The Effectiveness of Exercise Package on Activities of Daily Living (ADL) and Selected Respiratory Parameters among Patients with Chronic Obstructive Pulmonary Disease (COPD) in a Selected Hospital, Dehradun, Uttarakhand

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Abstract: *Chronic obstructive pulmonary disease (COPD) is one of the primary respiratory conditions reduces the life span, major reason for morbidity that is associated with worsening the quality of lives on a global scale. The aim is to bring improvement in self care activity and selected respiratory parameters of the patient with COPD. The main purpose was to improve activities of daily living and respiratory function by exercise in COPD patients. Quantitative research approach and quasi – experimental, equivalent pre-test and post- test research design was used to evaluate the effectiveness of exercise package on activities of daily living (ADL) and selected respiratory parameters among patients with chronic obstructive pulmonary disease (COPD) in a selected hospital, Dehradun, Uttarakhand. Total 70 samples, 35 in experimental group and 35 in control group were selected by purposive sampling technique. Data was collected with socio-demographic data, clinical profile, baseline data, Activities of daily living (ADL) rating scale. The findings of the study revealed that the mean post-test score of activities of daily living of was 57.05 ± 4.56 in experimental group and 45.58 ± 7.27 in control group. The study revealed that improving physical activities like doing less intensity exercise shows positive impact in day today life activities.*

Keywords: COPD, ADL.

1. Introduction

In 2017 Global initiative on obstructive lung disease (GOLD) modified and simplified that COPD is an avoidable and manageable condition with continuous pulmonary manifestation along with airflow restriction because of pathological changes caused by considerable exposure to harmful substances or gases [1]. COPD is the neglected epidemic mortality, a fast growing global epidemic. It is estimated around 3 million people may die each year. Currently, it is the top fourth killer disease and moreover expected to climb to the third position across the world by 2030. The WHO has predicted the COPD death rates will increase by around 160 % in the south - East Asian countries over the next twenty years. Half a million people are estimated to die due to COPD in India every year, the second largest number in the world after china [2]. **In Uttarakhand,** Chronic respiratory disease accounted 7 % mortality and 3 % disabilities. Estimation of incidence ranged 2 to 22 % in men and 1.2 to 19 % in women. A burden of COPD has risen to 6.8 % in 2016 [3]. Regular exercise is part of a healthy lifestyle, even in COPD conditions. It might feel like it's not safe, or may be unattainable, however the correct quantity and kind of exercise has several advantages and actually improves the condition [4]. Walking is a safe and effectual form of exercise for everyone including COPD patients. This simple basic activity enhances the use of oxygen capacity in the body, builds stamina, strengthens muscles and improves overall sense of welfare. A routine walking is easier and also constructs more self – sufficient to tolerate exercise [5].

An incentive spirometry is an instrument commonly used for particular lung conditions like COPD, or other respiratory diseases to help keep lungs healthy. It helps the lungs to retain and intake slow, deep breaths. The incentive spirometry is an exercise to lungs and helps to keep the alveoli sufficiently inflated and also measures the filling of airflow in each breath [6].

2. Literature Review

Telerlek H, Cakmak A, Kutukcu CE, Arikan H, Ince ID, Saglam M, et al (2019) Turkey conducted cross-sectional study. The total samples were 27 clinically stable COPD patients. An assessment was done to assess the maximum and moderate exercise capacity. The study result showed moderate relationship in between highest exercise ability and general ADL performance [7].

Roos DP, Lucas C, Strijbos JH, Trijffel VE (2017) Netherland, done randomized controlled trial. The samples

were stable COPD patients. The 10-week physical activity program was administered to experimental group which contained exercise training and walking program at home and control group got the conventional treatment. The results proved that physical activity of interventional group increased significantly against control group. The functional capacity was increased among the experimental group [8].

3. Objectives

1) To evaluate the effectiveness of exercise package on activities of daily living in experimental group among patients with COPD.
2) To evaluate the effectiveness of exercise package on selected respiratory parameters in experimental group among patients with COPD.
3) To find out the correlation between post test score of activities of daily living and selected respiratory parameters among patients with COPD.

4. Method and Materials

Quantitative research approach and quasi – experimental, equivalent pre-test and post- test research design was used. Total 70 samples, 35 in experimental group and 35 in control group were selected by purposive sampling technique among patients with chronic obstructive pulmonary disease (COPD) in a selected hospital, Dehradun, Uttarakhand. The reliability of the tools was checked by administering tool to the 15 participants and it contained socio demographic, clinical profile, baseline data and ADL rating scale. The test re-test method was used to computing the reliability and score was r= 0.98 which was found to be highly reliable. Pre-testing was done among 10 COPD patients to determine the clarity of items and understanding of the language and time required to fill the tools and participants were reported no difficulty in answering the questions. Approximately, 10-15 minutes was taken to complete the tools by each participant. Pilot study done with 10 COPD patients, to find feasible to conduct the main study and there was no practical difficulty found. Data was collected by using semi-structured interview and observational methods after taking informed consent from the participants.

The exercise package includes walking and incentive spirometry given to experimental group. The patient encouraged to walk and finish the maximum 5 laps and each lap is 20 meters long and then patients were instructed to perform Incentive spirometry with 15 breaths in one session and instructed to perform again in every 6 hours which was three times a day. Post- test was done on fifth day, collected baseline data and ADL scale.

5. Analysis

5.1 Description of socio-demographic variables of participants

Socio-demographic data revealed that highest number of participants belongs to the age group 61- 70 yrs 15 (42.9 %) experimental group and 12 (34.3 %) control group.

Maximum numbers of participants are male 22 (62.9 %) and 25 (71.4 %) in both the groups. Maximum participants had no formal education 13 (37.1 %) and 14 (40 %). Highest participants were unemployed 11 (31.4 %) and 10 (28.6 %). Maximum number of participants were belongs to the family income ranges 5001-10000 with 22 (62.9 %) and 15 (42.9 %). Maximum numbers of participants belong to joint family 25 (71.4 %) and 22 (62.9 %). Maximum participants were from rural area 21 (60 %) and 22 (62.9 %). Highest number of participants were non-vegetarian 27 (77.1 %) and 28 (80 %). Almost 28 (80.0 %) and 31 (88.6 %) were having cross ventilation at home. Maximum 23 (65.7 %) and 18 (51.4 %) were exposure to chulha smoke. Equally highest participants exposed to passive smoke 24 (68.6 %) and 24 (68.6 %) in experimental group and control group respectively.

5.2 Frequency and percentage distribution of selected clinical profile of COPD patients:

Maximum participants had normal BMI 19 (54.3 %) in experimental group and 25 (71.4 %) in control group had normal BMI. Maximum duration of COPD were 73 months and above 17 (48.6 %) in experimental group, in contrast, 13 (37.1 %) 0-24 months were in control group. Most of them were had co-morbid conditions 30 (86 %) experimental group and 25 (71 %) control group. In experimental group, the maximum number of participants were taking treatment for 73& above months 16 (46 %) in experimental groups but the highest treatment duration was 0 – 24 months 15 (43 %) in control group. Around all patients were on medication for COPD 35 (100 %) in both groups respectively. Maximum participants were on nebulization 30 (86 %) experimental group and 33 (94 %) control group. The participants were not on oxygen therapy was 21 (60 %) experimental group and 20 (57 %) control group.

5.3 Frequency and percentage distribution of activities of daily living in experimental and control group among patients with COPD

Maximum number of participants 24 (68.6 %) experimental group were belongs to a limited extend dependent but 17 (48.6 %) of control group was belongs to partially dependent. The average pre-test score was nearly same among (42.69) experimental group and (41.86) control group. But the mean post-test score was higher in experimental group (57.06) than the control group (45.57).

5.4 Frequency and percentage distribution of selected respiratory parameters of COPD patients

Majority of participants were had tachypnea 28 (80.0 %) in pretest and 22 (62.9 %) in post-test in experimental group as well as in control group 29 (82.9 %) in the pre-test 26 (74.3 %) in the post-test. Maximum participants had dyspnea in pretest 29 (82.9 %) than in post-test 13 (37 %) in experimental group and also in control group with 19 (54 %) and 10 (29 %) respectively. Minimum participants had an acceptable level of spo2 (88 % - 92 %) in pre-test 9 (26 %) as well as in post-test 3 (9 %) among experimental group and also 10 (29 %) in pre-test and 7 (20 %) in post test among control group.

Table 1: Comparison of pre-test and post-test mean score of activities of daily living (ADL) between experimental and control group of patients with COPD

Asses sment	Exp. Group (n_1=35)	Con. Group (n_2=35)	Mean Difference	t test value	P value
	Mean ± SD				
Pre-test	42.68 ± 4.9	41.86 ± 7.32	0.83	0.556	0.005
Post-test	57.05 ± 4.56	45.58 ± 7.27	11.5	7.92	0.000*

Independent "t" test, 't_{68}'= 1.67 at p<0.05   *Significant

Table 1: displays the mean post-test score of ADL in experimental group (57.05 ± 4.56) was higher than the control group (45.58 ± 7.27) and the value was statistically significant with '$t68$'= 7.92, p<0.05. Therefore, the null hypothesis fails to accept.
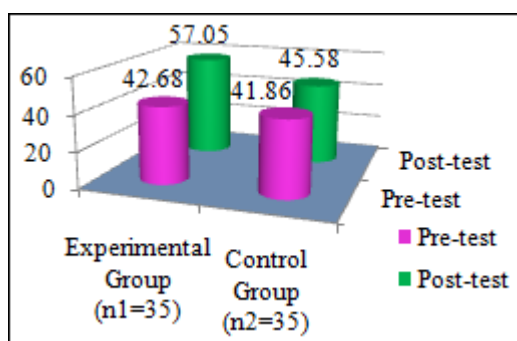
Figure 1: Comparison of mean pretest and post test of ADL among experimental and control group

Table 2: Comparison of pre-test and post-test mean score of respiratory parameters between experimental and control group of patients with COPD

Parameter	Assessment	Exp. Group (n_1=35)	Con. Group (n_2=35)	Mean Difference	t test value	P value
		Mean ± SD				
Resp. Rate	Pre-test	25.89± 4.34	25.49 ± 4.58	0.4	0.375	0.73
	Post-test	22.06 ± 3.0	22.97 ± 2.63	-0.91	1.354	0.89
Spo2	Pre-test	93.51 ± 2.66	94.23 ± 2.87	-0.71	1.08	0.49
	Post-test	95.49 ± 1.95	95.54 ± 2.68	-0.57	0.102	0.06

Independent "t" test, 't_{68}'= 1.67 at p<0.05   *Significant

Table 2: shows no much noticeable difference among mean post test score of selected respiratory parameters between the groups and also not statistically significant. The calculated t value < table value at p<0.05 selected respiratory parameters. Therefore the null hypothesis accepted

Table 3: Correlation between post-test of activities of daily living and selected respiratory parameters among patients with COPD

Variables	r
Post test score of activities of daily living and respiratory rate among patients with COPD.	-0.3
Post test score of activities of daily living and SPO2 among patients with COPD.	-0.083

Table 3: shows negative correlation between activities of daily living and respiratory rate with -0.3 and in SPO2 with -0.083. Therefore the null hypothesis is fails to accept.

Implication
Findings of the present study supported that nursing interventions were effective in improving the ADL and also shows progress in respiratory parameters in COPD patients.

1) The findings can serves as an evidence based practice for caring COPD patients i.e. exercises like walking and incentive spirometry were essential and helps in improving the condition of the patient.
2) Nurses can motivate the patient and encourage them to actively practice their daily routine.
3) The study findings can be utilized in formulating rating scale for COPD patient in ward.

6. Limitations

- Randomization of sample into control and experimental group could not be done.
- Patient's follow-up could not be done after the discharge.

7. Recommendation

- Comparative study can be conducted on active exercises and deep breathing exercises among COPD patients.
- Study can be conducted on education and exercise training for longer duration to assess its effects on prevention of exacerbation on the COPD patient.
- A similar study can be conducted on patients for the longer intervention duration with large sample size.
- A similar study can be conducted among Asthma patients.

8. Conclusion

The study concluded that the exercise package i.e. walking and incentive spirometry were effective in improving Activities of daily living (ADL) and showed better improvement in respiratory parameters of patients with COPD. So the exercise can bring positive outcome for better living and also shows that the regular longer duration of practice reduces the dependency level.

References

[1] S Roversi, L Corbetta, E Clini . GOLD 2017 recommendations for COPD patients: toward a more personalized approach. COPD Research and Practice. 2017 Dec;3 (1):1-6.
[2] SK Jindal Textbook of Pulmonary and Critical Medicine. 1st ed. Newdelhi: Jaypee Brothers Medical Publishers (P) Ltd.; 2011.
[3] H Watz, B Waschki, T Meyer, H Magnussen, Physical activity in patients with COPD. European Respiratory Journal. 2009 Feb 1;33 (2):262-72.
[4] COPD FOUNDATION. [Online].; 2019 [cited 2019 may. Available from:http://www.copdfoundation.org/learn-more/i-am-a-person-with-COPD/exercise.aspx.

[5] D L. verywellhealth. [Online].; 2019 [cited 2020 January. Available from: http://www.verywellhealth.com.

[6] http://www.rcjournal.com/cpgs/ispircpg.html. [Online].; 2011 [cited 2019 May. Available from: http://www.rcjournal.com/cpgs/ispircpg.html.

[7] H Tekerlek, A Cakmak, E Calik-Kutukcu, H Arikan, D Inal-Ince, M Saglam, N Vardar-Yagli, C Oksuz, T Duger, S Savci, C Bozdemir-Ozel. Exercise Capacity and Activities of Daily Living are Related in Patients With Chronic Obstructive Pulmonary Disease. Archivos de bronconeumologia. 2020 Apr 1;56 (4):208-13

[8] P D Roos, C Lucas, JH Strijbos, E Van Trijffel. Effectiveness of a combined exercise training and home-based walking programme on physical activity compared with standard medical care in moderate COPD: a randomised controlled trial. Physiotherapy. 2018 Mar 1;104 (1):116-21.

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