

# Effect of Singing along with Pulmonary Rehabilitation on Quality of Life and Dyspnea in Patient with Chronic Obstructive Pulmonary Disease

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## ABSTRACT

**Introduction:** Chronic obstructive pulmonary disease (COPD) patients have many symptoms like dyspnea, cough, fatigue, etc. The Global Initiative for chronic obstructive Lung Disease has categorized these patients according to their symptoms in 4 grades (Grade A to D). Pulmonary rehabilitation is well established treatment for COPD though the impact of more enjoyable activity is assumed more on quality of life. Hence singing was chosen as an intervention additionally to pulmonary rehabilitation in present study. Singing requires a rhythmic controlled respiration so it can have some role in improvement in dyspnea. There are very less evidences showing combine effect of singing and pulmonary rehabilitation in COPD patient so the need of study arises.

**Methods:** Medical Research Council Scale and Hospital Anxiety and Depression Scale are valid and reliable tool to measure dyspnea and quality of life respectively. Based on inclusion and exclusion criteria out of 90 screened patients 56 patients were recruited in the study. All 56 patients were divided into two groups (n=26). Group A(Experimental group) was given pulmonary rehabilitation 4 days a week and singing classes 2 days a week for 4 weeks. Group B (Control group) was given only pulmonary rehabilitation 4 days a week for 4 weeks.

**Results:** Significant improvement is seen in dyspnea and quality of life, in both groups but the significance level was higher in experimental group ( $p<0.05$ ).

**Conclusion:** Despite certain limitation the present study demonstrated singing additional to pulmonary rehabilitation can improve dyspnea and quality of life better than pulmonary rehabilitation alone.

**Key words:** COPD, Singing, Quality of Life, Pulmonary rehabilitation.

## INTRODUCTION

Chronic Obstructive Pulmonary disease is one of the commonest respiratory diseases globally. <sup>(1)</sup> According to Global Initiative for Chronic Obstructive Lung Disease Criteria patients with COPD can be categorized in to 4 group according their lung capacities, and episodes of exacerbations. <sup>(2)</sup> The major symptoms of COPD are dyspnea, fatigue, cough, reduced exercise tolerance etc. Because of these physical symptoms the quality of life is also seen affected in COPD patients. <sup>(3)</sup> Pulmonary rehabilitation is very well

established treatment for COPD. Pulmonary rehabilitation demonstrates improvement not only in respiratory symptoms but also in maximum exercise tolerance, muscle strength, functional status etc. <sup>(4)</sup> It has some impact on quality of life but some hobby or fun activity is more enjoyable than exercises. <sup>(5)</sup> Singing requires controlled voice production. Respiration is one of main factor in voice production. For singing controlled respiration is must. Singing can demonstrate effects not only on quality of life but also on respiratory symptoms. So, singing was chosen in addition to

pulmonary rehabilitation. Amanda Gimense Bonilha (2009) conducted a study to evaluate effect of singing classes on pulmonary function and quality of life of COPD patients. Total 43 patients were recruited for the study. Main inclusion criteria were Patients with recognized COPD according to global initiative for chronic obstructive lung disease criteria, stable clinical condition for last 2 months of admission in the study. Those patients with any other co-morbidity, still smoking or using oxygen therapy were excluded from the study. All patient completed spirometry measurements, Arterial blood gases analysis and Saint. George respiratory questionnaire. All patients were randomized in to a singing group or control group. Singing classes were conducted for once a week for 1 hour, for 24 weeks. Control group patients were given hand craft work such as paper folding or drawing. At the end on 24 weeks the outcome were assessed. The study demonstrated that regular singing classes are beneficial to improve maximum expiratory capacity and quality of life. They have also considered the singing as a non risky and well tolerated activity for patient with COPD. <sup>(6)</sup> It is obvious that singing and breathing are interconnected but another fact is singing cannot be a substitute of pulmonary rehabilitation. So it is hypothesized that combination of both singing and pulmonary rehabilitation will show some even more significant improvement in COPD patients instead of only pulmonary rehabilitation. Because there are very few evidences available focusing the combine effect of singing and pulmonary rehabilitation in COPD patients an efforts is made to investigate effect of singing along with pulmonary rehabilitation on dyspnea and quality of life in patient with COPD. MRC and HADS scales were chosen as an outcome measure for evaluate dyspnea and quality of life as they are valid and reliable tool to use as an outcome in patient with COPD. <sup>(3,7)</sup>

## **MATERIALS AND METHODS**

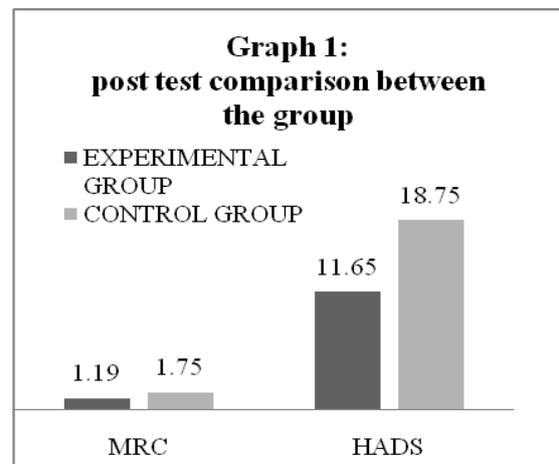
In this experimental study design simple random technique was used for sampling. Total 90 patients who diagnosed as COPD according to Global Initiative for Chronic Obstructive Lung Disease criteria from an outpatient department of a hospital were recruited. The criteria to take part in study were set as Recognized COPD According to Global Initiative for Chronic Obstructive Lung Disease criteria Grade A to C, Age less than 65 years, those who consider singing as their hobby. Patient with other concurrent respiratory disease or associated medical conditions, any malignant disease, and who does not consider singing as their hobby were excluded from the study. Based on these criteria out of 90 patients 56 patients (21 females, 45 males) were included in the study with mean age of 54 years. Informed consent was taken from all patients in writing. 56 patients were divided into 2 equal groups (n=28). Group A (Experimental group) was given pulmonary rehabilitation for 45 minutes a day, 4 days a week for 4 weeks. Pulmonary rehabilitation program included endurance training, resisted training, ventilator muscle training, and disease specific patient education program in form of pamphlets. The dosage of pulmonary rehabilitation was patient tailored and set according to the AACVPR guidelines. <sup>(4)</sup> Along with pulmonary rehabilitation additional singing classes were conducted for this experimental group. Singing classes were incorporated by a senior and professional singing teacher in presence of a physiotherapist. Singing class scheduled for 1 hour, 2 classes per week for 4 weeks. One class of singing included pre singing session and singing practice. Pre singing session included local relaxation of respiratory muscles (5 minutes), singing related exercises (slow and fast inspiration and expiration practice, vocalization exercises by loud and rhythmic pronunciation of vowels for 5-10 minutes) and demonstration of song and explanation of singing technique (5 minutes). Singing practice was done for 45 minutes with one

intermittent rest of 5 minutes. Singing teacher was instructed to choose Indian classical Songs which have positive and inspirational lyrics. Singing teacher was not aware about the purpose of the study. Minimum musical equipments were required and provided by singing teacher. Total 16 sessions of pulmonary rehabilitation and 8 singing classes were attended by this group. Group B (Control group) was given only pulmonary rehabilitation programme same as group A. Total 16 session of pulmonary rehabilitation was attended by this group. MRC and HADS were assessed on the first and last day of pulmonary rehabilitation and singing classes in both groups. The program was finalized after the approval of ethical committee.

## RESULTS

Data analysis was done using Graphpad Prism version 7.03. Pretest –post test data within the group was analyzed using paired t test and post-post data

between the groups was analyzed using unpaired t test (p value < 0.05). From experimental group 2 patients dropped the study because of non medical reasons so data of total 26 patients was analyzed in experimental group. So final sample size for both group at the end of study was group- A (Experimental group) n=26 and group-B (Control group) n=28. The pre and post data is shown in Table 1 for both groups for MRC and HADS. The comparison of post test data of both groups is done in graph 1.



**Table: 1 Comparison of mean value of pre test post data of experimental and control group**

Out-come	Experimental group			Control group		
	Pre	Post	P Value	Pre	Post	P Value
MRC	2.27	1.19	0.001	2.39	1.75	0.047
HADS	25.15	11.65	0.001	24.5	18.17	0.023

## DISCUSSION

As the result suggested that improvement is seen in dyspnea as well as quality of life in both groups. But the significance level is higher in experimental group whereas in control group improvement in dyspnea is greater than improvement in Quality of life. In the study of Amanda Gimense they noticed significant improvement in pulmonary function test results at the end of signing classes. Singing is similar to controlled active expiration, which will improve muscle performance of diaphragm muscle. Active expiration also acts on elastic recoil. It increases pressure of elastic recoil on diaphragm and ribcage. When this pressure will be released after relaxation, the next

inspiration will be facilitated. Thus they have concluded that signing classes have some role in improvement in pulmonary function as well as quality of life in patient with COPD. (6) In the present study same reasons have been assumed for improvement in dyspnea. Additionally With improvement in performance of elastic recoil chances of hyperinflation will also reduces. Controlled active expiration will also desensitize the patient with quantity of dyspnea. That can again lead to alter the patients' perception for dyspnea. There must be a combine mechanism for reduction in dyspnea with singing classes. (5,8,9) Group singing facilitates mood and social interaction among patients. Few patients reported that singing sessions were more

enjoyable that rehabilitations session and their belief regarding COPD that being a patient of respiratory condition they should limit their activities that was also changed. (10,11) Some of previous studies have observed that singing session increase motivation and adherences to therapy sessions. (12) Certain limitations were noted for the present study. Study was done with small sample size and only on patient with COPD. Author recommends conducting a study with larger sample size. The effect of singing can be also tested on other respiratory conditions such as restrictive disease. In present study effect of singing was tested only on dyspnea and quality of life, but other symptoms like pulmonary function tests change in breathing pattern during and after singing, effect on frequency and amount of expectoration of sputum can be also tested. Long term effect of singing can be checked by follow up at regular interval which was not a part of this study. Effect of particularly singing exercises and vocal exercises is also a scope of research. Though certain limitations, the present study demonstrated that group singing classes along with pulmonary rehabilitation improves quality of life and dyapnea more effectively than pulmonary rehabilitation alone in patients with COPD.

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**Conflict of interest:** No conflict of interest.

**Abbreviations:** COPD: chronic obstructive pulmonary disease, MRC: medical research Council scale, HADS: Hospital Anxiety and Depression scale

#### REFERENCES

1. Alvar Agusti MDea. Pocket Guide To COPD Diagnosis, Management, And Prevention. Global Initiative for Chronic Obstructive Lung Disease: 2017.

2. Ley B. The 2011 GOLD classification for COPD: Old GOLD vs. New GOLD Guidelines. PULMCCM. 2013.
3. Martijn A. Spruit SJSea. An Official American Thoracic Society/European Respiratory Society Statement: Key Concepts and Advances in Pulmonary Rehabilitation. American Thoracic Society Documents: American Journal Of Respiratory And Critical Care Medicine. 2013;188(8):13-64.
4. Guidelines for Pulmonary Rehabilitation Programme. American Association of Cardiovascular and Pulmonary Rehabilitation, Promoting Health and Preventing Disease, 4th Edition. 2011.
5. Victoria M Lord VJHea. Singing classes for chronic obstructive pulmonary disease: a randomized controlled trial. BMC Pulmonary Medicine. 2012.
6. Amanda Gimenes Bonilha FOea. Effects of singing classes on pulmonary function and quality of life of COPD patients. International Journal of COPD. 2009;1-8.
7. Snaith RP. The Hospital Anxiety And Depression Scale. Health and Quality of Life Outcomes. 2003;1.
8. Olsman E LC, Duggleby W, Willems D . A singing choir: Understanding the dynamics of hope, hopelessness, and despair in palliative care patients. A longitudinal qualitative study. PubMed-NCBI. 2015;Dec;13(6):164350.
9. Adam Lewis PC. Singing for Lung Health-a systematic review of the literature and consensus statement. Primary care and Resiratory Medicine. 2016;26.
10. Simon Coulton SC. Effectiveness and cost-effectiveness of community singing on mental health-related quality of life of older people: randomised controlled trial. The British Journal of Psychiatry 207, 250-255.
11. Abell RV BA, Chalmers KA. Group singing and health related quality of life in Parkinson's disease. PubMed-NCBI. 2016;36(55-64).
12. Jeanette Tamplin FAB, et al. Effect of Singing on Respiratory Function, Voice, and Mood After Quadriplegia: A Randomized Controlled Trial. American Congress of Rehabilitation Medicine. 2013; 94:426-34.

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