

**THE EFFECTIVENESS OF  
A PULMONARY REHABILITATION PROGRAM  
IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY  
DISEASE (COPD)**



**Nukul Ploybutr**

**A Thesis Submitted in Partial Fulfillment of the Requirements**

**for the Degree of Master of Public Health**

**Health Systems Development Programme**

**College of Public Health**

**Chulalongkorn University**

**Academic Year 2002**

**ISBN: 974-9599-00-4**

**© College of Public Health, Chulalongkorn University**

**Bangkok, Thailand**

Thesis Title: The Effectiveness of a Pulmonary Rehabilitation Program in Patients with Chronic Obstructive Pulmonary Disease (COPD)


By: Nukul Ploybutr

Program: Master of Public Health (Health Systems Development)  
College of Public Health

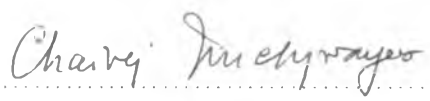
Thesis Advisor: Assistant Professor Nuntavarn Vichit-Vadakan, M.S., M.P.H.  
Dr.P.H.


---


Accepted by the College of Public Health, Chulalongkorn University, Bangkok  
Thailand in Partial Fulfillment of the Requirements for the Master's Degree

 ..... Dean of the College of Public Health  
( Samlee Plianbangchang, M.D., Dr.P.H )

#### THESIS COMMITTEE

 ..... Chairperson  
( Professor Chaivej Nuchprayoon, M.D., M.S.C., F.R.C.P. )

 ..... Thesis Advisor  
( Assistant Professor Nuntavarn Vichit-Vadakan, M.S., M.P.H. Dr.P.H. )

 ..... Member  
( Associate Professor Ong-arj Viputsiri, M.D., Dr.P.H. )

## ABSTRACT

This project of the effectiveness of a pulmonary rehabilitation program in patients with chronic obstructive pulmonary disease (COPD) aimed to evaluate the effects of a 6-week pulmonary rehabilitation program for the patients with chronic obstructive pulmonary disease (COPD) on the quality of life, the exercise capacity and the perception of dyspnea. The study group was thirteen patients diagnosed as COPD, from 42 to 78 years of age who were being treated at Chiangmuan Hospital, Chiangmuan District, Phayao Province. The study group participated in the pulmonary rehabilitation program. The 6 weeks hospital based rehabilitation program consisting of education, exercise training, psychological support, 6 months of individualized regimens of home-based exercise practice with monthly supervised exercise by home visit nurse, and 6 months of monthly hospital follow up care.

The outcome evaluation was completed by comparing data on three main patients outcome at baseline, 3 and 6 months after completed the program. The study measured three main patients outcome namely; the quality of life measured by the Chronic Respiratory Disease Questionnaire (CRQ), the exercise capacity measured by the 12-minutes Distance Walk Test (12 MD), and the perception of dyspnea after exercise measured by the Horizontal Visual Analogue Scale (HVAS).

The results of the study revealed that after the pulmonary rehabilitation program the participants showed a statistically significant increase in all three main patients outcome. There were significant differences in the study group in quality of life

measured by the Chronic Respiratory Disease ( $p < .05$ ), the exercise capacity that measured by the 12-min distance walk test ( $p < .05$ ) and changed in the perception of dyspnea measured by the Horizontal Visual Analogue Scale ( $p < .05$ ) between preprogram, 3 and 6-month after the program.

This study also examined the interactive effects of age and the different stages of the disease on each of the dependent variables. Participants who were over-61 years of age group showed a greater response to the intervention on the quality of life, the exercise capacity and the perception of dyspnea than those with 40 - 50 and 51 - 60 age groups. And the patients with mild airway obstruction response more positively to the rehabilitation program on the three patients' outcomes than the moderate and severe airway obstruction groups.

It could be concluded from this study that the pulmonary rehabilitation program that combined education and exercise training with supervised exercise practiced showed improvement the patients' outcomes and help the COPD patients to learn the ways to help themselves achieve and maintain an optimal level of life.

Nevertheless, the future study in this area should use an experimental design or cohort design for could be certain that the results. In addition the pulmonary rehabilitation program need to be tested in a larger sample of COPD subjects and should be considered for every COPD. There should be evaluated the effect of a pulmonary rehabilitation program on health care cost, survival, the short- and long-term success of the rehabilitation program. Finally, the rehabilitation program should be applied to chronic diseases other than COPD

## ACKNOWLEDGEMENTS

The accomplishment of the thesis has made possible because of the contributions and participation of various persons and organizations to whom I am most grateful.

I am very grateful and appreciative to Assistant Professor Nuntavarn Vichit-Vadakhon my thesis advisor, for her valuable guidance, suggestion, constructive comments and constant enormous support including revising of the thesis.

I would also like to express my sincere gratitude to Dr. Jassada Pichichumhol my co-advisor and the Director of Chiangmuan Hospital, who kindly permitted and gave me a opportunity to work and provided me valuable guidance, suggestion, constructive comments, interest and constantly encourage me to complete this study.

I specially wish to acknowledge Phayao Public Health Officer, who provided financial support to my study. In addition, I wish to extend my hearty thanks to all of the rehabilitation staff for their technical assistance and enthusiastic help and I also thank to the COPD patients for their willingness and co-operation that made the study possible.

I received whole-hearted encouragement from many friends and colleagues who gave me all the strength and moral support.

Finally, I am particularly thankful to my father, my mother, my husband and my children who gave the inspiration to me to complete this study.

# LIST OF CONTENTS

	<b>Page</b>
ABSTRACT .....	iii
ACKNOWLEDGEMENTS .....	v
LIST OF CONTENTS .....	vi
LIST OF TABLES .....	ix
LIST OF FIGURES .....	xiv
ABBREVIATION .....	xv
<b>CHAPTER I INTRODUCTION</b>	
1.1 Problem Statement .....	1
<b>CHAPTER II PROJECT DESCRIPTION</b>	
2.1 Introduction .....	6
2.2 Objectives .....	7
2.3 Approaches, Methods, and/or Techniques .....	7
2.4 Program Participants .....	10
2.5 Program Activities .....	11
2.6 Problems, Conflicts, and Means for Resolution .....	22
<b>CHAPTER III PROJECT EVALUATION</b>	
3.1 Introduction .....	25
3.2 Evaluation Phase .....	27

• Phase 1 : Based line .....	27
• Phase 2 : Hospital based rehabilitation training program .....	34
• Phase 3 : Home based rehabilitation and home-visit .....	42
• Phase 4 : Hospital follow-up care .....	46
• Phase 5 : Post intervention .....	48

#### **CHAPTER IV DISCUSSION AND CONCLUSION**

4.1 Discussion .....	83
4.2 Post intervention .....	86
4.3 Conclusion .....	89
4.4 Study limitations .....	90

#### **CHAPTER V RECOMMENDATIONS**

5.1 Implications for practice .....	92
5.2 Recommendation for future study .....	93

<b>REFERENCES</b> .....	95
-------------------------	----

#### **APPENDICES**

APPENDIX 1 : Chronic obstructive pulmonary disease ( COPD) Interview .....	103
APPENDIX 2 : Assessment the quality of life by the chronic respiratory disease Questionnaires .....	105
APPENDIX 3 : Assessment the exercise capacity by performed the 12 - minutes distance walking test (12 MD) .....	111

APPENDIX 4 : Assessment the perception of dyspnea after exercise .....	112
APPENDIX 5 : Guideline in-depth interviews and observation form .....	113
APPENDIX 6 : Guideline in-depth interviews and observation form .....	114
APPENDIX 7 : Guideline in-depth interviews and observation form .....	115
APPENDIX 8 : Curriculum of pulmonary rehabilitation program.....	116
APPENDIX 9 : Individual data of the 13 COPD patients in the pulmonary rehabilitation program .....	123
APPENDIX 10 : The project team .....	126
BIOGRAPHY .....	127



## LIST OF TABLES

	Pag :
Table 2.2 : A pulmonary rehabilitation training program for COPD .....	20
Table 2.3 : Project Activity with time table .....	24
Table 3.1: Patients characteristics .....	30
Table 3.2 : Mean score and standard deviation on the CRQ scale before the pulmonary rehabilitation program .....	33
Table 3.3 : Mean scores and standard deviations on the 12- minute distance walk test before the pulmonary rehabilitation program .....	34
Table 3.4 : Mean scores and standard deviations on the horizontal visual analogue scale ( HVAS ) scores before the pulmonary rehabilitation program .....	34
Table 3.5 : Mean scores and standard deviations on the CRQ scale before and after the pulmonary rehabilitation program .....	53
Table 3.6 : Results of paired t-test analysis of mean scores on the CRQ taken before and 3 months after the pulmonary rehabilitation Program .....	54
Table 3.7 : Results of paired t-test analysis of mean scores on the CRQ taken 3 months and 6 months after the pulmonary rehabilitation program.....	55
Table 3.8 : Results of paired t-test analysis of mean scores on the CRQ taken preprogram and 6 months after the pulmonary rehabilitation program .....	56

Table 3.9 : Mean scores and standard deviations on the 12- minute distance walk test before and after the pulmonary rehabilitation program .....	57
Table 3.10 : Paired t-test analysis on preprogram and 3 months after program mean scores on the 12- minute distance walk test .....	57
Table 3.11 : Paired t-test analysis between 3 months and 6 month after the pulmonary rehabilitation program on the 12-minute distance walk test .....	58
Table 3.12 : Paired t-test analysis of mean scores on the 12- minute distance walk test (12MD) between preprogram and 6 - months after the pulmonary rehabilitation program .....	59
Table 3.13 : Mean scores and standard deviations on the horizontal visual analogue scale ( HVAS ) scores before and after the pulmonary rehabilitation program .....	59
Table 3.14 : Paired t-test analysis of preprogram and 3 – months after the pulmonary rehabilitation mean scores on the horizontal visual analogue scale (HVAS) .....	60
Table 3.15 : Paired t-test analysis of 3- months and 6 month after the pulmonary rehabilitation mean scores on the horizontal visual analogue scale (HVAS) .....	61
Table 3.16 : Paired t-test analysis of preprogram and 6 – months after the pulmonary rehabilitation mean scores on the horizontal visual analogue scale (HVAS).....	61

Table 3.17 : Mean scores and standard deviations on the chronic respiratory disease questionnaires (CRQ) before and after the pulmonary rehabilitation program in the three different age groups of the participants .....	63
Table 3.18 : Comparison of the mean scores and standard deviation on the chronic respiratory disease questionnaires (CRQ) at baseline and 3 months after intervention in the three age groups of the participants .....	64
Table 3.19 : Comparison of the mean scores and standard deviation on the chronic respiratory disease questionnaires (CRQ) at baseline and 6 months after intervention in the three age groups of the participants .....	66
Table 3.20 : Mean scores and standard deviations on the 12-minute distance walk test before and after the pulmonary rehabilitation program in the three age groups of the participants .....	68
Table 3.21 : Comparison the mean scores on the 12-minute distance walk test (12 MD) at baseline and 3 months after program between the three age groups of the participants .....	68
Table 3.22 : Comparison the mean scores on the 12-minute distance walk test (12 MD) at baseline and 6 months after program between the three age groups of the participants .....	69
Table 3.23 : Mean scores and standard deviation on the horizontal visual analogue scale (HVAS) before and after the pulmonary rehabilitation program in the three age groups of participants .....	70

Table 3.24 : Comparison of the mean scores on the horizontal visual analogue scale (HVAS) between before and 3 months after the pulmonary rehabilitation program in the three age groups of participants .....	71
Table 3.25 : Comparison of the mean scores on the horizontal visual analogue scale (HVAS) between before and 6 months after the pulmonary rehabilitation program in the three age groups of participants .....	72
Table 3.26 : Mean scores and standard deviations on the chronic respiratory disease questionnaires (CRQ) before and after the pulmonary rehabilitation program in the three different stages of the disease .....	74
Table 3.27 : Comparison of the mean scores and standard deviation on the chronic respiratory disease questionnaires (CRQ) at baseline and 3 months after intervention in the three different stages of the disease .....	75
Table 3.28 : Comparison of the mean scores and standard deviation on the chronic respiratory disease questionnaires (CRQ) at baseline and 6 months after intervention in the three different stages of the disease .....	76
Table 3.29 : Means scores and standard deviation of the participants on the 12-minute distance walk test (12MD) at baseline, 3 and 6 months after the pulmonary rehabilitation program in the three different stages of the disease .....	77

Table 3.30 : Comparison the mean scores on the 12-minute distance walk test (12 MD) at baseline and 3 months after program between the three different stage of disease .....	78
Table 3.31 : Comparison the mean scores on the 12-minutes distance walk test (12 MD) at baseline and 6 months after program between the three different stages of the disease .....	79
Table 3.32 : Mean scores and standard deviation on the horizontal visual analogue scale (HVAS) before and after the pulmonary rehabilitation program in the three different stages of the disease .....	80
Table 3.33 : Comparison of the mean scores on the horizontal visual analogue scale (HVAS) between before and 3 months after the pulmonary rehabilitation program in the three different stages of the disease .....	81
Table 3.34 : Comparison of the mean scores on the horizontal visual analogue scale (HVAS) between before and 6 months after the pulmonary rehabilitation program in the three different stages of the disease .....	82
Table 3.35 : Individual data of the 13 COPD patients in the pulmonary rehabilitation program.....	123

## LIST OF FIGURES

	Page
Figure 2.1 : Overview of the pulmonary rehabilitation program.....	9
Figure 3.1 : Overview of program evaluation .....	25

## ABBREVIATION

COPD	The chronic obstructive pulmonary disease
CRQ	The chronic respiratory disease questionnaires
12 MD test	The twelve minutes distance walk test
HVAS	The horizontal visual analogue scale
FEV <sub>1</sub> /FVC	Forced expiratory volume in one second to forced vital capacity