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A study to assess the effectiveness of interventional package on pulmonary functional parameters among patients with chronic obstructive pulmonary disease admitted in selected hospital Indore (M.P.)

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Abstract

Chronic Obstructive Pulmonary Disease is very common in general population. It is a slowly progressing disease involving the airways or pulmonary parenchyma resulting in airflow obstruction. The most common factor leading to COPD is cigarette smoking, exposure to occupational dust and chemicals. The symptom of COPD ranges from dyspnoea, chronic cough with or without sputum production. Interventional package containing education and deep breathing exercises improved the health status and increased the exercise tolerance of patients with COPD. The main objective of the study was to determine the effectiveness of interventional package on pulmonary functional parameters among patients with chronic obstructive pulmonary disease in experimental group. The research design adopted was quasi experimental with two group pretest posttest design. Purposive sampling technique was followed to obtain a sample of 100 COPD patients (50 COPD patients in experimental groups and 50 COPD patients in control groups) Pretest and posttest assessment was done by using pulmonary functional parameters.

Interventional package containing educational phase was provided for 15-20 minutes daily and deep breathing exercises were administered 2 cycles per day for 7 days to the experimental group whereas control group was not given any intervention. Post test was conducted after intervention both experimental and control group on day 7. The study reveals that they improve the pulmonary functional parameters after intervention, then in the control group. The t value of difference of comparison mean of pulmonary function tabulated was found to be $t=28.45$, $df = 59$ $p<0.05$. The study also shows that there is an association between age, history of smoking, family history, the conclusion of the study shows that interventional package is found to be an effective non pharmacological therapy to improve lung function.

Keywords: Interventional package, pulmonary functional parameters, COPD patients

Introduction

Chronic Obstructive pulmonary Disease is a major cause of ill health globally.

World COPD Day is 19 November 2015. COPD is found to be one of the most distressful conditions badly affecting human life. COPD is the fourth leading cause of death in the United States. The disease is characterized by an abnormal inflammatory response in the lungs and restricted airflow. The disease typically occurs after age 35. Every six seconds people with serious respiratory disease are reminded that their breathing is impaired and they cannot enjoy life as they used to as their activities are restricted and that their lives may not be as long (COPD University of Maryland report 2008).

According to WHO estimates, 65 million people have moderate to severe chronic obstructive pulmonary disease. More than 3 million people died of COPD in 2005, which corresponds to 5% of all deaths globally. COPD is the third leading cause of death in the United States. More than 11 people have been diagnosed with COPD, but an estimated 24 million may have the disease without even knowing it. COPD causes serious long term disability and early death (WHO Burden of COPD 2015).

The potential outcome of COPD is progressive deterioration in lung function as a result of persisting lung inflammation in response to inhaled pollutants, chiefly tobacco smoke (Pawls *et al* 2001)^[21]. This process results in the eventual development of chronic symptoms which may eventually become disabling (celli *et al* 2004)^[22].

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The hallmark symptom of COPD is shortness of breath that gets worse overtime. It is often accompanied by a phlegm producing cough and episodes of wheezing. Late severe symptoms include rapid, labored breathing and persistent craving for air hunger even during rest or after minimal physical activity. About 75% of patients have chest pain. Nearly half of COPD patients report some limitation in daily activities. They have trouble walking upstairs or carrying even small packages. They also have poor nutrition. So, they tend to be underweight (University of Maryland report 2008).

Need and Significance for the study

“Exercise is a medicine for creating change in a person’s physical, emotional and mental status” (Carol Welch).

COPD is the leading cause of breathing disability in the world. COPD is caused mainly by smoking, but also by exposure to airborne pollution, to harmful fumes or particles at home or at work, or by inheriting a genetic deficiency (Puntuieri *et al.* 2009, Barnett 2012)^[23, 24].

COPD is the 5th biggest killer disease worldwide. Every hour COPD is estimated to kill over 250 people worldwide. The WHO estimates that in 2000, 2.74 million people died of COPD worldwide. According to WHO, passive smoking carries serious risks, especially for children and those chronically exposed. WHO estimates that passive smoking is associated with a 10 to 43 percent increase in risk of COPD in adults (World Health statistics (2008).

Global Mortality data from the WHO World Health Report (Who 2002) show that COPD mortality rates were higher in men for almost all regions.

COPD is the third leading cause of death in the U.S. It is estimated that there may currently be 16 million people in the United States currently diagnosed with COPD (COPD statistics US information 2008).

In 2011, 12.7 million U.S adults were estimated to have COPD, in 2011, an estimated 10.1 million Americans reported a physician diagnosis of chronic bronchitis, of the estimated 4.7 million Americans ever diagnosed with emphysema 92% are 45 or older (COPD statistics US information 2008).

In India NCDS were estimated to have accounted for 53% of all deaths and 44% of disability adjusted life years lost in 2005. of these chronic respiratory diseases accounted for 7% deaths and 3% disability. Crude estimates suggest there are 30 million COPD patients in India. India contributes significant and growing percentage of COPD mortality which is estimate to be amongst the highest in the world. The overall prevalence of COPD was 4.36%. The prevalence among males and females were 5.32% and 3.41% respectively. Approximately 20% to 30% of smokers will ultimately develop COPD (Koul P A COPD Indian guidance Lung India 2013).

Statement of Problem

“A study to assess the effectiveness of interventional package on pulmonary functional parameters among patients with chronic obstructive pulmonary disease admitted in selected hospital, Indore”

Objectives

1. To assess the pulmonary functional parameters among

2. patients in experimental and control group before implementing the interventional package.
3. To assess the pulmonary functional parameters among patients in experimental and control group after implementing the interventional package.
4. To determine the effectiveness of interventional package on pulmonary functional parameters.
5. To find out the association between the pulmonary functional parameters and the selected demographic variables of patients with COPD.

Review of Literature

Ana S.M. Afonso *et al.* (2011)^[25] conducted a population-based study among patients with COPD. The age group more than 40 and having smoking history more than 12 months. The data were collected in Dutch IPCT database using two step validation algorithms. Among 185, 325 participants 7308 subjects with COPD had incident & COPD. They found that the incidence of COPD was higher in men (3.33 - 3.77) than in women (2.17 - 2.52). Also, they reported that the overall baseline prevalence of COPD was 3.02%. Thus, they concluded that the true incidence of may be 30-40% higher in Netherlands Early intervention emphasize the need for better primary and secondary prevention in patients with COPD.

Graciane Laender Moreira *et al.*, (2003)^[26] Sao Paulo Brazil) conducted a study to determine the under-diagnosis rate in new COPD cases. They done the nine - year follow up period through the platino study. 613 participated in the follow up phase. Rates were assessed with the chi-square test and for numerical variables they used the t-test. They found that 70.0% of the incident COPD cases and 62.3% of all COPD cases. They concluded that the underdiagnosis rate in new COPD cases identified during the follow up phase was 70.0%. So, they reported the need awareness about COPD in primary health care clinics.

Zeliha ARslan *et al.*, (2012)^[27], Turkey conducted a study to establish the prevalence of COPD. They conducted a cross sectional study using a spirometry and the basic Bold questionnaire. A total of 946 patients aged 40 years and over were participated in this study. They found that the prevalence of stage I or higher COPD was 13.3% (8.7% for women and 16.5% for men) and the prevalence of COPD at Gold stage II or higher was 7.1% (4.1% for women and 9.2% for men). They noted a high prevalence of COPD in never smokers. They concluded that occupational exposure may have a significant role in COPD development because of the high COPD prevalence in the non - smoking population.

Evrin Eylem Akpınar (2013)^[28] Turkey conducted a study to determine the prevalence of COPD patients. They had done a prospective study using clinical risk assessment. A total of 172 patients were participated in the study. The data was analyzed using chi-square test and Man - Whitney U test. The present study showed that the mean age was 71.31 r 9.62 years. 142 patients (82.6%) were male and 30 patients (17.4%) were female. This showed that the prevalence rate was 29.1%. They concluded that the prevalence was higher so they need awareness to prevent the development of COPD exacerbation.

Result

Table 1: Percentage Distribution of study subjects According to Demographic variables N= 100

Demographic Variables	Experimental Group		Control Group		Total		χ ²
	f	%	f	%	f	%	
Age Group							
35 - 45 yrs.	7	14	5	10	12	12	
46 - 55 yrs.	17	34	15	30	32	32	
56 - 65 yrs.	15	30	18	36	33	33	9.38
66 - 75 yrs.	12	24	11	22	23	23	
Gender							
Male	27	54	28	56	55	55	
Female	23	46	22	44	45	45	1.15
Education							
Primary	7	14	5	10	12	12	
Middle	12	24	13	26	25	25	
SSLC	13	26	15	30	28	28	1.33
Higher Secondary	10	20	10	20	20	20	
Nil	8	16	7	14	15	15	
Occupation							
Sedentary	27	54	28	56	55	55	3.45
Non - Sedentary	23	46	22	44	45	45	
Income							
Rs. 15000	12	24	11	22	23	23	
Rs. 8000	27	54	28	56	55	55	2.79
Rs. Below 5000	12	24	10	20	22	22	
Marital Status							
Single	0	0	0	0	0	0	0
Married	50	100	50	100	100	100	
Type of Family							
Nuclear	35	70	33	66	68	68	0.025
Joint	15	30	17	34	32	32	
Type of House							
Pucca	15	30	17	34	32	32	
Tiled	17	34	15	30	32	32	1.39
Thatched	0	0	0	0	0	0	
Concrete	18	36	18	36	36	36	
History of Smoking							
Yes	33	66	32	64	65	65	4.28
No	17	34	18	36	35	35	
If Yes							
Active Smoker	18	36	15	30	33	33	
Passive Smoker	15	30	17	34	32	32	
Family History							
Allergy	18	36	20	40	38	38	4.96
Lung Disease	15	30	17	34	32	32	
Heart Disease	17	34	13	26	30	30	

The above table 1 describes distribution in number and percentage of study subjects according to their demographic variables. Out of 100 samples 12% were in the age group of 35 - 45 years, 32% were in the age group of 46.55 years, 33% were in the age group of 56-65 years, 23% were in the age group of 66-75 years. In relation to gender, 55% were Males, 45% were females. Regarding to education, 12% were primary, 25% were middle, 28% were SSLC, 20% were Higher Secondary and 15% had no education. In relation to Occupation, 55% were sedentary workers, 45% were Non - sedentary workers. Regarding income 23% had 15000, 55% had 8000, 22% had below Rs. 5000 income. In relation to Marital Status 0% were single, 100% got married. Regarding type of family 68% were nuclear 32% were joint family. Regarding to type of house 32% had pucca house, 32% had tiled, 0% had thatched, 36% had concrete house. In relation to history of smoking 65% persons were smokers and 35% were non - smokers. Regarding family history 38% had allergies, 32% had lung disease and 30% had heart diseases.

Table 2: Assess the pre test and post test level of measurements by using spirometer in both experimental and control groups.

Description	Experimental Group				Control Group			
	Pre test		Post test		Pre test		Post test	
Spirometer	f	%	f	%	f	%	f	%
Mild	0	0	22	44	0	0.00	0	0.00
Moderate	22	44	28	56	23	46	13	26
Severe	28	56	0	0.00	27	54	37	74

The above table 4 shows the pretest and post test level of measurements by using spirometer in both experimental and control groups. In the experimental group 56% experienced severe and 44% experienced moderate in pretest. In the control group in pretest 54% experienced severe and 46% experienced moderate. Whereas in post test 56% experienced moderate and 44% experienced mild in the experimental group and in the control 74% experienced severe and 26% experienced moderate.

Table 3: Assess the pretest and post test level of measurement by using chest expansion by inch tape in both experimental and control group.

Description	Experimental Group				Control Group			
	Pre test		Post test		Pre test		Post test	
Chest Expansion	f	%	f	%	f	%	f	%
Mild	4	8	30	60	5	10	0	0.00
Moderate	16	32	20	40	15	30	30	60
Severe	30	60	0	0.00	30	60	20	40

The above table 5 shows the pretest and post test level of measurement by using chest expansion by inch tape in both experimental and control groups. In the experimental group 60% experienced severe, 32% experienced moderate and 8% experienced mild in pretest. In the control group in pre test 60% experienced severe, 30% experienced moderate and 10% experienced mild. Whereas in post test 40% experienced moderate and 40% experienced mild in the experimental group and in the control group 40% experienced severe and 60% experienced moderate.

Discussion

The present study was undertaken to assess the effectiveness of Interventional Package on pulmonary functional parameters among patients with COPD admitted in index hospital. Quasi experimental design was adopted with two group pre test post test design for the study. The health status measurements and level of dyspnea was assessed by pulmonary functional parameters.

Conclusion

The study identified that the level of dyspnoea was reduced in experimental group. It was found that there was a significant improvement in the pulmonary functional parameters of experimental group after interventional package than in control group. The „t“ value of difference of mean reduction of dyspnoea, on pulmonary functional parameters tabulated was found to be $t = 10.67, 3.55, 4.13, 6.66, 7.06, df = 59, p < 0.05$.

The study also shows that there was an association between the age, smoking and family history.

Conflict of Interest

Not available

Financial Support

Not available

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