Original Article

Comparative Effect of Pursed-Lip Breathing and Stacked Breathing on Pulmonary Function and Wellbeing in Bronchiectasis Patients

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ABSTRACT

Objective: To compare the effects of pursed-lip breathing and stacked breathing on pulmonary function and wellbeing in bronchiectasis patients.

Study Design: Randomized Controlled study

Place and Duration of Study: This study was conducted at the services hospital and Riphah University from June 2021 to February 2022.

Materials and Methods: Twenty bronchiectasis patients were randomly and equally allocated into two groups, group 1 and group 2, through random number generator by Non-probability convenient random sampling technique. Subjects in Group A received Stalked breathing exercise and conventional treatment. Group B received Pursed lips breathing and conventional treatment and the intervention was conducted for 3-4 times daily with 8-10 repetition and 4-5 days per week. The intervention was repeated after 4 weeks of 1st intervention. The data was analysed by SPSS, version 25. Statistical significance was P= 0.05. Inter group difference evaluated with non- parametric tests.

Results: With respect to changes in the pulmonary functions of both groups, group 1 and group 2, before and after the intervention, there was significant differences in PEFR/min after treatment between groups, (U= 16.5, z = 2.539, p = 0.01), while for rest of the variables, results were insignificant (p>0.05). Mann-Whitney test was used to evaluate the difference between the groups.

Conclusion: It is concluded that both treatment techniques are equally effective in pulmonary function and wellbeing in patient with bronchiectasis.

Key Words: Bronchiectasis, pursed lips breathing, Stacked Breathing

Citation of article: Salman, Quarat-ul-Ain, Naqvi SMA, Zafar A, Bukhari R, Ahmed A. Comparative Effect of Pursed-Lip Breathing and Stacked Breathing on Pulmonary Function and Wellbeing in Bronchiectasis Patients. Med Forum 2022;33(7):17-20.

INTRODUCTION

This is an unusual disease that occurs after an infection, which damages any single or more than one conducting bronchi, permanently. The actual definition of bronchiectasis is the lifelong dilation of the bronchi, along with cough, constant sputum buildup, as well as repeated infections of the respiratory system.

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Received: March, 2022
Accepted: June, 2022
Printed: July, 2022

It is also commonly known as chronic respiratory syndrome[1]. Chronic Obstructive Pulmonary Disease is very alike this in that both have similar symptoms such as cough, sputum, shortness of breath, and wheezing. Whereas, bronchiectasis includes the walls of the bronchi to get inflamed. Bronchi are “pipes” that take air from the mouth/nose to the lungs. These are the central affected areas when a patient has bronchiectasis. From the mouth, the trachea comes down and divides into two bronchi, that is the left and right that are even more divided down to secondary bronchi; each of which supplies a lobe of the lung. Further division is called tertiary bronchi that take air into one bronchopulmonary segment each. In this disease, lining cilia get damaged as well and hence cannot move the mucus out of the airway [(2,11)]. At present, a CT scan of a high resolution is considered to be the top gold standard in order to diagnose bronchiectasis[(3)].

Education and comprehensive treatment are the keys to bronchiectasis management.[(4)] Physical therapy can be quite helpful in alleviating bronchiectasis symptoms. Patients tend to cough more because muco-ciliary clearance is lowered to roughly 15% of usual.

Treatments for secretory clearance, weariness caused by poor clearance, and increased coughing are all targets of physiotherapy[5,6,13]. A pulmonary rehabilitation program usually comprises 45 to 60 minutes of steady aerobic exercise. It aids in the strengthening of muscles throughout the body as well as the reconditioning of the heart and lungs.[7,8]. Physiotherapists help patients with Bronchiectasis by practicing lung exercises such as pursed-lip breathing (PLB) and stacked breathing to help ease symptoms and physical restrictions. However, the results of breathing exercises published previously were seen to be mixed, making effectiveness of this sort of breathing uncertain.[9,10,14]. In 2021 Bilge conducted a prospective, randomized, comparative study in patients with bronchiectasis to examine the efficacy of an oscillating positive expiratory device (OPED) and active cycle breathing methods (ACBT). The Flutter® gadget and ACBT are two home-based physiotherapeutic approaches that are beneficial. In terms of sputum production, the Flutter® device looks to be more efficient [15].

MATERIALS AND METHODS

Study Design and Settings: It was a Randomized clinical trial and conducted in services hospital and Riphah University.

Sample Size and Selection Criteria:

The sample size was collected via EPITOOL. 20 patients were recruited by assuming a 10% attrition rate with the following details. Data was entered and analyzed by SPSS version 25. Mean 1= 164.8
Variance 1 = 20.9
Mean 2 = 174.5
Variance 2 = 25.2
Confidence =
0.95 Ratio of
sample = 1
Tails = 2

Inclusion Criteria: Both genders, Aged between 40 to 60 years, acute bronchiectasis (diagnosed by a doctor), Shortness of breath, Fever and chills, Cough with blood or mucus.

Exclusion Criteria: Patients with cardiac, metabolic, or endocrine disorders, acute chest infection, having cardiac or other surgeries, Patients with a diagnosis of cancer or active gastrointestinal problems, those requiring supplemental oxygen [12].

RESULTS

A total of 20 patients were enrolled in this study and divided into two groups i.e., Stacked Breathing (Group 1) and Pursed Lip Breathing (Group 2). The baseline demographic characteristics of participants are summarized in Table 1.

Table No.1: Baseline Demographic Features of Study Participants

Characteristics	Group 1 (n=10)	Group 2 (n=10)
Age	50.3±5.9	50.4±6.5
Gender		
Male	6	5
Female	4	5
Smoking		
No	5	6
Yes	5	4
PEFR/min	388±39.1	353±48.7
FEV_1%	59.3±6.0	58.6±7.6
FEV_1Predicted	59.3±6.0	58.6±7.6
Symptom Score	13.6±0.6	13.9±0.8
Activity Score	10.8±0.7	10.8±0.6
Impact Score	2.4±0.6	2.3±0.8
Total Score	6.6±0.5	6.2±0.7

Table No.2: Tests of Normality (Shapiro-Wilk)

	Statistics	Df	Sig.
PEFR/min (pre-treatment)	.969	20	.740
FEV1 % (pre-treatment)	.877	20	.16**
FEV1 % predicted (pre-treatment)	.877	20	.16**
Symptom score (pre- treatment)	.784	20	.001**
Activity score (pre- treatment)	.800	20	.001**
Impact Score (pre-treatment)	.765	20	.000**
Total score (pre-treatment)	.760	20	.000**
PEFR / min (pre-treatment)	.958	20	.500
FEV_1 % (pre- treatment)	.895	20	.033**
FEV1 % predicted (pre-treatment)	.895	20	.033**
Symptom score (pre- treatment)	.788	20	.001*
Activity score (pre- treatment)	.873	20	.013**
Impact Score (pre-treatment)	.800	20	.001*
Total score (pre-treatment)	.780	20	.000*

*p<0.001, **p<0.05

Table No.3: Mann-Whitney U test (Between Group)

Variables	Mean Rank	Z-score	P-value
PEFR/min (pre- post treatment)	16.50	-2.539	.011
FEV1 % (per-post treatment)	26.0	-1.825	.068
Symptom	33.5	-1.424	.154

score (pre-post treatment)			
Activity score (pre-post treatment)	30.5	-1.575	.115
Impact score (pre-post treatment)	42.5	-0.622	.534
Total score	39.0	-0.935	.350

DISCUSSION

This study examined the effects of a stacked breathing exercise and pursed- lip breathing exercise on bronchiectasis patients after four weeks of training on pulmonary function and wellbeing. Both treatment techniques are equally effective in pulmonary function and the well-being of inpatients with bronchiectasis.

When the results of the study compared with the previous literature, it is highlighted the fact that physiotherapists help patients with Bronchiectasis by practicing lung exercises such as pursed- lip breathing (PLB) and stacked breathing to help ease symptoms and physical restrictions. However, the results of breathing exercises published previously were seen to be mixed, making the effectiveness of this sort of breathing uncertain. In this study, there was a significant difference in PEFR/min after treatment between Group 1 and Group 2, ($U= 16.5$, $z = -2.539$, $p = 0.01$), while for the rest of the variables, results were insignificant ($p>0.05$) which supports the idea of stalked breathing in management of bronchiectasis. Results from the parent article, when compared, summarized the topic as Diaphragmatic breathing makes the most of your diaphragm muscle while also helping you take in more oxygen. Pursed lip breathing keeps the airways open longer and allows trapped air in the lungs to escape. Both of the exercises taught by our specialists help you maintain your airways open, control shortness of breath and relax your body. These strategies allow you to participate in your daily activities with ease.[15]

CONCLUSION

It is concluded that both treatment techniques are equally effective in pulmonary function and well-being in patient with bronchiectasis.

Recommendations: There is a lot to explore about therapeutic interventions in order to treat respiratory diseases along with pharmaceutical management.

Author's Contribution:

Concept & Design of Study:	Salman, Quarat-ul-ain
Drafting:	Syed Mazhar Ali Naqvi, Amirah Zafar
Data Analysis:	Rabia Bukhari, Anam Ahmed
Revisiting Critically:	Quarat-ul-ain, Syed Mazhar Ali Naqvi
Final Approval of version:	Salman, Quarat-ul-ain

Conflict of Interest: The study has no conflict of interest to declare by any author.

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