puffs per day of triamcinolone or 4 puffs per day of flunisolide. Consider chronic prednisone therapy only for those patients who clearly benefit from it and cannot maintain the improvement with inhaled corticosteroids. The role of antibiotics during an exacerbation of COPD is controversial. Current practice calls for avoidance of antibiotics when the patient is stable but to use them liberally during an exacerbation. Patients are usually advised to begin therapy with trimethoprim-sulfamethoxazole or doxycycline at the first sign of an exacerbation. Chest physiotherapy is particularly important in patients with abundant secretions, especially those patients with bronchiectasis. In the terminal stages of the disease, patients with COPD become, cachectic, a condition characterized by higher than normal resting energy expenditure and the burning of muscle and visceral protein. Proper nutritional support and exercise, including weight training are essential to prevent or decrease weight loss and maintain the level of fitness.

**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 pretest – posttest randomized group design was used and involving 45 subjects who were grouped purposively into

**Findings**

**Table 1:** Descriptive Statistics of Experimental and Control group in relation to Force Vital capacity

		N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Pre Test	Yoga Group	15	1.87	0.15	0.03	1.60	2.20
	Therapeutic Group	15	1.83	0.14	0.03	1.60	2.00
	Control Group	15	1.78	0.19	0.05	1.40	2.10
Post Test	Yoga Group	15	2.04	0.16	0.04	1.70	2.40
	Therapeutic Group	15	2.04	0.14	0.03	1.80	2.30
	Control Group	15	1.86	0.20	0.05	1.40	2.10

Table 1 clearly indicates that the mean and standard deviations of force vital capacity at different groups (yoga group, therapeutic group, and control groups). The observed mean and standard deviation of pretest, force vital capacity of yoga group 1.87+0.15, Therapeutic group 1.83+0.14 & control group 1.78+0.19; and Posttest, force vital capacity of yoga group 2.04+0.16, Therapeutic group 2.04+0.14, &

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

Force vital capacity 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.

Control group 1.861+0.20 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 posttest of yoga group, therapeutic group and control group in relation to force vital capacity. 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 Force Vital Capacity

	Source of variance	Sum of Squares	DF	Mean Square	F	Sig.
Pre Test	Between Groups	0.056	2	0.0282	1.005	.375
	Within Groups	1.180	42	0.0280		
	Total	1.236	44			
Post Test	Between Groups	0.312	2	0.156	5.099*	.010
	Within Groups	1.287	42	0.031		
	Total	1.599	44			

Table 2 revealed that, the pretest obtained ‘F’ value of 1.005 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 force vital capacity, since obtained ‘F’ value of 5.099 is found significant at 0.05 level.

**Table 3:** Adjusted posttest means of yogic practices, Therapeutic exercise and control group in relation to force vital capacity

Groups	Mean	Std. Error
Yoga Group	2.002	0.024
Therapeutic Group	2.045	0.024
Control Group	1.906	0.024

From the table 3, it is revealed that mean of yoga group is 2.002 with the standard error of 0.024 and mean of therapeutic exercise group is 2.045 with the standard error of 0.024, whereas the mean of control group is 1.906 with the standard error of 0.024. 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 force vital capacity for pretest-posttest respectively and the results are presented in table 4.

**Table 4:** Analysis of Covariance of Comparison of Adjusted posttest means of yogic practices, Therapeutic exercise and Control Group in relation to Force vital capacity

	Sum of Squares	DF	Mean Square	F	Sig.
Contrast	0.147	2	0.073	8.820*	.001
Error	0.342	41	0.008		

Table 4 revealed that, the obtained 'F' value of 8.820 is found significant at 0.05 levels. This result indicates that the treatment (yoga and therapeutic) is given to subjects has

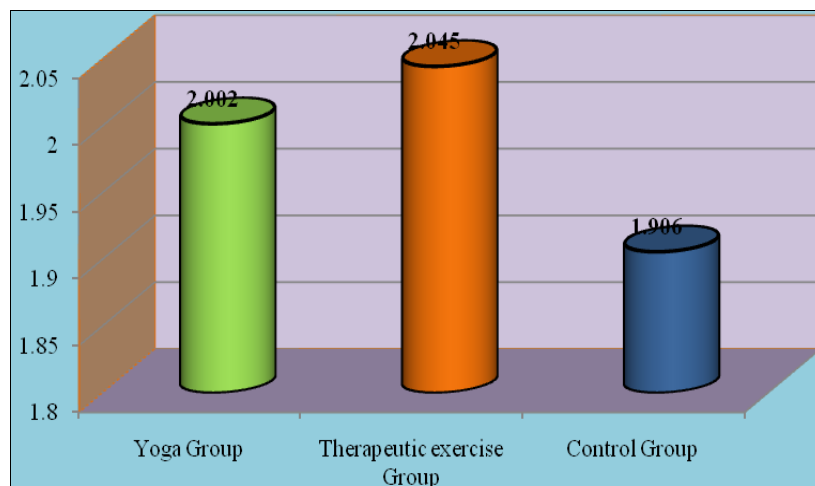
increase force vital capacity of subjects, but which treatment group is better to other treatment group, LSD post hoc test is applied.

**Table 5:** LSD Post-hoc Test for the comparison of paired means of yogic practices, Therapeutic exercise group and Control Group in relation to Force Vital Capacity

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Control	yoga	0.096*	0.034	0.008
	therapeutic	0.138*	0.034	0.000
yoga	therapeutic	0.042	0.034	0.212

It is evident from table 5 that significant difference is found between adjusted final mean scores of control group & yoga group and control group & therapeutic group. The no significant difference is found between adjusted final mean

score of Yoga group and therapeutic group, it is evident that both yoga and therapeutic exercise program have same effect on force vital capacity of subjects.



**Fig 1:** The Graphical representation of mean scores of yoga group, therapeutic exercise group and control group in relation to force vital capacity

**Discussion of Findings**

Breathing is the source of our life energy. Inspiration has a much wider meaning than just taking in air: it also means being creative, in a very deep, complex sense. Expiration not only means exhaling air; it is relaxation, letting go, finally also letting go of life. This link between life, death, and breath has been considered by many religions and philosophical systems. In the Bible we read that God made man from the dust of the earth and breathed into his nostrils the breath of life, and man became a living being. In those ancient Indian texts that are particularly relevant to yoga, such as the Vedas,

Upani ads, Yoga-Sūtras, and Ha ha-Yoga-Prad pikā, breathing is described as the essential process related to life. Our life starts with our first inhalation and ends with our last exhalation. We can survive without taking fluids for about 4 days, without solid food for about 4 weeks, but without breathing for only 2–3 minutes. Breathing also connects our inner body with the environment. Philosophically speaking it connects the individual with the universe. It also connects physical and psychological aspects and is related to all bodily systems. Therefore we need to ensure that our breathing and all related structures and functions work as well as possible.

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

### Conclusions

It is concluded that there is significant effect of yogic practices and therapeutic exercise on Force Vital Capacity of person with chronic obstructive pulmonary disease.

### Practical Applications

The results of this study provide insight into therapeutic exercise program for improvement of force vital capacity 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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