

A Study to Assess the Effectiveness of Spirometry Exercise on Specific Pulmonary Parameters of Patients with Respiratory Conditions

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Abstract

Background: Those with lung diseases know too well how hard the simple act of breathing can become. The good news is that you can do something to help your body breath more easily. Choosing the right food, exercising and breathing exercises are effective ways to increase lung capacity. One of the very effective way to improve lung function is by using an incentive spirometer exercise. An incentive spirometer measures and improves lung function. *Aims and Objectives:* An experimental randomized block one group pre-test post test design study was conducted. "A study to assess the effectiveness of spirometry exercise on specific pulmonary parameters of patients with respiratory conditions admitted in selected wards of Dr. Vikhe Patil memorial hospital Ahmednagar". The data was collected by using modified clinical proforma with non probability purposive sampling technique. The results were analyzed and interpreted using descriptive, inferential statistics and Paired 't' test. *Results:* The study findings revealed that the average mean of the post-test experimental group was 0.731, while post-test control group was 0.481, the average SD of post test experimental group was 0.228, and post-test control group was 0.174. The obtained 't' value was 7.02 which is greater than the table value, therefore, the spirometry exercise was found to be effective at 5% level and significant association was found between the post-test score and the demographic variables. *Conclusion:* Incentive spirometry exercises are effective in coping with respiratory disorders. Using an incentive spirometry exercise can help the patient to practice taking deep breaths, which can help to open airways, prevent fluid or mucus from building up in the lungs and make it easier to breath.

Keywords: Spirometry Exercise; Pulmonary Parameters; Respiratory Conditions.

Introduction

Health is an invaluable part of the human beings life. Without it, people can become uninspired, demotivated and unable to thrive for success. Good health favors personal efficiency and contributes to an individual's lifespan and has much to do with happiness and success. But diseases affects people not only physically, but also emotionally and socially. Diseases can alter one's perspective of life. It can be acute or chronic.

The most common chronic respiratory diseases prevailing throughout the world are chronic obstructive pulmonary disease, asthma etc. COPD is

a chronic lung disease which refers to several disorders that affect the movement of air in and out of the lungs. Asthma is a common chronic inflammatory disease of the airways characterized by variable and recurring symptoms, reversible airflow obstruction and bronchospasm. Common symptoms include wheezing, coughing, chest tightness and shortness of breath.

Promotion of exercises is found to be the good conservative management for patient with many respiratory diseases, because breathing exercise can improve lung functions as well as can strengthen the respiratory muscles, even when the lungs are diseased. The proposed rationale for using incentive spirometry exercise is to prolong exhalation and thereby improve pulmonary functions.

Regular and frequent exercise under supervision can deal with pulmonary functions to a larger extent. spirometry exercises are proved in decreasing breathlessness in people suffering from chronic lung disease can increase exercise tolerance and strengthens thoracic muscles.

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Harry B. John (2011) conducted a study on exercise training, a therapy for patients with COPD. During the study 11 patients with COPD underwent an 18 week program of exercise training with subjective and objective improvements. Increased activity of daily living were noted and analysis of exercise diaries. The result were resting and exercise heart rate and breathlessness decreased, and maximum tolerated workload increased significantly in all patients.

A study was conducted by Rosa G, Casan P and Belde J (2000) on pulmonary rehabilitation in patients with COPD. 40 patients with stable COPD having severe airflow obstruction was included. Rehabilitation included walking, breathing exercises, controlled coughing and changes in life style actives. Exercise of 30 minute duration was performed at home twice daily for 4 weeks supervision. Six minute walking distance, FEV1 (forced expiratory volume in first second of expiration) and various indices of chronic respiratory disease questionnaire were measured in samples before and after intervention. The study concluded that domiciliary pulmonary rehabilitation for 4 weeks resulted in significant improvement in the quality of life and exercise tolerance with an improvement in FEV1.

Asthma on the other hand is a chronic lung disease that inflames and narrows the airways. Asthma causes recurring periods of wheezing, chest tightness, shortness of breath and coughing. The coughing often occurs at night or early in the morning, which also can be minimized with incentive spirometry exercises.

Many studies proved that, Spirometry exercises increases inspiratory volume, maintains alveolar ventilation, increases vital capacity and inspiratory reserve volume and even prevent atelectasis. Many articles say that spirometry exercise can increase pulmonary parameters.

Hence, the investigator felt the need to conduct a study on effectiveness of spirometry exercise on patient with these selected respiratory parameters.

Material and Methods

An experimental randomized block research design with quantitative research approach in which

two groups pre-test, post-test design was used for this study. 30 patients admitted in Dr. Vikhe Patil Memorial Hospital Ahmednagar with COPD and Asthma were selected by non-probability purposive sampling technique for data collection. Before commencement of the study, ethical approval was obtained from the Institutional Ethical Committee, and official permission was received from the authority.

Tool was composed of two sections. In demographic variables comprise of age, gender, diagnosis, history of illness, history of spirometer use, occupation, habit and duration of smoking etc. The clinical proforma includes chest expansion, breath holding time, minute volume, vital capacity, inspiratory reserve volume, residual volume, respiratory rate, expiratory reserve volume and inspiratory capacity.

The purpose of the study was informed and explained to the participants and those who voluntarily agreed to participate in the study and gave an informed consent. Assessment of effectiveness of spirometry exercise was done by administering it to the sample and collecting pre-test and post-test scores. The data collected was recorded systematically on each subject and was organized in a way that facilitates for data analysis. Descriptive and inferential statistics was used to analyze the data. Demographic proforma was analyzed by using frequency and percentage. Effectiveness of spirometry exercise was assessed by frequency, percentage, mean and standard deviation. Chi square test was used to find the association between post test score with selected demographic variables.

Results

The study findings shows that the distribution of pre-interventional mean, SD and mean percentage of pre-test score of experimental group was 0.45 and of control group was 0.46. The post-interventional mean post-test score of control group was 0.39 while experimental group had 0.73. Therefore, mean difference of the experimental group was 0.28 and the mean difference of control group was -0.07, which proves effectiveness of spirometry exercise in improving respiratory parameters.

Particulars	Pre - Test		Post - Test		Mean Difference		t- Value
	EXPT	CTRL	EXPT	CTRL	EXPT	CTRL	
Mean	0.45	0.46	0.73	0.39	0.28	-0.07	7.02

There was significant association found between the post-test score and the demographic variables. The obtained 't' value for Bonferroni multiple comparison test is 7.02, which is greater than the table value. Therefore, the spirometry exercise was found to be effective at 5% level and revealed that significant association was found between the post-test score and the demographic variables.

Conclusion

Spirometry remains essential for the diagnosis and monitoring of both COPD and Asthma. The use of spirometry in patients at risk for the development of both diseases or with respiratory symptoms could help to detect and treat the cases at an early stage when intervention may prevent further deterioration. Because of the reversible component of asthma and COPD, the use of peak flowmeters with respiratory exercise to determine airflow on a continued basis is practical and seems to have resulted in improving outcomes. As the findings of the study reveals that the use of spirometry exercise were significantly effective in improving respiratory parameters in

patients suffering with respiratory disorders. The nursing adequate knowledge regarding the use of spirometry for exercise will contribute towards positive improvement in patients condition who are suffering with respiratory disorders.

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