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## ORIGINAL ARTICLE

# IMPACT OF EXERCISING WITH ACAPELLA ON PEAK EXPIRATORY FLOW RATE OF CHRONIC ASTHMATICS

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## ABSTRACT

***Background Of The Study:*** *Asthma is the clinical syndrome characterized by wheeze. It occurs in younger age group and is caused by trigger factors such as specific allergens (Pollen grain, Dust, Drug). Acapella combines the benefits of both Positive Expiratory Therapy and airway vibrations to mobilize pulmonary secretions and can be used in virtually any position allowing patients to move freely and sit, stand or recline. Objective of the study was to analyse the impact of exercising with Acapella on the PEFR of Chronic Asthmatics.* ***Methodology:*** *This was an experimental study conducted among 50 subjects of adoloscent age with chronic asthmatics. They were given exercise with Acapella for a frequency of 10 minutes, single session in a day, for 2 weeks duration. The study was conducted in department of Physiotherapy, ACS MedicalCollege and Hospital. Only chronic asthmatics had been selected in this study. The PEFR was used as a outcome measure for this study. The outcome was measured through PEFR values.****Result:****The results were analysed for 50 subjects at the end of the study. The improvement was highly significant in chronic asthmatics who exercised with Acapella.* ***Conclusion:*** *It was concluded from this experimental study the Acapella had more effect on chronic asthmatics and hence prevent premature collapse of alveoli. As it combines the benefits of positive expiratory pressure or PEP therapy with airway vibrations, which makes exhalation against resistance.*

**Keywords:** Peek Expiratory Flow Rate, Chronic Asthmatics, ACAPELLA, trigger factors

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## INTRODUCTION

Asthma is a disease marked by breathlessness and wheezing caused by generalized narrowing of intrapulmonary airways which varies in severity spontaneously or as a result of treatment. Symptoms may be episodic or chronic but the pattern may vary considerably from time to time in individual patients[1, 2].

The changes causing airway obstruction in asthma include hypertrophy and hyperplasia of bronchial smooth muscles, thickening of the epithelial basement membrane of the airways, oedema and eosinophilic infiltration of the bronchial mucous glands with increase in the number of globlet cells [3,4].

This leads to narrowing of larger bronchi and plugging of bronchi and bronchioles with viscid mucus which contains eosinophils and shed respiratory epithelial cells. The pathological changes characteristic of asthma may result from a number of different pathogenic mechanism. Chronic Asthma paroxysms of symptoms are usually less conspicuous and there is persistent wheezing with breathlessness. Cough may be a prominent feature with mucoid sputum and recurrent episodes of frank respiratory infection are common. Episodes vary considerably in their duration lasting from a few hours to several days or longer [5,6].

## METHODOLOGY [7,8]

This was an experimental study for 50 subjects, conducted at Faculty oh Physiotherapy, ACS Medical College and Hospital, Chennai. Convenient sampling method used to select the samples for the study. This study conducted for 2 weeks with single session of 10 minutes in a day.

**Inclusion criteria:** Subjects within age group 18-25years and suffering from Chronic asthmatics were included for this study.

**Exclusion criteria:** Respiratory fatigue or failure, Altered mental status patients were excluded from this study.

**Materials Used:** Chair and Acapella device, Wright's peak flow meter .

**Outcome measure:** Peak Expiratory Flow Meter (PEFR)

**Procedure:** Selected 50 subjects were evaluated with assessment form and informed consent were given. After obtaining proper consent subjects were made to undergone PEFR screening using Wright's peak flow meter.

The Acapella consists of a dial which has the positive (+) and negative (-) rotator which decreases the resistance of the device. The subject should be able to exhale for 3 to 4 seconds while the device vibrates, incase if the subject cannot maintain the exhalation of this length of time the dial can be adjusted in clockwise direction.

The clockwise direction increase the resistance of the vibrating orifices which allowed the subject to exhale at a lower flow rate. Selection of the proper resistance range produces the desired inspiratory to expiratory (I:E) ratio of 1:3 to 1:4.

Once the proper range has been achieved the subject was asked to exhale harder or softer according to the response the subject feels from the vibratory pressure. The subject was well positioned in a comfortable and supported way. Sitting could be the most comfortable position. Before exercising with Acapella subjects were made to undergo PEFR and the values were recorded. The mouth piece was tightly placed in mouth during exhalation. The

subject was asked to take a deep breath and hold for 3 seconds exhale as much as possible and cheeks should be kept for firm while exhaling. The exhalation lasted for approximately up to 3 to 4 times longer than inhalation. Subjects were asked to perform 10 to 20 PEEP breaths and 3 to 4 "huff" cough to raise the secretion. After 2 weeks the subject was again assessed with PEFR and the values had been recorded.

**Fig 1. Exercising with Acapella**

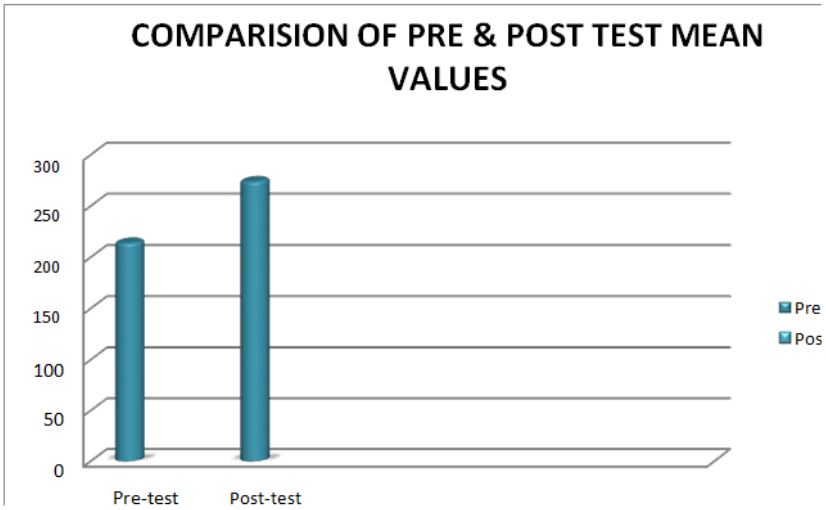
**Fig 2. Measuring PEFR**

## RESULT

On comparing the mean values of Pre Test & Post Test on Peak Expiratory flow Meter (PEFR), it shows significant Mean differences between Pre Test (214) & Post Test (274) at P≤0.000.

| PEFR | Mean | Standard Deviation | T-test | Significance |
|---|---|---|---|---|
| **PRE-TEST** | 214 | 92.60 | 9.63 | .000 |
| **POST-TEST** | 274 | 107.01 | | |

**Table 1:** Comparison of pre and post test values of PEFR




**Graph1:** Difference in mean values with the group

## DISCUSSION

The present study was experimental study was conducted with the sample size of 50 subjects and the purpose was to determine the impact of exercising with Acapella on the PEFR of Chronic Asthmatics. The adults with asthma were exercised with Acapella. The subjects were assessed with PEFR before exercising with Acapella. After two weeks of exercising with Acapella, the PEFR was measured again it was noticed that there was an improvement in the PEFR values in subjects who were exercised with Acapella.

It was evident from the study that the Mean Value of Pre Test (214) and Post Test (274) showed a significant difference.

Jayson CJ,et al 2018.,Concluded that the subjects who were given acapella showed significant difference than the subjects who were given diaphragmatic breathing exercise[9].

Johnson,et al 2011.,Concluded that the measurements of PEFR serves as a valuable and reliable tool for asthma screening, diagnosis, and prognosis. Daily PEFR monitoring is a useful measure for clinician for providing appropriate dose of the asthma medications [10].

Patterson J.E,et al 2005.,This study concluded that the Acapella is as effective a method of airway clearance as ACBT for patients with bronchiectasis [11].

A.Lopez.Vina.et al 2000.,They concluded that the use of PEF monitoring in optimal conditions showed a beneficial effect on adherence to prescribed regimens in patients with moderate asthma [12].

This study is accepted alternate hypothesis that there is significant difference in pre-test and post-test values of PEFR.

## CONCLUSION

The Mean Value of pre peak expiratory flow rate was (214) and the Mean Value of post peak expiratory flow rate was (274).

It was concluded from this experimental study the Acapella had more effect on chronic

asthmatics and hence prevent premature collapse of alveoli. As it combines the benefits of positive expiratory pressure or PEP therapy with airway vibrations, which makes exhalation against resistance.

In addition, the Acapella was preferred by samples or subjects who judged that it was more useful in clearing secretions.

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