

Effect of Pranayama on Level of Dyspnoea among Patients with Chronic Obstructive Diseases

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Abstract: *The study was conducted with an objective of assessing the level of dyspnoea among patients with COPD. Quasi Experimental Non-Randomised Control group design was adopted for the study. A sample of total 60 were included; 30 experimental, 30 controls were collected using purposive sampling from Inpatient and Outpatient areas of Chest and T.B Department in Kannur Medical College, Hospital, Kannur. Intervention, Nadi Suddhi Pranayama was practiced twice daily for half an hour upto one month continuously. Post test were conducted after one month period and which revealed that post test dyspnoea score was lower than the pretest score by using Medical Research Council Dyspnoea scale(MRC Scale).The study results showed that calculated t value 13.43 is greater than table value ($t_{29}=2.045$) at 0.05 level of significance. Therefore study concluded that Pranayama exercise reduces the level of dyspnoea among COPD patients.*

Keywords: Effectiveness, Pranayama, Chronic Obstructive Pulmonary Disease, Level of Dyspnoea, MRC Scale

1. Introduction

Breathing is a physiological function that is almost synonymous with being alive. It is a basic human need ^[1]. Breathing problems are on an increasing trend now. It causes significant disability to human beings.

COPD is a term used to describe chronic lung diseases that are characterized by progressive obstruction of the airflow into and out of the lungs and shortness of breath^[2]. It is expected to be the third leading cause of death and fifth cause of disability worldwide by the year 2020. Approximately 14 million Indians are suffering from COPD.

Dyspnoea, the hallmark symptom of COPD is the reason for which most patients seek medical attention and is a major cause of disability and anxiety associated with the diseases that lead to reduced quality of life. It has been suggested that dyspnoea is the single most factor contributing to functional difficulties in COPD.

A comparative study was conducted to evaluate the impact of inspiratory muscle training on lung function and exercise tolerance among 35 patients in Madrid, The result showed that trained group experienced a significant decrease in dyspnoea evaluated by the Borg scale. The study concluded that it is accompanied by a decreased sense of dyspnoea.^[12] A randomized controlled trial was conducted in Venezuela to determine the impact of comprehensive pulmonary rehabilitation on dyspnoea and health related quality of life among 24 patients with severe COPD. The result showed that there was a significant improvement in the severity of depression ($P<0.01$), a decrease in symptoms ($P<0.05$), and increase in daily living activities($P<0.05$) and dyspnoea measured by the Medical research council scale was significantly better in pulmonary rehabilitation group ($P<0.01$). The study concluded that pulmonary rehabilitation induces important changes in dyspnoea. So it is important

for patient to improve their health by improving their lifestyle. Therefore best treatment, awareness about the disease and inculcating alternative treatment such as different types of breathing exercises in the form of yoga are the best option to decrease this trend. In order to shower those awareness and techniques related to lung expansion nurses need to play vital roles. The breathing exercises act as one of the key elements of COPD management program. A comprehensive yoga program is one of the effective breathing exercises and has a statutory effect on general health and respiratory health; thereby helps to increase a person's ability to perform activities of daily living. This yogic regimen may change the milieu at the bronchioles and the alveoli particularly at the alveolar-capillary membrane to facilitate diffusion and transport. ^[11] During the clinical postings investigator came across many cases of COPD with dyspnoea as the main symptom which affect their activities of daily living. Breathing exercises are aimed at improving symptoms of dyspnoea and ameliorate adverse physiological effects. On reviewing the literature investigator found yoga mainly Pranayama is one of the main breathing exercise in which yoga improves the blood circulation; there is better perfusion of tissues also, which increases the strength of respiratory muscles and oxygen delivery also been increases. The further advantage of yogic breathing lies in the fact that it is more of a vertical breathing. Hence the investigator felt it necessary to assess the effect of Pranayama on dyspnoea.

2. Background of the Problem

COPD is not untreatable. It is not necessarily progressive. It is not necessarily crippling: It is not a single disease, so it never affects two patients in exactly the same way. "My improved condition is directly attribution to excellent specialized medical advice, participation in an effective multidisciplinary wellness program, the fellowship of an active positive support group and my personal commitment to the effort required to get result" says Bill Harden who is

the author of COPD survival guide 2000, who is a COPD patient himself^[12].

COPD is characterized by air flow limitation that is not fully reversible. COPD is a major cause of chronic morbidity, mortality and represents a substantial economic and social burden throughout the world⁴.

COPD is expected to be the third leading cause of death and fifth cause of disability worldwide by the year 2020^[3]. The world health organization (WHO) estimates that COPD as a single cause of death shares 4th place after coronary heart disease, cerebrovascular disease and acute respiratory infection. WHO estimates that in the year 2008, 2.74 million people died of COPD worldwide. In 2009 it increased to more than 3 million which corresponds to 5% of all deaths globally. There are almost 80 million people suffering from moderate to severe COPD worldwide.

COPD is the fourth leading cause of death in America, claiming the lives of 1, 20,000 Americans in 2002. It is estimated that 10.7 million U.S adults have COPD; In Europe 4 to 6 percentage of the adult population suffers from COPD in a clinically relevant form, although two thirds of it shows only minor ventilator impairments. The prevalence increases proportionally with age.^[5]

COPD is estimated to be 6.2 percent in 11 Asian countries surveyed by the Asian pacific society of respiratory diseases. Prevalence of COPD in India is 5% in males and 2.7% in females with the male to female ratio of 1.6:1 into approximately 12 million cases in India alone. The incidence and prevalence of COPD is increasing as a result of urban ambient air pollution and indoor exposure concentrations of particulate air pollution.^[6]

Reports from northern India in which incidentally has cooler climatic conditions accompanied by smog during winter, also suggest that the prevalence may be higher than that in south India. The range of prevalence rates reported in males from north India (2.12%–9.4%) is generally higher than that reported from south India (1.4%–4.08%).^[7] It is estimated to be range of prevalence by clinical pattern of COPD in South India among age group of 50-60 is 65% in males and 35% in females in Trichur, Kerala.^[7]

COPD is highly variable reflecting ,it has been defined by the global initiative for obstructive lung disease(GOLD) as a disease state characterized by airflow limitation that is not fully reversible. Dyspnoea, the hallmark symptom of COPD is the reason for which most patients seek medical attention and is a major cause of disability and anxiety associated with the disease that leads to reduced health related quality of life. So it is important for patient to improve their health by improving their lifestyle.⁸

Lifestyle plays a critical role in the treatment of COPD by making certain lifestyle changes; thereby one can able to reduce symptoms and improve quality of life. The life style pattern such as diet, habits, exercise and breathing exercise plays an important role in the prevention and treatment of the patients. Hence changing the life style will improve the

health status and reduces the hospital readmission in COPD.⁹⁻¹⁰

2.1 Statement of the Problem

A study to assess the effect of Pranayama on level of dyspnoea among patients with Chronic Obstructive Pulmonary Disease in Kannur Medical College Hospital, Anjarakandy.

2.2 Objectives of the Study

- 1) To assess the level of dyspnoea among patients with COPD in experimental and control group.
- 2) To assess the effect of Pranayama on dyspnoea among patients with COPD in experimental group.
- 3) To compare the level of dyspnoea among patients with COPD in experimental and control group.
- 4) To find out the association between level of dyspnoea among patients with COPD and selected socio personal variables.

2.3 Hypothesis

H1: There will be significant change in level of dyspnoea among patients with Chronic Obstructive Pulmonary Disease after Pranayama.

H2: There will be significant difference in level of dyspnoea between experimental and control group.

H3: There will be significant association between level of dyspnoea among patients with Chronic Obstructive Pulmonary Disease and selected socio personal variables.

3. Method

3.1. Design and Setting

Non Randomised Control Group design. The study was conducted in Kannur Medical College Anjarakandy, kannur.

3.2. Sample Size and Sampling Technique

60 Patients having dyspnoea associated with COPD in Kannur Medical College Hospital, Anjarakandy were selected using Non probability purposive sampling technique

3.3. Assesment Tools

1. Tool 1: Structured intercviw Schedule for assessing socio personal variables like age, gender, religion, education, occupation, monthly family income, type of food, duration of COPD, history of smoking, duration of smoking,

2. Tool 2: Standardised Medical Research Council Scale [MRC SCALE]

MRC scale is a well known standardized tool widely used for research work; assessing the subjective feeling of dyspnoea ,difficulty in performing activities of daily living .It is not subjected to copyright and is widely used for clinical and research work. when studying the respiratory problems of Welsh coal miners at the Medical Research Council Pneumoconiosis Unit in the 1940s. The questions

were first published in 1952 and rapidly developed into the MRC breathlessness scale. The MRC breathlessness scale comprises five statements that describe almost the entire range of dyspnoea from none (Grade 0) to almost complete incapacity (Grade 4). It can be self-administered by asking subjects to choose a phrase that best describes their condition, e.g. 'I only get breathless with strenuous exertion' (Grade 0) or 'I am too breathless to leave the house' (Grade 4). Alternatively, it can be administered by an interviewer with the statements framed as questions, e.g. 'Are you short of breath when hurrying on the level or walking up a slight incline' (Grade 2). The score is the number that best fits the patient's level of activity.

3.4. Validity and Reliability

Validity of the structured questionnaire was done by 12 experts from different departments of nursing, Pulmonology Medicine, Department. The reliability of the structured questionnaire was checked by test-retest method Karl Pearson's correlation coefficient

The tool was administered among three patients who attended in the Kannur Medical College Chest and T.B Department. Using Karl Pearson's formula for correlation coefficient $r = .89$ for structured questionnaire. Using Spearman Brown's Prophecy formula: $R = 0.8$ for structured questionnaire. The tool was found to be reliable

3.5. Data collection procedure

The study was conducted after getting permission from the Institutional Ethics Committee, Medical Superintendent, and the Head of the Department of Chest and T.B Medicine of Kannur Medical College Hospital, Anjarakandy. The purpose of the study and role of the patients in the study were clearly explained and informed consent was obtained from the patients. The investigator collected the data from patients of both IP and OP of Chest and T.B department of Kannur Medical College Hospital, Anjarakandy. A total of 60 patients were selected by purposive sampling technique. Out of these 30 were assigned to experimental and 30 were assigned to control group. Levels of dyspnoea of all patients in the experimental and control group were assessed by MRC Dyspnoea scale. Then Nadi Suddhi Pranayama exercise was taught and practiced twice daily (morning and evening) for half an hour for one month in the experimental group. Post-test on 31st day reveals that the mean post-test dyspnoea score of the experimental group was lower than their mean pre-test dyspnoea score. The calculated, t' value 13.43 is greater than the table value ($t_{29}=2.045$) at 0.05 level of significance.

4. Result

The data thus obtained were analyzed and presented under the following sections.

4.1 Demographic Data

- 1) Among the total sample, majority of the patients belongs to the age group of 51-60(65%) and least number of patients belongs to the age group of 41-50 (.

- 2) Highest percentage of patients belongs to the Muslim category (50%) and the least category of patients belongs to the Christian category (13%).
- 3) Highest percentage of patients having college education (50%) and least percentage of patients having secondary education (13.3%).
- 4) Majority of the patients were having monthly income >6000 (30%) and least percentage of patients were having monthly income 4001-6000(8%).
- 5) Majority of the patients were non vegetarian (68.3%) and least percentage of patients belongs to the category of vegetarian (31.6%).
- 6) Highest percentage of the patients were having duration of COPD of 6-10 years(65%), and least percentage were having COPD of 1-5 years (13.3%).
- 7) Majority of the patients were having history of smoking(68.3%) and least percentage were not having history

4.2. Pre test and post test dyspnoea scores in experiemental and control group between the experiemental and control group

Table 1: Mean and standard deviation of pre test and post test dyspnoea scores in experimental and control group

	Experimental group		Control group	
	pre test	post test	pre test	post test
Mean	2.06	1.2	2.33	2.33
SD	.76	.66	.76	.76

The table shows that the mean post test score of dyspnoea for the experimental group(1.2+/- .66) is less than that of the mean pre test level of dyspnoea (2.06+/- .76) .while the mean post test score (2.33+/- .76)of dyspnoea for the control group is same that of the pre tet dyspnoea s ore(2.3+/- .76)

- 1) The study reveals that during the pretest, majority of the patients in both the groups (experimental group, 40% and control group,46.6%) have grade 2 dyspnoea.
- 2) After intervention the percentage of patients in the experimental group having grade 2 dyspnoea (40%) and grade 3 dyspnoea(33.33%) reducedand the percentage of patients having grade 1 dyspnoea (53.3%) and no dyspnoe(13.3%) increased in the experimental group.
- 3) But in the control group during the pre test and post test, the percentage of patients were having grade 2 dyspnoea (46.6%) and grade 3 dyspnoea (33.3%) and grade 11 dyspnoea (20%) remaining the same

4.3 Effect of pranayama on dyspnoea among patients with COPD in experimental groups

Table 2: Mean, SD, mean difference and t value between pretest and post test dyspnoe scores of experiemental group.

	Mean	SD	df	t value
Experimental group				
Pretest	2.06	.76	29	13.67
Posttest	1.2	.66		

The data in the table shows that the mean post-test dyspnoea score (1.2+/- .66) is lower than the pre test score(2.06+/- .76)for the experiemental group. The calculated 't value' 13.67 is greater than the table value($t_{29}=2.045$)at 0.05

level of significance. Hence the research hypothesis is accepted.

- 1) There was as significant reduction in dyspnoea score after the regular performance of Pranayama exercise
- 2) There was a significant difference in post test dyspnoea scores

4.4. Comparison of post test dyspnoea scores in experimental and control group

Table 4: Mean, SD, mean difference and independent "t" value between post test dyspnoea scores of experimental and control group ($n_1=30, n_2=30$)

Post test	Mean	SD	df	t value
Experimental group	1.2	.66	58	5.6
Control group	2.23	0.76		

4.5. Chi-square showing association of pretest score with Table value at selected socio personal variable (n=60)

Socio Personal	χ^2	Table value at 0.05 level of significance	Inference variables	df
Age	35.78	9.49	4	**
Gender	6.35	5.99	2	**
Religion	0.783	9.49	4	
Education	10.67	12.59	6	
Occupation	18.63	18.31	10	**
Family income	10.67	12.59	6	
Type of food	5.62	5.99	6	
Duration of COPD	35.78	9.49	4	**
History of smoking	6.5	5.99	2	**
Duration of smoking	35.78	9.49	4	**
Type of Smoke	5.6	5.99	6	
Other habits	0.783	9.49	4	

P<0.05, ** significant

In this study both groups of dyspnoea score has significant association with age, gender, occupation, duration of COPD, duration of smoking and history of smoking.

5. Discussion

COPD is a devastating lung disease that progressively robs a person's ability to breathe. COPD is like an iceberg. The burden of the disease that we know about represents just the top of the problem. We are facing a dual challenge because not only COPD rapidly increasing in prevalence, but also many people with COPD are unaware that they have the disease.^[8] Surprisingly a little has actually been learned over the past years about COPD. Studies were very limited; however things are improving with some encouraging studies, clinical trials and research under way for medication and treatments. There is a very long way to go however.^[2] The findings in the study are consistent with the results of another study to assess the intensity of dyspnoea among patients with Chronic Obstructive Pulmonary Disease, which revealed that among 489 women who were randomly selected from an industrial area in London, 22% had mild dyspnoea with grade 1, 25% had moderate dyspnoea with grade 2 dyspnoea, and 53% had severe dyspnoea with grade 3 dyspnoea ($P<0.012$) and the study concluded that Chronic Obstructive Pulmonary Disease causes severe dyspnoea in majority of the patients that is sufficient to affect their

quality of life.^[6] Another study to assess the effect of yoga on dyspnoea among Chronic Obstructive Pulmonary Disease patients, which revealed that after a three week of regular performance of yoga on level of dyspnoea in the experimental group reduced by 60% ($p=0.001$) and the study concluded that yoga as a breathing exercise has its beneficial role in reducing dyspnoea in patients with Chronic Obstructive Pulmonary Disease.^[10] The findings related to association between age and pre-test dyspnoea score are in consistent with the findings of another study to assess the prevalence of dyspnoea with advancing age, which revealed that among the 674 patients who were randomly selected from a community setting, majority of the patients (67%, $P=0.01$) older than 55 years have dyspnoea associated with COPD.^[7] The findings related to the association between duration of COPD and dyspnoea are in consistent with the findings of another study to investigate the relationship duration of COPD and the incidence and progression of dyspnoea, which revealed that more duration of COPD increases the dyspnoea.^[6]

6. Conclusion

The main aim of the study was to assess the level of dyspnoea among patients with Chronic Obstructive Pulmonary Disease and to evaluate the effect of Pranyama among those patients. Naadi Sudhi Pranayama was given for the patients to perform twice daily for 25 days and then post test was conducted. The following conclusions were drawn on the basis of findings of the study:

- 1) Majority of the patients have moderate level of dyspnoea (grade 3 dyspnoea) during the pre- test.
- 2) The level of dyspnoea reduced to mild level (grade 2 dyspnoea) for majority of the patients during the post test for the experimental group and the dyspnoea level remained the same in the control group.
- 3) The Pranayama proved that it was one of the effective non pharmacological methods for reducing dyspnoea associated with Chronic Obstructive Pulmonary Disease.

There by this study concluded that, One indication for a nation's development is the level of health and quality of life of its citizens. The study findings shows that there is a need for regular health education practices and alternative therapies carried out by hospital nurses and 78 community nurses to promote health among patients suffering from Chronic obstructive Pulmonary Disease. Nurses should also take initiative to encourage the patients for regular practice of the intervention to reduce the symptoms. Thus it improves the quality of life for not only the individual patients, but also that of the family and community.

7. Future Scope

In comparison with findings of the present study, the following recommendations have been made for further study:

- 1) A similar study can be replicated on a larger group of population.
- 2) A similar study can be conducted with increasing the duration of the intervention more than three weeks.
- 3) A similar study can be conducted in community set up using a large sample.

- 4) A comparative study can be done to find the effectiveness of different intervention like Pranayama and other breathing exercise.

7.1 In Nursing Administration

In collaboration with the education department, education programme for the nurses regarding management of dyspnoea in patients suffering from Chronic Obstructive Pulmonary Disease. The nurse administrators can take initiative for training the nurses in exercise regimens for managing the symptoms of Chronic Obstructive Pulmonary Disease.

7.2 Nursing Research

The study throws light on awareness about dyspnoea in Chronic Obstructive Pulmonary Disease experienced by patients in our community and alternative methods for the management of the symptoms. More and more research can be done in this area regarding dyspnoea associated with Chronic Obstructive Pulmonary Disease which affects the quality of life of individuals and to control by regular practice of Pranayama. So the body of knowledge is the key factor, this can be explored by increasing research studies in the field of Chronic Obstructive Pulmonary Disease.

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