

A STUDY TO ASSESS THE EFFECTIVENESS OF PULMONARY REHABILITATION PACKAGE ON KNOWLEDGE AND QUALITY OF LIFE REGARDING SELECTED RESPIRATORY COMPLICATIONS AND BIO PHYSIOLOGICAL PARAMETERS AMONG PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) AT SELECTED HOSPITALS, KOLLAM**Preetha P. A.*¹ and Binutha V. P.²**¹MSc Nursing Student, Bishop Benziger College of Nursing, Kollam, Kerala, India.²Associate Professor, Bishop Benziger College of Nursing, Kollam, Kerala, India.***Corresponding Author: Preetha P. A.**

MSc Nursing Student, Bishop Benziger College of Nursing, Kollam, Kerala, India.

Article Received on 13/11/2022

Article Revised on 03/12/2022

Article Accepted on 23/12/2022

ABSTRACT

The chronic obstructive pulmonary diseases have many respiratory complications. The aim of the study was to assess the effectiveness of pulmonary rehabilitation package on knowledge and quality of life regarding respiratory complications and bio physiological parameters among patients with COPD in selected hospitals, Kollam. The main objectives of the study were, to assess the knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD at selected hospitals, Kollam, to determine the effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD at selected hospitals, Kollam, to find out the association between pretest knowledge regarding respiratory complications among patients with COPD and selected demographic variables, to find out the association between pretest quality of life among patients with COPD and selected demographic variables, to find out the association between pretest bio physiological parameters among patients with COPD and selected demographic variables. A quasi experimental non randomized control group research design was used. The present study was conducted in Bishop Benziger hospital, Kollam. The sample consisted of 60 patients with COPD in selected hospitals, Kollam. Purposive sampling technique was used. The findings of the study revealed that there was significant difference between mean pre-test and post test score among patients with COPD in experimental group and there was significant difference between mean post test score among patients with COPD in experimental group and control group. The study concluded that pulmonary rehabilitation package was very effective in patients with COPD.

KEYWORDS: Effectiveness, Pulmonary rehabilitation package, Quality of life, respiratory complications, bio physiological parameters.**INTRODUCTION**

Pulmonary rehabilitation should be part of the treatment plan for any chronic lung disease. It's a combination of exercise, breathing techniques, diet and education that aim to give patients a better quality of life and be able to have more control of their symptoms.

Pulmonary rehabilitation is aimed to improve the quality of life by decreasing respiratory symptoms and complications. It is very essential to make an awareness in patients with COPD regarding respiratory complications and its bio physiological parameters.

During the clinical experience at hospital, the researcher has noted that chances of getting respiratory complications among COPD patients increases day by day. Lack of knowledge about the respiratory

complications and bio physiological parameters are the main causes of worsening this condition. Previous studies have shown that pulmonary rehabilitation package has a greater effect on COPD patients. Through this pulmonary rehabilitation package, complications such as respiratory infections, respiratory failure, heart problems, high blood pressure in lung arteries, lung cancer, cardio vascular diseases, pulmonary embolism, barotrauma and pulmonary fibrosis can be reduced. So it is essential that the patients with COPD should possess knowledge regarding respiratory complications and bio physiological parameters.

The number of cases of COPD in India has increased from 28.1 million in 1990 to 55.3 million in 2019, an increase in prevalence from 3.3% to 4.2%. Statistics from a national study reveals that Kerala has over 4680

cases of COPD per one lakh population, and occupies the fifth rank in terms of prevalence in the country and 21st in terms of mortality. In Kollam, the mortality rate (COPD death rates) is 21 deaths per 1 lakh population.

Statement of Problem

A study to assess the effectiveness of pulmonary rehabilitation package on knowledge and quality of life regarding selected respiratory complications and bio physiological parameters among patients with Chronic obstructive pulmonary disease (COPD) at selected hospitals, Kollam.

Objectives

- To assess the knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD at selected hospitals, Kollam.
- To determine the effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD at selected hospitals, Kollam.
- To find out the association between pretest knowledge regarding respiratory complications among patients with COPD and selected demographic variables.
- To find out the association between pretest quality of life among patients with COPD and selected demographic variables.
- To find out the association between pretest bio physiological parameters among patients with COPD and selected demographic variables.

Operational Definitions

➤ Effectiveness

In this study effectiveness refers to the outcome of pulmonary rehabilitation package on knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD.

➤ Pulmonary rehabilitation package

In this study pulmonary rehabilitation package refers to the multi-interventional package regarding complications of COPD and its remedial measures such as diet, exercise and breathing techniques with an intention to improve respiratory functions like expiration, inspiration and gas exchange among patients with COPD.

➤ Knowledge

In this study knowledge refers to the information gained by the respondents which is reflected by the score obtained by the respondents to the items in the knowledge questionnaire regarding respiratory complications.

➤ Quality of life

In this study quality of life refers to change in respiratory rate and lung functions, which is reflected by the score obtain by the items of 3 points likerts scale.

➤ Respiratory complications

In this study respiratory complications of chronic obstructive pulmonary disease include respiratory infections, respiratory failure, heart problems, high blood pressure in lung arteries, cardiovascular diseases, pulmonary embolism, barotrauma and pulmonary fibrosis.

➤ Bio physiological parameters

In this study bio physiological parameters refers to Heart Rate, Respiration Rate and SPO₂.

➤ Patients with COPD (Chronic Obstructive Pulmonary Disease)

In this study patients with COPD are persons who have chronic inflammatory lung disease admitted in ICUs and medical wards.

RESEARCH METHODOLOGY

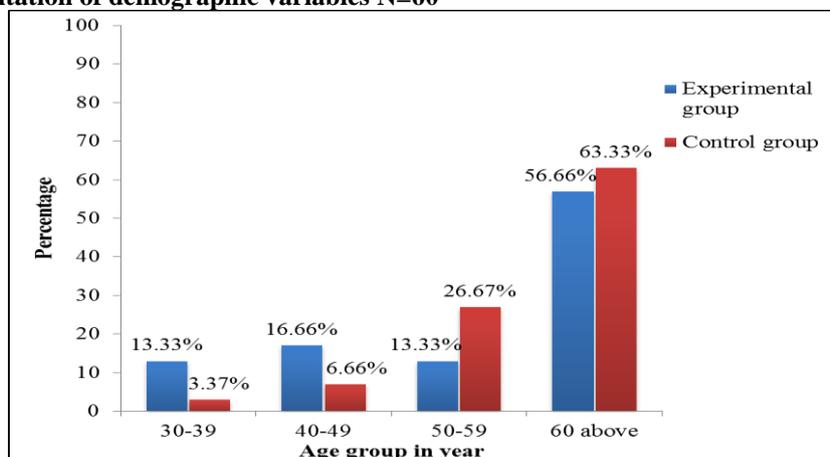
Research Approach	Quantitative research
Research design	A quasi experimental, pre-test post-test control group design
Variables	<p>Dependent variable In this study, dependent variables were knowledge, quality of life and biophysiological parameters.</p> <p>Independent variable Pulmonary rehabilitation package</p> <p>Demographic variables In this study, demographic variables were age, gender, duration of COPD, presence of any other diseases, education, marital status and occupation.</p>
Setting of the study	Bishop Benziger Hospital, Kollam
Population	Patients with COPD
Sample	60 patients with COPD from Bishop Benziger hospital.
Sample size	60 Patients with COPD
Sampling technique	Purposive sampling technique

RESULTS AND DISCUSSION**Section A: Description of sample characteristics**

This section deals with the percentage distribution of sample characteristics such as age, gender, duration of COPD, educational status, marital status and occupation.

Table 1: Frequency and percentage distribution of demographic variables N=60.

Sl. No	Demographic variables	Exp.Group		Control group	
		frequency	%	frequency	%
1.	Age				
A	30-39	4	13.33%	1	3.37%
B	40-49	5	16.67%	2	6.66%
C	50-59	4	13.33%	8	26.66%
D	60 and above	17	56.67%	19	63.33%
2.	Gender				
A	Male	16	53.33%	23	76.67%
B	Female	14	46.67%	7	23.33%
C	Transgender	0	0%	0	0%
3.	Duration of COPD				
A	1-5 yrs	18	60%	16	53.33%
B	6-10yrs	12	40%	12	40%
C	10 and above	0	0%	2	6.67%
4.	Other diseases				
A	YES	14	46.67%	11	36.67%
B	NO	16	53.33%	19	63.33%
5.	Educational status				
A	undergraduate	19	63.33%	17	56.67%
B	graduate	7	23.34%	11	36.67%
C	Post graduate	4	13.33%	2	6.66%
D	others	0	0%	0	0%
6.	Marital status				
A	married	19	63.33%	21	70%
B	unmarried	3	10%	1	3.33%
C	separated	2	6.67%	2	6.67%
D	widow or widower	6	20%	6	20%
7.	Occupation				
A	Self-employed	7	23.33%	4	13.33%
B	Employed	8	26.67%	7	23.33%
C	Retired	8	26.67%	10	33.33%
D	Unemployed	7	23.33%	9	30.01%

Graphical representation of demographic variables N=60**Figure 3: Percentage wise distribution of sample according to age.**

The data in the figure 3 shows that, in experimental group, 13.33 % belongs to the age group of 30-39years, 16.66% belongs to the age group of 40-49% years, 13.33% of sample belongs to the age group of 50-59years and 56.66% belongs to the age group of 60 and

above. In control group, 3.37% of sample belongs to the age group of 30-39years, 6.66% belongs to the age group of 40-49%, 26.67% belongs to the age group of 50-59 years, and 63.33% of sample belongs to the age group of 60 years and above.

N=60

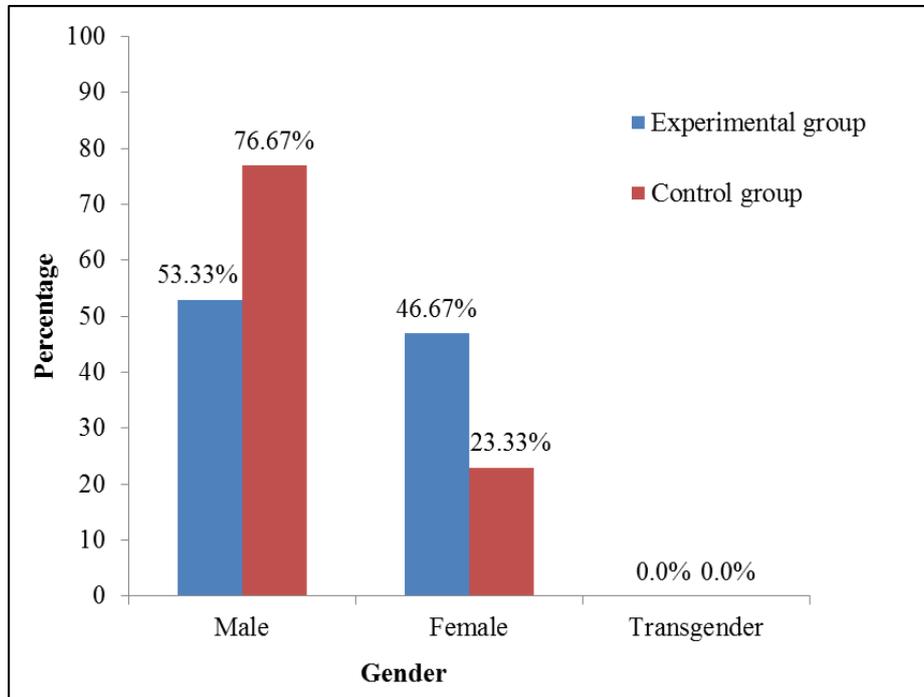


Figure 4: Percentage wise distribution of sample according to gender.

The data in the figure 4 shows that, in experimental group, 53.33% belongs to male category and 46.67% belongs to female category. In control group, 76.67% of

sample belongs to male category and 23.33% of sample belongs to female category.

N=60

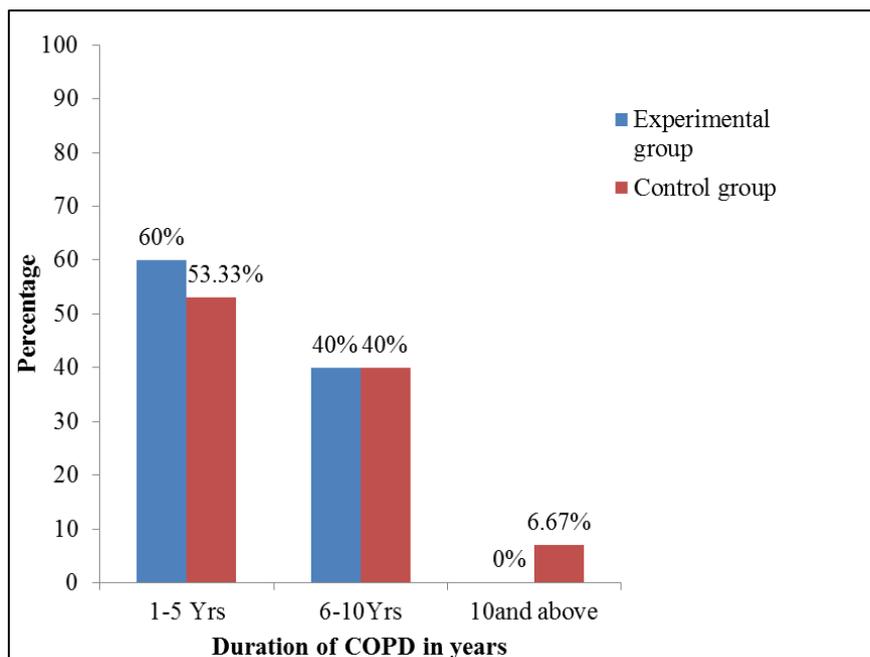


Figure 5: Percentage wise distribution of sample according to Duration of COPD.

The data in the figure 5 shows that, in experimental group, 60% of sample had 1-5 years' duration of COPD and 40% had 6-10 years of duration of COPD. In control group 53.33% of samples had 1-5 years duration of

COPD, 40% of sample had 6-10 years of duration of COPD and 6.67% of sample had 10 years and above duration of COPD.

N=60

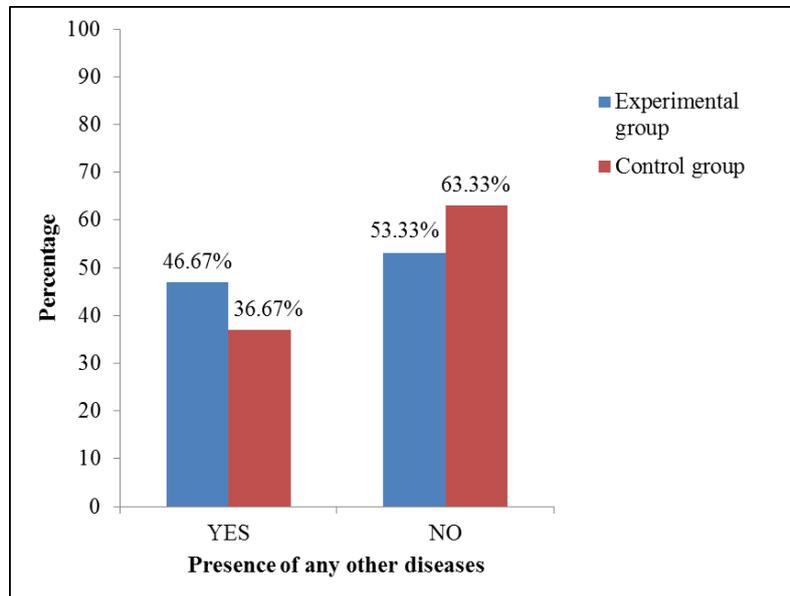


Figure 6: Percentage wise distribution of sample according to presence of other diseases.

The data in the figure 6 shows that, in experimental group, 46.67 % of sample have other diseases and 53.33% of sample have no other diseases. In control

group, 36.67 % of samples have other diseases and 63.33% of samples have no other diseases.

N=60

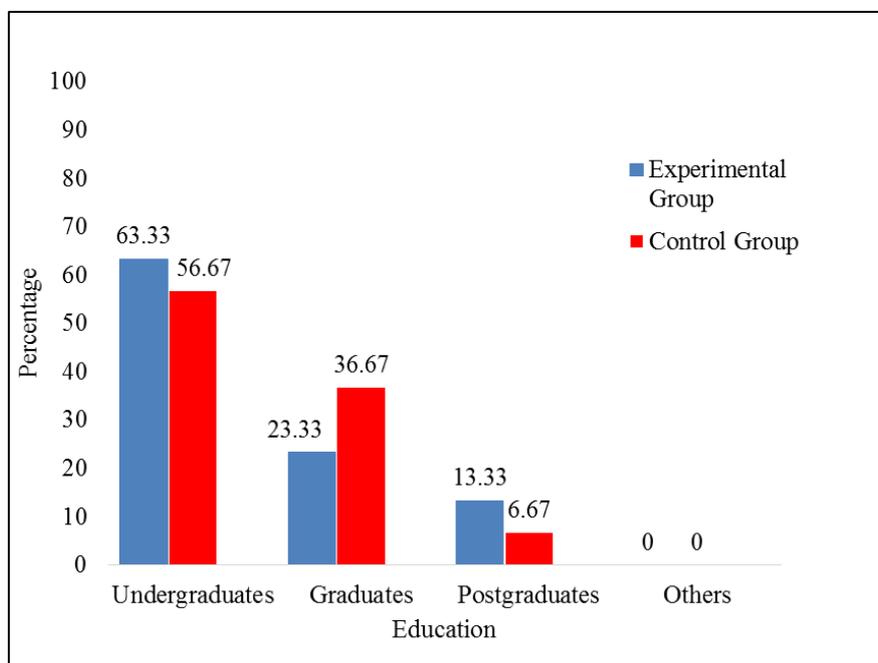


Figure 7: Percentage wise distribution of sample according to educational status.

The data in figure 7 shows that, in experimental group, 63.33 % were undergraduates, 23.33% were graduates and 13.33% of sample were postgraduates. In control

group 56.67% of sample were undergraduates, 36.67% were graduates and 6.67% were postgraduates.

N=60

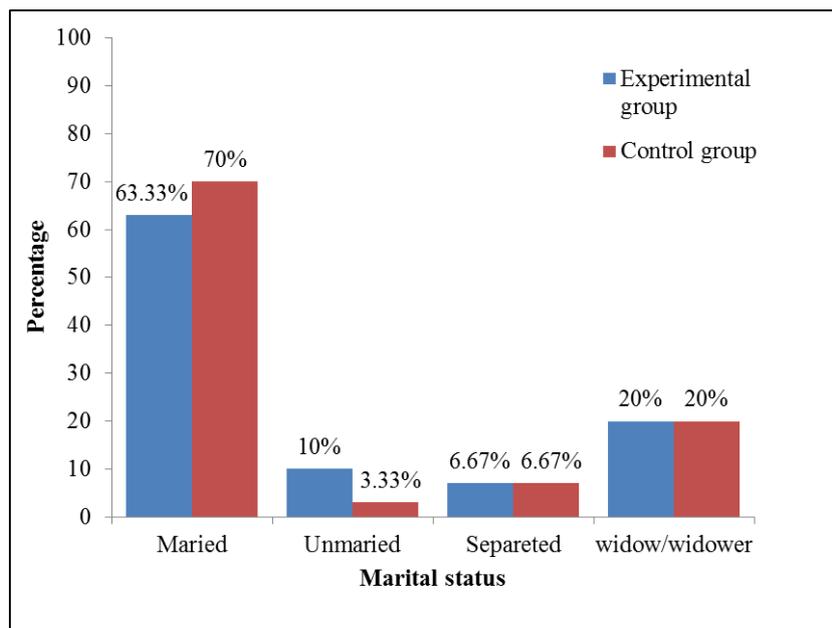


Figure 8: Percentage wise distribution of sample according to Marital status.

The data in the figure 8 shows that, in experimental group, 63.33% were married, 10% unmarried, 6.67% of sample divorced and 20% were widows or widowers. In control group 70% of sample were married, 3.33% of

sample were unmarried, 6.67% of sample were separated, and 20% of sample belongs to widow or widower category.

N=60

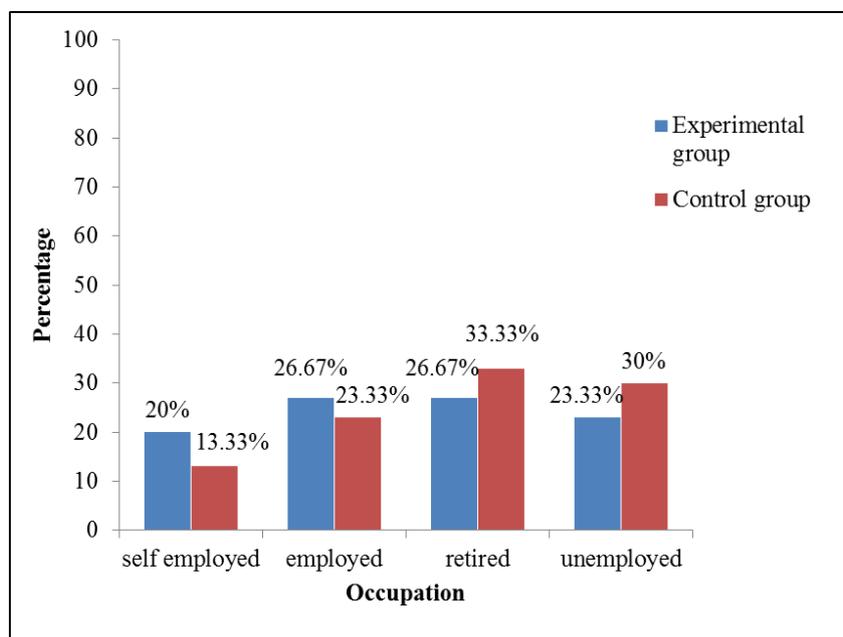


Figure 9: Percentage wise distribution of sample according to occupation.

The data in the figure 9 shows that, in experimental group, 20% of sample were self-employed, 26.67% of sample belonged to employed category, 26.67% of sample were retired from service and 23.33% of sample belonged to unemployed category. In control group, 13.33% of sample were self-employed, 23.33% of sample employed, 33.33% of sample were retired from

service, and 30% of sample belonged to unemployed category.

Frequency and percentage distribution of knowledge scores among patients with COPD**Table 2: Frequency and percentage distribution of pretest and posttest knowledge score in experimental group n=30**

Level of knowledge	Pretest		Posttest	
	Frequency	Percentage	Frequency	Percentage
Poor	14	46.67	0	0
Average	15	50	5	16.67
Good	1	3.33	13	43.33
Excellent	0	0	12	40

Data in Table 1 shows that in the experimental group, 46.67% sample had poor knowledge, 50% of sample had average knowledge and remaining 3.33% sample possessed good knowledge in pretest. In the post test

40% of sample had excellent knowledge, 43.33% sample had good knowledge and remaining 16.67% sample had average knowledge.

Frequency and percentage distribution of Quality of life scores among patients with COPD**Table 3: Frequency and percentage distribution of pretest and posttest Quality of life score in experimental group. n=30**

Level of QOL	Pretest		Posttest	
	Frequency	Percentage	Frequency	Percentage
Poor	0	0	0	0
Average	30	100	30	100
Good	0	0	0	0

Data in Table 2 shows that in the experimental group, 100% of sample in both the pretest and post test possess average quality of life.

categorized as 25 percentile poor (8-11), average (12-15), good (16-19) and excellent (20-23).

Section B: Effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications among COPD patients

The knowledge score was assessed using structured knowledge questionnaire. The score range was

Table 4: Mean, standard deviation, and 't' value of pre-test knowledge scores of COPD patients regarding respiratory complications in experimental and control group.

N=60

Group	mean	SD	't' value	significance
Experimental group	11.96	2.23	0.39	NS
Control group	11.73	2.33		

Table value t (58) = 1.67

significant

The calculated 't' value is 0.39 is lesser than table value (1.672) at 0.05 level of significance, so there is no significant difference in mean pre-test knowledge score between experimental and control group. Hence it can be

concluded that COPD patients selected in experimental and control group had homogeneity in terms of their pre-test knowledge score.

Table 5: Comparison of mean pre-test and post-test knowledge scores of COPD patients regarding respiratory complications in experimental group. N=30

	mean	SD	't' value	significance
Pretest	11.96	2.23	14.15	S
Posttest	18.46	2.19		

Table t value (49) = 1.69

S –significant

The table 5 shows that the mean, standard deviation and t value of pre and post test of knowledge score among COPD patients in experimental group. Since the calculated t value (14.15) is higher than the table value

there was significant difference between pre and post test knowledge scores of patients with COPD in experimental group.

Table 6: Mean, Standard deviation and 't' value of post-test knowledge scores of COPD patients regarding respiratory complications in experimental and control group. N=60

Group	mean	SD	't' value	significance
Experimental group	18.46	2.19	9.51	S
Control group	12.16	2.88		

Table value t (98) = 1.67

S- significant

The table 6 shows that the mean, standard deviation and t value of post test of knowledge score among COPD patients in experimental group and control group. Since the calculated t value (9.51) is higher than the table value (1.67) there was significant difference between post test knowledge score in experimental group and control group.

Section C: Effectiveness of pulmonary rehabilitation package on Quality of life among COPD patients

The quality of life score was assessed using 3 point likert scale. The score range was categorized as poor (1-10), average (11-20) and good (21-30).

Table 7: Mean, Standard deviation and 't' value of pre-test scores of Quality of life among patients with COPD in experimental and control group. N=60

Group	mean	SD	't' value	significance
Experimental group	16.43	2.25	0.64	NS
Control group	16.06	2.17		

Table value t (98) = 1.67

NS- non significant

The calculated 't' value is 0.64 which is less than table value (1.67) at 0.05 level of significance, so there is no significant difference in quality of life score between experimental and control group. Hence it can be

concluded that COPD patients in experimental and control group had homogeneity in terms of their pre-test quality of life score.

Table 8: Comparison of mean pre-test and post-test Quality of life scores of patients with COPD in experimental group. N=30

	mean	SD	't' value	significance
Pretest	16.43	2.25	6.43	S
Posttest	18.43	1.45		

Table t value (29) = 1.69

S –significant

The table 8 shows that calculated 't' value (6.43) is higher than table value (1.69) value at 0.05 level of significance, so there is significant difference between the pre-test and post test scores of QOL regarding pulmonary rehabilitation package in experimental group. Hence hypothesis H₂ which states that there will be

significant difference between mean pre-test and post-test scores of quality of life regarding selected respiratory complications and bio physiological parameters among patients in experimental group was accepted.

Table 9: Mean, Standard deviation and 't' value of post-test Quality of life scores of patients with COPD in experimental and control group.

N=60

Group	mean	SD	't' value	significance
Experimental group	18.43	1.45	3.65	S
Control group	16.56	2.38		

Table value t (58) = 1.67

S- significant

The data in table 9 shows that calculated 't' value (3.65) is higher than table value (1.67) value at 0.05 level of significance, there is significant difference between the post test scores of quality of life in experimental and control group.

Section D: Effectiveness of pulmonary rehabilitation package on bio physiological parameters such as Heart rate, Respiration rate and SpO₂ Level among COPD patients

Heart rate

The heart rate was categorized as low HR (61-72), Normal (73-84) and High HR (85-96).

Table 10: Mean, standard deviation, and 't' value of pre-test heart rate of COPD patients in experimental and control group. N=60

Group	mean	SD	't' value	significance
Experimental group	77.40	9.64	0.08	NS
Control group	77.60	9.19		

Table value t (58) = 1.67

Non significant

The data in the table 10 shows that calculated 't' value is 0.08 is lesser than table value (1.672) at 0.05 level of significance, so there is no significant difference in mean pre-test heart rate between experimental and control

group. Hence it can be concluded that COPD patients selected in experimental and control group had homogeneity in terms of their pre-test heart rate.

Table 11: Comparison of mean pre-test and post-test heart rate of COPD patients in experimental group. N=30

	mean	SD	't' value	significance
Pretest	77.40	9.64	3.72	S
Posttest	71.80	3.29		

Table t value (29) = 1.69

S –significant

Calculated 't' value (3.72) is higher than table value (1.69) value at 0.05 level of significance, there is

significant difference between the pre-test and post test scores of heart rate in experimental group.

Table 12: Mean, Standard deviation and 't' value of post-test heart rate of COPD patients in experimental and control group. N=60

	mean	SD	't' value	significance
Pretest	71.80	3.29	0.14	NS
Posttest	71.90	3.61		

Table value t (58) = 1.67

Non significant

Calculated 't' value (0.14) is lesser than table value (1.67) value at 0.05 level of significance, there is no significant difference between the post-test heart rate experimental and control group.

Respiratory rate

The Respiration rate was categorized as Low RR (12-17), Normal (18-22) and High RR (23-28).

Table 13: Mean, standard deviation, and 't' value of pre-test respiratory rate of COPD patients in experimental and control group. N=60

Group	mean	SD	't' value	significance
Experimental group	24.40	3.03	0.12	NS
Control group	24.30	3.29		

Table value t (58) = 1.67

Non significant

The calculated 't' value is 0 is lesser than table value (1.672) at 0.05 level of significance, so there is no significant difference in mean pre-test heart rate between experimental and control group. Hence it can be

concluded that COPD patients selected in experimental and control group had homogeneity in terms of their pre-test respiration rate.

Table 14: Comparison of mean pre-test and post-test respiration rate of COPD patients in experimental group. N=30

	mean	SD	't' value	significance
Pretest	24.40	3.03	14.33	S
Posttest	15.80	2.18		

Table t value (29) = 1.69

S –significant

Calculated 't' value (14.33) is higher than table value (1.69) value at 0.05 level of significance, there is significant difference between the pre-test and post test scores of respiration rate in experimental group.

Table 15: Mean, Standard deviation and 't' value of post-test respiration rate of COPD patients in experimental and control group.

N=60

Group	mean	SD	't' value	significance
Experimental group	15.80	2.18	0.39	NS
Control group	16.06	2.99		

Table value t (58) = 1.67

Non significant

Calculated 't' value (0.39) is lesser than table value (1.67) value at 0.05 level of significance, there is no significant difference between the post-test respiration rate experimental and control group.

SpO2 LEVEL

The SPO2 level was categorized as Severe hypoxia (86-90), mild hypoxia (91-95) and Good O₂ saturation (96-100).

Table 16: Mean, standard deviation, and 't' value of pre-test SPO2 level of COPD patients in experimental and control group.

N=60.

Group	mean	SD	't' value	significance
Experimental group	93.70	3.33	0.11	NS
Control group	93.80	3.41		

Table value t (58) = 1.67

Non significant

The calculated 't' value 0.11 is lesser than table value (1.67) at 0.05 level of significance, so there is no significant difference in mean pre-test SPO2 level between experimental and control group. Hence it can be

concluded that COPD patients selected in experimental and control group had homogeneity in terms of their pre-test SPO2 level.

Table 17: Comparison of mean pre-test and post-test SPO2 level of COPD patients in experimental group. N=30

	mean	SD	't' value	significance
Pretest	93.70	3.33	9.77	S
Posttest	99.36	0.80		

Table t value (29) = 1.69 S –significant

Calculated 't' value (9.77) is higher than table value (1.69) value at 0.05 level of significance, there is

significant difference between the pre-test and post test scores of SPO2 level in experimental group.

Table 18: Mean, Standard deviation and 't' value of post-test SPO2 level of COPD patients in experimental and control group.

Group	mean	SD	't' value	significance
Experimental group	99.36	0.80	0.85	NS
Control group	99.16	0.98		

Table value t (58) = 1.67 Non significant

Calculated 't' value (0.85) is lesser than table value (1.67) value at 0.05 level of significance, there is no significant difference between the post-test SPO2 level in experimental and control group.

Hence H₃ which states that there will be significant difference between mean pretest and post test scores of bio physiological parameters among patients with COPD in experimental group was accepted.

Section E: Association between pre-test knowledge score among COPD patients and selected demographic variables**Table 19: Association between knowledge regarding respiratory complications among COPD patients and demographic variables.**

N=60

SI No	Demographic variables	Knowledge score				Df	x ²	Table value	Significance
		Poor	average	good	excellent				
1.	Age in years								
A	30-39	3	2	0	0	6	9.81	1.94	S
B	40-49	3	4	0	0				
C	50-59	11	1	0	0				
D	60 and above	15	20	1	0				

SI No	Demographic variables	Knowledge score				Df	x ²	Table value	Significance
		Poor	average	good	excellent				
2.	Gender								
A	Male	19	20	0	0	2	3.27	2.92	S
B	female	13	7	1	0				
C	Transgender	0	0	0	0				
3.	Duration of COPD								
A	1-5yr	26	8	0	0	4	17.96	2.13	S
B	6-10yr	5	18	1	0				
C	10 and above	1	1	0	0				
4.	Any other diseases								
A	Yes	8	16	1	0	2	8.49	2.92	S
B	No	24	11	0	0				
5.	Education								
A	Undergraduate	17	18	1	0	4	2.30	2.13	S
B	Graduate	12	6	0	0				
C	Post graduate	3	3	0	0				
D	Others	0	0	0	0				
6.	Marital status								
A	Married	24	16	0	0	6	15.99	1.94	S
B	Unmarried	2	2	0	0				
C	Separated	1	2	1	0				
D	Widow/widower	5	7	0	0				
7.	Occupation								
A	Self-employed	7	3	0	0	6	7.43	1.94	S
B	Employed	9	6	0	0				
C	Retired	6	12	0	0				
D	Unemployed	10	6	1	0				

The association between pre-test knowledge score regarding respiratory complications among COPD patients and selected demographic variables was assessed using chi square test. Data in the table 15 shows that the calculated chi square values are greater than the table values at 0.05 level of significance, therefore there was significant association between pre-test knowledge score among patients with COPD and selected

demographic variables like age, gender, duration of COPD, presence of any other diseases, education, marital status and occupation.

Hence hypothesis 4 which states that there will be significant association between mean pretest score of knowledge of COPD patients with demographic variables was accepted.

Section F: Association between quality of life among COPD patients and selected demographic variables

Table 20: Association between quality of life among COPD patients and selected demographic variables.

N=60

SI No	Demographic variables	QOL score			Df	x ²	Table value	Significance
		Poor	average	good				
1.	Age in years							
A	30-39	0	5	0	3	40.93	7.81	S
B	40-49	0	7	0				
C	50-59	0	12	0				
D	60 and above	0	36	0				
2.	Gender							
A	Male	0	39	0	2	38.1	5.99	S
B	female	0	21	0				
C	Transgender	0	0	0				
3.	Duration of COPD							
A	1-5yr	0	34	0	2	26.8	5.99	S
B	6-10yr	0	24	0				
C	10 and above	0	2	0				
4.	Any other diseases							
A	Yes	0	18	0	1	1.66	3.84	NS

SI No	Demographic variables	QOL score			Df	x ²	Table value	Significance
		Poor	average	good				
B	No	0	17	0				
5.	Education							
A	Undergraduate	0	36	0	3	50.4	7.81	S
B	Graduate	0	18	0				
C	Post graduate	0	6	0				
D	Others	0	0	0				
6.	Marital status							
A	Married	0	40	0	3	58.4	7.81	S
B	Unmarried	0	4	0				
C	Separated	0	4	0				
D	Widow/widower	0	12	0				
7.	Occupation							
A	Self-employed	0	11	0	3	2.35	7.81	NS
B	Employed	0	15	0				
C	Retired	0	18	0				
D	Unemployed	0	16	0				

The association between pre-test score of quality of life among COPD patients and selected demographic variables was assessed using chi square test. Data in the table 16 shows that there was significant association between pre-test score and selected demographic variables like age, gender, duration of COPD, education and marital status because calculated chi square values were higher than the table values. There was no

significant association between pre-test score and selected demographic variables like presence of any other diseases and occupation because calculated chi square values were less than the table values. Hence hypothesis 5 which states that there will be significant association between mean pretest score of quality of life with demographic variables was partially accepted.

Section G: Association between bio physiological parameters among COPD patients and selected demographic variables

Table 21: Association between pre-test score of heart rate among COPD patients and selected demographic variables.

N=60

SI No	Demographic variables	Heart Rate			Df	x ²	Table value	Significance
		LowHR	NormalHR	HighHR				
1.	Age in years							
A	30-39	1	1	3	6	8.56	1.94	S
B	40-49	3	1	3				
C	50-59	3	2	6				
D	60 and above	15	15	7				
2.	Gender							
A	Male	14	15	10	2	2.50	2.92	NS
B	female	9	4	8				
C	Transgender	0	0	0				
3.	Duration of COPD							
A	1-5yr	17	8	11	4	5.38	2.13	S
B	6-10yr	5	10	7				
C	10 and above	1	1	0				
4.	Any other diseases							
A	Yes	8	11	7	2	2.47	2.92	NS
B	No	15	8	11				

The association between pre-test score of Heart rate among COPD patients and selected demographic variables was assessed using chi square test. Data in the table 17 shows that the calculated chi square values are lesser than the table values at 0.05 level of significance for variables like gender and presence of any other diseases. Therefore, there was no significant association

between pre-test heart rate score among patients with COPD and selected demographic variables like gender and presence of any other diseases. The calculated chi square values are greater than the table values at 0.05 level of significance for variables such as age and duration of COPD. Therefore, there was significant association between pre-test heart rate score among

patients with COPD and selected demographic variables like age and duration of COPD.

Table 22: Association between pre-test score of Respiratory rate among COPD patients and selected demographic variables.

N=60

SI No	Demographic variables	Resp. Rate			Df	x ²	Table value	Significance
		LowHR	NormalHR	HighHR				
1.	Age in years							
A	30-39	0	3	2	6	8.47	1.91	S
B	40-49	0	2	5				
C	50-59	1	1	10				
D	60 and above	0	11	25				
2.	Gender							
A	Male	0	11	28	2	1.90	2.90	NS
B	female	1	6	14				
C	Transgender	0	0	0				
3.	Duration of COPD							
A	1-5yr	1	8	25	4	2.83	2.13	S
B	6-10yr	0	9	15				
C	10 and above	0	0	2				
4.	Any other diseases							
A	Yes	0	9	16	2	1.82	2.92	NS
B	No	1	8	26				

The data in table 19 shows that, association between pre-test score of Respiration rate among COPD patients with selected demographic variables was assessed using chi square test. The calculated chi square values are lesser than the table values at 0.05 level of significance for variables such as gender and presence of any other diseases. Therefore, there was no significant association between pre-test respiratory rate score among patients

with COPD and selected demographic variables like gender and presence of any other diseases. The calculated chi square values are greater than the table values at 0.05 level of significance for variables such as age and duration of COPD. Therefore, there was significant association between pre-test respiratory rate score among patients with COPD and selected demographic variables like age and duration of COPD.

Table 23: Association between pre-test score of SpO2 level among COPD patients and selected demographic variables.

N=60

SI No	Demographic variables	SpO2 level			Df	x ²	Table value	Significance
		Severe Hypoxia	Mild Hypoxia	Good O2saturation				
1.	Age in years							
A	30-39	0	3	2	6	2.43	1.94	S
B	40-49	2	3	2				
C	50-59	2	5	5				
D	60 and above	9	13	14				
2.	Gender							
A	Male	7	16	14	2	0.02	2.92	NS
B	female	4	10	9				
C	Transgender	0	0	0				
3.	Duration of COPD							
A	1-5yr	4	14	16	4	8.42	2.13	S
B	6-10yr	7	12	5				
C	10 and above	0	0	2				
4.	Any other diseases							
A	Yes	6	12	7	2	2.15	2.92	NS
B	No	5	14	16				

The data in the table 20 shows that, association between pre-test score of SpO2 Level among COPD patients and

selected demographic variables was assessed using chi square test. The calculated chi square values are lesser

than the table values at 0.05 level of significance for variables such as gender and presence of any other diseases, Therefore, there was no significant association between pre-test score of SpO₂ level among patients with COPD and selected demographic variables like gender and presence of any other diseases. The calculated chi square values are greater than the table values at 0.05 level of significance for variables such as age and duration of COPD. Therefore, there was significant association between pre-test score of SpO₂ level among patients with COPD and selected demographic variables like age and duration of COPD.

Hence hypothesis H₆ which states that there will be significant association between mean pretest bio physiological parameters with demographic variables was partially accepted.

DISCUSSION

The present study was conducted to assess the effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with Chronic obstructive pulmonary disease (COPD) at selected hospitals, Kollam. The findings of the study are discussed with reference to the objectives, hypotheses and findings of other studies.

The findings are discussed based on the objectives

The objectives of the study were

- To assess the knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD at selected hospitals, Kollam.
- To determine the effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD at selected hospitals, Kollam.
- To find out the association between pretest knowledge regarding respiratory complications among patients with COPD and selected demographic variables.
- To find out the association between pretest quality of life among patients with COPD and selected demographic variables.
- To find out the association between pretest bio physiological parameters among patients with COPD and selected demographic variables.

To assess the knowledge regarding respiratory complications and quality of life among patients with COPD

In the present study, knowledge was assessed by knowledge questionnaire and quality of life was assessed by 3 point Likert scale. The present study findings revealed that in experimental group the mean pre-test scores of knowledge regarding respiratory complications was (11.96±2.23) and in control group the mean pre-test

scores of knowledge regarding respiratory complications was (11.73±2.33).

The findings of the present study are consistent with another study which was conducted to assess the effectiveness of pulmonary rehabilitation on knowledge and quality of life among patients with COPD at Wuhan. It was a quasi-experimental, non-randomized control group research study. In the present study Quasi experimental pretest posttest control group design was adopted. It was found that, the present study used quantitative approach, and the sample size of the present study was 60 and in referent study it was 165. In the present study purposive sampling technique was used and in the referent study non probability convenience sampling technique was used. The settings of the both studies were hospitals.

The finding of the referent study revealed that in experimental group the mean pretest scores of knowledge was (8.6±1.56) and in control group the mean pre-test scores of knowledge was (8.5±1.56) and in case of quality of life in experimental group the mean pretest scores of quality of life was (5.7±1.30) and in control group the mean pre-test scores of quality of life was (5.5±1.30).^[34]

The result of the both studies revealed that samples have knowledge regarding respiratory complications and quality of life of patients with COPD in pretest.

To determine the effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications and quality of life among patients with COPD

There was significant difference between mean posttest knowledge score among patients with COPD in experimental and control group. The present study findings revealed that the pulmonary rehabilitation package was effective in patients with COPD on their knowledge.

There was significant difference between mean posttest quality of life score among patients with COPD in experimental and control group. The present study findings revealed that the pulmonary rehabilitation package was effective in patients with COPD on their quality of life.

The present study is consistent with another study which was conducted to assess the effectiveness of pulmonary rehabilitation program on knowledge, quality of life and measured inspiratory capacity in patients with COPD at Beijing.^[35]

The present study compared with the referent study, found that, both studies were quasi experimental. In the present study, the sample size was 60 and in referent study the sample size was 60 and used purposive sampling technique. In present study knowledge

questionnaire, 3 point Likert's scale were used as tools, in referent study St George's knowledge questionnaire and 6-minute walk test were used as tools.

The result of referent study showed that worse SGRQ scores ($P < .01$) in pre-test. After Pulmonary Rehabilitation the outcome was improved ($P < .001$). Regarding quality of life 70% of sample have low level quality of life ($P < .01$) in pre-test, but in post-test mean 6-minute walk test score ($P = .948$) was improved and Δ SGRQ ($P = .086$) after Pulmonary Rehabilitation. Both studies revealed that pulmonary rehabilitation was effective in knowledge and quality of life.

To find out the association between pretest knowledge regarding respiratory complications among patients with COPD and demographic variables

In this present study, demographic variables were age, gender, duration of COPD, presence of any other diseases, education, marital status and occupation.

The findings of the present study revealed that there was significant association between pretest knowledge score among patients with COPD and selected demographic variables like age, gender, duration of COPD, presence of any other diseases, education, marital status and occupation because the calculated chi square values were greater than the table values at 0.05 level of significance.

The present study is consistent with another study conducted to assess impact of gender and other factors on PR outcomes in patients with chronic obstructive pulmonary disease (COPD) at Shanghai. Both studies were quasi experimental. In present study the sample size was 60 and in referent study the sample size was 140. In both purposive sampling technique was used. In the present study knowledge questionnaire and 3 point Likert scale were used as tools, in referent study 6-minute walk test was used as tools.^[36]

The findings of the referent study revealed that there was significant association between pretest knowledge score among patients with COPD and selected demographic variables like gender and exposure to pollutants. Both studies revealed that there was significant association between pretest knowledge score among patients with COPD and selected demographic variables.

To find out the association between pretest quality of life score among patients with COPD and demographic variables

The findings of the present study revealed that there was no significant association between pre-test score among patients with COPD and selected demographic variables like presence of any other diseases and occupation as the calculated chi square values were lesser than the table values at 0.05 level of significance. There was significant association between pre-test score and selected demographic variables like age, gender, duration of COPD, education and marital status as the calculated chi

square values were greater than the table values at 0.05 level of significance.

The present study is consistent with another study which was conducted to assess the effect of a brief self-care support intervention and to find out the association between quality of life among patients with COPD and selected demographic variables. On comparing the present study with the referent study, it was found that, both studies were quasi experimental. In present study the sample size was 60 and in referent study the sample size was 40. In both the studies purposive sampling technique was used. In the present study knowledge questionnaire and 3 point Likert's scale were used as tools, in referent study St George's respiratory questionnaire and 6-minute walk test were used as tools.^[37]

The referent study revealed that there was significant association between pre-test score of quality of life and selected demographic variables like age, gender. Both studies revealed that there is significant association between pre-test quality of life and selected demographic variables.

To find out the association between pretest bio physiological parameters score among patients with COPD and demographic variables

The findings of the present study revealed that there was no significant association between pre-test bio physiological parameters score among patients with COPD and selected demographic variables like gender and presence of any other diseases. There was significant association between pre-test bio physiological parameters score and selected demographic variables like age and duration of COPD.

The present study is consistent with another study which was conducted to assess the effect of pulmonary rehabilitation on quality of life, heart rate, exercise capacity and dyspnea. Purposive sampling technique used in this study and the sampling size was 144.

The findings of the present study when compared with the referent study, it was found that, both study was quasi experimental study and the present study sample size was 60. Sixty-four patients with COPD participated in a 12-week, 2 sessions-per-week, hospital-based PR program. Baseline and post-PR status were evaluated by spirometry, Heart Rate Variability, health-related quality of life (HRQL, St. George's Respiratory Questionnaire, SGRQ), cardiopulmonary exercise test, respiratory muscle strength, and dyspnoea Borg's scale.

The findings of the referent study revealed that there was significant association between pre-test bio physiological parameters score and selected demographic variables like age and gender. Both studies revealed that there is

significant association between pre-test bio physiological parameters score and selected demographic variables.^[38]

Summary

This study was done to evaluate the effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD in selected hospitals, Kollam. The objectives of the study were to assess the knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD at selected hospitals, Kollam, to determine the effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD at selected hospitals, Kollam. to find out the association between pretest knowledge regarding respiratory complications among patients with COPD and demographic variables. to find out the association between pretest quality of life among patients with COPD and demographic variables. to find out the association between pretest bio physiological parameters among patients with COPD and demographic variables. The conceptual frame work used in the study was Roy's adaptation model. Quantitative research approach was used in this study. A quasi experimental pretest posttest control group design was selected to assess the effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD. The present study was conducted at Bishop Benziger hospital Kollam. In this study sample consisted of 60 patients with COPD. Purposive sampling technique was used in the study. Demographic Performa, Knowledge questionnaire and 3 point Likert scale were used as tool for this study.

The pilot study was conducted in Sanker's hospital Kollam from 24/01/2022 to 29/01/2022. The sample for pilot study consisted of 10% of the samples with COPD. The main study was done with 60 samples. After obtaining consent from the participant pretest was administered. After pretest experimental group received pulmonary rehabilitation package. The post test was conducted for both group after 7 days of intervention. The effectiveness of pulmonary rehabilitation package was calculated by paired t test method.

CONCLUSION

The present study was aimed to find the effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD in selected hospitals, Kollam.

- The findings of the study revealed that there was no significant difference in mean pretest knowledge score between experimental and control group since because the calculated t value (0.39) was lesser than table value (1.62) at 0.05 level of significance.

Hence it can be concluded that COPD patients selected in experimental and control group had homogeneity in terms of their pretest knowledge score.

- The calculated t value (9.51) was higher than the table value (1.67), there was significant difference between post-test knowledge score in experimental group and control group.
- The calculated t value (14.15) was higher than the table value (1.67), there was significant difference between pre and post-test knowledge scores of patients with COPD in experimental group. Hence hypothesis H_1 which states that there will be significant difference between mean pretest and posttest knowledge scores regarding respiratory complications among patients with COPD in experimental group was accepted.
- There was no significant difference in mean pretest quality of life score between experimental and control group since because the calculated t value (0.64) was lesser than table value (1.67) at 0.05 level of significance. Hence it can be concluded that COPD patients selected in experimental and control group had homogeneity in terms of their pretest quality of life score.
- The calculated t value (3.65) was higher than the table value (1.67) there was significant difference between post-test quality of life score in experimental group and control group.
- The calculated t value (6.43) is higher than the table value (1.67), there was significant difference between pre and post-test quality of life scores of patients with COPD in experimental group. Hence hypothesis H_2 which states that there will be significant difference between mean pretest and posttest quality of life scores among patients with COPD in experimental group was accepted.
- There was no significant difference in mean pretest scores of bio physiological parameters (heart rate, respiration rate and SpO_2 level) between experimental and control group since because the calculated t value was lesser than table value at 0.05 level of significance. Hence it can be concluded that COPD patients selected in experimental and control group had homogeneity in terms of their pretest scores of bio physiological parameters.
- The calculated t value is higher than the table value, there was significant difference between post-test bio physiological parameters score in experimental group and control group.
- The calculated t value is higher than the table value, there was significant difference between pre and post-test bio physiological parameters scores of patients with COPD in experimental group. Hence H_3 which states that there will be significant difference between mean pretest and posttest scores of bio physiological parameters among patients with COPD in experimental group was accepted.

The present study proved that pulmonary rehabilitation package was effective in improving knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD in selected hospitals, Kollam.

Nursing implications

The present study was conducted to assess the effectiveness of pulmonary rehabilitation package on knowledge regarding respiratory complications, quality of life and bio physiological parameters among patients with COPD. The findings of the study showed that pulmonary rehabilitation package was effective in patients with COPD. The findings of the study have various implications in the field of nursing practice, nursing education, nursing research and nursing administration.

Implications for nursing practice

- In nursing practice one goal of Pulmonary Rehabilitation is to maximise patients' ability to improve their exercise tolerance. Patients are prescribed an exercise programme based on severity of COPD.
- Nurses have a core function in assessing activities of daily living and assisting patients to meet their needs. It is important to assess how patients are coping with all activities of living using a standard assessment process.
- In Pulmonary Rehabilitation nurses can make an important contribution to the assessment of patients' nutritional intake and sleep patterns, which are important components of the PR assessment. During the programme, nurses can give dietary advice and, if required, offer help to modify diets.

Implications for nursing education

- COPD is one of the commonest respiratory diseases in hospital settings, the nursing personnel as well as the student nurses must be aware about how to identify, prevent and manage the respiratory complications of COPD.
- The nurse educators can conduct nurse education programme related to new nursing intervention for reducing the respiratory complications.
- Encourage the student for effective utilization of research based practice.

Implications for nursing administration

- The nurse administrators can see the aspect of health promotion while providing nursing care.
- Nurse administrators can provide necessary facilities for practice of pulmonary rehabilitation in management of COPD.
- Nursing administrators can also take necessary steps to formulate nursing care protocols for pulmonary rehabilitation package.
- Education programmes can be arranged and nurses need to attend these programmes regularly to update

their knowledge about current practices regarding effectiveness of pulmonary rehabilitation package.

Implications for nursing research

- Nursing research is an essential aspect of nursing as it uplifts the profession and has an important role in creating the body of knowledge and ways to practice them.
- This study serves as a basis for students and nurses to conduct research on management of patients with COPD.
- Disseminate the findings of the research through conferences, seminars and publishing in nursing journals.

Limitations

- It is difficult to improve quality of life of COPD patients within one week.
- Lack of motivation among samples probably due to the difficulties of the advanced age could be the reason affecting the effectiveness of pulmonary rehabilitation package.

Recommendations

The study recommends the following for future research.

- Extended data collection period may improve quality of life among patients with COPD.
- The similar study can be conducted with larger sample for better generalizations.
- A similar study can be conducted with other latest interventions for the management of COPD.

REFERENCE

1. Sharma SK. Nursing research and statistics. Punjab: Elsevier publishers, 2012.
2. Polit F, Beck T. Nursing research: principles and methods. 7th ed. Philadelphia: Lippincott William and wilkins, 2004.
3. Burt L, Susan C. COPD exacerbations. *Eur Respir J*. [cited 2022 Mar], 2013; 113(2): 34-43. Available from: <https://pubmed.ncbi.nlm.nih.gov/27941160/>
4. Linu L, Min C, Chung A. Efficacy of a respiratory rehabilitation exercise training package in hospitalized elderly patients with acute exacerbation of COPD: a randomized control trial. *Curr Med Res Opin*, 2015; [cited 2021 Mar]; 10(2): 173-9. Available from: <https://pubmed.ncbi.nlm.nih.gov/32046720/>
5. COPD Working Group. Pulmonary rehabilitation for patients with chronic pulmonary disease (COPD): an evidence-based analysis. *Curr Med Res Opin*, 2012; [cited 2021 Feb]; 12(6): 1-75. Available from: <https://pubmed.ncbi.nlm.nih.gov/35588429/>
6. Rainer G, Tessa S, Inga J, Kenn K. Pulmonary rehabilitation and exercise training in chronic obstructive pulmonary disease, 2018; [cited 2021 Jan]; 115(8): 117-123. Available from: <https://pubmed.ncbi.nlm.nih.gov/19961283/>.
7. American thoracic society. Pulmonary rehabilitation-physiopedia. Brookman F. The free

- encyclopedia. Europe: Available from: https://www.physiopedia.com/Pulmonary_Rehabilitatin, 2013.
8. Suissa S, Dell'Aniello S, Gonzalez AV, Ernst P. Inhaled corticosteroid use and the incidence of lung cancer in COPD. *Eur Respir J.*, 2020; [cited 2021 Mar]; 55(2): 190-5. Available from: <https://pubmed.ncbi.nlm.nih.gov/31744837/>.
 9. Liu S, Zhou Y, Limu M, Chen X, Zou W, Zhao D, et al. Association between exposure to ambient particulate matter and chronic obstructive pulmonary disease: results from a cross-sectional study in China. *Thorax*, 2017; [cited 2022 Mar]; 72(9): 788-95. Available from: <https://pubmed.ncbi.nlm.nih.gov/27941160/>
 10. Xie M, Liu X, Cao X, Guo M, Li X. Trends in prevalence and incidence of chronic respiratory diseases from 1990 to 2017. *Respire Res.*, 2020; [cited 2022 Mar]; 21(1): 48-49. Available from: <https://pubmed.ncbi.nlm.nih.gov/32046720/>