



P-ISSN: 2394-1685
E-ISSN: 2394-1693
IJPESH 2015; 1(4): 10-13
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www.kheljournal.com
Received: 28-01-2015
Accepted: 10-02-2015

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Effectiveness of active cycle of breathing techniques [Acbt] Versus Acbt with Acapella on airway clearance in bronchiectasis

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Abstract

Effectiveness of Active Cycle of Breathing Techniques [ACBT] versus ACBT with Acapella on Airway Clearance in Bronchiectasis.

Background: Bronchiectasis patients need airway clearance and improve their pulmonary function. Breathing techniques and respiratory devices are important to maintain a clear lung function and hence it will improve in all phase for the patients.

Objective: To compare the Effectiveness of ACBT alone with ACBT & Acapella as methods of Airway Clearance in Adult Bronchiectasis.

Methods: A pre-post experimental study design. Thirty subjects (mean age 55 ± 3 years) were randomly divided into experimental group (15 subjects) and control group (15 subjects). The experimental group attended 30 minutes treatment session for 30 days then FEV₁ and FVC were determined as outcome measure using a standard method of Computerized Spirometry.

Results : The participants at the baseline were (n=30) with age (mean 55 ± 3 years) duration of 30 days result showed that experimental group has improved FEV₁ and FVC. There was statistically significant change in FEV₁ and FVC for experimental group.

Conclusion: Acapella can be used as an adjunctive exercise program along with ACBT to improve airway clearance and breathing.

Keywords: Bronchiectasis, Active cycle of breathing technique, Acapella, PFT, Airway clearance.

1. Introduction

Bronchiectasis is a disease state defined by localized, irreversible dilatation of part of the bronchial tree caused by destruction of the muscle and elastic tissue. Bronchial dilatation is associated with destructive and inflammatory changes in the walls of medium-sized airways, often at the level of segmental or subsegmental bronchi. Patients typically present with persistent or recurrent cough and purulent sputum production patients with bronchiectasis can fill 240ml (8 oz) glasses with their daily sputum production.

Acapella is a small hand held device for airway clearance. It has both resistive and vibratory features, which help to loosen and clear secretions from chest. This causes the vibration and resistance to the airflow which is then transmitted to the lungs. The resistance to the airflow will help to keep the airways open to get air behind the sputum and help it move upwards. The vibrations will help to loosen secretions from airways and move them up more easily for effective chest clearance.

Active Cycle of Breathing Technique (ACBT) is an airway clearance technique, ACBT involves three different breathing exercises to help move mucous from the lungs. 1 breathing control 2. Thoracic expansion exercise 3. Forced expiratory technique.

2. Materials and Methods

The 30 participants were randomized into experimental group (15 subjects) and control group (15 Subjects) by using random allocation. The experimental group received ACBT with Acapella and the control group received ACBT alone.

Inclusion Criteria

- Moderate & severe bronchiectasis with sputum production
- Age 45 – 75 yrs
- Gender – Both
- No regular chest physiotherapy

Exclusion Criteria

- Subjects with
- Other pulmonary disease
 - Rib Fracture
 - Severe hemoptysis & metastatic cancer
 - Osteoporosis & Tuberculosis
 - Neurological conditions.

Procedure: Subjects included in the study are made to fill the informed consent, and then detailed explanation about the assessment procedure is given to the subjects included in the study. The 30 subjects were taken to compare the effectiveness of ACBT with Acapella and ACBT alone.

Group A [Control group] – active cycle of breathing technique (ACBT) alone.

Group B [Experimental Group] – ACBT with Acapella. Study duration-30minutes/day for 1 month. Pre-test & Post-test scores of Forced Expiratory Volume in 1 sec [FEV₁] & Forced Vital Capacity [FVC] were recorded by Pulmonary Function Testing (PFT).

3. Results & Discussion

According to the interpretation of data, t- test value of experimental group shows statistically significant difference. Table 1, 2 shows the difference in FEV₁ and FVC for both experiment and control groups. In this study the statistics analysis showed that ACBT with Acapella was effective in airway clearance and lung function than ACBT alone. The result of the study shows that ACBT with ACAPELLA has significant Airway clearance & more sputum expectoration than ACBT alone in bronchiectasis patients.

Tables & Fig:

Table 1: Statistical analysis between Group I and Group II (FEV₁ as parameter)

FEV1	PRE TEST		POST TEST		SIGNIFICANCE
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	
GROUP A	2.312	0.425	2.422	0.435	0.029
GROUP B	2.335	0.733	2.853	0.663	0.000

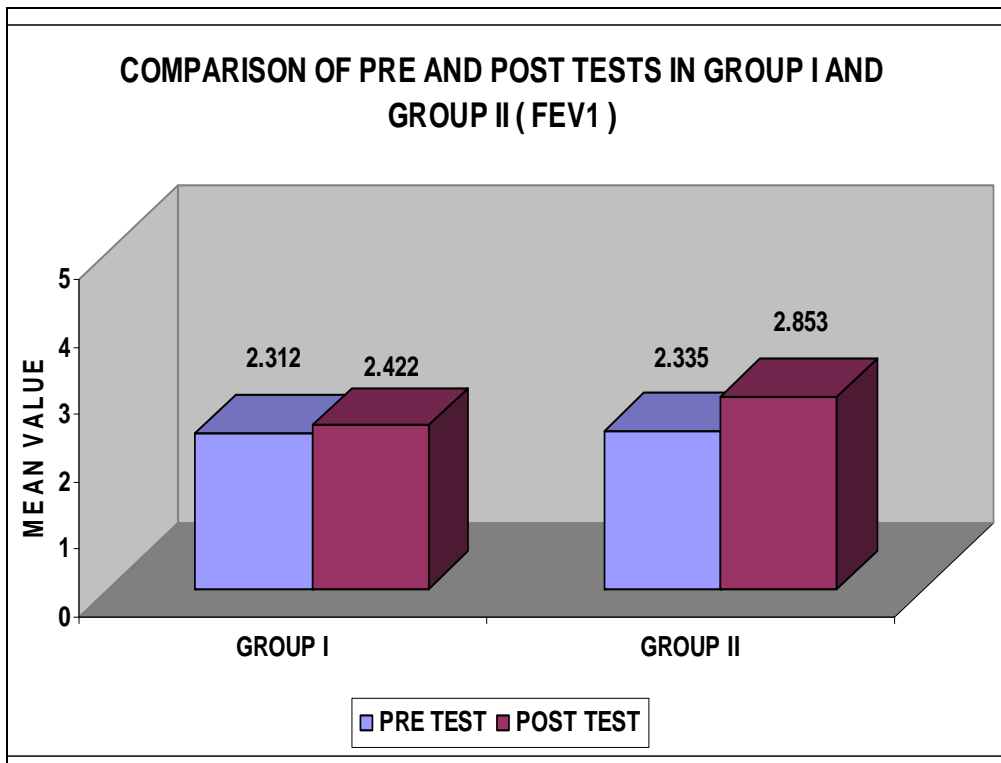
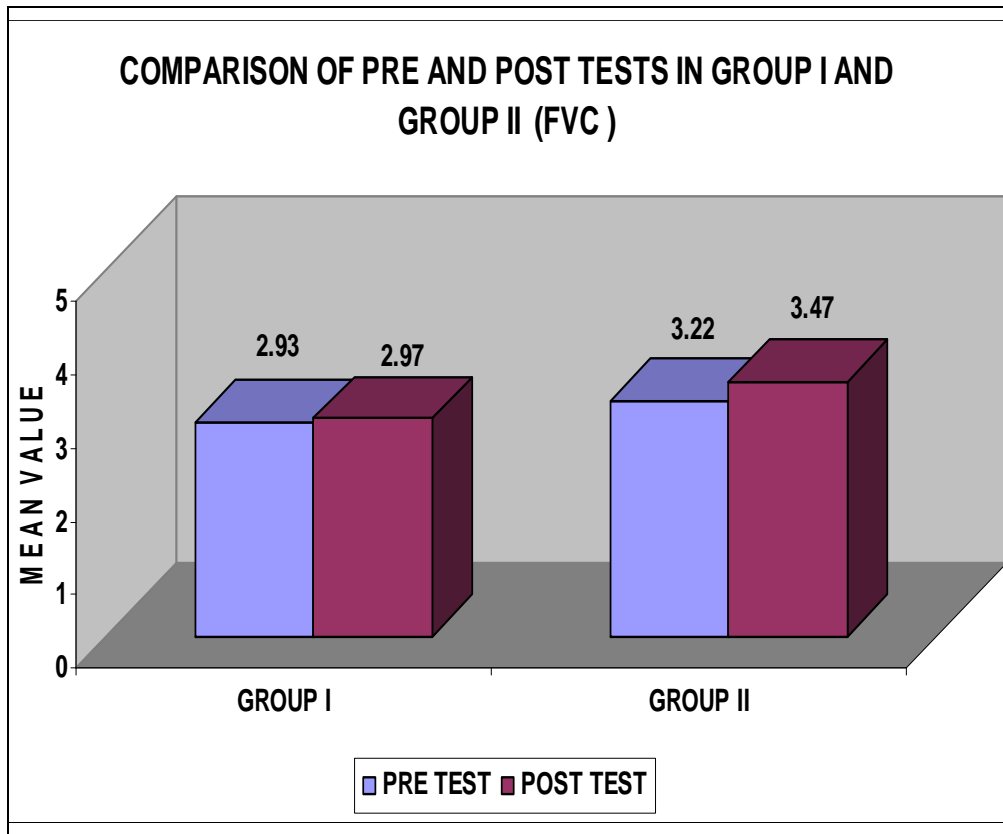


Table 2: Statistical analysis between Group I and Group II (FVC as parameter)

FVC	PRE TEST		POST TEST		SIGNIFICANCE
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	
GROUP I	2.930	0.555	2.973	0.5259	0.067
GROUP II	3.220	0.669	3.413	0.9702	0.010



4. Conclusion

This study investigated the effectiveness of ACBT with Acapella. The experimental groups include FEV1 and FVC from the pre-test to the post-test within 30 days of training. From the result of the study, it was concluded that ACBT with Acapella shows significant Airway clearance & more sputum expectoration than ACBT alone in bronchiectasis patients. Acapella can be used as an adjunct with the breathing exercise.

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