



International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

IJAMSCR | Volume 5 | Issue 1 | Jan - Mar - 2017
www.ijamscr.com

Research article

Medical research

Added effect of therapist made low cost flutter device for airway clearance in acute exacerbation of COPD.

Bhagyashree Gokhale, Dr.Varoon C. Jaiswal(PT) Dr.Sneha Ghuman(PT), Dr.Snehal Ghodey(PT)

(Maer's Physiotherapy College Talegaon, India)

BPTH Intern MAEER'S Physiotherapy College Talegaon Dabhade.

Associate Professor MAEER'S Physiotherapy College Talegaon Dabhade.

Assistant Professor MAEER'S Physiotherapy College Talegaon Dabhade.

Principal, MAEER'S Physiotherapy College Talegaon Dabhade.

***Corresponding Author: Bhagyashree Gokhale**

Email id: gobbhagyashree@gmail.com

ABSTRACT

The purpose of the study is to determine the added effect of therapist made low cost flutter device for airway clearance in acute exacerbation of COPD and to identify whether there is any difference in the amount of expectorated sputum when the device is used adjuvant with foregoing treatment. 30 subjects were selected with COPD as a diagnosis and having secretions and were randomly assigned into two equal groups. Control group was treated with Purse-lip breathing, percussion and huffing techniques along with standard medical protocol of the hospital. Experimental group was treated with low cost flutter device along with foregoing treatment. In the intergroup comparison the amount of expectorated sputum after 24 hours was analysed and the experimental group showed significant increase in expectorated sputum. So the present study say that therapist made low cost flutter may be effective in removing secretion from lungs and could be used as an adjuvant.

Keywords: Therapist made low cost flutter, Expectorated sputum, Purse-lip breathing, Percussion techniques.

INTRODUCTION

COPD is a preventable and treatable disease state characterized by airflow limitation that is not fully reversible. The airflow limitation is usually progressive and associated with a chronic inflammatory response of the lungs to noxious particles or gases. [1] Prevalence of COPD in rural areas of India lies between 6.5% and 7.7%. [2]

The diagnosis of COPD is first suspected when a patient complains of a cough, sputum production,

dyspnoea, or recurrent lower respiratory infections. [1]

Repeated inhalation of tobacco, smoke & other irritants irritates the sensitive lining of the airways, leading to inflammation, hyper-secretion and broncho-spasm. These pathological changes give rise to the physiological abnormalities that characterize COPD include accumulation of secretions, ciliary dysfunction, airflow limitation, hyperinflation, abnormal gas exchange, pulmonary

hypertension, and various systemic effects (e.g., limb muscle weakness). [1]

Airway mucus hypersecretion is recognised as a potential risk factor for an accelerated loss of lung function in COPD and is a key patho-physiological feature in many patients, particularly those prone to respiratory tract infection. [3]

Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) describes the phenomenon of sudden worsening in airway function and respiratory symptoms. [4]

Exacerbations are associated with a significant worsening in the quality of life of patients with COPD. [5] Patients with exacerbations experience more breathlessness than usual in routine activities like bathing and walking, they have trouble sleeping, feel very tired and feel confused. [6] Physiotherapists use various techniques & devices to remove secretions from the lungs.

Positive expiratory pressure therapy is a technique used to enhance sputum clearance during acute exacerbations of chronic obstructive pulmonary disease (AECOPD). Flutter, Acapella and the Cornet are some devices that deliver PEP. [7] These available devices cannot be reused and also are too costly.

Other effective ways for airway clearance are

- Directed coughing & huffing.
- Forced expiratory techniques.
- Active Cycle of breathing technique.

But these techniques are

- Time consuming
- Difficult to explain the technique to the patient

There are studies that say flutter valve improves respiratory mechanics and sputum production in patients. [8] But the cost of a single flutter device is too high. Also the device cannot be used on another patient. People from rural areas could not afford such expensive devices.

There is a need to find some less expensive device with similar benefits. Hence Dr Varoon C Jaiswal (PT) associate professor MAEERS Physiotherapy College Talegaon Pune has designed a low cost flutter device made up of PVC pipe with

a marble inside it which oscillates to create vibrations and may help in clearance of secretions & hence the study was designed to study the effect of the therapist made low cost flutter [9-12].

METHODOLOGY

Type of study is experimental study with purposive sampling. The study was carried out at Bhausaheb Sardesai Talegaon Rural Hospital on 30 male subjects diagnosed with COPD and having secretions in their lungs. Patients with other respiratory conditions, unstable cardiac conditions and musculoskeletal and neurological conditions were excluded from the study.

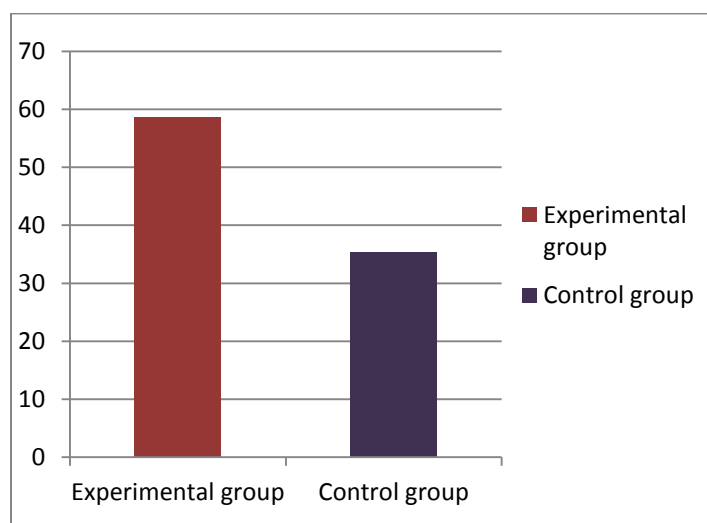
PROCEDURE

With the approval of Institutional Ethical Committee the study was conducted & 30 samples were selected as per the inclusion criteria (Patients diagnosed with COPD with secretions). Two groups were made, group A and group B. The allocation was done randomly by lottery method. Subjects in group A (control group) received only conventional treatment (Bronchodilators, oxygen therapy, gluco-corticoids, chest PT including pursed-lip breathing and percussion technique). Subjects were asked to dispose the sputum in a calibrated mug by huffing technique and the amount of secretion was collected after 24 hours. Subjects in group B (experimental group) were treated by using low cost flutter device and conventional therapy (Bronchodilators, oxygen therapy, gluco-corticoids, chest PT). The flutter device was made up of PVC pipe, of 2.5" in diameter and a marble of 5gm was placed inside the pipe between two caps(outer of 25mm and inner of 25mm).The caps were perforated so that the air can pass through it. Subjects were asked to inhale and blow through the device for one minute (10-15 repetitions).This was repeated around 4 -5 times a day. Subjects in this group also disposed the sputum in the provided calibrated sputum mug and the amount of secretions in the mug was collected after 24hrs.Amount of collected sputum was measured using a calibrated sputum mug.



Statistical analysis and Graph

Amount of collected sputum in experimental and control group was statistically analysed using Unpaired-t test.



	EXPERIMENTAL GROUP	CONTROL GROUP
MEAN	58.67	35.33
SD	24.962	14.201

P value=0.0039, considered very significant.

DISCUSSION

The study was designed to find out the added effect of therapist made low cost flutter device for airway clearance in patients with acute exacerbation of COPD. The study was done on 30 subjects amongst which 15 were included in experimental group and 15 were in control group randomly. The subjects in experimental group were treated with therapist made low cost flutter device along with conventional physiotherapy treatment, while those in control received solely the conventional treatment. In both the groups sputum was collected in a calibrated mug over a period of 24 hours. In the study it was found that the mean

amount of sputum in the experimental group (58.67) is more than that in the control group (35.33) and the P value is less than 0.001 which is considered very significant.

Positive expiratory pressure (PEP) is the application of positive pressure at the mouth during expiration. Breathing out against resistance is thought to open up airways, even distribution of ventilation, force air through collateral ventilation and hence boost the muco-ciliary clearance. Also PEP devices reduce incidence of chest infection and hence improve lung function.

Therapist made low cost flutter cost Rs 57/- approx. which is least expensive than the original

flutter. It has a marble at one end that vibrates to create oscillations and also encourages slow breathing in order to maintain vibrations and hence gives feedback. Hence this device has the combined effects of PEP and oscillations. The oscillations may reduce sputum viscosity by re-arranging crosslinks and reducing molecular size.

The study was done to find whether there is a difference in collected sputum after using the therapist made device but some more clinical trials should be done with the device. Treatment with low cost flutter may be effective and hence should be used adjuvant to conventional treatment.

CONCLUSION

The study concludes that the added effect of therapist made low cost flutter device is more effective than the conventional treatment alone in

clearance of airway secretions in subjects with acute exacerbation of COPD.

Acknowledgement

I would like to thank my parents for the constant support and strength.

I am extremely grateful to Dr. Snehal Ghodey, Principal MAEER'S physiotherapy college for her advice and help

I am extremely thankful to Dr. Varoon Jaiswal under whose guidance I was able to complete the study.

Special thanks to Dr. Sneha Ghuman and my batch-mates for their help.

Last but not the least, I express my special thanks to all my subjects who participated in the study and gave their full co-operation for its completion.

REFERENCES

- [1]. The ATS Board of Directors; Official Statement Of COPD by the American Thoracic Society (ATS) and the European Respiratory Society (ERS) ATS Documents; 2014.
- [2]. Ailsa J McKay, P A Mahesh, Julia Z Fordham & Azeem Majeed. Prevalence of COPD in India: a systematic review. Primary Care Respiratory Journal (2012) 21,313–321 doi:10.4104/pcrj.2012.00055.
- [3]. Rogers DF; The role of airway secretions in COPD: patho-physiology, epidemiology and pharmaco-therapeutic options. COPD 2005.
- [4]. Neil Macintyre and Yuh Chin Huang. Acute exacerbation and respiratory failure in chronic obstructive pulmonary disease, American Thoracic society guidelines.
- [5]. Llor C, Molina J, Naberan K, Cots JM, Ros F, Miravittles M; Exacerbations worsen the quality of life of chronic obstructive pulmonary disease patients in primary healthcare. EVOCA study group. 2008.
- [6]. American Thoracic Society guidelines for exacerbation in COPD.
- [7]. Alexander Hough; Physiotherapy in Respiratory care; an evidence based respiratory and cardiac management. Third edition.
- [8]. Figueiredo PH, Zin WA, Guimarães FS. Flutter valve improves respiratory mechanics and sputum production in patients with bronchiectasis. *Physiother Res Int.* 17(1), 2012, 12-20. doi: 10.1002/pri.507. Epub 2010.
- [9]. G C Donaldson, T A R Seemungal, A Bhowmik, J A Wedzicha. Relationship between exacerbation frequency and lung function decline in chronic obstructive pulmonary disease. THORAX 2008.
- [10]. Rachel Garrod, Toby Lasserson; Role of physiotherapy in the management of chronic lung diseases: An overview of systematic reviews. *Respiratory medicine.* 101(12), 2007, 2429-2436
- [11]. Sharon Baines, Amanda Dryer, Robert Gaddard, Dr. John White; THORAX-Guidelines for physiotherapy management of adults.
- [12]. Angshu Bhowmik Kamaljeet Chahal, Gillian Austin, Indranil Chakravorty; Improving mucociliary clearance in chronic obstructive pulmonary disease. Department of respiratory medicine, Homerton University Hospital NHS Foundation Trust, Homerton, London UK. 103(4), 2009, 496, 50. doi:10.1016/j.rmed.2008.10.014.
- [13]. MW Konstan, RC Stern, CF Doershuk. Efficacy of flutter device for airway clearance in patients with cystic fibrosis. *The Journal of pediatrics*, 1994 – Elsevier
- [14]. Osadnik CR¹, McDonald CF, Jones AP, Holland AE Airway clearance techniques for chronic obstructive pulmonary disease. *Cochrane Database Syst* 14(3), 2012, CD008328. doi:10.1002/14651858.CD008328.pub2.

- [15]. A Hristara- Papadopoulou, J Tsanakas,² G Diomou,¹ and O Papadopoulou; Current devices of respiratory physiotherapy. *Hippokratia*. 12(4), 2008, 211–220
- [16]. K. George Mathew, Praveen Aggarwal. *Medicine manual for undergraduates*; fourth edition.

How to cite this article: Bhagyashree Gokhale, Dr.Varoon C. Jaiswal (PT) Dr.Sneha Ghuman (PT), Dr.Snehal Ghodey (PT). Added effect of therapist made low cost flutter device for airway clearance in acute exacerbation of COPD. *Int J of Allied Med Sci and Clin Res* 2017; 5(1): 298-302.

Source of Support: Nil. **Conflict of Interest:** None declared.