

Effectiveness of Pharmacotherapy with And Without Pulmonary Rehabilitation In Copd Patients

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Abstract— BACKGROUND: COPD(Chronic Obstructive Pulmonary disease) have been reported as one of the reason for mortality and decreased quality of life around the world (5). This disease causes side effects of breathlessness, cough, mucus production and deteriorate quality of life...etc. Medicine and pulmonary rehabilitation treatment has proven to be effective in the relief of symptoms and enhances the recovery of patients.

OBJECTIVE:

To compare the effectiveness of pulmonary rehabilitation in addition to pharmacotherapy in COPD patients

METHODOLOGY: Data was taken from the patients diagnosed with COPD and observe the effectiveness of pulmonary rehabilitation and pharmacotherapy treatment by categorizing population into two groups; Group 1 managed with pharmacotherapy alone and Group 2 managed both pharmacotherapy as well as physiotherapy (pulmonary rehabilitation). Participants of group 1 received pharmacotherapy with bronchodilators, nebulization and aminophyllines. Group 2 received physiotherapy which will include measures for improvement of muscle strength, exercise capacity and breathing technique. A structured questionnaire was used for preliminary data collection. Information about previous week was assembled by utilizing CCQ(clinical COPD Questionnaire)(25) and Clinical assessment test (CAT) was performed to assess the present wellbeing of the patient. The questions was totally explained to the patients.

RESULTS: The mean value of scoring of group 1 (pharmacotherapy) is 23.3467 ± 5.384 and group 2 (pharmacotherapy with PR) is 18.86 ± 4.131 which clearly states the difference of effect of treatment on patients of COPD. The p-value indicates the significance of the study. Patients of group 1 lie in the high impact (21-30) category of the COPD patients whereas patients of group 2 lie in the medium impact (11-20) category of the COPD patients on the health status. This study shows that the patients taking medicine along with PR shows more improvement in their health as compared to the patients taking only medicine.

Index Terms— COPD, Pharmacotherapy, PR(pulmonary rehabilitation).

INTRODUCTION

Chronic obstructive pulmonary disorder (COPD) is a progressive, weakening respiratory situation, including emphysema and chronic bronchitis, described by trouble breathing, lung airflow confinements, cough, and different indications. COPD is related with a history of cigarette smoking(1). People with COPD are at danger of creating coronary diseases, lung disease and an assortment of different conditions.

The worldwide prevalence of COPD is keeps on increasing, turning into the third leading reason for death by the year 2020(2). Starting at 2012, COPD was the fourth leading reason for mortality in Canada, which is equivalent to

the worldwide The prevalence of COPD in people somewhere in the range of 40 and 80 years old in Spain is 10.2% and increases with age, tobacco utilization and lower instructive dimensions. The rate of diagnosed COPD is exceptionally high and undiagnosed people with COPD already have a noteworthy impedance in HRQL and ADL(4).

COPD is a noteworthy reason for mortality and dreariness around the world (5). This disease causes side effects of breathlessness, which restricts every day activities and therefore reduces life quality (QoL). A decreased QoL is shown as an exacerbated emotional status and is identi-

fied with weakness (7).

COPD includes obsessive changes in four unique compartments of the lungs, which are fluidly present in people with the disease Tobacco smoking is the primary hazard factor for COPD, albeit other breathed in harmful particles and gases may contribute. This causes a fiery reaction in the lungs, which is misrepresented in certain smokers, and prompts the trademark obsessive sores of COPD. Notwithstanding aggravation, an irregularity of proteinases and antiproteinases in the lungs, and oxidative pressure are additionally significant in the pathogenesis of COPD (9). The distinctive pathogenic components produce the neurotic changes which, thus, offer ascent to the accompanying physiological variations from the norm in COPD: mucous hypersecretion and ciliary break; wind current restraint and hyperinflation; gas trade irregularity; pneumonic hypertension; and foundational effects (9)

COPD management expects to improve pulmonary work, anticipate disintegration, and upgrade QoL. The management of patients with chronic obstructive pulmonary disease (COPD) for the most part includes the management of symptoms and avoiding worsening or intensifications. Life style modifications, for example, exercise and discontinuance of smoking are likewise encouraged to patients with the propensity. Among the pharmacological operators utilized, long term drugs incorporate bronchodilators and inhaled glucocorticosteroids. These assistance to lighten manifestations and intensifications.

Pulmonary rehabilitation (PR) is characterized as a "directed remedial procedure of reestablishing a patient's capacity" (10). PR is a fundamental treatment for Patients with COPD(11). PR for the most part incorporates physical exercise, training, psychosocial treatment, and self-management The viability of PR in exercise limit, side effects, and QoL of patients with COPD have additionally

been examined Patients with poor financial foundation, difficult or no entrance to physiotherapy or restoration focuses may confine themselves to just pharmacotherapy despite being informed about the benefits concerning an adjunctive treatment.

Copd patients show variability in symptoms like functional limitations and well being, hence their maximal treatment is complicated.

This investigation intended to incorporate relaxation exercises and extremity muscle preparing to an ordinary PR program and to survey the impacts of these activities on QoL, dyspnea degree, practice resistance, and aspiratory capacity of patients with COPD. This examination will assist to realize importance and benefits of pulmonary rehabilitation as a leading and effective way of combating COPD. Likewise Patient training is required to treat Respiratory illness.

PROCEDURE

Study Design:

Observational Cross sectional study design was conducted.

Setting:

Data was collected from different hospitals of Lahore

- Mayo hospital
- Jinnah hospital
- UOL teaching hospital
- Mansoorah hospital
- Nawaz sharif social security hospital

Duration of study:

Study was completed within 4 months after the approval of synopsis.

Sample size:

Sample size was taken for the two consecutive months from different hospitals of the Lahore.

Sample Technique:

Non probability convenient sampling will be used.

Sample selection criteria

Inclusion Criteria:

- Patients diagnosed with COPD(16)
- Male and female(16)
- At least 40 years of age(16)
- Have a smoking history > 10pack-years(16)

Exclusion Criteria:

- Underlying systemic diseases like cancer,cardiac issues...etc(24)
- Dementia/ Cognitive impairment or symptomatic psychiatric illness(24)
- Severe co-morbidity which means that exercise is contraindicated(24)
- Hypoxemic patients at rest or exercise(24)

Methodology:

This cross sectional study was completed after the authorization from ethical review board. A sample of 150 was taken for the two consecutive months. The inclusion and exclusion criteria was used to select the participants who will take part in the study. Data was taken from the patients diagnosed with COPD and observe the effectiveness of pulmonary rehabilitation and pharmacotherapy treatment by categorizing population into two groups; Group 1 managed with pharmacotherapy alone and Group 2 managed both pharmacotherapy as well as physiotherapy (pulmonary rehabilitation). Participants of group 1 includes 75 patients who received pharmacotherapy with bronchodilators, nebulisation and aminophyllines. Group 2 contain 75 patients who received physiotherapy which includes measure for improvement of muscle strength, exercise capacity and breathing technique e.g Intermittent positive pressure ventilation(IPPV), positive expiratory pressure(PEP), spirometry and body positioning....etc A structured questionnaire was used for preliminary data collection.

Information about previous week was assembled by utilizing CCQ(clinical COPD Questionnaire)(25) and Clinical assessment test (CAT) was performed to assess the present wellbeing of the patient. The questions was totally explained to the patients.

Ethics were retained in concern throughout the entire interval of study. Participants was involved in the study after signing a well-informed consent form.

EQUATIONS

An observational cross sectional study was conducted. Total participants who participate in this study were 150. After explaining objective of this study to every participant, permission was taken through written consent form. Data collected from diagnosed COPD patients through questionnaires (CCQ and CAT). Questionnaire includes three sections and section one includes demographic data, all of them was general. Section two, include 10 questions(CCQ), these questions were about the past week condition of the patients before admitting into the hospital and third section includes the 08 questions(CAT) related to the present well being of the patient. Each question was explained to the patient. Data was evaluated by means of computer program SPSS version 23. The effectiveness of pharmacotherapy with and without pulmonary rehabilitation(PR) in COPD patients was done after data collection by using independent t-test statistics.

FIGURES AND TABLES

Descriptive Statistics of Medicine:

Descriptive Statistics of CCQ Medicine

	N	Mean	Std. Deviation
Q1	75	2.0533	.86826
Q2	75	5.8000	.92998
Q3	75	2.6133	1.47862
Q4	75	2.0933	1.24307
Q5	75	5.0533	1.50578
Q6	75	5.4667	1.73465
Q7	75	3.6400	.98145
Q8	75	3.2667	1.09462
Q9	75	2.8000	1.05267
Q10	75	1.6933	.92959
Valid N (listwise)	75		

Descriptive Statistics CAT Medicine

	N	Mean	Std. Deviation
Q11	75	1.8400	.97315
Q12	75	2.1467	1.25949
Q13	75	3.0533	.80360
Q14	75	2.1600	1.17450
Q15	75	3.9600	.93635
Q16	75	3.7200	1.09742
Q17	75	2.9467	.83655
Q18	75	3.5200	1.47373
Valid N (listwise)		$\Sigma=23.35$	

Descriptive Statistics CAT Physiotherapy & Medicine

	N	Mean	Std. Deviation
Q11	75	1.3600	1.06085
Q12	75	1.8133	1.14719
Q13	75	2.3467	.76217
Q14	75	2.7200	.99404
Q15	75	3.1067	1.15751
Q16	75	2.9733	1.05232
Q17	75	2.5067	.89100
Q18	75	2.0400	1.17910
Valid N (listwise)		$\Sigma=18.86$	

The mean value of medicine and Pulmonary rehabilitation CAT falls in the category of Medium impact(11-20) on health status which means patients show less symptoms and health improving with the combination therapy.

Descriptive Statistics

	N	Mean	Std. Deviation
Mental Score	150	2.4733	1.02451
Function Score	150	2.9417	.63286
Symptom Score	150	4.4250	.91122
Total Score	150	3.4413	.55517
Valid N (listwise)	150		

Descriptive statistics of Medicine and pulmonary rehabilitation:

Descriptive Statistics CCQ Physiotherapy & Medicine

	N	Mean	Std. Deviation
Q1	75	2.0267	1.11468
Q2	75	5.2133	1.43596
Q3	75	2.8933	1.43859
Q4	75	2.2933	1.23871
Q5	75	4.6133	1.65948
Q6	75	5.1733	1.84811
Q7	75	3.5200	1.10722
Q8	75	3.3600	1.14656
Q9	75	3.1867	1.08669
Q10	75	2.0667	1.08221
Valid N (listwise)	75		

Method	N	Mean	Std. Deviation
Medicine	75	23.3467	5.383893
Medicine & PR	75	18.8667	4.13075

Methods	N	Mean	Std. Deviation	T
Medicine	75	23.3467	5.383893	5.71
Medicine & PR	75	18.8667	4.13075	5.71

The mean value of group 1 (pharmacotherapy/medicine) is 23.3467±5.384 and group 2 (pharmacotherapy/medicine with

PR) is 18.86 ± 4.131 which clearly states the difference of effect of treatment on patients of COPD. The p-value indicates the significance of the study. Patients taking only medicine lie in the high impact (21-30) category of the COPD patients whereas patients taking PR with medicine lie in the Medium impact (11-20) category of COPD patients on the health status. This study shows that the patients taking medicine along with PR shows more improvement in their health as compared to the patients taking only medicine.

Discussion

Chronic obstructive pulmonary disease (COPD) is a growing, weakening respiratory conditions, including emphysema and chronic bronchitis, described by trouble breathing, lung air-flow confinements, cough, and different indications. The worldwide prevalence of COPD is keeps on increasing, turning into the third leading reason for death by the year 2020.

Casaburi, Kukafka et al. conducted a study to prove that ventilatory mechanics improves from tiotropium would allow up-graded capacity to prepare muscles and increase benefits of PR. It was concluded that Tiotropium in blend with PR improved continuance of a consistent work rate treadmill task and created significant enhancements in breathing and well-being status. Whereas in my study, there is a comparison between two groups one taking pharmacotherapy and the other taking pharmacotherapy along with Pulmonary rehabilitation and the results were showing the remarkable recovery of symptoms in patients taking pharmacotherapy along with PR. The mean value of pharmacotherapy group is 23.3467 ± 5.384 and pharmacotherapy with PR group is 18.86 ± 4.131 which clearly states the difference of effect of treatment on patients of COPD. The p-value indicates the significance of the study.

Pitta, Trooster et al. conducted a study to check the advantages carried by pulmonary rehabilitation to patients with COPD and no huge changes happened in exercises with the exception of changes in dyspnea after the program were fundamentally identified with changes in walking time in every day life. But this includes COPD patients taking medicine as well as pulmonary rehabilitation and the results clearly indicates the improvement in the health status of the patients.

Qu Y, Peng H, et al. conducted a study to decide the impact of mix of chest physiotherapy (CPT) and irregular non-intrusive ventilation for chronic obstructive pulmonary disease (COPD) patients with respiratory failure. It was Concluded that COPD patients who need discontinuous non-intrusive BiPAP ventilation, accepting CPT can successfully improve the restorative effect. Whereas in my study, it was suggested that COPD patients undergoing pharmacotherapy must rely on pulmonary rehabilitation to overcome the effects and symptoms of the disease. As this combination therapy improves the symptoms and health status of the patients.

Roberts S et al. studied the effect of pursed lips breathing (PLB) for dyspnea in the treatment of COPD. This investigation discovered that the PLB in expanding patients trust in their capacity to deal with their shortness of breath. In my study, the results were explaining the positive impact that pharmacotherapy with PR have on COPD patients. The remarkable recovery of disease and overall health of patients were novel findings.

The study entitled "The effectiveness of pharmacotherapy with and without pulmonary rehabilitation in COPD patients" was conducted by taking 150 as sample size. Sample size was divided into two groups 75 in each: group 1 which is taking pharmacotherapy and group 2 taking pharmacotherapy with Pulmonary rehabilitation. One sample t-test was applied to analyze the results and it was shown that the mean value of pharmacotherapy (group 1) is 23.3467 ± 5.384 and pharmacotherapy with PR (group 2) is 18.86 ± 4.131 , which indicates the improvement in the overall health status of patients in group 2. The mean value of scoring of Group 1 lies in the High impact (21-30) of COPD on health status of patients whereas the mean value of scoring of Group 2 lies in the Medium impact (11-20) of COPD on health status of the diseased patients.

Appendices

The Clinical COPD Questionnaire (CCQ) contains 10 items (CCQn, where n is the numeric order ranging from 1-10). Patients were instructed to recall their experiences during the previous week (week-version CCQ), Each patient responded to each of CCQn with a 7-point scale ranging from 0 (indicating asymptomatic/no limitation) to 6 (indicating extremely symptomatic/totally limited). Calculation of scores were as follows:

$$\text{CCQ total score} = (\text{CCQ1} + 2+3+4+5+6+7+8+9+10)/10$$

$$\text{CCQ symptom score} = (\text{CCQ1} + 2 + 5 + 6)/4$$

$$\text{CCQ function score} = (\text{CCQ7} + 8 + 9 + 10)/4$$

$$\text{CCQ mental state score} = (\text{CCQ3} + 4)/2.$$

assessment of clinical severity of COPD with CCQ needs neither data generated from time-consuming process nor labor-intensive tests. CCQ is easy to complete by the patients themselves at their outpatient visits. Furthermore, the convenience of applicability of serial CCQ in follow-up evaluation makes detection of changes in severity of COPD more rapidly and effectively, and thus necessary intervention may start in a more timely fashion (25).

Please check the number of the response that best describes how you have been feeling during the past (Only one response for each question).

On average, during the past week, how often did you feel:

	Never	hardly ever	a few times	several times	many times	a great many times	almost all the time
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1. Short of breath at rest? 0 1 2 3 4 5

2. Short of breath doing physical activities? 0 1 2 3 4 5

3. Concerned about getting a cold or your breathing getting worse? 0 1 2 3 4 5

4. Depressed (down) because of your breathing problems? 0 1 2 3 4 5 6

In general, during the past week, how much of the time:

	Never	hardly ever	a few times	several times	many times	a great many times	almost all the time
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5. Did you cough? 0 1 2 3 4 5 6

6. Did you produce phlegm? 0 1 2 3 4 5 6

On average, during the past week, how limited were you in these activities because of your breathing problems:

	not limited at all	very slightly limited	slightly limited	moderately limited	very limited	extremely limited	totally limited /or unable to do
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7. Strenuous physical activities (such as climbing stairs, hurrying, doing sports)? 0 1 2 3 4 5 6

8. Moderate physical activities (such as walking, housework, carrying things)? 0 1 2 3 4 5 6

9. Daily activities at home (such as dressing, washing yourself)? 0 1 2 3 4 5 6

10. Social activities (such as talking, being with children, visiting friends/ relatives)? 0 1 2 3 4 5 6

Your name:

How is your COPD? Take the COPD

This questionnaire will help you and your healthcare professional measure how your COPD (Chronic Obstructive Pulmonary Disease) is having on your wellbeing and daily life. Your score will help you and your healthcare professional to help improve the management of your COPD.

For each item below, place a mark (X) in the box that best describes you for each question.

Example: I am very happy 0 1 2 3 4 5

I never cough 0 1 2 3 4 5

I have no phlegm (mucus) in my chest at all 0 1 2 3 4 5

My chest does not feel tight at all 0 1 2 3 4 5

When I walk up a hill or one flight of stairs I am not breathless 0 1 2 3 4 5

I am not limited doing any activities at home 0 1 2 3 4 5

I am confident leaving my home despite my lung condition 0 1 2 3 4 5

I sleep soundly 0 1 2 3 4 5

I have lots of energy 0 1 2 3 4 5

COPD Assessment Test and the CAT logo is a trade mark of the GlaxoSmithKline group of companies. © 2009 GlaxoSmithKline group of companies. All rights reserved. Last Updated: February 24, 2012

CAT Score	Health impact	Recommendation
0-10	Low	Smoking cessation, preventive care, and reduced exposure; consider LAMA and rescue inhalers
11-20	Medium	Smoking cessation, preventive care, reduced exposure and LAMA and rescue inhalers; consider ICS and/or rehab, and possible lung transplant evaluation
21-30	High	Smoking cessation, preventive care, reduced exposure, ICS/LABA/LAMA therapy, referrals for pulmonary rehab
31-40	Very High	Smoking cessation, preventive care, reduced exposure, ICS/LABA/LAMA therapy, referrals for pulmonary rehab, evaluation, and O ₂ supplementation

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7.3 References

Unfortunately, the Computer Society document translator cannot handle automatic endnotes in Word; therefore, type the reference list at the end of the paper using the "References" style. See the IJSER's style for reference formatting at: <http://www.ijser.org/transref.htm>. The order in which the references are submitted in the manuscript is the order they will appear in the final paper, i.e., references submitted nonalphabetized will remain that way.

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CONCLUSION

This study concluded that Pulmonary rehabilitation with pharmacotherapy have great impact on COPD patients to control the symptoms and health status. This also shows that pharmacotherapy is effective in treatment of COPD patients but the combination of pharmacotherapy with Pulmonary rehabilitation is proved to be more efficient in the recovery of the disease and related symptoms.

- Health care professionals need to tell the impact and significance of Pulmonary rehabilitation along with pharmacotherapy on recovery of COPD symptoms to the patient.
- Sedentary lifestyle of patients should be discouraged.
- Smoking is the risk factor of COPD so individuals need to stop smoking.
- Study should conduct under control group to measure the proper impact of Pulmonary rehabilitation with pharmacotherapy.

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10. RECOMENDATIONS

- More studies should be conducted on the impact of Pulmonary rehabilitation to deduce a defined plan to reduce prevalence of COPD in the community.

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