

# Effectiveness of balloon exercise on level of dyspnoea among patients with lower respiratory tract disorder

## Abstract

**Background:** Breath is the key to health and wellness, a function can learn to regulate and develop in order to improve our physical, mental and spiritual wellbeing. Breathing is one of the most important functions of our body. A person can only live from 5 to 10 seconds without taking another breath. The main function of breathing is to deliver oxygen to our lungs and to remove carbon-di-oxide when necessary which is done by respiratory system. Respiratory disease is a significant chronic health problem in our society. Chronic respiratory disease is found to be one of the most distressful conditions, badly affecting human life.

**Aim:** The main aim of the current study was to assess the effectiveness of the effectiveness of ballooning exercise on level of dyspnoea among patients with lower respiratory tract disorder in medical wards of MGMC&RI, Puducherry.

**Materials and methods:** Quantitative research approach was used for this study. The pre-experimental study design was used for this study. Total 20 samples were selected using purposive random sampling technique balloon therapy was given for a week. The data pertaining to level of dyspnoea was collected using structured self administered questionnaire and respiratory assessment for dyspnea.

**Results:** Among 20 patients the level of dyspnea was measured using dyspnoea scale before the implementation of balloon therapy, 15(75%) patients had poor dyspnea score. Out of 20 samples, 12(60%) of patients had normal dyspnea scale.

**Conclusion:** Regular practice of ballooning exercise can improve the respiratory status to a greater extent among patients with lower respiratory disorders.

**Keywords:** effectiveness, ballooning exercise, dyspnea

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## Introduction

Breath is the key to health and wellness, a function can learn to regulate and develop in order to improve our physical, mental and spiritual wellbeing. Breathing is one of the most important functions of our body. The main function of breathing is to deliver oxygen to our lungs and to remove carbon-di-oxide when necessary which is done by respiratory system. Respiratory disease is a significant chronic health problem in our society. Chronic respiratory disease is found to be one of the most distressful conditions, badly affecting human life.<sup>1,2</sup> World health organization (2011) shows that by mid-century, morbidity and mortality from respiratory disease will reach record at High levels. The report of "WORLD HEALTH STATISTICS 2011" Says that, 235 million people currently suffer from asthma, 90% of COPD deaths occur in low and middle income countries and >3 million people died of COPD in 2005. The lower respiratory tract infection pneumonia remains that most common infection seen in the community and among hospitalized patient.<sup>3,4</sup> National Disease Statistics (2011) worldwide shows a high prevalence of respiratory morbidity among patients with respiratory disorders. It says that COPD is the third leading cause of death in America. 12.7 million U.S adults (aged 18 and above) were estimated to have COPD, 10.1 million American reported chronic bronchitis and 4.7 million with emphysema. Most of the disease burden in India is due to the respiratory disorders namely asthma, bronchitis, and tuberculosis (TB) and Pneumonia. In low resource setting these diseases are mainly attributed with exposure

to indoor pollution, solid cooking fuels, poor housing, low nutritional status and sanitary condition. The association of respiratory disorder with geographical region may be relevant with population density, industrial and textile pollutants, and tobacco consumption.<sup>5</sup> Over 35 million people in the United States are living with lung disease and one in seven people die from it each year. Respiratory disease accounts for the 14% of total expenditure for health care in the United States (Health People, 2010). Flick M.R, Moody LE et al (2011, Sweden) conducted a study on effect of nebulization on arterial oxygen saturation in COPD. 20 patients with mild to severe COPD received ultrasonic nebulization to assess the danger of short term changes in blood gas level during this therapy. The status of arterial oxygenation was monitored during 20 minutes. In all 20 patients pulse oxymetry studies showed only a small mean change at ten minutes of nebulization therapy.<sup>6</sup> Regular lung exercises can help diminish the breathlessness associated with chronic obstructive pulmonary disease (COPD), but they require expensive training and patient support. A group of British physicians hypothesized that blowing up a balloon could be an inexpensive substitute for such exercises. They tested their hypothesis in a randomized trial of 28 patients with spirometrically documented severe COPD (FEV1 less than 1 liter). Thirteen patients were told to inflate a rubber balloon 40 times a day for eight weeks, and the other 15 served as controls. At the beginning and end of the study, each subject was assessed on three outcome measures: distance walked in six minutes, overall sense of well-being, and self-assessment of breathlessness. At the end of the study, the balloon group showed a

significant improvement in breathlessness and slight but no significant improvements in walking distance and well-being.<sup>7</sup>

## Objectives of the study

- I. To assess the level of dyspnoea among patients with lower respiratory tract disorders during pretest.
- II. To evaluate the effectiveness of ballooning exercise on level of dyspnoea among patients with lower respiratory tract disorders during post-test.
- III. To find out the association between level dyspnoea of the patient with lower respiratory tract disorders and selected demographic variables.

## Methodology

### Research approach

Experimental research approach was adopted for the study as it was intended to assess the effectiveness of balloon therapy on level of dyspnoea among patient's lower respiratory tract disorders.

### Research design

The design used was single group pre-test, post-test design -pre experimental design.

### Study setting

The study was conducted in Mahatma Gandhi Medical College and Research Institute Puducherry. It is a Multi-Specialty Hospital situated 15 km away from Puducherry. It is 850 bedded with Specialty Wards.

### Study population

The population of the study included patients in male medical ward and female medical ward of MGMCR&RI, who met the inclusion criteria.

### Sample and sample size

Patient admitted in female medical ward and male medical ward and those who fulfill the criteria, where selected as sample. The sample size was 20.

### Criteria for sample selection

#### Exclusion criteria

- I. Patient who were not willing to participate
- II. Patient with oral lesions
- III. Patient who cannot follow the instruction. e.g., deaf and dumb, psychiatric patients and blind patients.
- IV. Patient who had chronic disease like cancer, congestive cardiac failure etc...

#### Inclusion criteria

- I. Patient with age of 20-60 years
- II. Both the sexes

### Sampling technique

The samples who met the inclusion criteria during the data collection were selected using Purposive sampling technique.<sup>8,9</sup>

## Procedure for data collection

Before starting data collection researcher obtained permission from the HOD of pulmonary medicine. The sample was selected on the basis of selection of criteria an oral consent was obtained. Pre-test was done on the first day of data collection and post-test was done on the 14<sup>th</sup> day after the ballooning exercise. Data was collected using observation and interviewing method focusing on the improvement in dyspnoeic state among patients with lower respiratory tract disorder. The data was collected from wards for a period of two weeks.<sup>7,10</sup>

## Results

### Background variables

- a. The level of dyspnea was measured using dyspnea scale before the implementation of balloon therapy, 15(75%) patients had poor dyspnea score.
- b. Out of 20 samples, each patient had normal respiratory status after the implementation of balloon therapy when compared to the pre test score. After the implementation of ballooning exercise, 12(60%) of patients showed normal grading in dyspnea scale
- c. There is an association between age, gender, smoking habit and duration of illness with the respiratory status.
- d. Considering the age group, 4(20%) of 20 samples belongs to the age group 20-40years, 13(65%) belongs to the age group 41-60years and 3(15%) belongs to the age group of 61 & above. There was an association with dyspnea score as the p value 0.045 which was found to be significant.
- e. With respect to the gender, 13(65%) are male & 7(35%) are female. There is a significant association between gender and respiratory status. There was an association with respiratory rate as the p value 0.058 which was found to be significant.
- f. With respect to the smoking habit 8(40%) are smokers and 12(60%) were non smokers. There is significant association between smokers and respiratory status. There was an association with dyspnea score as the p value 0.0035 which found to be significant.
- g. With respect to the duration of illness, 10(50%) belongs to the duration of the illness less than 2 years, 8(40%) belongs to the duration of illness 2-3 years and 2(10%) belongs to the duration of illness more than 2 years. There was an association with lung capacity as the p value 0.027 which was found to be significant.<sup>11</sup>

### Frequency and percentage distribution of samples with demographic variables (Table 1a-Table 1f, Table 2 & Table 3)

**Table 1A** Frequency and percentage distribution of Age and Gender among patients with lower respiratory tract disorders (N=20)

Sl. No	Demographic Variables	Frequency	Percentage
1	Age		
	20-40	4	20
	41-60	13	65
	61 & above	3	15
2	Gender		
	Male	13	65
	Female	7	35

**Table 1B** Frequency and percentage distribution of education and occupational status among patients with lower respiratory tract disorders

SI. No	Demographic variables	Frequency	Percentage
1	Educational status		
	Non-literate	5	25
	Primary	12	60
	Secondary	2	10
2	Graduate	1	5
	Occupational status		
	Unemployed	5	25
	Self employed	15	65
	Employment in public sector	2	10
	Employment in private sector	0	0

**Table 1C** Frequency and percentage distribution of area of work and duration of illness among patients with lower respiratory tract disorder

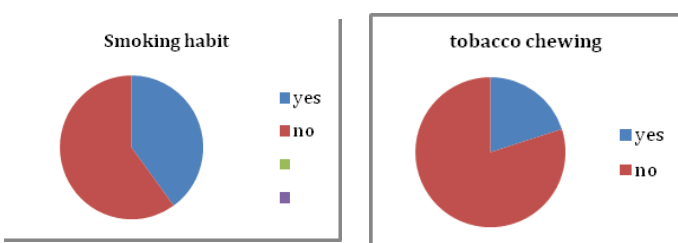
SI. No	Demographic variables	Frequency	Percentage
1	Area of work		
	Cotton industry	0	0
	Chemical industry	0	0
	Mining industry	0	0
	others	20	100
2	Duration of illness		
	<2 years	10	50
	2-3 years	8	40
	>2years	2	10

**Table 1D** Frequency and percentage distribution of types of workers and presence of co-morbid illness among patients with lower respiratory tract disorders.

SI. No	Demographic variables	Frequency	Percentage
7	Types of workers		
	Sedentary workers	5	25
	Moderate workers	12	60
	Heavy workers	3	15
8	Presence of co-morbid illness		
	Anemia	5	25
	Ischemic heart disease	4	20
	Thyroid disorders	1	5
	None	10	50

**Table 1E** Frequency and percentage distribution of habit of smoking and tobacco chewing patients with lower respiratory tract disorders

SI. No	Demographic variables	Frequency	Percentage
9	Habit of smoking		
	Yes	8	40
	No	12	60
10	Habit of tobacco chewing		
	Yes	16	80
	No	4	20

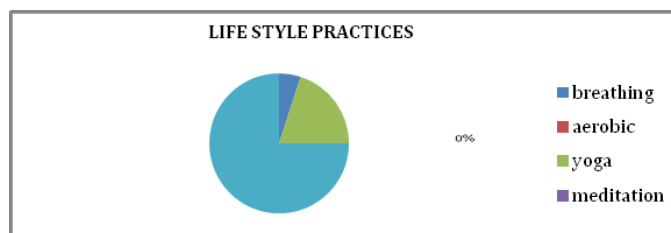


**Table 1F** Frequency and percentage distribution of alternative therapy practices and medication intake among patients with lower respiratory tract disorders

SI. No	Demographic variables	Frequency	Percentage
11	Alternative therapy practices		
	Ayurveda	0	0
	Homeopathy	0	0
	Naturopathy	0	0
	Siddha	1	5
	Unani	0	0
12	None	19	25
	Medication intake		
	Bronchodilators	14	70
	Antibiotics	5	15
	NSAIDS	1	5

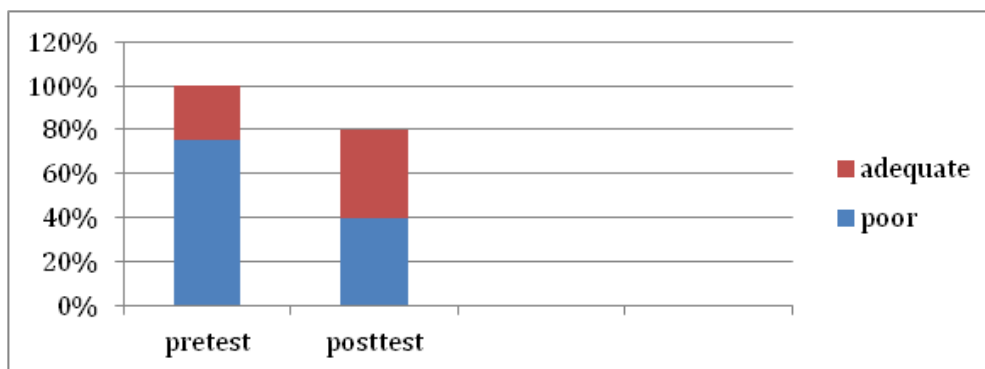
**Table 1G** Frequency and percentage distribution of life style practices among patients with lower respiratory tract disorders

Sl. No	Demographic variables	Frequency	percentage
13	Life style practices		
	Breathing	1	1
	Aerobic	0	0
	Yoga	4	20
	Meditation	0	0
	others	15	75



**Table 2** Frequency and percentage distribution of pre-test and post test scores of dyspnea scale among patients with lower respiratory tract disorders

Sl. No	Dyspnea Scale	Pre-Test		Post-Test		Pre-test vs. post test P value
		Frequency	Percentage	Frequency	Percentage	
a)	normal	5	25	12	60	0.008
b)	poor	15	75	8	40	



**Table 3** Association of dyspnea grading with selected demographic variables  
s\*\*:-significant, NS\*\*:-non significant

Sl. No	Demographic variables	Dyspnoea grading of patient with lower respiratory tract disorder				X2 value
		Poor		Adequate		
		F	%	F	%	
1	Age					X2=6.188
	20-40	2	10	2	10	df=2
	41-60	12	60	1	5	P=0.045
	61 and above	1	5	2	10	S**
2	Gender					X2=3.590
	Male	8	40	5	25	df=1
	Female	7	35	0	0	P=0.058
						S**
3	Educational status					X2 =4.711
	Non literate	3	15	2	10	df=1
	primary	10	50	2	10	P=0.194

Table continued

Sl. No	Demographic variables	Dyspnoea grading of patient with lower respiratory tract disorder				X2 value
		Poor		Adequate		
4	secondary graduate	2	10	0	0	NS**
	graduate	0	0	1	5	
	Occupational status					X2 = 1.908
	Un-employed	3	15	2	10	df=2
	Self-employed	11	55	2	10	P=0.385
	Employment in public sector	1	5	1	5	NS**
5	Employment in private sector	0	0	0	0	
	Area of work					X2 = 0
	Cotton industry	0	0	0	0	df=0
	Chemical factory	0	0	0	0	P=0
	Mining industry	0	0	0	0	NS**
6	Others	15	75	5	25	
	Duration of illness					X2 = 1.467
	<2years	8	40	25	10	df=2
	2-3 years	5	25	2	10	P=0.48
7	>2years	2	10	0	0	NS**
	Types of workers					X2 = 1.600
	Sedentary workers	3	15	2	10	df=2
	Moderate workers	9	45	3	15	P=0.449
8	Heavy workers	3	15	0	0	NS**
	Co-morbid illness					X2 = 2.400
	Anemia	3	15	2	10	df=3
	IHD	4	20	0	0	P=0.494
9	Thyroid disorder	1	5	0	0	NS**
	None	7	35	3	15	
	Smoking Habit					X2 = 4.444
	Yes	8	40	0	0	df=1
10	No	7	35	5	25	P=0.035
	Tobacco chewing habit					S**
	Yes	12	60	4	20	X2 = 0.000
	No	3	15	1	5	df=1
11	Alternative therapies if any					P=1
	Ayurveda	0	0	0	0	NS**
	Homeopathy	0	0	0	0	X2 = 0.351
	Naturopathy	0	0	0	0	df=1
	Siddha	1	5	0	0	P=0.554
	Unani	0	0	0	0	NS**
	None	14	70	5	25	
12	Medication Intake					X2 = 0.495
	Bronchodilators	10	50	4	20	df=2
	Antibiotics	4	20	1	5	P=0.781
	NSAIDS					NS**
13	Life style practices					X2 = 2.222
	Breathing	1	5	0	0	df=2
	Aerobic	0	0	0	0	P=0.329
	Yoga	4	20	0	0	NS**
	Meditation	0	0	0	0	
	Others	10	50	5	25	

24 describe the association of dyspnoea grading among patient with lower respiratory tract disorder with selected demographic variables. There was a significant association of age, gender and smoking habit at  $p < 0.05$ . Hence it showed that dyspnea increases among age, gender, and smoking habit among patient with lower respiratory tract disorder.<sup>9</sup>

## Discussion

The objective was to evaluate the effectiveness of balloon therapy on level of dyspnoea among patients with lower respiratory tract disorders during posttest. On conducting post-test to the selected 20 (60%) was found to be non dyspnoeic, 8(40%) were dyspnoeic. There was no association with most of the demographic variables like educational status, occupational status area of work, type of workers, co-morbid illness, tobacco chewing, alternative therapies, medication intake and life style practices with respiratory status which includes dyspnea scale. Whereas there was an association with age, gender, smoking habit and duration of illness with the level of dyspnea.<sup>4,12,13</sup>

## Conclusion

Exercise is the medicine for creating change in a person's physical, emotional and mental status. Thus the balloon therapy is an empirical evidence to follow it in day to day practice by patients with respiratory tract disorders.<sup>10,14,15</sup>

## Acknowledgments

None.

## Conflict of interest

The authors declare that there is no conflict of interest.

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