



A COMPARATIVE STUDY ON THE EFFECTS OF DIAPHRAGMATIC BREATHING EXERCISE AND PURSED LIP BREATHING EXERCISES ON PEFR IN SMOKERS

Physiotherapy

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ABSTRACT

Smoking is most common cause of most of the respiratory and cardiovascular diseases. Smoking reduces lung volumes and capacities. Breathing exercise helps to reduce the respiratory and cardiovascular problems. As smoking causes Airway Obstruction this study aims to evaluate how the diaphragmatic breathing exercise and pursed lip breathing exercise effect the PEFR (Peak Expiratory Flow Rate) in smokers and also to compare these effects and to prefer for rehabilitation. Group A (30 individuals) was treated with diaphragmatic breathing exercise and Group B (30 individuals) was treated with pursed lip breathing exercise for 4 weeks. Pre-test and post test PEFR values were collected. Statistical analysis were made using paired 't' test and independent 't' test at 5% level of significance. There was significant improvement in PEFR in both groups. However, Group A had shown greater improvement than Group B. This study concluded that, Diaphragmatic breathing exercise is most effective in improving PEFR in smokers.

KEYWORDS

Airway obstruction, Peak Expiratory Flow Rate (PEFR), Diaphragmatic Breathing Exercise, Pursed Lip Breathing Exercise.

INTRODUCTION

Tobacco kills nearly 6 million people each year. More than five million of those deaths are the result of direct tobacco use while more than 600000 are the result of non-smokers being exposed to second-hand smoke. Unless urgent action is taken, the annual death toll could rise to more than eight million by 2030.-WHO said.

Tobacco smoking is a major risk factor for cardiovascular disease, chronic obstructive pulmonary disease and some cancers and the morbidity and mortality with tobacco use is entirely preventable. India is the second largest consumer of tobacco products and third largest producer of tobacco in the world.

About a quarter of smokers develops chronic obstructive pulmonary disease and is the fourth commonest cause of death worldwide COPD is characterized by airflow limitation that is not fully reversible. Air flow limitation may be due to inflammation or due to increase in the thickness of the wall.

Cigarettes were the leading known risk factor for the development of chronic obstructive pulmonary disease and 50% of smokers develop clinically significant airflow obstruction. There are inconsistent findings which show that smoking affects medium and large airways. Others have reported that smoking affects both small and large airways.

Peak expiratory flow rate measure the maximal airflow rate achieved while forcefully expelling air from the lungs, following maximal inspiration; expressed in liters/ min. PEFR is a useful parameter to monitor airway obstruction, assess its severity and variation and evaluate the effects of treatment.

Breathing exercises helps to improve lung ventilation and systemic regulation. Breathing exercises shows immediate improvement in the oxygen saturation and lung volumes and capacities.

Diaphragmatic breathing exercise is the preferred breathing exercise for all the surgical and critically ill who develop greater difficulties with the respiratory and other systemic problems. Also this form of breathing exercise improves overall lung aeration and arterial oxygen saturation. Diaphragmatic breathing exercise improves lung compliance and respiratory muscle capacity. Thus it improves the forced expiratory flow rate.

The pursed lip breathing exercise is the breathing technique which helps the patients with airway resistance /airway constriction and increased respiratory rate. This technique provides some amount of resistance to the expiration and improves expiratory muscle performance. Diaphragmatic breathing improves PEFR. And the pursed lip breathing exercise is not included in any studies with smoking individuals. As pursed lip breathing creates a resistance to expiration the study hypothesized to evaluate effect of pursed lip breathing on PEFR.

Need For The Study

Studies with Diaphragmatic Breathing Exercise in various lung and cardiac diseases showed a significant effect on various factors such as $Vo_{2\max}$, FEV₁, FVC, V_T and PEFR. As cigarette smoking predisposes various pulmonary and cardiac diseases, this study brings the Diaphragmatic Breathing Exercise to evaluate the PEFR in smokers. Many studies used pursed lip breathing to treat and evaluate PEFR in various pulmonary conditions. This study focuses on to evaluate PEFR in smokers who are in risk of development of pulmonary problems.

There is no study to compare diaphragmatic breathing exercise with the pursed lip breathing exercise in normal people and any disease conditions. This aim of the study is to compare the effectiveness of diaphragmatic breathing exercise and pursed lip breathing exercise on PEFR in smoking individuals.

OBJECTIVES

- To examine the effect of diaphragmatic breathing exercise on PEFR in smokers.
- To examine the effects of pursed lip breathing exercise on PEFR in smokers.
- To compare the effects of diaphragmatic breathing exercise and pursed lip breathing exercise on PEFR in smokers.

MATERIALS AND METHODOLOGY

This Quasi experimental study took 60 smoking individuals between the age group of 25 – 40 years, known smoker for 5 – 10 years, BMI of 18.5 to 30, PEFR < 80% and good consciousness and cognitive functions from various 6 mansions on Purposive Sampling Technique method and they were divided into Diaphragmatic Breathing Exercise group (GROUP-A: 30 individuals) and Pursed Lip Breathing Exercise group (GROUP-B: 30 individuals).

Group A received Diaphragmatic Breathing Exercises and **Group B** received Pursed Lip Breathing Exercise twice a day for 6 weeks with the frequency of 5 repetitions for 6 sets on each session. Individual's PEFR had been measured on the first day of the treatment procedure (pre-test) and at the end of the 6th week (post-test) with Mini Peak Flow Meter. Pre – test and post-test values of the study have been collected and assessed for variation in improvement and their results will be analysed using Independent't' test and Paired 't' test.

Data Presentation

Paired't' Test:

Group	Scale	Mean values		Calculated 't' value		Level of Significance
		Pre test		Post test		
Group A	Peak Expiratory Flow Rate (PEFR) l/min	271.42	366.42	5.29	2.048	P < 0.05 and significant

Group B	Peak Expiratory Flow Rate (PEFR) l/min	272.85	286.78	5.227	2.048	P < 0.05 and significant
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Independent't' Test:

Assessment	Scale	Mean values		Calculated 't' value	Table 't' value	Level of Significance
		Group – A	Group - B			
Pre – test	Peak Expiratory Flow Rate (PEFR) l/min	271.42	272.85	0.151	2.000	P > 0.05 and not significant
Post – test	Peak Expiratory Flow Rate (PEFR) l/min	366.42	286.75	9.24	2.00	P < 0.05 and significant

Data Analysis And Interpretation**Peak Expiratory Flow Rate****Pre-Test Value:**

When the pre-test values of group A and group B are analyzed by Independent't' test, the calculated value was 0.151. For the 54 degrees of freedom at 5% level of significance, the table value is 2.000. It is proved that there is no significant difference between Group A and Group B.

Group A:

For 27 degrees of freedom at 5% level of significance the table 't' value is 2.048. The calculated 't' value between pre-test and post-test value is 5.199. Since the calculated value is greater than the table value, so Diaphragmatic Breathing Exercises has significant effect on PEFR in this group.

Group B:

For 27 degrees of freedom at 5% level of significance the table 't' value is 2.048. The calculated 't' value between pre-test and post-test value is 5.227. Since the calculated value is greater than the table value, so Pursled Lip Breathing Exercises has significant effect on PEFR in this group.

Post-Test Value:

When the post-test values of group A and group B are analyzed by Independent't' test, the calculated value was 9.24. For the 54 degrees of freedom at 5% level of significance, the table value is 2.000. Since the calculated value is greater than the table value, null hypothesis H_0 is rejected. It is proved that, there is significant difference between Group A and Group B.

DISCUSSION

Smoking is recognized as important cause of morbidity and mortality. Generally accepted that people with higher levels of smoking breathing exercise reduces the morbidity and mortality.

In the present study, PEFR increased significantly in both the groups after 4 weeks of diaphragmatic breathing exercise (Group A) and pursled lip breathing exercise (Group). So both the exercises improve PEFR in smoking individuals. So both the diaphragmatic breathing exercise and pursled lip breathing exercise are having greater influence on PEFR in smoking individual.

As well as the statistical analysis showed a significant improvement in between group analysis. Finally this study says that, diaphragmatic breathing exercise shows greater improvement on PEFR than the pursled lip breathing Exercise in smoking individuals.

The available literatures are the evidence to support the causal association between smoking and PEFR. Results of these studies were associated with the control and prevention of smoking.

Diaphragmatic breathing helps to, relieve dyspnoea, strengthen the diaphragm, decrease the work of breathing by slowing your breathing

rate, increase blood oxygen saturation, decrease oxygen demand/increase the muscular oxygenation, increase chest wall expansion and respiratory muscular strength, reduce stress/tension, reduce general body pain, release toxins from body and enhance good sleep, boost energy system and improve stamina, improve cellular regeneration, control heart rate, rhythm and blood pressure.

Pursed lip breathing exercise helps to reduce the work of breathing by prolonging the exhalation and delaying the next breath, also by relieving the strain on overstretched chest muscles. Pursled lip breathing enhances reduction in shortness of breath (Journal for the American College of Chest Clinicians Oct'1996), gas exchange in blood, relieves stale air trapped in lungs, enhances relaxation, and reduces nocturnal dyspnoea in pulmonary oedema. Pursled lip breathing helps in patients with reduced peak expiratory flow rate i.e. asthma, COPD. Pursled lip breathing reduces the work of accessory muscles and improves peak expiratory flow rate.

Additionally, Diaphragmatic breathing exercise improves strength of the respiratory muscles and improves the ventilatory function and reduces work of breathing. Thus, the diaphragmatic breathing exercise improves forced expiratory capacity. Diaphragmatic breathing exercise improves peak expiratory flow rate in post abdominal surgery patients³.

On other hand few studies stated that, deep breathing exercises helps in cessation of smoking following training. In this study also, the participants showed a greater reduction in smoking frequency after this 4 weeks training. But there is no evidence to explain about this physiologically, here this result may be because of their mental intention towards training.

Finally this study says that, both the Diaphragmatic breathing exercise and the Pursled Lip Breathing exercises are helpful in improving PEFR among smokers and Diaphragmatic Breathing Exercise is more helpful.

CONCLUSION

This study aimed to evaluate the effect of Diaphragmatic Breathing Exercise and Pursled Lip Breathing Exercise on PEFR in smoking individual also to compare these effects. This study showed a significant improvement in PEFR in smoking individuals from both groups. So these both exercises are helpful in treating patients with reduced PEFR but comparison of the results of these two groups shown that the Diaphragmatic Breathing Exercise Group has greater effect than the Pursled Lip Breathing Exercise Group. So this study concluded that diaphragmatic breathing exercise is most effective breathing exercise training to improve PEFR in smokers.

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