A COMPARITIVE STUDY ON POSITVE EXPIRATIORY PRESSURE TECHNIQUE AND AUTOGENIC DRAINAGE ON BRONCHIAL HYGIENCE IN BRONCHIAL ASTHMA

Dissertation submitted to

THE TAMIL NADU DR. M. G. R. MEDICAL UNIVERSITY,

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MASTER OF PHYSIOTHERAPY

Degree programme

Submitted by

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The Dissertation entitled

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Under the guidance of

Prof. C.K. MURALIDHARAN M.P.T (CARDIO), MIAP.,

Dissertation submitted to

THE TAMILNADU DR. M. G. R. MEDICAL UNIVERSITY,

CHENNAI-32.

Dissertation evaluated on ----------

Internal Examiner External Examiner

CERTIFICATE I

This is to certify that the dissertation work entitled **A COMPARITIVE STUDY ON POSITVE EXPIRATIORY PRESSURE TECHNIQUE AND AUTOGENIC DRAINAGE ON BRONCHIAL HYGIENCE IN BRONCHIAL ASTHMA**

was carried out by Reg. no. **27113225** P.P.G College of physiotherapy, Coimbatore-35, affiliated to The Tamilnadu Dr. M.G.R Smedical university, Chennai-32, under the guidance

Prof. C K MURALIDHRAN M P T (CARDIO) MIAP.,

Prof. K. RAJA SENTHIL M.P.T (Cardio-Resp), MIAP, PhD

Principal

CERTIFICATE II

This is to certify that the dissertation work **A COMPARITIVE STUDY ON POSITVE EXPIRATIORY PRESSURE TECHNIQUE AND AUTOGENIC DRAINAGE ON BRONCHIAL HYGIENCE IN BRONCHIAL ASTHMA** was carried out by Reg. no. **27113225** P.P.G College of physiotherapy, Coimbatore-35, affiliated to The Tamilnadu Dr. M.G.R medical university, Chennai-32, under my guidance

Prof. C K MURALIDHRAN M P T (CARDIO) MIAP.,

Prof. C.K. MURALIDHARAN M.P.T (CARDIO), MIAP.,

Professor

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First I dedicate my Project to **MY MOTHER** for providing me the wisdom and knowledge to complete my study successfully.

I Praise and thank GOD for his gracious showers of blessings upon me that has shaped me.

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Last but not least I thank my **FRIENDS AND FAMILY MEMBERS** who provided support and encouragement throughout this work.

ABSTRACT

INTRIDUCTION . Bronchial Asthma is one of the common COPD disorder and is defined as chronic cough and expectoration which persists for at least 3 months period for at least 2 consecutive years. The cause of Bronchial Asthma is related to long term irritation of the trachea bronchial tree. The most common cause of irritation is cigarette smoking. Other causes are air pollution, bronchial infections and occupational diseases.

OBJECTIVES. To find out the effect of positive expiratory pressure technique in improving the bronchial hygiene in moderate Bronchial Asthma patients.

To find out the effect of Autogenic drainage in improving the bronchial hygiene in moderate Bronchial Asthma patients.To compare the effectiveness of positive expiratory pressure technique and Autogenic drainage in improve the bronchial hygiene in moderate Bronchial Asthma patients

METHODS. A total number of 30 subjects were involved for this study with consideration of inclusion and exclusion criteria. The subjects were divided into positive expiratory pressure technique group(A) and autogenic drainage group(B) with 15 subjects in each group .Before treatment pre test is conducted for both group A and group B and the result are noted. After a brief demonstration about the positive expiratory pressure technique by flutter device and autogenic drainage in Group A and Group B ,the post test was conducted. The result were recorded to compare the pre test and post test results.

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RESULTS. The results of this study is in accordance with Andreas Pfleger et al (1992) who suggested that airway clearance techniques are used to aid in mucus clearance in a variety of diseases such as COPD and new techniques like Positive expiratory pressure technique and autogenic drainage can be used to rely heavily on basic airway clearance.

CONCLUSIONS. The study concludes that the positive expiratory pressure technique using flutter device eliminates mucous from the bronchial airway and thus improves bronchial hygiene in moderate Bronchial Asthma patients.

INTRODUCTION

Diseases of respiratory system are the major causes of illness affecting a greater part of population world wide .Chronic obstructive pulmonary disease (COPD) is the internationally preferred term encompassing chronic bronchitis, emphysema and asthma .Chronic obstructive pulmonary disease (COPD) is the most common chronic pulmonary disorder afflicting 10 to 15% of adults over the age of 45, COPD is a disorder characterized by the presence of airflow obstruction that is generally progressive, accompanied by airway hyper reactivity and may be partially reversible. A review of population studies from India, estimated that total number of COPD patients aged 40 years and above in 1996 were 8.15 million males and 4.21 millions females.

Bronchial Asthma is one of the common COPD disorder and is defined as chronic cough and expectoration which persists for at least 3 months period for at least 2 consecutive years. The cause of Bronchial Asthma is related to long term irritation of the trachea bronchial tree. The most common cause of irritation is cigarette smoking. Other causes are air pollution, bronchial infections and occupational diseases.

Conventional methods like chest physical therapy, Active cycle of breathing technique, Airway clearance techniques like postural drainage, percussion, vibration, shaking and forced expiratory techniques are used for mucus clearance in Bronchial Asthma patients. Recent methods like positive expiratory technique using flutter device and Autogenic drainage are also used for improving bronchial hygiene in chronic obstructive pulmonary disease patients.

In contrast to flutter therapy bronchial secretion during autogenic drainage are mobilized not only by high frequency oscillation, pressure changes and the air flow changes but by a special calm breathing technique. Autogenic Drainage was introduced by Chevalier in Belgium in 1967 for the treatment of chronic obstructive pulmonary disease patients. Autogenic Drainage uses diaphragmatic breathing to mobilize secretions by varying expiratory airflow. It consists of three phases; Firstly, breathing at low-lung volumes to “unstuck” the peripheral secretions and

Secondly, breathing at low to mid lung volume to collect the mucus in the middle airways. Finally, breathing at mid to high lung volumes to evacuate the mucus from the central airways.

All detectable rheological differences in the sputum collected at the end of every autogenic drainage and flutter physiotherapy section may be caused by high frequency oscillation and pressure and air flow changes produced by the flutter device. Many studies have been conducted to show the individual effect of positive expiratory pressure technique and autogenic drainage to improve the bronchial hygiene in moderate Bronchial Asthma patients. Hence this study aims to analyze the effectiveness of both the treatment techniques and prove the better effectiveness by comparing positive expiratory pressure technique and autogenic drainage in improving the bronchial hygiene in moderate Bronchial Asthma patients.

AIM OF THE STUDY

The aim of the study was to improve the bronchial hygiene is moderate Bronchial Asthma patients

OBJECTIVES OF THE STUDY

- To find out the effect of positive expiratory pressure technique in improving the bronchial hygiene in moderate Bronchial Asthma patients.
- To find out the effect of Autogenic drainage in improving the bronchial hygiene in moderate Bronchial Asthma patients.
- To compare the effectiveness of positive expiratory pressure technique and Autogenic drainage in improve the bronchial hygiene in moderate Bronchial Asthma patients.

HYPOTHESIS

Null Hypothesis

There was no significant difference between positive expiratory pressure technique and Autogenic drainage in improving the bronchial hygiene in moderate Bronchial Asthma patients.

Alternate Hypothesis

There was significant difference between positive expiratory pressure techniques and Autogenic drainage in improving the bronchial hygiene in moderate Bronchial Asthma patients.

REVIEW OF LITERATURES

Darbee J C et al (2005) had done a comparative study of physiologic responses of low positive expiratory pressure breathing and high frequency chest wall oscillation on 15 cystic fibrosis patients with pulmonary exacerbation and found that positive expiratory pressure breathing increases Oxygen saturation, ventilation distribution, gas mixing and lung function.

Brooks et al (2002) conducted a study on flutter device to determine the effect of airflow and the incline of the device at the mouth on expiratory pressure and oscillation frequency. They concluded that a positive incline and large airflow results in an increased expiratory pressure.

Savci S et al (2000) conducted a study in Turkey with 30 clinically stable COPD patients treated with Active cycle of breathing technique(ACBT) and Autogenic Drainage (AD) for 20 days. Patients were assessed through Pulmonary function test, arterial blood gas analysis, 6 minute walk test and modified Borg's scale before and after the treatment and found that there was increased Forced vital capacity, Peak expiratory flow rate, arterial oxygenation and exercise performance. They concluded that both techniques are effective in clearing secretions & improving lung functions.

Bellone A et al (2000) conducted a comparative study of effectiveness of oscillating positive expiratory pressure using flutter device with postural drainage and ELTGOL (expiration with the glottis open in the lateral posture) on oxygen saturation and sputum production. They considered 10 Bronchial Asthma patients with exacerbation for their study and concluded that flutter techniques was more effective in prolonging secretion removal in chronic bronchitis.

Ernst M App et al (1998) studied the efficacy of flutter device and autogenic drainage on removal of bronchial secretions in 14 cystic fibrosis patients using oxygen saturation (pulse oxymeter) as parameter. The treatment was carried out twice daily for four consecutive weeks with 15 minutes treatment/session and found that the applied oscillations are capable of decreasing mucus viscoelasticity within the airways at frequencies and amplitudes achievable with flutter device.

C M Q Van winden et al (1998) conducted a comparative study of flutter device and positive expiratory pressure mask on symptoms and lung function in 22 cystic fibrosis patients using peak expiratory flow rate (peak flow meter) and oxygen saturation (pulse oxymeter) as parameter. The treatment was given twice a day for two weeks continuously and found that there was a significant improvement in sputum expectoration after treatment with flutter.

Miller S et al (1995) conducted a comparative study of autogenic drainage and the active cycle of breathing techniques with postural drainage on mucus clearance in 18 cystic fibrosis patients and concluded that autogenic drainage cleared mucus from the lungs faster than active cycle of breathing technique over the whole day.

Leru P et al (1994) conducted a study on the efficiency of the flutter device in assisting the mucus removal in 20 Bronchial Asthma patients whose clinical and functional parameters were assessed before and after the regular use of device for two to eight weeks. Thus, they concluded that flutter device is significantly efficient for the treatment of chronic obstructive bronchitis especially with mild to moderate deterioration.

P Wollmer A et al conducted a comparative study of post expiratory technique with postural drainage or positive expiratory pressure breathing in assisting mucociliary clearance at rest in 14 patients with chronic obstructive pulmonary disease. The patients from two methods for equal efficient but most of patients preferred PEP as a treatment.

Corstens F A et al conducted a comparative study of positive expiratory pressure and post expiratory techniques on trachea bronchial clearance in Bronchial Asthmaand it is concluded that FET is more effective than PEP in enhancing trachea bronchial clearance.

Hanke IM A et al conducted a comparative study of positive expiratory pressure mask physiotherapy (PEP) versus forced expiration technique (FET/PD) on regional lung clearance In chronic bronchitis. Evaluated in seven patients with Bronchial Asthma and abundant sputum production statistical significance (pless than 0.02) Was reached only for clearance in the inner region .It is concluded that PEP has no demonstrable effect on regional lung clearance in these patients.

Dulciance Nunes Paiva A et al conducted a study on effects of expiratory positive airway pressure on the electro myographic activity of accessory inspiratory muscles in COPD patients in 13 healthy subject as controls and 12 patients with stable COPD at baseline we determined EA during spontaneous respiration lung function parameters and respiratory muscle strength. And concluded that use of EPAP promoted a significant reduction in the EA of the SCM the controls and in the patients with stable COPD. However this did not occur regarding the EA of the scalene muscle.

Elena Bellei A et al conducted a study on effects of expiration under positive pressure in patients with acute exacerbation of chronic obstructive pulmonary disease and mild acidosis requiring non invasive positive pressure ventilation with 27 patients large amount of bronchial secretions. Group A patients received PEP mask pucs assisted coughing. The control (Group B,14 patients) received assisted coughing alone. The result is the amount of sputum production at the end of physiotherapy was significantly higher in group A compared with group B.

MATERIALS AND METHDOLOGY

MATERIALS

- Couch
- Flutter Device
- Peak Expiratory Flow Meter
- Pulse Oxy Meter
- Pillows
- Timer
- Stethoscope
- Chair
- Borg's Scale

METHODOLOGY

STUDY DESIGN

Quasi Experimental Study

STUDY SETTING

The study was conducted at outpatient department in ASHWIN HOSPITAL , Coimbatore. Coimbatore District Headquarters Hospital, Under the supervision of concerned authority.

STUDY SAMPLING

A total number of 30 subjects were selected by convenient sampling method after giving due consideration to inclusion and exclusion criteria and they were divided into two groups namely Group A and B with 15 subjects in each groups.

STUDY DURATION

- The treatment duration for both group was given as listed below:
  - ✓ Duration per session: 15-20minutes/session
  - ✓ No. of sessions per day : Twice a day
  - ✓ No. of days per week: 5days
  - ✓ Duration of study: 2weeks

INCLUSION CRITERIA

- Clinically diagnosed moderate Bronchial Asthma patients.
- Moderate Bronchial Asthma patients with dyspnoea grading above 3 (10-point modified Borg's scale)
- Both males and females.
- Age group between 40-60 years.

EXCLUSION CRITERIA

- Clinically diagnosed mild &severe Bronchial Asthma patients.
- Age group below 40 and above 60 years.
- Associated unstable cardiovascular diseases &any other neurological deficits.
- Patients who has undergone recent thoracic and abdominal surgeries.
- Any other associated restrictive lung diseases.
- Patients with airway hyperactivity of bronchial airways.

PARAMETERS

- PEFR(Peak expiratory flow rate).
- Rate of Perceived Exertion modified Borg's scale.

PROCEDURE

A total number of 30 subjects were involved for this study with consideration of inclusion and exclusion criteria. The subjects were divided into positive expiratory pressure technique group(A) and autogenic drainage group(B) with 15 subjects in each group .Before treatment pre test is conducted for both group A and group B and the result are noted. After a brief demonstration about the positive expiratory pressure technique by flutter device and autogenic drainage in Group A and Group B ,the post test was conducted. The result were recorded to compare the pre test and post test results.

STATISTICAL TOOLS

The following statistical tools are used to find out statistical significance between pre and post test values of peak expiratory flow rate and Borg's scale in Group A and Group B subjects.

PAIRED" t" TEST

The paired "t" test will be used to find out the statistical significance between pre and post test values of peak expiratory flow rate and Borg's scale in Group A and Group B subject .

Formula: Paired "t" test

$$S = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

$$t = \frac{\bar{d}\ \sqrt{n}}{S}$$

d = Difference between the Pre Test Vs Post Test

$\bar{d}$ = Mean difference

n = Total number of subjects

S = Standard deviation

UNPAIRED "t" – TEST

Unpaired "t" test was used to compare the mean difference between Group A and B subjects measured with peak expiratory flow rate and Borg's scale.

Formula:- Unpaired "t" test

$$S = \sqrt{\frac{(n_1-1)\,S_1^2 + (n_2-1)\,S_2^2}{n_1 + n_2 - 2}}$$

$$t = \frac{|\,\bar{x}_1 - \bar{x}_2\,|}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

n_1 = Total number of subject in Group - A

n_2 = Total number of subject in Group - B

x_1 = Difference between Pre test Vs Post test of Group - A

$\bar{x}_1$ = Mean difference between Pre test Vs Post test of Group - A

x_2 = Difference between Pre test Vs Post test of Group - B

$\bar{x}_2$ = Mean difference between Pre test Vs Post test of Group - B

S = Standard deviation

DATA PRESENTATION

TABLE –I

S. NO	GROUP-A POSITIVE EXPIRATORY PRESSURE TECHNIQUE GROUP				GROUP-B AUTOGENIC DRINAGE GROUP			
	PEFR		MODIFIED BORG'S SCALE		PEFR		MODIFIED BORG'S SCALE	
	Pre	Post	Pre	Post	pre	post	Pre	Post
1.	200	250	4	2	250	300	5	4
2.	150	200	5	3	100	150	5	5
3.	100	150	5	4	300	350	5	5
4.	200	250	4	3	150	200	6	5
5.	150	200	3	1	200	250	4	4
6.	200	200	4	3	150	200	5	4
7.	150	200	6	4	100	200	5	4
8.	100	150	4	2	200	300	4	3
9.	100	150	6	5	300	400	6	5
10	150	150	6	4	350	450	6	5
11.	200	250	4	2	100	250	6	6
12.	250	250	5	3	250	300	4	3
13	300	300	4	3	200	300	5	4
14	150	200	6	4	150	250	4	4
15	200	200	5	4	250	350	5	5

PEFR-Peak Expiratory Flow Rate

DATA ANALYSIS AND INTERPERTATION

This chapter deals with the data analysis and interpretation from pre and post test of group A and B.

TABLE II

GROUP A

The comparative mean value, mean difference, standard deviation and‘t ‘ value between pre vs. post test score of peak expiratory flow rate in Group A

S.NO	Peak expiratory flow rate	Mean	Mean Difference	S.D	Paired t-value
1.	Pre test	173.33	33.34	24.39	5.29
2.	Post test	206.67			

The paired ‘t’ value of pre and post test of group A was 5.29 ,which was greater the tabulated ‘t’ value of 2.26 showed a statistical significant difference at 0.05 level between pre vs. post test results.

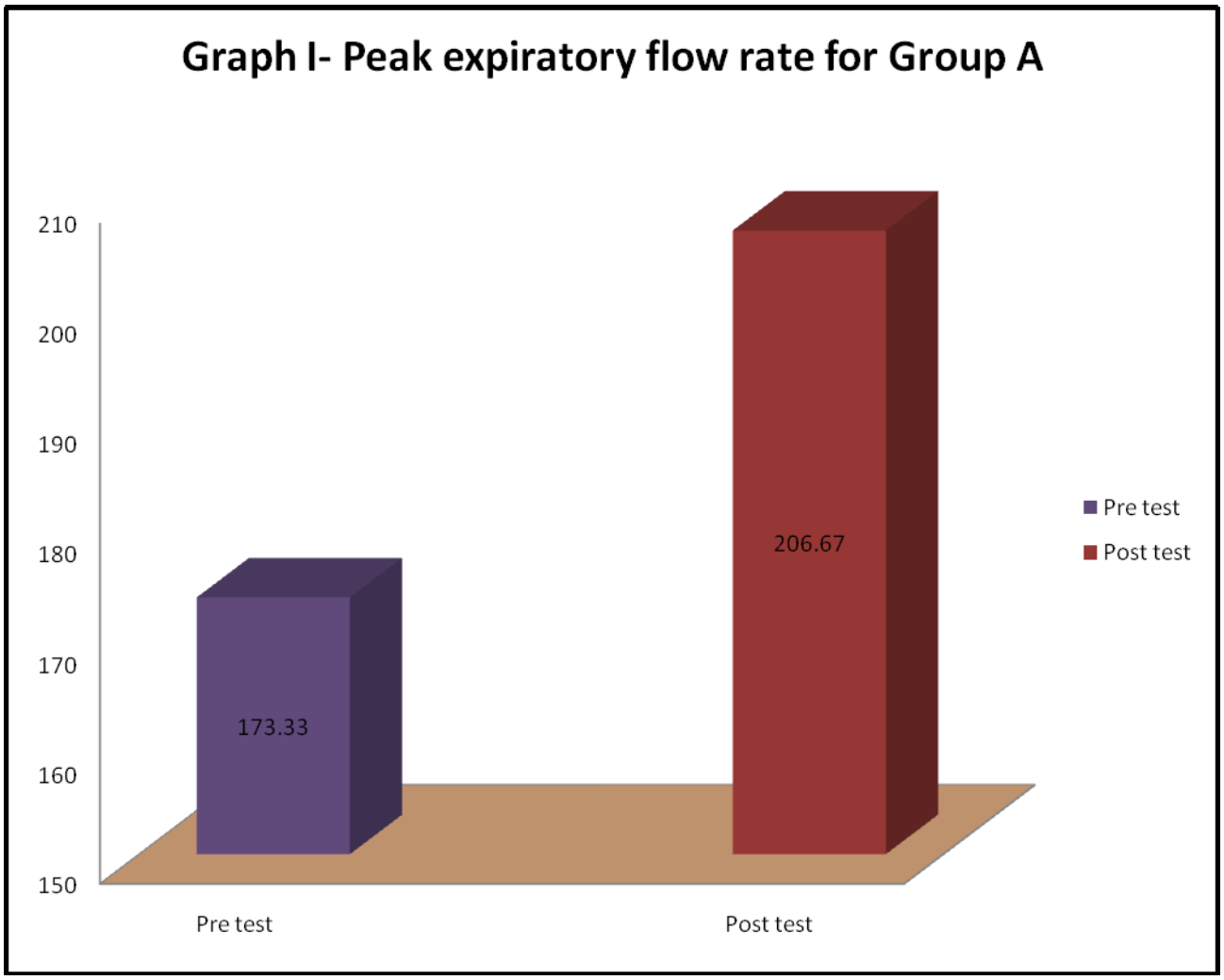

Graph I- Peak expiratory flow rate for Group A
210
200
190
180
170
160
150
173.33
206.67
Pre test
Post test
Pre test
Post test

TABLE III

GROUP B

The comparative mean value, mean difference standard devotions and‘t’ value between pre vs. post score of peak flow expiratory rate in Group B

S.NO	Peak expiratory flow rate	Mean	Mean Difference	S.D	Paired t-value
1. 2.	Pre test Post test	203.33 283.33	80	31.62	9.80

The paired ‘t’ value of pre and post test of group B was 9.80 which was greater than the tabulated ‘t’ value of 2.26 which showed a statistical significant difference at 0.05 level between pre-test vs post-test results.

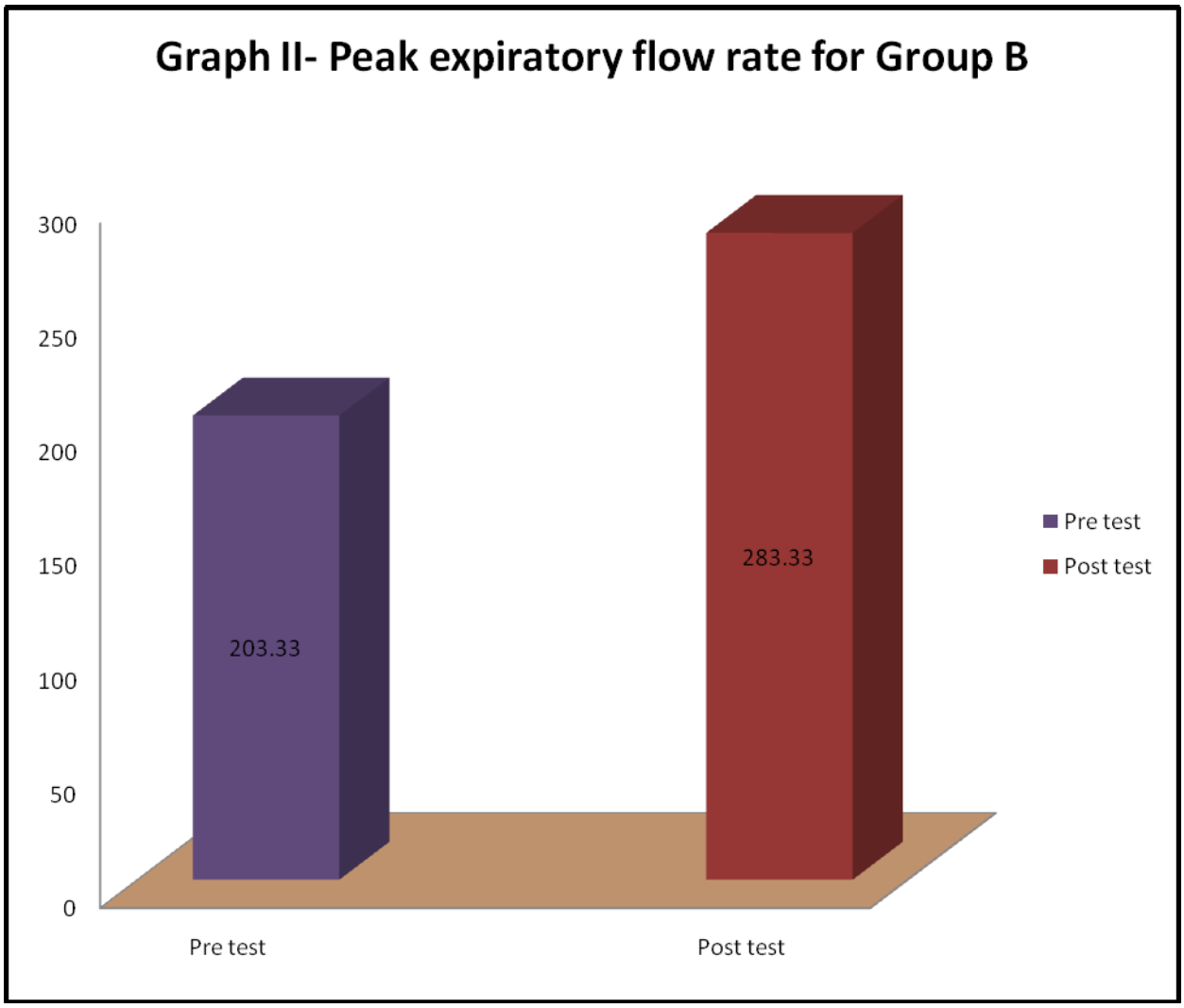

Graph II- Peak expiratory flow rate for Group B
300
250
200
150
100
50
0
203.33
283.33
Pre test
Post test
Pre test
Post test

TABLE IV

Table IV represent the mean values, mean difference, standard deviation and unpaired 't' value between pre and post test values of peak expiratory flow rate between Group A and Group B.

S.NO	Peak expiratory flow rate	Mean	Mean Difference	S.D	UnPaired t-value
1.	Pre test	206.67	76.66	96.73	3.17
2.	Post test	283.33			

The unpaired' t test values of Group A and B was 3.17 which was greater than the tabulated 't' value of 2.16 showed a statistical significant difference at 0.05 level between mean difference of Group A and Group B.

Therefore the study was rejecting the null hypothesis and accepting the alternate hypothesis.

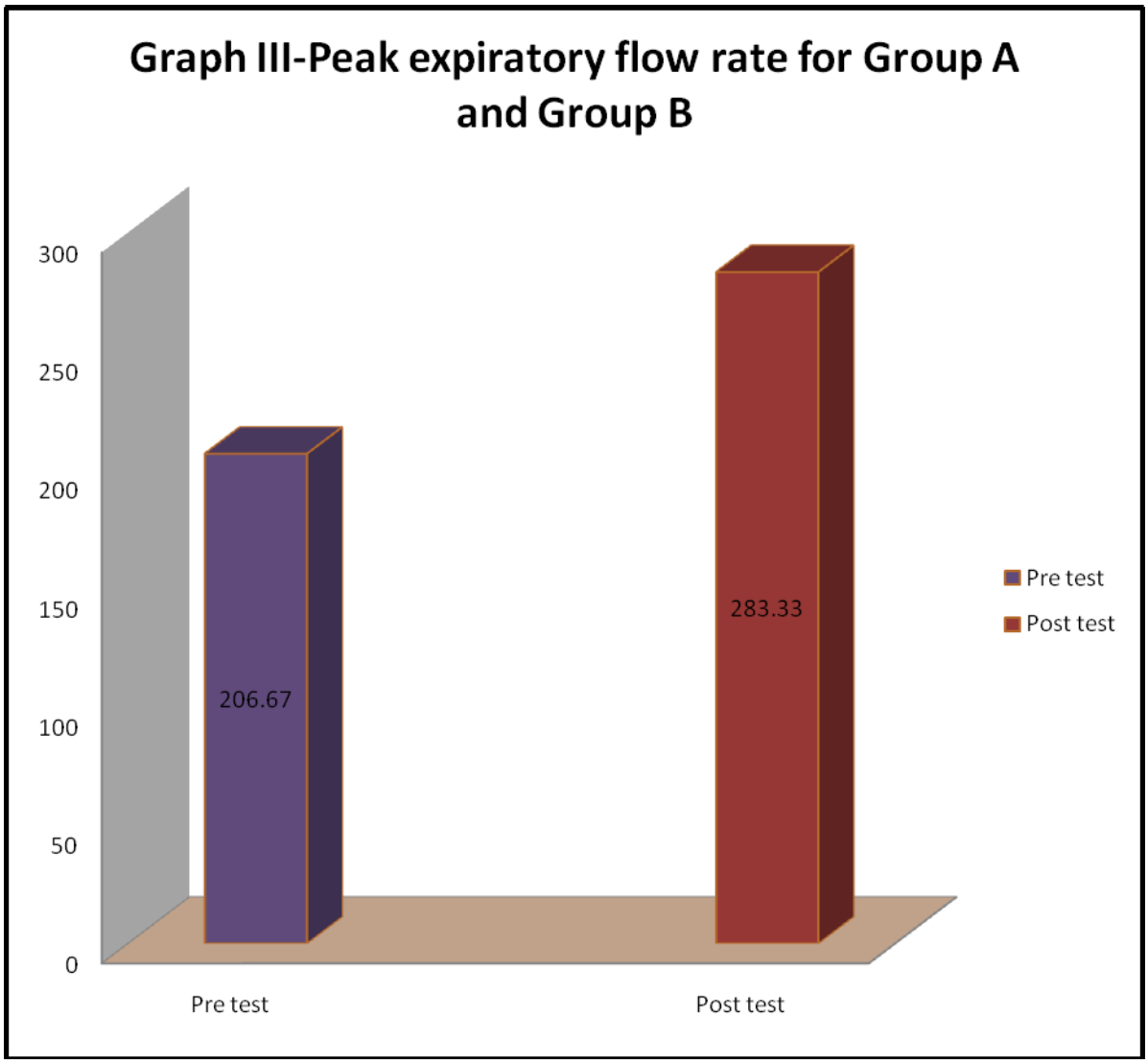
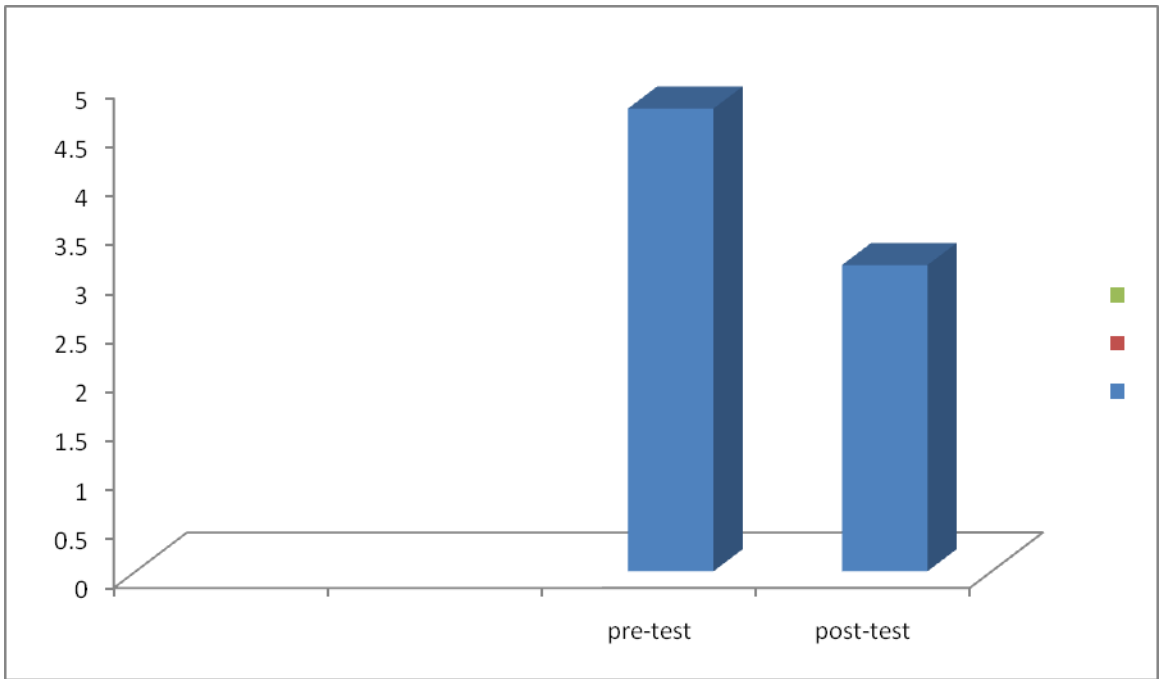

Graph III-Peak expiratory flow rate for Group A and Group B
300
250
200
150
100
50
0
206.67
283.33
Pre test
Post test
Pre test
Post test

TABLE V

Table V represent the mean values, mean deviation ,standard deviation and paired ‘t’ value between pre and post test values of modified borg scale in Group A

S.NO	Modified Borg Scale	Mean	Mean Difference	S.D	Paired t-value
1.	Pre test	4.73	1.6	0.51	12.2
2.	Post test	3.13			

The paired ‘t’ value of pre and post test of group A was 12.2 which was greater than the tabulated ‘t’ value of 2.26 showed a statistical significant difference at 0.05 level between pre test vs. post test results.


5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
pre-test
post-test

TABLE

Group B

TABLE VI

Table VI show mean values, mean deviation ,standard deviation and paired ‘t’ value between pre vs. post test values of modified borg scale in Group B

S.NO	Modified Borg Scale	Mean	Mean Difference	S.D	Paired t-value
1.	Pre test	5.0	0.6	0.51	4.5
2.	Post test	4.4			

The paired ‘t’ value of pre and post test of Group B was 4.5 which was greater than the tabulated ‘t’ value of 2.26 showed a statistical significant difference at 5.0 level between pre test vs. post test results.

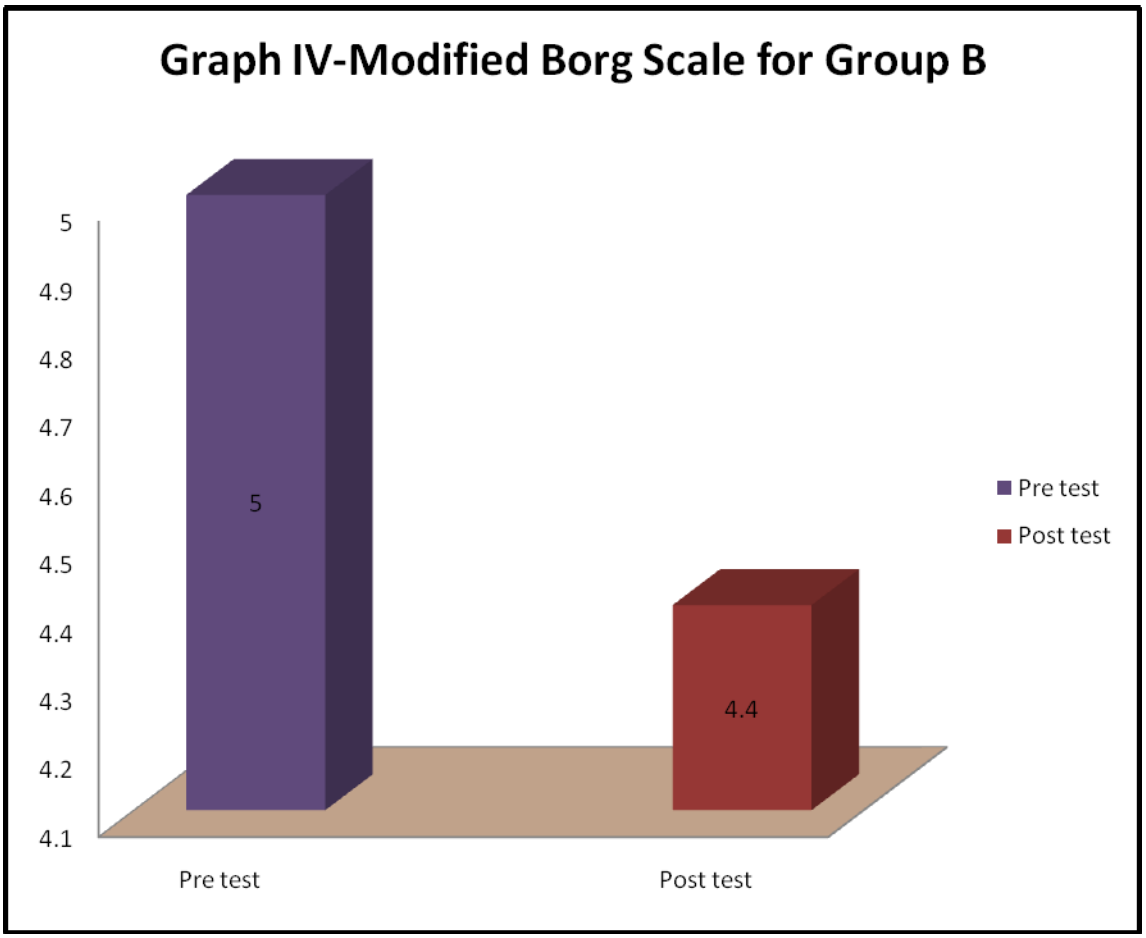

Graph IV-Modified Borg Scale for Group B
5
4.9
4.8
4.7
4.6
4.5
4.4
4.3
4.2
4.1
5
4.4
Pre test
Post test
Pre test
Post test

TABLE VII

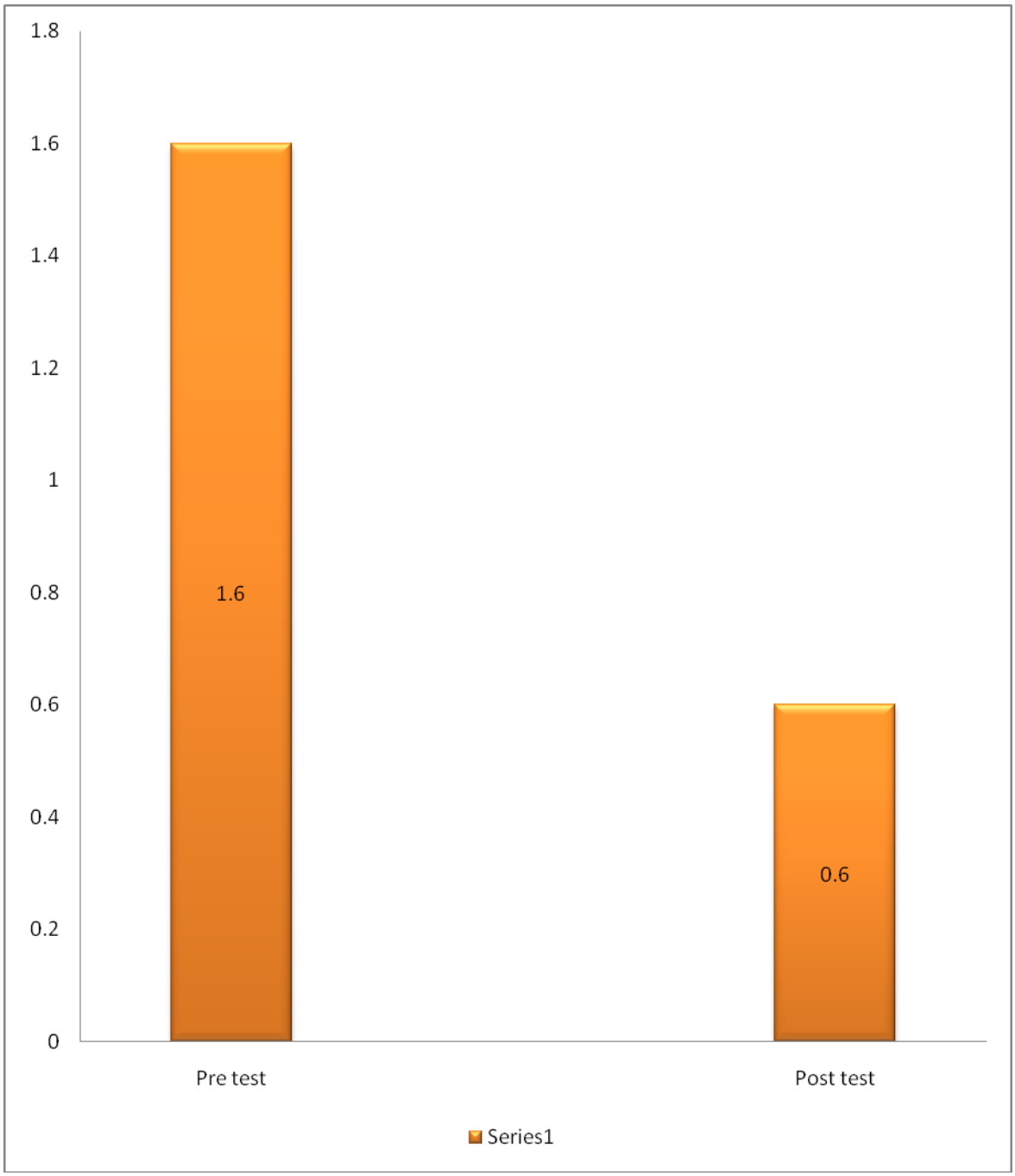
Table VII shows the comparative mean value, mean deviation , standard deviation and unpaired ‘t ‘ value of modified borg scale A and B.

S.NO	Modified Borg Scale	Mean	Mean Difference	S.D	Unpaired t-value
1.	Pre test	1.6	1	1.59	5
2.	Post test	0.6			

The unpaired ‘t’ test values of Group A and B was 5 which was greater than the tabulated ‘t’ value of 2.16 showed a statistical significant difference at 0.05 level between mean difference of Group A and Group B.

Therefore the study was rejecting the null hypothesis and accepting the alternate hypothesis.

TABLE VII



DISCUSSION

The purpose of this study was to compare the efficacy of positive Expiratory pressure technique and autogenic drainage on bronchitis patients.

Discussion on parameters

C M Q Van winden et al (1998) conducted a comparative study of flutter device and positive expiratory pressure mask on symptoms and lung function in 21 cystic fibrosis patients using peak expiratory flow rate (peak flow meter) and oxygen saturation as parameter. There was a significant improvement in sputum expectoration after treatment in sputum expectoration after treatment with flutter.

Based on the above study the present study has taken peak expiratory flow rate as one of the parameters.

Savci S et al (2000) conducted a study in Turkey with 30 clinically stable COPD patients treated with Active cycle of breathing technique(ACBT) and Autogenic Drainage (AD) for 20 days. Patients were assessed through Pulmonary function test, arterial blood gas analysis, 6 minute walk test and modified Borg's scale before and after the treatment and found that there was increased Forced vital capacity, Peak expiratory flow rate, arterial oxygenation and exercise performance. They concluded that both techniques are effective in clearing secretions & improving lung functions.

Based on the above study the present study has taken modified brog's scale as one of the parameters.

Discussion on positive Expiratory pressure technique.

Ernst M App et al (1998) studied the efficacy of flutter device and autogenic drainage on removal of bronchial secretions in 14 cystic fibrosis patients using oxygen saturation (pulse oxymeter) as parameter.

The treatment was carried out twice daily for four consecutive weeks with 15 minutes treatment/session and found that the applied oscillations are capable of decreasing mucus viscoelasticity within the airways at frequencies and amplitudes achievable with flutter device.

Bellone A et al (2000) conducted a comparative study of effectiveness of oscillating positive expiratory pressure using flutter device with postural drainage and ELTGOL (expiration with the glottis open in the lateral posture) on oxygen saturation and sputum production. They considered 10 Bronchial Asthmapatients with exacerbation for their study and concluded that flutter techniques was more effective in prolonging secretion removal in chronic bronchitis.

Based on the above studies by Ernst M App, Bell one A this study has taken positive expiratory pressure training to Group A.

In analysis and interpretation of peak flow expiratory rate in Group A

The paired 't' value of pre and post test of group A was 5.29 ,which was greater the tabulated 't' value of 2.26 showed a statistical significant difference at 0.505 level between pre vs. post test results. The pretest mean was 173.33,post mean was 206.67 and mean difference was 33.34 which showed a significant improvement in bronchial hygiene.

In analysis and interpretation of modified Borg's scale in Group A

The paired 't' value of pre and post test of group A was 12.2 which was greater than the tabulated 't' value of 2.26 showed a statistical significant difference at 0.05 level between pre test vs. post test results. The pre test means was 4.7 post test mean was 3.13 and the mean difference was 1.6 which showed a significant improvement in bronchial hygiene.

Discussion on autogenic drainage.

Miller S et al (1995) conducted a comparative study of autogenic drainage and the active cycle of breathing techniques with postural drainage on mucus clearance in 18 cystic fibrosis patients and concluded that autogenic drainage cleared mucus from the lungs faster than active cycle of breathing technique over the whole day.

Based on study Miller S,the study has given autogenic drainage to Group B.

In analysis and interpretation of peak flow expiratory rate in Group B

The paired ‘t’ value of pre and post test of group B was 9.80 which was greater than the tabulated ‘t’ value of 2.26 showed a statistical significant difference at 0.05 level between pre test mean Was 203.33 post test mean was 288.33 and mean difference was 80 which showed a significant reduction of mucous clearance on Bronchial Asthmain response to autogenic drainage.

In analysis of interpretation of modified Borg’s scale in Group B

The paired ‘t’ value of pre and post test of Group B was 4.5 which was greater than the tabulated ‘t’ value of 2.26 showed a statistical significant difference at 5.0 level between pre test vs. post test results. The pre test means was 5.0 post test mean was 4.4 and the mean difference was 0.6 which showed a significant improvement in mucous clearance in chronic bronchitis in response to autogenic drainage.

In the analysis and interpretation rate of peak flow expiratory rate in Group A and Group B

The unpaired‘t’ test values of Group A and B was 3.17 which was greater than the tabulated ‘t’ value of 2.16 showed a statistical significant difference at 0.05 level between mean difference of Group A and Group B.

The pre-test mean in group A was 206.67 the post-test mean in group was 288.33 and mean difference of Group A and group B was 76.66 which showed a statistically significant reduction of mucous clearance in response to treatment in group A than group B.

Therefore the study was rejecting the null hypothesis and accepting the alternate hypothesis.

In the analysis and interpretation of modified borg's scale in Group A and Group B

The unpaired 't' test values of Group A and B was 5 which was greater than the tabulated 't' value of 2.16 showed a statistical significant difference at 0.05 level between mean difference of Group A and Group B.

The pre-test mean in group A was 1.6. The post-test mean in group B was 0.6 and mean difference of group A and group B was 1 which showed a statistically reduction of mucous clearance in response to treatment in group A than group B.

Therefore the study was rejecting the null hypothesis and accepting the alternate hypothesis.

Reason for increased score of mucous clearance in chronic bronchitis in patients.

The results of this study show that Flutter therapy resulted in a significant reduction in sputum viscoelasticity and thus improves mucus clearance.

This is in accordance with the study by Konstan et al, who found a large increase in expectorated sputum volume with Flutter therapy compared with cough or conventional chest physiotherapy.

Flutter therapy improved cough clearance by keeping the airways open during lightly forced expiration, through the added positive airway pressure produced during expiration.

The shear rates during such a cough maneuver, with the consequent flow and pressure changes, have to be high enough to move bronchial secretions, but not so high that airways collapse occurs.

The results of this study is in accordance with Andreas Pfleger et al (1992) who suggested that airway clearance techniques are used to aid in mucus clearance in a variety of diseases such as COPD and new techniques like Positive expiratory pressure technique and autogenic drainage can be used to rely heavily on basic airway clearance.

Also Bell one A et al (2000) who compared the effectiveness of oscillating positive expiratory pressure using flutter device with postural drainage and ELTGOL (expiration with the glottis open in the lateral posture) on oxygen saturation and sputum production; concluded that flutter techniques was more effective in prolonging secretion removal in chronic bronchitis.

SUMMARY AND CONCLUSION

The aim of the study was to compare the effect of positive expiratory pressure technique and autogenic drainage on bronchial hygiene in moderate Bronchial Asthma patients. A total of 30 patients who met inclusion criteria were selected and divided into 2 groups of 15 each and named group A and group B

The paired ‘t’ test was used to compare the pre test versus post test values of modified borg scale and peak expiratory flow rate in both group. Based on the statistical analysis ,the result of this study showed that there were significant improvements in both groups between pre and post test. The mean difference of modified Borg scale rated and peak expiratory flow rate between group A and group B.

The unpaired ‘t’ value for peak expiratory flow meter was 3 at 0.05 level, which was greater than the tabulated ‘t’ value(2.16). The unpaired ‘t’ value modified brog’s scale was 5 at 0.05 level, which was greater than the tabulated ‘t’ value(2.16). Thus the result showed that the subject who participated in group A showed good improvement in reduction mucous clearance than the groupB.

Therefore , the study rejects the null hypothesis and accepts the alternate hypothesis.

The study concludes that the positive expiratory pressure technique using flutter device eliminates mucous from the bronchial airway and thus improves bronchial hygiene in moderate Bronchial Asthma patients.

RECOMMENDATIONS

A similar study can be conducted for cystic fibrosis patients to improve their lung function.

A similar study can be conducted for pulmonary disease patients for clearing the mucous secretion.

A similar study can be conducted for chest physiotherapy intervention in COPD patients to improve the long function and clearing mucous secretion.

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APPENDIX

Group A: (Positive expiratory pressure technique)

The subjects were asked to seat in a comfortable position leaning forward with elbows supported on a table and neck slightly extended in order to open up the airway.

The flutter device was held horizontally and tilted slightly upwards in order to get maximal oscillatory effect and was placed in the mouth. Inspiration was done through the nose.

A slow breath in, only slightly deeper than normal with a breath hold of 3-5 seconds followed by breath out through the flutter device at a slightly faster rate than normal.

After 4-8 of these breaths, a deep breath with a 'hold' at full inspiration was followed by a forced expiration through the flutter device.

This precipitated expectoration and was followed by a pause for breathing control, and then according to the subjects' preference a cough or huff was done.

The full effects of the vibrations induced by the flutter may be received by changing the angle of the device.

Movement of the flutter upward increases the pressure and frequency while movement of the device downward results in lower pressure and frequency.

A flutter session consists of 10 to 15 breaths followed by huffing, with session lasting about 15 to 20 minutes.

To avoid dizziness due to hyper ventilation, a patient should refrain from forced exhalation.

It may be necessary to pause every 5 to 10 exhalations before resuming the session.

Flutter device

Using Flutter device

The flutter device should be cleaned regularly with hot and soapy water. In the hospital the equipment should be sterilized according to infection control recommendations.

Group B: (Autogenic Drainage)

The patients were seated up straight in a chair with back support. The upper air ways were cleared of secretions by huffing or blowing the nose.

The therapist was seated to the side and slightly behind the patient, close enough to hear the patient's breathing.One hand was placed to feel the work of abdominal muscles and the other hand placed on the upper chest.

In all phases, the inhalation was done slowly through the nose, using diaphragm; two to three breath holds allowing collateral ventilation to get air behind the secretions. Exhalation was done through the mouth.

The vibration of mucus is felt with hand placed on upper chest. The frequency of vibrations revealed their locations.

High frequencies reveal secretions located in small airways. Low frequencies mean that secretions were moved to larger airways.

1. **The Unsticking Phase:**

   Inspiration was followed by a deep expiration in to the expiratory reserve volume. It was done by contracting the abdominal muscles. This low lung volume breathing continued until the mucus was loosened and started to move in to the larger airways.

2. **The Collecting Phase:**

   The tidal volume breathing was then changed gradually from expiratory reserve volume towards the inspiratory reserve volume range so that the lungs were expanded more with each inspiration.

   The patient increased both inspiration and expiration to move a greater volume of air.

   This low to middle lung volume breathing continued until the sound of mucus decreased, signaling its movement in to the central airways to be evacuated.

3. **The Evacuating Phase:**

In this Phase, the patient increased inspiration in to the inspiratory reserve volume range. This middle to high lung volume breathing continued until the secretions were in the trachea and ready to be expectorated.

The collected mucus was evacuated by a stronger expiration or a high volume huff.

The duration of each phase of autogenic drainage depended on the location of the secretions. The duration of a session depended on the amount and viscosity of the secretions.

INFORMED CONSENT

Name :

Age :

Sex :

Occupation :

Address for communication :

Declaration:

I have fully understood the nature and purpose of the study. I accept to be a subject in this study. I declare that the above information is true to my knowledge.

Date:

Place:

Signature of the Subject

ASSESSMENT CHART

Name :

Age :

Sex :

Occupation :

Vital Signs

BP :

HR :

RR :

On Examination

Observation :

Palpation :

Percussion :

1. **Mediate percussion :**
2. **Diaphragmatic percussion :**

Auscultation

1) **Breath sounds :**
2) **Added sounds :**

Investigation

PEFR :

Peak Expiratory Flow Rate	
Pre test	Post test

Modified Borg Scale

Rate of perceived Exertion	
Pre test	Post test

Mode of treatment **:** Positive Expiratory pressure technique

Using flutter device

Autogenic drainage

Signature of the investigator

Modified Borg Scale:

The original Borg scales of perceived has been modified for measurement of breathlessness. It has 12 points of which have accompanying verbal descriptions.

Scale		Revised rating scale
0	Nothing at all	
0.5		Very, very weak
1	Very weak	
2	Weak	
3	Moderate	
4	Somewhat strong	
5	Strong	
6		
7	Very strong	
8		
9	Very, very strong	
10	Maximal	