



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 8.4
IJAR 2021; 7(12): 85-91
www.allresearchjournal.com
Received: 16-10-2021
Accepted: 18-11-2021

Sofia Macdaline
Professor, M.Sc, Department
of MSN, Annai Velankanni's
College of Nursing,
Tamil Nadu, India



A comparative study to assess the effectiveness of steam inhalation versus breathing exercise in the airway clearances among COPD patients, in railway general hospitals, Chennai

Sofia Macdaline

Abstract

Recurrent respiratory infection and asthma distort the bronchial tract and deprive the lung tissue of its resilience. This leads to obstruction of airway in and out of the lungs. Such condition is generally known COPD. COPD cause hypoxemia as well as severe dyspnea and distress in patient. Sometimes they feel even a sensation of death. The gravity of the problem poses persistent challenge to doctors and nurses who have to relieve such patients of their mounting respiratory distress.

The Objectives of The Study

1. To assess and compare the pre-intervention level of airway clearance in experimental group I (steam inhalation), experimental group II (breathing exercise) and control group.
2. To assess the post-intervention level of airway clearance in experimental group I (steam inhalation), experimental group II (breathing exercise) and control group.
3. To compare the post-intervention level of airway clearance between experimental group I (steam inhalation) and experimental group II (breathing exercises)
4. To compare the post-intervention level of airway clearance between experimental group I (steam inhalation) and control group.
5. To compare the post-intervention level of airway clearance between experimental group II (breathing exercises) and control group.
6. To compare the pre and post-intervention level of airway clearance among COPD Patients in experimental group I (steam inhalation), experimental group II, and control group.
7. To associate the post-intervention level of airway clearance of experimental group I (steam inhalation), experimental group II (breathing exercises) and control group with selected demographic variables.

Methodology: Research approach: Quantitative research approach.

Research Design: Quasi experimental pre and post-test design

Setting of the study: The study was conducted at railway hospital- perampur.

Sample size: The sample consist of 90 hospitalized patients fulfilling the selection criteria (the inclusion and exclusion criteria) from the railway hospital. The subjects belong to the age groups of 35-65 yrs

Sampling technique: Non- Probability purposive sampling techniques

Conclusion: The present study assessed the effectiveness of breathing exercise versus steam inhalation on selected respiratory parameter on patient with COPD at selected hospital. The result of the study concluded that selected breathing exercise (purse lip and diaphragmatic breathing exercise) given COPD clients were effective in improving their respiratory parameter. Therefore the investigator felt that more important should be given to the selected breathing exercise. It should be given as non-pharmacological measures to enhance reduction of frequent exacerbation.

Keywords: steam inhalation versus breathing, airway clearances among, COPD

Introduction

Every child born is not really alive until he breathes. He has very few moments left. If he breathes after the birth, in those few moments life enters. If he does not breathe, he will remain dead.

“When it starts, you start to live.
When it stops, you die.”

Corresponding Author:
Sofia Macdaline
Professor, M.Sc, Department
of MSN, Annai Velankanni's
College of Nursing,
Tamil Nadu, India

Recurrent respiratory infection and asthma distort the bronchial tract and deprive the lung tissue of its resilience. This leads to obstruction of airway in and out of the lungs. Such condition is generally known COPD. COPD cause hypoxemia as well as severe dyspnea and distress in patient. Sometimes they feel even a sensation of death. The gravity of the problem poses persistent challenge to doctors and nurses who have to relieve such patients of their mounting respiratory distress.

COPD is a leading cause of disability, mortality and morbidity. It affects one in every 14 people over 45 years. Hence the most economically productive age group is affected (Cleverly 1996). Consequently the disease deeply undermines the economy of the nation. India is a developing country, it encounters COPD as a growing health problem and millions of man per hour. Petty (1978) pictures COPD as a silent killer disease. WHO report (1997) says that COPD ranks as fifth as cause of global morbidity and mortality.

Need of the Study

COPD mainly affects middle-aged and elderly people. In 1998, the WHO estimated that COPD was the fifth most common cause of death worldwide, responsible for 4.8% of all mortality (estimated 2,745,816 deaths in 2002), and morbidity is increasing. Estimated prevalence in the USA rose by 41% between 1982 and 1994, and age-adjusted death rates rose by 71% between 1966 and 1985. All-cause age-adjusted mortality declined over the same period by 22% and mortality from cardiovascular diseases by 45%. In the UK, physician-diagnosed prevalence was 2% in men and 1% in women between 1990 and 1997.

Nursing measures are more important to clear the airway. Nurses play a vital role in clearing the airway. Today's nurses have their care on evidence-based practice appropriate care to the clients with COPD. Literature shows that COPD is increasing in recent years because of automobile exhaust and other environment pollutes. Thus the incidence of COPD may soar high in near future. Prevailing methods of airway clearance may not mitigate the rate of mortality and morbidity from COPD.

Statement of the problem: A Comparative Study to Assess the Effectiveness of Steam Inhalation versus Breathing Exercise in the Airway Clearances among COPD Patients, in Railway General Hospitals, Chennai.

Objectives Of the Study

1. To assess and compare the pre-intervention level of airway clearance in experimental group I (steam inhalation), experimental group II (breathing exercise) and control group.
2. To assess the post-intervention level of airway clearance in experimental group I (steam inhalation), experimental group II (breathing exercise) and control group.
3. To compare the post-intervention level of airway clearance between experimental group I (steam inhalation) and experimental group II (breathing exercises)
4. To compare the post-intervention level of airway clearance between experimental group I (steam inhalation) and control group.

5. To compare the post-intervention level of airway clearance between experimental group II (breathing exercises) and control group.
6. To compare the pre intervention and post-intervention level of airway clearance in experimental group I (steam inhalation), experimental group II, and control group.
7. To associate the post-intervention level of airway clearance of experimental group I (steam inhalation), experimental group II (breathing exercises) and control group with selected demographic variables.

Operational Definitions

Effectiveness: It is the outcome of airway clearance among COPD patients in between the groups.

Steam Inhalation: Teach about the Steam inhalation with Nelson inhaler without instillation of drugs for 15 minutes in order to liquefy and mobilize bronchial secretions.

Breathing Exercise: It is given in 3 methods like purse lip breathing, diaphragmatic breathing and coughing exercise for 15 minutes. It is the alternative of active inhalation (inspiration) of air into the lungs through the nose with the passive exhalation (expiration) of air through the mouth. Each exercise done for a count of 10 full breaths.

COPD Patients: COPD is a lung disease that makes damage to the breathe. It is caused by lungs over many years, usually from smoking. COPD is often a mix of two diseases: Chronic bronchitis And Emphysema. The patient with cough and difficulty in expectoration who have met the secretion criteria and who have been selected for the study.

Airway Clearance: Airway clearance refers to the outcome expected among COPD patients after intervention with are measured by Airway clearance scale by auscultation method.

Methodology

Research approach: Quantitative research approach.

Research Design: quasi experimental pre and post-test design

Setting of the study: The study was conducted at railway hospital- perampur.

Sample: patients admitted in the medical and thoracic wards who are who are have the complaints COPD, in railway hospital during the data collection period and were fulfilling the selection criteria.

Sample size: The sample consist of 90 hospitalized patients fulfilling the selection criteria the inclusion and exclusion criteria) from the railway hospital. The subjects belong to the age groups of 35-65 yrs

Sampling technique: Non- Probability purposive sampling techniques

Criteria for sample collection

Inclusion criteria

1. Patients with COPD who are admitted in the selected hospital.
2. Patients in the age of 35-65 yrs.
3. Patients who are willing to participate in the study.

Exclusive criteria

1. patients with age of below 35 and above 65 yrs
2. Patients who are not willing for the study.
3. Patients with hypertension, cardiac disease and other complicated conditions.

Variables

1. **Independent Variable:** In this study independent variable are steam inhalation and breathing exercise.
2. **Dependent variables:** In these study dependent variables is airway clearance
3. **Extraneous variables:** Extraneous variables are age, sex, educational status, Area of residence, Family monthly income, Level of activity in occupation, Marital status, Duration of COPD, No of bronchodilators

Description of the tool

The tool used for data collection was

Part I: Interview schedule

Part II: Airway clearance scale by Auscultation method.

Part-I

The investigator planned to get information verbally in a face to face contact as the assess the interview help her to develop a rapport with the patient and this would help to gain the cooperation.

Demographic data of the patient

- age, sex, educational status, Area of residence, Family monthly income, Level of activity in occupation, Marital status

Health data

- Duration of COPD, No of bronchodilators.

Part-II

It's a five point scales used to assess the different types of sound decided by bronchial tree during airway (high score 25 and less score 5)

Table 1: Respiratory status and Experimental group

Respiratory status	Experimental group I (Steam inhalation)		Experimental group II (breathing exercise)		Control group	
	n	%	N	%	n	%
Mild	6	20.00	7	23.33	6	20.00
Moderate	13	43.33	16	53.32	9	30.00
Severe	11	36.66	7	23.33	15	50.00

Score interpretation:

N=90(30+30+30)

Data collection procedure: The investigator had collected data within four weeks with effect from 01/08/08 to 30/08/08. Formal approval was obtained from the Director of railway general hospital, Chennai. Using purposive sampling, 90 patients who were having COPD problem were selected.

The investigator introduced herself to the participants and the purpose of the study was explained to ensure better co-operation during the data collection period. Using questionnaire, demographic data and health data were collected. Approximately 5 minutes was spent to elicit the data from the participants. The samples were assigned to steam inhalation, breathing exercise and control group randomly by using lottery method. The interventions were given to the experimental groups alone. Immediately after the interventions, the participants underwent the particular intervention after the pre-assessment. The post assessment of level of airway clearance was done after the intervention in the experimental groups and in the control group. Collection of data was performed within stipulated time of 4 weeks.

Plan for data analysis: Data were analyzed using descriptive and inference statistical.

Results and discussion: 26.7% of patients in experimental group I (steam inhalation), 53.3% of patients in experimental group II (breathing exercise) and 40% of patients in the control group belong to the age group of 30-35 years. 16.7% in experimental group I (steam inhalation), 23.3% in experimental group II (breathing exercise) and

13.3% in control group belongs to the age group of 41-45 years.

Females were the majority participants in the study. They were 73.3% in experimental group I (steam inhalation), 70% in experimental group II (breathing exercise) and 66.7% in control group.

Majority of patients in higher school education were 43.3% in experimental group I (steam inhalation), 40% in experimental group II (breathing exercise) and 33.3% in the control group. The minority of patients in higher secondary education were 10% in experimental group I (steam inhalation), 13.3% in experimental group II (breathing exercise) and 23.3% in control group.

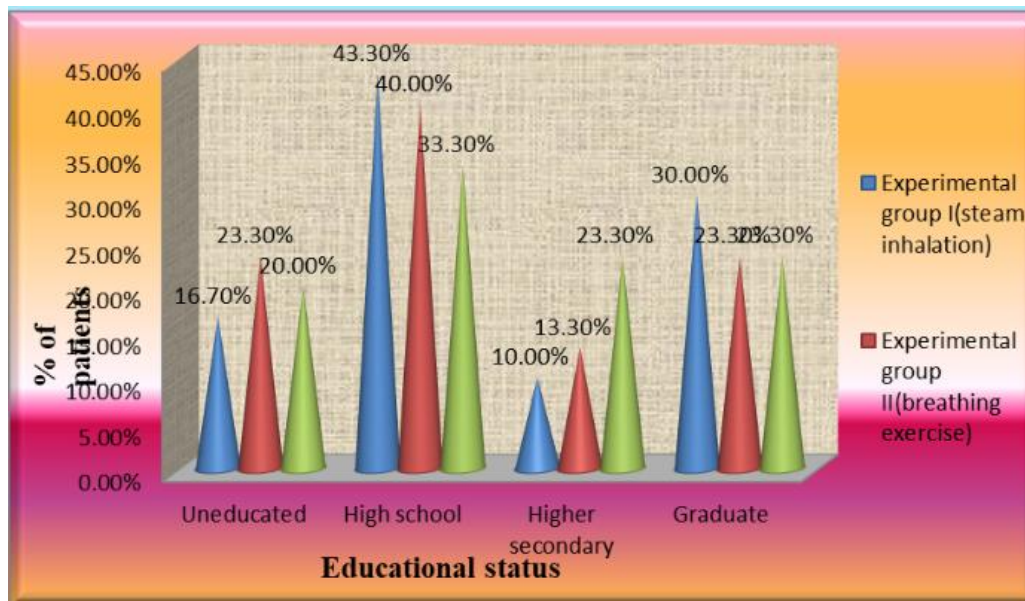
80% of patients in experimental group I (steam inhalation), 70% of patients in experimental group II (breathing exercise) and 53.3% of patients in the control group were Hindus. 6.7% in experimental group I (steam inhalation), 20% in experimental group II (breathing exercise) and 16.7% in control group were Muslims.

40% in experimental group I (steam inhalation), 33.3% in experimental group II (breathing exercise) and 60% in control group were in semi-urban area. 26.7% in experimental group I (steam inhalation), 16.7% in experimental group II (breathing exercise) and 6.7% in control group were in rural area.

56.7% in experimental group I (steam inhalation), 33.3% in experimental group II (breathing exercise) and 36.7% in control group had their family income of Rs.10000/- 20% in experimental group I (steam inhalation), 20% in experimental group II (breathing exercise) and 23.3% in control groups had their family income of Rs.3000-6000/-.

80% in experimental group I (steam inhalation), 86.7% in experimental group II (breathing exercise) and 93.3% in control group were sedentary workers. Only 10% of patients in experimental group I (steam inhalation), none of them in

experimental group II (breathing exercise) and 3.3% in control group were heavy workers. 83.3% in experimental group I (steam inhalation), 70% in experimental group II (breathing exercise) and 86.7% in control group were married.



Educational status

Association of post intervention level of airway clearance in experimental group I (steam inhalation) with demographic variables

Demographic variables	No. of patients	Mean	SD	One way ANOVA
Age	30 -35 yrs	8	25.75	F=3.66 P=0.03 S
	36 -40 yrs	9	26.60	
	41 -45 yrs	5	26.78	
	46 -50 yrs	8	27.88	
Sex	Male	8	27.38	F=1.41P=0.17 NS
	Female	22	26.55	
Education	Uneducated	5	26.10	F=2.99 P=0.05 S
	High school	13	27.00	
	Higher secondary	3	27.40	
	Graduate	9	28.50	
Religion	Hindu	24	26.83	F=3.14 P=0.06 NS
	Muslim	2	24.50	
	Christian	4	27.50	
Residence	Rural	8	26.63	F=0.80 P=0.46 NS
	Urban	10	26.40	
	Semi urban	12	27.17	
Income	Rs.3000 -6000	6	26.67	F=0.12 P=0.88 NS
	Rs. 6001 -10000	7	26.57	
	>Rs.10000	17	26.88	
Occupation	Sedentary	24	26.71	F=0.09 P=0.91 NS
	Moderate	3	27.00	
	Heavy	3	27.00	
Marital status	Single	5	27.60	F=1.42 P=0.16 NS
	Married	25	26.60	

NS= Not Significant S= Significant
N=90(30+30+30)

The table shows the Association between post intervention level of airway clearance with steam inhalation and their demographic variables. The age of patients and education was associated with the level of airway clearance. The other demographic variables were not associated with the level of airway clearance for COPD Patients.

Comparison of post intervention level of airway clearance between experimental group I (steam inhalation),

experimental group II (breathing exercises) and control group.

Part 5a: Mean and standard deviation of post intervention level of airway clearance between experimental I (steam inhalation) and control group.

Part 5b: Mean and standard deviation of post intervention level of airway clearance between experimental II (breathing exercise) and control group.

Part 5c: Mean and standard deviation of post intervention level of airway clearance between experimental I (steam inhalation) and experimental II (breathing exercise)

Section F: To compare the pre intervention and post intervention level of airway clearance among COPD patients between experimental group I (steam inhalation), experimental group II (breathing exercise), and Control group.

Part 6: Mean and standard deviation of pre intervention and post intervention level of airway clearance among COPD patients between experimental group I (steam inhalation), experimental group II (breathing exercise), and Control group.

Section E: Comparison of Post Intervention Level Of Airway Clearance Between Experimental Group I (Steam

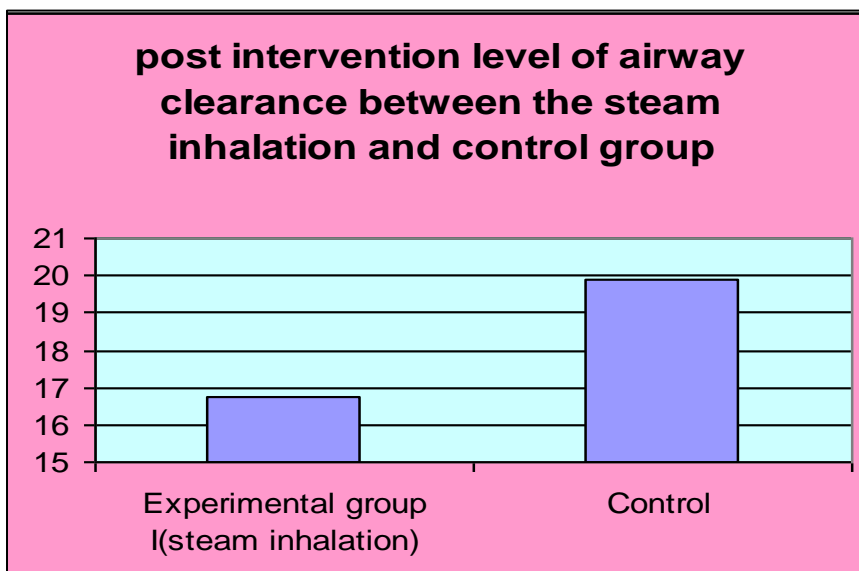
Inhalation), Experimental Group II (Breathing Exercises) and Control Group.

Table 2a: Mean and standard deviation of post intervention level of airway clearance in experimental I (steam inhalation) and control group.

Group				Student independent t-test
Experimental group I (steam inhalation)		Control		
Mean	SD	Mean	SD	t=7.86 P=0.001 S
16.77	1.45	19.90	1.63	

N=90(30+30+30)

Table 2a shows the comparison of the post intervention level of airway clearance between the experimental group I (steam inhalation) and control group. The mean value of was 16.77 and S.D was 1.45 in experimental group I (steam inhalation) and in control group, the mean value was 19.90 and S.D was 1.63. The independent t test projected value was t=7.86 which was statistically significant at P=0.001 level. Hence, both the groups were heterogeneous.



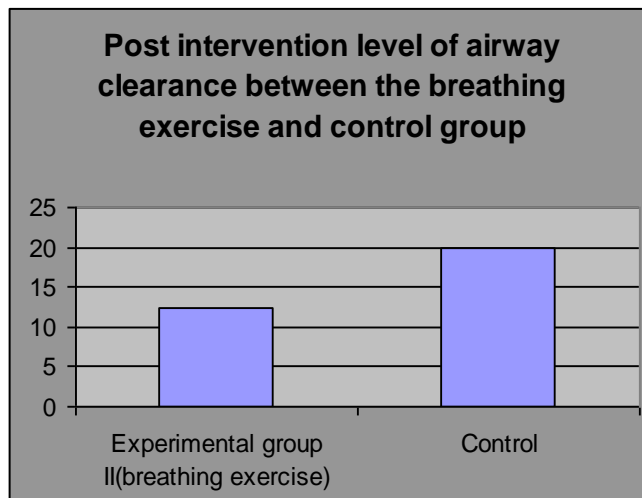
Graph 1: Bar diagram depicting the comparison of post intervention level of airway clearance between experimental I (steam inhalation) and control group

Table 2b: Mean and standard deviation of post intervention level of airway clearance in experimental II (breathing exercise) and control group.

Group				Student independent t-test
Experimental group II (breathing exercise)		Control		
Mean	SD	Mean	SD	t=16.5 P=0.001 S
12.50	1.83	19.90	1.62	

N=90(30+30+30)

The table 2b shows comparison of the post intervention level of airway clearance between the experimental group II (breathing exercise) and control group. The mean value was 12.50 and S.D was 1.83 in experimental group II (breathing exercise) and in control group, the mean value was 19.90 and S.D was 1.62. Both the groups were not equal which was confirmed using student independent t-test projected the 't' value is 16.5 which was statistically significant at P<0.01 level. Hence, both the groups were heterogeneous.



Graph 2: Bar diagram depicting the comparison of the post intervention level of airway clearance between the experimental group II (breathing exercise) and control group

Table 3c: Mean and standard deviation of post intervention level of airway clearance in experimental I (steam inhalation) and experimental II (breathing exercise)

Group				Student independent t-test
Experimental group I(steam inhalation)		Experimental group II(breathing exercise)		
Mean	SD	Mean	SD	
16.77	1.45	12.50	1.83	t=9.98 P=0.001 S

N=90(30+30+30)

The table 3c shows the comparison of the post intervention level of airway clearance between the experimental group I(steam inhalation) and experimental II(breathing exercise).

The mean value was 16.77 and S.D was 1.45 in experimental group I(steam inhalation) and in control group, the mean value was 12.50 and S.D was 1.83. Both the groups were not equal which was confirmed using student independent t-test projected the 't' value is 9.98 which was statistically significant at $P < 0.01$ level. Hence, both the groups were heterogeneous.

To Compare The Pre Intervention And Post Intervention Level Of Airway Clearance Among Copd Patients Between Experimental Group I(Steam Inhalation), Experimental Group Ii (Breathing Exercise), And Control Group.

Table 4: Mean and standard deviation of pre intervention and post intervention level of airway clearance among COPD patients in experimental group I (steam inhalation), experimental group II(breathing exercise), and control group.

Groups	Pre intervention level of airway clearance		Post intervention level of airway clearance		Paired t test
	Mean	SD	Mean	SD	
Experimental group I (Steam inhalation)	21.8	1.40	16.77	1.45	t=20.02 P=0.001
Experimental group II (breathing exercise)	21.83	1.94	12.5	1.83	t=19.15 P=0.001
Control group	21.33	1.56	19.9	1.62	t=1.92 P=0.06

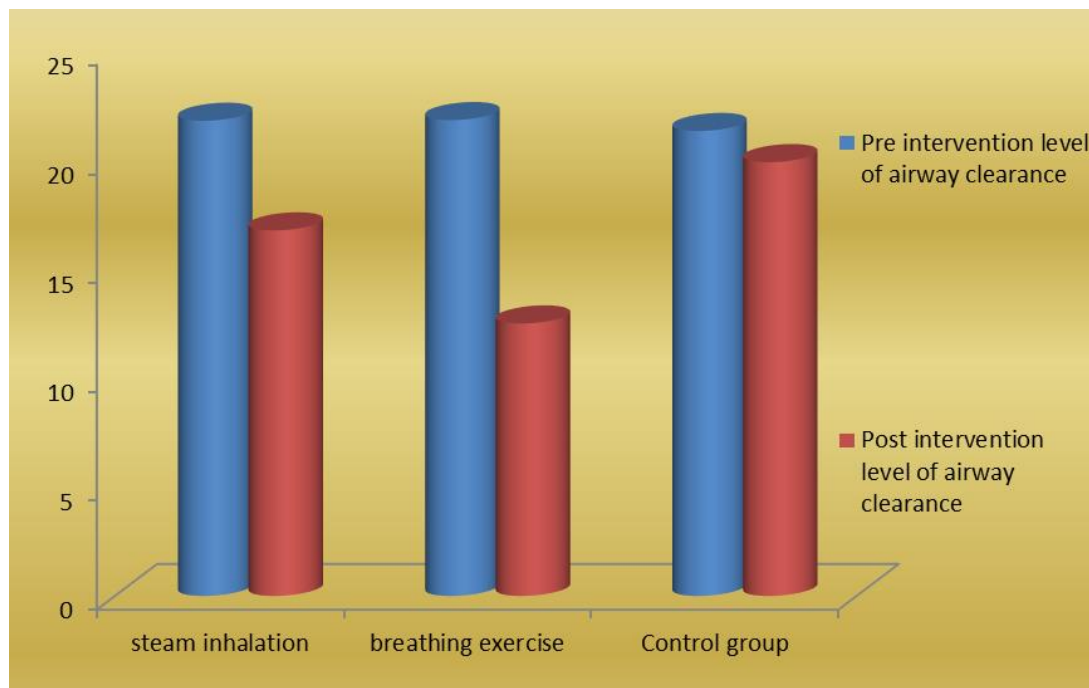
N=90(30+30+30)

The table 4 shows comparison between the pre intervention and post intervention level of airway clearance among COPD patients in experimental group I(steam inhalation), experimental group II(breathing exercise), and control group.

The mean value was 21.8 and SD was 1.40 in pretest, the mean value was 16.77 and SD was 1.45 in posttest of experimental group I(steam inhalation) and the projected 't' value is 20.02 which was statistically significant at $P=0.001$ level.

The mean value was 21.83 and SD was 1.94 in pretest, the mean value was 12.5 and SD was 1.83 in posttest of experimental group II(breathing exercise) and the projected 't' value is 19.15 which was statistically significant at $P=0.001$ level

The mean value was 21.33 and SD was 1.56 in pretest, the mean value was 19.9 and SD was 1.62 in posttest of control group and the projected 't' value is 1.92 which was not statistically significant at $P=0.05$ level. It was tested using student paired t-test.



Graph 3: Cylinder diagram depicting the comparison between the pre intervention and post intervention level of airway clearance among COPD patients in experimental group I(steam inhalation), experimental group II(breathing exercise), and control group.

Discussion

There was a significant association of post intervention level of variables such as age ($P=0.001$) and no of bronchodilators

($P=0.05$) shows the significant association between the demographic variables and level of airway clearance, where as no significant association with the other variables

between the demographic variables such as age, sex, educational level, economic status, habits and final post test results in airway clearance. Hence the research hypothesis was accepted.

The breathing exercise was showed the effective airway clearance in breathing exercise of experimental group II and there is no significant difference in experimental group I and control group who had received the COPD care. there is significant different in the associate the post-test level of airway clearance of experimental group I with steam inhalation, experimental group II with breathing exercise and control group with hospital routine procedure with selected demographic variables. So the research hypothesis is accepted.

Conclusion

The present study assessed the effectiveness of breathing exercise versus steam inhalation on selected respiratory parameter on patient with COPD at selected hospital. The result of the study concluded that selected breathing exercise (purse lip and diaphragmatic breathing exercise) given COPD clients were effective in improving their respiratory parameter. Therefore the investigator felt that more important should be given to the selected breathing exercise. It should be given as non-pharmacological measures to enhance reduction of frequent exacerbation.

Reference

1. Black M Joyce. Medical and Surgical Nursing: Clinical Management for Positive Outcome. (10th Ed.). St. Louis: Saunders Publications 2005.
2. Braunwold. Principles of Internal Medicine. (15th Ed.). New York: Hill Medical Publishing Division 2001.
3. Brenda G Bare, Suzanne C, Smeltzer. Medical Surgical Nursing. (10th Ed.). Philadelphia: J. B. Lippincott Company 2003.
4. Burns. The Practice of Nursing Research Conduct, Critique and Utilization. (2nd Ed.). Philadelphia: W. B. Saunders Company 1993.
5. Davidson. Principles and Practice of Medicine. (6th Ed.). Hong Kong: Longman Group Limited 1991.
6. Parker E Marilyn. Nursing Theories and Nursing Practice. (2nd Ed.). Philadelphia: F.A. Davis Company. 2001.
7. Polit DF, Hungler. Nursing Research, Principles and Methods. (6th Ed.). Philadelphia: Lippincott Publications 2001.
8. Anarella J, Roohan P. The prevalence of COPD largely depends on a person's risk factor of cigarette smoking? Italian journal of thoracic medicine 2007;59(3):210-6.
9. Baroloman Nursing Interventions for COPD Patients. American journal of pulmonary rehabilitation 2003;4:135-140.
10. Beamon. Importance of hydration therapy in COPD, American Journal of Research 2008;8(4):130-40.
11. Bennete. The effect of steam inhalation on airway clearance with cough, Indian Journal of Research, 2005;140(7):440-460.
12. Bonet. voluminous lung, Journal of respiratory medicine 1979;8(3):332-8.
13. <http://www.pubmed.com>
14. <http://www.medscape.com>
15. <http://www.google.co.in>
16. <http://www.yahoo.co.in>