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## RESEARCH ARTICLE

# TO STUDY THE EFFECTS OF YOGA ON PULMONARY FUNCTIONS IN PATIENTS OF COPD

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### ABSTRACT

**Objectives:** The aim of our study was to determine the effects of yoga on pulmonary functions in patients of COPD.

**Methods:** Of all the patients attending the medicine OPD of Muzaffarnagar medical college and Hospital, Muzaffarnagar from November 2014 – April 2015, a total of 120 participants were recruited in the study. They were grouped and sub-grouped as under: - Group 1-YOGA group: - Subgroup 1A – 30 COPD patients practicing YOGA and taking usual medical treatment. Subgroup 1B – 30 Healthy volunteers practicing YOGA. GROUP 2- CONTROL group; Subgroup 2A:- 30 COPD patients on routine standard treatment for COPD not practicing YOGA. Subgroup 2B:- 30 healthy volunteers not practicing YOGA. Pulmonary functions testing (FEV1, FVC) and WHO quality of life questionnaire for their Quality of Life (Q. O. L.) scores were done at recruitment in the study, at 3 months follow up and at 6 months and then the data from study and control group was evaluated and compared using unpaired 't' test.

**Results:** There was significant improvement in FEV1 and psychological aspect of quality of life in COPD patients practicing YOGA in the study group compared to the control group.

**Conclusion:** The result supports the hypothesis and the research question that yoga therapy supplement with usual medical care for COPD patients is more effective than the usual medical care alone. Therefore, it is recommended that yoga therapy is safe and may be considered in COPD patients as a potential means to improve the pulmonary functions.

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### INTRODUCTION

COPD has been defined by the Global initiative for Chronic Obstructive Lung Disease (GOLD), an international collaborative effort to improve awareness, diagnosis, and treatment of COPD, as a disease state characterized by *airflow limitation that is not fully reversible (1)*. COPD include *emphysema*, an anatomically defined condition characterized by destruction and enlargement of the lung alveoli; *chronic bronchitis*, a clinically defined condition with chronic cough and phlegm; and *small airway disease*, a condition in which small bronchioles are narrowed. COPD is the fourth leading cause of death and affects >16 million persons in United States. COPD is also a disease of increasing public health importance around the world.

GOLD estimates suggest that COPD will rise from the sixth to the third most common cause of death worldwide by 2020 (2). Treatment of COPD includes smoking cessation, oxygen therapy in chronically ill patients and pharmacological medication. All therapies are directed at improving symptoms and decreasing the frequency and severity of exacerbations. Yoga is a safer and viable therapeutic modality. Regular

practice of Yoga is known to improve overall performance and working capacity (3). Current evidence suggests improvement in cardiovascular and pulmonary functions following yoga practice (4). Yogic asanas and pranayama have been shown to reduce the resting respiratory rate. Furthermore, they increase vital capacity, Timed Vital Capacity, Maximal Voluntary Ventilation, Breath Holding Time, Maximal Inspiratory Pressure and Maximal Expiratory Pressure (5).

### MATERIALS AND METHODS

The study was conducted in the department of medicine of Muzaffarnagar Medical College and Hospital, Muzaffarnagar from November 2014 through April 2015. A total of 120 participants were recruited in the study. They were grouped and sub-grouped as under:

Group 1-Yoga group: - Subgroup 1A – 30 COPD patients practicing Yoga and taking usual medical treatment. Subgroup 1B – 30 Healthy volunteers practicing Yoga. Group 2- Control group; Subgroup 2A:- 30 COPD patients on routine standard treatment for COPD not practicing Yoga. Subgroup 2B:- 30 healthy volunteers not practicing Yoga.

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**Inclusion criteria**

Patients of COPD, patients of both sexes between the ages of 20 and 70 years, patient who gives written informed consent for completing the entire span of project within six months, mentally and physically fit up to a minimum level required to participate in the study and patients fulfilling GOLD criteria (q.v.) of COPD.

**Exclusion criteria**

Patients with ages of <20 or >70 years, patients with acute

months follow up and at 6 months (i.e., A total of three test per person by computerized spirometer (Complete pulmonary functions test by COSMED pulmonary equipment) and then after the study was over all the data from study and control group was evaluated and compared. Statistical analysis was carried out using unpaired 't' test to determine the significance between the two groups.

**RESULTS**

The results of the study are depicted in the table.

**Table 1** Shows the Blood pressure parameters (Mean±2S.D.) on various day of Study group and control group

Groups	Parameters	Day 1	3 month	6 months	P-value
Subgroup 1A	FEV1	55.21±8.44	56.55± 8.75	59.52±9.21	<0.001
	FVC	68.41 ±6.40	68.41± 6.42	69.10 ±6.34	0.120
	QOL SCORE				
	Physical	12.03 ± 1.02	13.14±0.83	14.17 ± 0.89	<0.001
	Psychological	11.97 ± 0.87	13.17±1.10	14.17 ± 0.89	<0.001
Subgroup 1B	Social	9.14 ± 0.79	9.03±0.50	9.10 ± 0.67	0.580
	Environmental	13.10 ± 0.90	13.28±1.00	13.31 ± 1.04	0.110
	FEV1	98.33±2.47	98.43± 2.10	99.10±2.44	0.106
	FVC	95.13 ±1.36	94.93±1.14	95.33 ± 1.77	0.561
	QOL SCORE				
Subgroup 2A	Physical	14.93 ± 0.91	15.93±0.74	16.63 ± 0.67	<0.001
	Psychological	13.10 ± 1.12	13.90± 1.12	15.20 ± 0.89	<0.001
	Social	11.00 ± 1.20	11.33± 1.31	11.03 ± 0.96	0.580
	Environmental	15.07 ± 0.74	14.80±0.92	15.20 ± 0.61	0.057
	FEV1	54.93±7.06	53.89± 7.08	52.93±7.18	0.028
Subgroup 2B	FVC	66.48 ±5.43	66.41± 5.42	66.70 ±5.38	0.207
	QOL SCORE				
	Physical	11.56 ± 1.05	11.56± 1.12	11.70 ± 1.14	0.327
	Psychological	11.93 ± 1.11	12.00±1.27	12.04 ± 1.06	0.611
	Social	9.00 ± 0.96	8.73±0.73	8.96 ± 0.94	0.802
Subgroup 2B	Environmental	11.93 ± 0.87	11.96± 0.76	12.00 ± 0.88	0.646
	FEV1	98.30±1.74	98.07± 1.48	98.37±1.19	0.807
	FVC	95.47 ±2.13	95.27±1.87	95.17 ±1.66	0.807
	QOL SCORE				
	Physical	14.93 ± 1.01	14.97±0.89	15.03 ± 1.10	0.599
Subgroup 2B	Psychological	14.07 ± 1.34	14.13±1.28	14.20 ± 1.37	0.645
	Social	11.17 ± 1.09	11.17± 1.09	11.20 ± 0.89	0.802
	Environmental	15.20 ± 0.89	15.20±0.61	15.23 ± 0.63	0.060

P<0.05- Significant, p<0.001- Highly significant

exacerbation of respiratory infection, patients with abnormal liver, renal or hematological profile, patients who are unwilling to give consent for their inclusion in the study, any substance abuse, mental illness or conditions, which in the opinion of investigator would make it difficult for the potential participant to participate in the intervention, patients not fulfilling the GOLD criteria, patients having contraindication of PFT i.e., recent MI, active bleeding, respiratory distress and patients stage- 4 COPD disease (GOLD) criteria. All the COPD patients and healthy volunteers in the YOGA group 1 were given practical demonstration of YOGIC Pranyama including Bhastrika, Anuloma viloma pranayama, Kapalbhatai Pranayama, Bhramari Pranayama and Udgeeth Pranayama by a person trained for YOGIC practices.

On satisfactory completion of YOGIC training the participants were asked to regularly practice Pranayama for 30-45 minutes every morning and preferably also in the evening for six months. Participants in all groups underwent Pulmonary functions testing (FEV1, FVC, FEV1/FVC) and were also assessed by WHO quality of life questionnaire for their Quality of Life (Q. O. L.) scores at recruitment in the study, at 3

The above shows that after practicing YOGA for six months there is highly significant improvement in FEV1 in subgroup 1A, Physical and Psychological domain in subgroup 1A, 1B.

**DISCUSSION**

Our study demonstrates that six months treatment with yoga therapy along with lifestyle modification and conventional treatment has a significant improvement in pulmonary functions (FEV1 and Physical and Psychological Domain of QOL score) in COPD Patients which is supported by Gopal KS Bhatnagar *et al* <sup>(6)</sup>, Katiyar SK *et al* <sup>(7)</sup>, Nagendra HR *et al* <sup>(8)</sup> and Luca Pomidory *et al* <sup>(9)</sup>

There was no significant improvement in FVC and Social and Environmental Domain Of QOL score in COPD patients.

From our study it may be summarised that yoga therapy in combination with conventional medical therapy was surely beneficial for the COPD patients and yoga should be added to the management of COPD in all the stages.

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