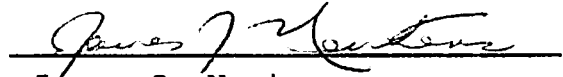


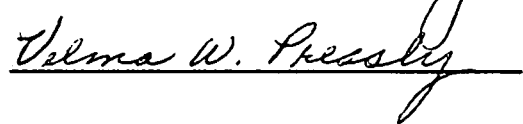
To the Graduate Council:

I am submitting herewith a dissertation written by Ann Putnam Johnson entitled "Disease Related Knowledge, MHLC, and Compliance with Treatment of the Patient with COPD." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Health Education.


James J. Neutens,
Major Professor

45
We have read this dissertation
and recommend its acceptance:





Accepted for the Council:


Vice Provost
and Dean of The Graduate School

DISEASE RELATED KNOWLEDGE, MHLC, AND COMPLIANCE
WITH TREATMENT OF THE PATIENT WITH COPD

A Dissertation
Presented for the
Doctor of Education
Degree
The University of Tennessee, Knoxville

Ann Putnam Johnson

May 1989

Copyright © Ann Putnam Johnson, 1989

All rights reserved

DEDICATION

This work is lovingly dedicated to my husband M. L., whose support, encouragement, sacrifices, and prayers enabled me to complete this study. Thank you for helping me achieve my dream. No words can adequately express how much you mean to me. I love you.

ACKNOWLEDGEMENTS

The author wishes to express her sincere appreciation and gratitude to Dr. Jim Neutens, Dr. Jack Pursley, Dr. Bill Wallace, and Dr. Velma Pressly, who served on the doctoral committee.

Appreciation is expressed to the patients and staff of the 9 East Unit at The University of Tennessee Medical Center who shared knowledge and time so that this study could be completed.

Heart felt gratitude is also expressed to my husband M. L., my son Jeremi, my parents Buddy and Clovie Putnam, my sister Tracee', and my grandmother Bertha Cooke. Thank you for having faith in me, for being supportive, for always being there when I need you, and for your many prayers.

ABSTRACT

This study examined the relationship among disease related knowledge, multidimensional health locus of control, and the level of treatment compliance for patients with chronic obstructive pulmonary disease (COPD). The target population was hospitalized at the University of Tennessee Medical Center, Knoxville.

Thirty subjects were interviewed at the bedside by the researcher. Four sets of data were completed for each participant. Instruments utilized consisted of a disease related self-care knowledge test developed by the researcher, a survey questionnaire concerning comprehensive treatment compliance behavior developed by the researcher, the Multidimensional Health Locus of Control Scale (MHLC), and a demographic\COPD instruction data form. Each subject received a score on the knowledge test and compliance form and was assigned to one of three dimensions concerning health locus of control.

The data were analyzed using chi-square and Spearman rho. Percentages and frequencies were used for demographic and instructional data.

A significant relationship was found between the level of disease related knowledge and the level of compliance with treatment. No significant relationships were found between the level of disease related knowledge

and the MHLC, or the level of treatment compliance and the MHLC.

From these findings the following conclusions were drawn:

1. The MHLC dimension of internal, powerful others, or chance had no affect on the amount of COPD related knowledge possessed by patients. The variables are not significantly related. Therefore, identifying the patient's MHLC dimension will not aid in predicting the amount of disease related knowledge the individual will seek or retain. Moreover, changing the MHLC dimension will not result in increased COPD knowledge levels.
2. The amount of COPD knowledge held by these patients had a significant positive affect on the level of treatment compliance for these individuals. Therefore, education concerning COPD self-care will result in increased compliance with treatment.
3. The MHLC dimension of internal, powerful others, or chance had no affect on the level of treatment compliance for COPD patients. The two variables are not significantly related. Therefore, changing the MHLC dimension or structuring treatment regimens to encompass differing MHLC dimension characteristics will not result in increased treatment compliance levels.

TABLE OF CONTENTS

CHAPTER	Page
I. INTRODUCTION	1
Statement of the Problem	4
Research Questions	5
Need for the Study	5
Delimitations	7
Limitations	8
Basic Assumptions	8
Definition of Terms	8
Summary	9
II. REVIEW OF THE LITERATURE	11
Studies Related in Content	11
Studies Related in Method	24
Studies Related in Content and Method	26
Summary	27
III. METHODS AND PROCEDURES	28
Introduction	28
Overview	28
The Sample	29
Selection of the Sample	29
Instrumentation	30
Development of Instrument to Measure	
Knowledge	30
Pilot Study	31

Selection of Instrument to Measure	
Health Locus of Control	34
Compliance with Treatment Form	35
Demographic and COPD Instruction	
Data Form	36
Data Collection	36
Data Analysis	37
Organization of Data	37
Analysis of Data	37
Summary	38
IV. ANALYSIS AND INTERPRETATION OF DATA	39
Subjects	39
Instructional Data	42
Disease Knowledge, MHLIC, and Compliance	
Instruments Scores	42
Research Questions and Results	47
Interpretation of Data	51
Summary	53
V. SUMMARY, FINDINGS, CONCLUSIONS, AND	
RECOMMENDATIONS	55
Summary	55
Findings	56
Conclusions	57
Recommendations	58
LIST OF REFERENCES	59
APPENDIXES	66

APPENDIX A.	PANEL OF JURORS FOR COPD	
	RELATED KNOWLEDGE TEST	67
APPENDIX B.	COPD KNOWLEDGE TABLE OF	
	SPECIFICATIONS	68
APPENDIX C.	CHRONIC OBSTRUCTIVE PULMONARY	
	DISEASE RELATED KNOWLEDGE TEST	69
APPENDIX D.	COPD RELATED KNOWLEDGE TEST	
	ITEM ANALYSIS	76
APPENDIX E.	MULTIDIMENSIONAL HEALTH LOCUS	
	OF CONTROL FORM A	78
APPENDIX F.	MEASUREMENT OF COMPLIANCE WITH A	
	COMPREHENSIVE COPD TREATMENT	
	PROGRAM	79
APPENDIX G.	DEMOGRAPHIC AND COPD INSTRUCTION	
	DATA FORM	84
APPENDIX H.	INTRODUCTORY STATEMENT	86
APPENDIX I.	KNOWLEDGE, MHLA, AND COMPLIANCE	
	SCORES OF SUBJECTS	87
VITA		89

LIST OF TABLES

TABLE	PAGE
1. Age of Patient Sample by Sex	40
2. Level of Education	41
3. COPD Instruction Data	43
4. COPD Knowledge Level	44
5. Multidimensional Health Locus of Control	45
6. Compliance with Treatment	46
7. Chi-Square Test of Independence for COPD Knowledge Level and MHLC	49
8. Chi-Square Test of Independence for Compliance with Treatment Level and MHLC	52

CHAPTER I

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a leading health concern in the United States. Symptoms usually appear in the fifth to sixth decades of life. Therefore, it is more prevalent in the elderly population or those over the age of fifty. In 1970, the estimated prevalence of COPD was 13,870,000 cases in the United States, at a rate of 68.3 per 1000 individuals. there were 267,987 cases in Tennessee and 20,720 cases in Knox county. Knox county residents experiencing limitations of activity due to COPD numbered 8,685. (Hays, 1977) In 1979, Tennessee death rates for COPD were significantly higher for ages 45 to 64 than the nation's rates. In 1980, COPD was the fifth leading cause of death in Tennessee. (Harris, 1983) In 1984, COPD was the eleventh leading cause of years of potential life lost before age 65 in the United States and accounted for an estimated 4.7 million hospital days per year (CDC, 1986). The American Lung Association reports 450,000 new cases per year and the illness affects over 15 million Americans (DeVito, 1985).

Since COPD does not usually produce symptoms until the fifth or sixth decade of life, it predominantly

affects an age group who may already have decreased coping abilities and energy levels. Therefore, management of the illness can be difficult. (McDonald, 1982)

Chronic obstructive pulmonary disease is an umbrella term encompassing the conditions of chronic bronchitis, emphysema, and adult asthma. These conditions commonly co-exist, presenting similar signs and symptoms, and condition specific diagnosis is usually not possible. The most pronounced symptom of COPD is obstruction of airflow entering and leaving the lungs. This is due to increased mucus secretion, increased viscosity of secretions, narrowing of the bronchial airways, impaired gas exchange of oxygen and carbon dioxide, and loss of elasticity of the lungs. The lungs are in a state of chronic infection.

Individuals with COPD experience a frequent productive cough, dyspnea, shortness of breath, and recurring acute infections of the lower respiratory tract. Since the condition is chronic, it gradually worsens, with symptoms becoming more severe, and exacerbations of acute respiratory infection occurring more frequently. Also, when the lungs of the individual are unable to supply oxygen to the body cells, he\she tends to engage in less and less physical activity with recreational and social pursuits being the first relinquished. The result is usually isolation, loneliness, and sometimes depression. Another common effect of chronic obstructive pulmonary

disease is anorexia or loss of appetite. This results in poor nutritional status, weight loss, and possible dehydration.

The primary focus of the treatment program is to treat symptoms, slow progression of the disease, and assist the individual to maintain a quality lifestyle. The treatment program consists of medications, respiratory therapy, education, exercise, and nutrition. The individual must assume responsibility for following the treatment program.

The COPD education component provides the individual with knowledge concerning self-care of the illness including methods to deal with the excessive mucus production, narrowing of the bronchial airways, loss of lung elasticity, decreased mobility, alterations in nutritional status, and community support services available. However the education process can be impeded by cost limitations, time limitations, environmental limitations, and lack of support. Patient education is sometimes considered nonessential by health care institutions. (Lubkin, 1986) Moreover, education\rehabilitation programs vary in structure (formal\informal), length of instruction, content taught , and qualifications of the instructor(s).

Since COPD is a life-long illness, compliance with the prescribed treatment regimen is of extreme importance. The literature reveals that a myriad of elements affect

compliance behavior. In addition to the aforementioned knowledge component, another element is health locus of control which is a construct. Locus of control is concerned with an individual's perception of personal control (Lefcourt, 1982). Individuals with an internal locus of control believe they have influence over future events, while individuals with an external locus of control believe others influence future events. The health locus of control looks at future events in terms of health and illness outcomes and behaviors. (Lubkin, 1986) Therefore the health locus of control assesses an individual's belief concerning the power source that determines events related to his\her health. This construct has been used to study compliance behavior and disease related knowledge.

Statement of the Problem

The problem of the study was to determine the relationship among disease related knowledge, multidimensional health locus of control, and level of treatment compliance for COPD patients at U.T. Medical Center, Knoxville.

Research Questions

The problem revealed the following research questions:

1. What was the significant relationship between COPD disease related knowledge and the multidimensional health locus of control scale (MHLC)?
2. What was the association between the COPD disease related knowledge and the level of treatment compliance?
3. What was the significant relationship between the MHLC and the level of treatment compliance?

Need for the Study

With the advance of scientific knowledge, there has been a shift in the major cause of morbidity and mortality from acute\infectious disease to chronic disease. Treatment plans have become more and more complex and the patient is required to implement the plan in the home environment. The treatment goal is patient compliance with the plan of care. Chronic illness treatment plans usually involve total lifestyle changes. Therefore, patients exhibit various levels of compliance behavior. Studies concur that on an average, 1/3 to 1/2 of patients

are noncompliant in some regard to treatment plans.

(Lubkin, 1986)

Compliance behavior is reported to be affected by a variety of elements. Therefore research is important to test the relationship of these reported variables to compliance behavior. Only through research will the solutions be provided for assisting patients toward higher levels of compliance and therefore higher levels of wellness. Two variables associated with compliance behavior are knowledge and locus of control. Knowledge provides the patient with the ability to implement the treatment plan and locus of control reveals patient beliefs about personal control over health. In order to assist patients with compliance, health care professionals need to know the relationship of these two variables to compliance behavior.

Moreover, chronic obstructive pulmonary disease is a major health concern for adults in the United States. It affects approximately 1 out of 14 persons over the age of 45 and is surpassed only by heart disease in the number of people it affects in this age group (Patient Care, 1984). COPD affects 165.3 persons per 1000 in the 65 to 74 year age group, and 117 persons per 100 in the in the 75 year and older age group (U. S. Dept. of Health and Human Services, 1985). Since COPD occurs most often in the elderly, as the elderly population continues to increase,

the number of individuals with COPD is also likely to increase. Since active patient participation is required for symptom control and quality of life, health care professionals must assist these individuals toward higher levels of compliance. Efforts must be focused on the treatment variables that will provide the most benefit to the patient. This is especially true in view of the fact that health care costs continue to increase. In order to ascertain the most effective way(s) to assist with compliance, various elements identified as affecting compliance behavior must be researched.

Delimitations

The major delimitations of this study were as follows:

1. The study was delimited to the investigation of only two factors affecting chronic disease treatment compliance behavior (knowledge and health locus of control).
2. The individuals interviewed were delimited to COPD patients on 9 East at U.T. Medical Center, Knoxville, Tennessee.

Limitations

The following were identified as limitations.

1. The study was limited to individuals who were willing to participate in the investigation.
2. The incidental sampling technique might have influenced the study.

Basic Assumptions

For the purpose of this study, the following assumption was made.

1. Individuals who participated in the investigation answered questions truthfully and to the best of their ability.

Definition of Terms

For the purpose of this investigation, the following operational definitions were used:

1. Chronic Obstructive Pulmonary Disease (COPD) - The medical diagnosis of such and/or the medical diagnosis of chronic bronchitis, emphysema, or adult asthma.
2. Disease related knowledge - amount of overall knowledge concerning self-care for the illness of chronic obstructive pulmonary disease

3. Health locus of control - an individual's perceived degree of control over his\her health status.
4. Internal health locus of control - individuals that believe that they have influence over their health.
5. Powerful others health locus of control - individuals that believe that their health status is influenced mostly by others.
6. Chance health locus of control - individuals that believe that their health status is influenced mostly by chance.
7. Compliance with the treatment plan - degree (0 - 100) that the individual with COPD follows or adheres to a comprehensive plan of care for these individuals.

Summary

In order to better serve the health care needs of individuals with COPD by increasing their level of wellness, quality of life, and curtailing excessive health care costs, members of the health care team need to know where to focus efforts. By emphasizing factors that most influence the course of the illness and allow for greater levels of compliance, the health care team can be more effective in providing care for these individuals. The ultimate objective is to allow these individuals to enjoy the highest possible quality of life with chronic

obstructive pulmonary disease. This study gave some definite direction to the health care team based on scientific investigation as opposed to intuition or guess.

CHAPTER II

REVIEW OF THE LITERATURE

This review of the literature reported on research studies related to the investigation of chronic obstructive pulmonary disease (COPD), knowledge levels, health locus of control, and compliance. The chapter was divided into three sections organized as follows.

1) Studies Related in Content

This section included studies concerning the subject areas of chronic obstructive pulmonary disease (COPD), health locus of control, and compliance.

2) Studies Related in Method

This section discussed studies using interviews and/or surveys to investigate chronic illness.

3) Studies related in Content and Method

This section included pertinent studies investigating chronic obstructive pulmonary disease treatment compliance in relation to disease knowledge and health locus of control utilizing the survey method.

Studies Related in Content

Between 1966 and 1968, the University of Colorado Medical Center studied 182 patients in the hospital's

pulmonary rehabilitation program. Participants were followed over a 10 year period. Results of the study showed that: 1) pulmonary hospital days were significantly reduced, 2) symptom complex and lifestyle were improved, 3) anxiety, depression, and somatic concern were significantly reduced, and 4) the ability to walk was increased 2 1/2 fold. (Sahn, et al, 1980)

Haas and Cardon (1969), conducted a 5 year controlled study at New York University School of Medicine with 252 male patients having chronic obstructive pulmonary disease. The sample was divided into three groups: 1) full treatment on an outpatient basis, 2) full treatment on an inpatient basis, and 3) control group of 50 patients treated identically (routine treatment of symptoms) except for the rehabilitation measures. The full treatment program, including the rehabilitation measures, consisted of: 1) treatment of symptoms, 2) relaxation exercises, 3) postural drainage, 4) breathing retraining, and 5) reconditioning exercises. The study results demonstrated that: 1) rehabilitation measures combined with treatment of symptoms is more effective than treatment of symptoms alone, and 2) a significant number of COPD patients, with training, can return to employment or at least to self-care.

Intelligence test scores (IQ), and physiologic measures were investigated to determine relationship in

predicting vocational rehabilitation in individuals with chronic obstructive pulmonary disease. Retrospective analysis was performed on 52 patients. Results of the study showed that intelligence scores were able to predict vocational rehabilitation outcome with 83 percent accuracy. When forced expiratory volume and intelligence scores were combined as predictors, the accuracy rate rose to 90 percent. (Daughton, et al, 1979)

Unger and others (1980), investigated the selection of an exercise program for patients with chronic obstructive pulmonary disease. During a 12 month period, 30 patients participating in a pulmonary rehabilitation program were included in the study. Participants exercised at a predetermined level for 6 weeks at the rate of once a week on the treadmill and three times daily by walking. Results were that: 1) in 25 patients the predicted exercise level was within 1 mph of the treadmill speed the patient was able to maintain prior to the program for 10 minutes, 2) the exercise level was safe, 3) VO_2 (minute consumption of oxygen), V_E (minute ventilation), pulse, and respiratory rate measured during exercise decreased significantly from preprogram levels, and 4) the greater the preprogram VO_2 , the greater the postprogram exercise reduction in VO_2 .

Twenty patients diagnosed with chronic bronchitis and emphysema were studied in regard to the effectiveness of

the education component of a pulmonary rehabilitation program. The rehabilitation program was conducted at two facilities using a similar care approach and the investigator's teaching program. Subjects kept diaries recording specific information concerning symptoms, methods used to cope with symptoms, and treatments used including breathing exercises, mobility, general exercise, postural drainage, increased fluid intake, use of medications, rest, and contacting a physician. The diary was developed by the investigator. Diaries were kept by the subjects for a period of 4 weeks. The subjects then started and completed the rehabilitation program. After completion of the program, the subjects kept diaries for eight weeks. Diaries were then collected and responses tabulated. Results showed significant increases in knowledge and skills. (Perry, 1981)

DeBebout, and others (1983), conducted a retrospective study to examine the effects of a pulmonary rehabilitation program at Loma Linda University Medical Center. Data of 75 patients who participated in the program were reviewed. A questionnaire administered to subjects prior to the program and again two years later revealed that most of the responding patients (43) felt that the quality of their life had improved as a result of the program.

Sitzman's study in 1983 on the use of biofeedback by 4 individuals with chronic obstructive pulmonary disease included a 4 week training program with meetings held three times a week and again one month following the program. The results of the study indicated that biofeedback could be helpful for some individuals with chronic obstructive pulmonary disease by assisting them to voluntarily reduce respiratory rate. Moreover, the effects of the training carried over to the baseline session held one month after the training program.

Openbrier (et al, 1983) compared nutritional status of patients with emphysema and chronic bronchitis, the relationship was examined between lung dysfunction and nutritional depletion. Seventy-seven subjects with emphysema and 30 with chronic bronchitis were studied. Results of the study showed no evidence of nutritional depletion in individuals with chronic bronchitis. However, individuals with emphysema were somatically depleted. These individuals exhibited significantly lower values for percent ideal body weight, arm muscle circumference, and triceps skin fold thickness. The results suggest that nutritional depletion contributes to lung dysfunction in emphysema.

Kinsman and others (1983), studied individuals with chronic bronchitis and asthma. An investigator developed instrument called the Bronchitis Emphysema Symptom

Checklist, was used to obtain data from 146 patients. Based on the reported frequency of physical symptoms, such as dyspnea, fatigue, and alienation, normative values were derived. Symptoms found in decreasing order of frequency were dyspnea, fatigue, sleep disturbance, congestion, irritability, anxiety, decathexis, helplessness and hopelessness, poor memory, and alienation.

In 1983, Wright and others studied the effects of pulmonary rehabilitation for patients with chronic obstructive pulmonary disease. The program consisted of outpatient education and aerobic exercise. Using a questionnaire, data were collected from 57 patients concerning symptoms, changes in exercise capacity, and days of hospitalization. A stress test administered before and after the program was used to measure objective increases in exercise tolerance. Findings of the study demonstrated significant improvement in physiological and symptomatic measurements, increases in exercise tolerance, and the number of days of hospitalization decreased.

Hunter and others (1984), investigated the nutritional status of patients with chronic obstructive pulmonary disease. The sample consisted of 73 individuals randomly selected from hospital admissions. Thirty-eight individuals agreed to participate in the study and thirty-five refused. As a result, 33 men and 5 women were studied. Nutritional status was assessed using dietary

intake, anthropometric measurements, biochemical analysis, and immunologic testing. Findings of the study were as follows. Nutrient intake of individuals with chronic obstructive pulmonary disease was significantly greater than or comparable to the RDA for all nutrients analyzed. Anthropometric measurements indicated that the morphologic root of weight loss for individuals with COPD is subcutaneous fat stores and lean body mass. The study conclusion was that the marasmic type of protein-calorie malnutrition is a common finding among individuals with chronic obstructive pulmonary disease.

Four strategies for locating individuals with chronic obstructive airway disease were compared. The strategies were: 1) search of hospital discharge records, 2) referral by physicians, 3) advertising, and 4) a mailed respiratory symptom questionnaire. The results showed that hospital discharge records accounted for 7 percent, physician referral for 27 percent, advertising campaign for 22 percent, and the mailed questionnaire for 44 percent of the resulting confirmed cases. The mailed questionnaire located the greatest number of cases not previously diagnosed. Physician referral was the least expensive strategy. A total of 923 persons were confirmed as having chronic obstructive airway disease. (Barlow, et al, 1984)

Howard, Davies, and Roughman (1987), observed the effectiveness of respiratory teaching for individuals with

chronic obstructive pulmonary disease. The sample consisted of 115 patients hospitalized at a Veterans' Administration hospital in New York . The respiratory teaching program consisted of a one hour class meeting three times a week. A pre-test post-test design was used. A control group was not used nor were the subjects randomly assigned to the study. Data collected included demographic data and response to the teaching. Analyses of the data were performed using the Statistical Package for the Social Sciences. Results of the study showed that clients who received teaching required fewer admissions to the hospital.

Various studies have been conducted utilizing the health locus of control scale. This scale was developed by Wallston and others in 1976 for prediction of health related behavior. Using a 6 point Likert-type scale, an item pool of 34 items written as face-valid measures of generalized expectancies regarding locus of control related to health were developed. The instrument was administered to 98 college students in a small southern university. An item analysis was run and items were selected using the criteria of: 1) item mean close to the midpoint, 2) wide distribution of response alternatives to the item, 3) significant item to scale correlation, and 4) low correlation with the Marlowe-Crowne Social Desirability Scale (so as not to reflect a social

desirability bias). From the original item pool of 35, 11 items were chosen for inclusion in the final scale. The instrument has a potential score range of 11 to 66 points. Alpha reliability of the final scale was .72.

Wallston and others (1976), tested the proposition that individuals with an internal health locus of control who also highly valued health, would seek more information about hypertension in a role playing situation than internals who valued health less, or externals regardless of the value placed on health. Using the Health Locus of Control scale and the Health Value scale, 88 subjects were tested. Results were consistent with the hypotheses at $p < .04$.

In another study by Wallston and others (1976), the health locus of control was utilized in regard to the study of weight reduction. The sample consisted of 22 overweight women. Subjects were matched on the Health Locus of Control scale scores and randomly assigned to either a self-directed weight reduction program (internal) or a group program (external). The two programs were 8 weeks in length. Results of the study showed that externals lost more weight in the group program as compared to the self-program, and internals lost more weight in the self-program as compared to the group program.

Finlayson and Rourke (1978), examined locus of control as a predictor in rehabilitation medicine. Treatment motivation and treatment success of hemiplegic individuals were studied. Results of the study showed that internals correlated significantly with motivation. However, results of the analysis relating perceived locus of control and treatment success approached, but did not reach acceptable levels of significance.

To further explore the possibility that more than one dimension of locus of control was represented in the original scale, further data analyses were undertaken by Wallston and others in 1979. The result was the development of the Multidimensional Health Locus of Control (MHCL) instrument. A new item pool was constructed to reflect the belief that the source of reinforcement for health related behavior is primarily one of three modes: 1) internal, 2) powerful others, or 3) chance. Using the Dale-Chall formula, the reading level of the items was at the fifth to sixth grade level. The item pool consisted of 81 items with 25 being internal, 30 related to powerful others, and 26 chance mode worded. The instrument was tested using individuals at an airport over 16 years of age. To develop the final instrument, 115 returned tests were used. Separate item analyses were run. To select items for the new MHLC instrument, the same criteria as cited in the previous study was used with

the addition of the criteria, item wording. For each dimension (internal, powerful others, chance) a form A and B was developed (equivalent forms). Alpha reliabilities for scale A (6 item single form) ranged from .673 to .767. When forms A and B were combined, (12 item form), the alpha reliabilities were .830 to .859.

Many studies have been conducted concerning the subject of compliance. In chronic illness, individuals must follow a prescribed treatment program for the duration of life. The level of compliance with the treatment program affects the disease process and progress, exacerbation of the disease, and overall life of the individual. Therefore a better understanding of compliance behavior is needed by health science professionals. Since compliance is multifaceted and affected by more than one variable, various aspects of compliance behavior have been studied.

Davis and Eichhorn (1963), studied compliance and health attitudes. Findings of the study were that positive health attitudes tend to increase compliance as compared to negative health attitudes.

Davis (1968) investigated the following sets of variables in regard to patient compliance: 1) demographic characteristics, 2) selected physical aspects of the illness, and 3) psychological traits of the individual. The sample consisted of 154 new patients seen by

physicians. Tape recordings of the interactions were obtained for a period of 8 months. Patients were also interviewed and physicians received questionnaires at various periods during the 8 months. Medical records were also analyzed. Study results showed that although 77 percent of the study group expressed a willingness to comply only 63 percent exhibited compliant behavior. Also, the more an illness affected aspects of an individual's daily activities, the less likely the individual was to comply. Lastly, patients characterized as cooperative, responsive, grateful, intelligent, articulate, and formal were more likely to comply.

In one review of the literature concerning compliance research, Marshton (1970) revealed that an individual's knowledge of illness and treatment did not seem to increase compliance. Other variables showing little or no association with compliance behavior were age, sex, race, marital status, socioeconomic level, and education level. Some significant factors found to indicate support of compliance behavior were patient satisfaction with care received and previous patient-physician interaction.

Vincent (1971) examined and analyzed variations in compliant behavior. The study sample consisted of 62 individuals under medical care for glaucoma on an outpatient basis. The data were collected by patient interviews conducted in the clinic. Data were gathered in

relation to whether the individual used the medication as prescribed. Demographic data was also collected. The data was analyzed and major findings were that: 1) noncompliance seemed to increase with age, 2) males without a partner reported more noncompliant behavior, 3) knowing about the action of the medication did not affect compliance behavior, 4) use of more than one medication per day seemed to increase compliance, 5) whites were more likely to comply, and 6) formal school education did not seem to affect compliance or noncompliance.

In another summary of compliance research, one-third of all studies reported a fifty percent or greater degree of noncompliance. This degree of compliance most often was determined by questionnaires. (Gillium & Barsky, 1974)

Becker and others (1978) studied compliance behavior with a medical regimen for asthma. A total of 111 mothers of asthmatic children were studied. Mothers were interviewed concerning their health motivation and attitude, views about various aspects of asthma, and the consequences of asthma. A covert evaluation was made by blood analysis of the children for level of the treatment medication. When mothers' reports of medication administration was compared to the blood medication levels of their child, a correlation of .913 was obtained.

Studies Related in Method

Lowery and Ducette (1976) conducted a survey to study the relationship among locus of control, individual difference, and response to diabetes. The sample included 84 diabetics ranging in age from 25 to 65 years. Subjects completed the Rotter Locus of Control Scale and a knowledge test concerning diabetes developed for the study. The knowledge test consisted of 48 true-false items. Results of the study were that internal diabetics had more diabetic information than external diabetics. However as the disease progressed, internals seemed to have more problems with the disease than externals.

Lewis and others (1978) studied the effects of the health locus of control on compliance behavior for patients with hypertension. The survey was conducted by one of two methods: 1) personal interview, or 2) telephone interview. Data were collected concerning health locus of control, health value, medication taking compliance, and assistance from significant others. There were 318 subjects in the investigation. Results of the study showed a significant two-way interaction between the perceived level of assistance from significant others and the health locus of control. The more internally oriented the individual, and the higher the level of perceived

assistance from others, the greater the level of self-reported compliance behavior.

Given and others (1978) conducted a study on individuals with hypertension concerning the association among patient's knowledge of medication, side effects and benefits, and compliance with the medication regimen. The sample consisted of 88 patients interviewed by telephone at the beginning of the medication regimen and 5 months later. Medical records were also reviewed. Results of the study were that knowledge and perceptions concerning medication benefits were significantly correlated with compliance. Moreover while knowledge had a greater correlation with compliance at the beginning of the medication regimen, perception of benefits had a greater association with compliance at the end of the study.

Scieszinski (1984) studied dietary compliance behavior of 48 subjects following discharge from the Galesburg Cottage Hospital. Factors identified in the study were age, education level, specific illness, time of the diet instruction, and cost of the diet. A survey instrument was developed by the researcher and the data were gathered via telephone interviews. Study findings revealed that no significant relationship existed between dietary compliance and the variables of age, time of dietary instruction, or cost of the diet. Subjects prescribed a diabetic or high fiber diet had a higher

percentage of noncompliance and subjects prescribed a bland or low cholesterol had a higher percentage of compliance.

Miller (1986) studied the relationship between disease related knowledge, the multidimensional health locus of control, and level of disease control for individuals with diabetes. Interviews were conducted and data collected from 17 individuals. The data were analyzed using t-tests and Pearson product moment correlation. Results revealed that: 1) disease related knowledge did not affect level of disease control, 2) no significant relationship existed between disease related knowledge and the health locus of control, and 3) no significant relationship was found between the level of disease control and the health locus of control.

Studies Related in Content and Method

Although the literature was extensively searched, the researcher could find no studies related in content and method. However as this review of the literature has shown, the content area of chronic obstructive pulmonary disease, and the variables of knowledge level concerning illness, health locus of control, and compliance have been researched. Moreover, the survey method has been utilized frequently to study other chronic illnesses.

Summary

This literature review has examined previous studies relevant to the subject area and variables of this investigation. As evidenced by this review, numerous studies have been conducted to investigate chronic obstructive pulmonary disease, knowledge level and education concerning illness, health locus of control, and compliance with treatment. Although no studies investigating COPD compliance with treatment, examining the combined variables of disease related knowledge, and health locus of control, by survey method could be found, several relevant and similar studies were discussed in the section on 'studies related in method'. The fact that no studies investigating COPD compliance with treatment using the combined variables of disease related knowledge and health locus of control were found and the fact that the variables, singularly and in various combinations, had been used to investigate other chronic illnesses, seemed to add support to the need for this study and further justified its completion.

CHAPTER III

METHODS AND PROCEDURES

Introduction

The format of the chapter was as follows: a) overview, b) selection of the sample to be studied, c) procedures for selecting and constructing the instruments used, d) the pilot study, e) collection of the data, and f) organization and analysis of the data.

Overview

The problem for this study was to analyze the relationship among the disease related knowledge, multidimensional health locus of control, and the level of treatment compliance for patients with COPD at UT Medical Center, Knoxville. An attempt was made to address the following questions:

1. What was the significant relationship between the COPD related knowledge and the multidimensional health locus of control scale (MHLC)?
2. What was the association between the COPD related knowledge and the level of treatment compliance?

3. What was the significant relationship between the MHLC and the level of treatment compliance?

The Sample

The study sample consisted of individuals in Knox county, Tennessee with the medical diagnosis of chronic obstructive pulmonary disease who were hospitalized on the 9 East respiratory unit at The University of Tennessee Medical Center, Knoxville. The University of Tennessee Medical Center (UTMC), located in Knoxville, is a 602 bed major center for health sciences. Patients at the facility represent various economic levels as evidenced by the fact that 42 percent had private insurance, 35 percent had medicare coverage, 10 percent had medicaid coverage, 8.7 percent self-pay (indigent), and 3.8 percent had coverage under other programs such as vocational rehabilitation.

Selection of the Sample

All of the eligible subjects who were willing to participate in the study were utilized. A sample size of 30 was obtained during the period from July 6 to June 20, 1988. Incidental sampling is often used in clinical research. Moreover, incidental sampling is most frequently used in clinical nursing research. This

sampling technique involves taking all the sampling units falling within the area being examined in the time allotted for data collection. The assumption was that there was no reason to believe that patients during this time period would be any different from patients with the same disease in another time period. (Diers, 1979) Often there are no options to accidental sample selection (Williamson, 1981).

Instrumentation

The instruments used in this study were: 1) Disease Related Knowledge Test, 2) The Multidimensional Health Locus of Control Scale, and 3) Compliance with Treatment Form. A data collection sheet was also formulated to collect information concerning demographic data and chronic obstructive pulmonary disease education information.

Development of Instrument to Measure Knowledge

A review of the literature revealed no specific test to measure disease related knowledge for individuals with chronic obstructive pulmonary disease. A test was then developed by the researcher for the purpose of this investigation and judged by a panel of jurors (Appendix A).

The literature was extensively perused to ascertain the content area for these individuals (American Hospital Association, 1982; Brunner & Suddarth, 1984; Hudson & Pierson, 1981; Sexton, 1981; Wirginis, 1981). A table of specifications (Appendix B) was then developed listing the major general content areas of: 1) respiratory irritants, 2) preventing acute bronchial infections, 3) reducing pulmonary secretions, 4) maintaining pulmonary ventilation, and 5) proper breathing techniques. A test of 25 true/false questions (approximately 5 per content area) was developed. The response of 'Do Not Know' was added to help decrease the incidence of guessing. However this response was scored as incorrect. Each correct answer was worth one point, therefore, there were 25 possible points on the test. After the correct number of responses were summed, the score was converted to a percent correct score, based on 100 percent. A copy of the Knowledge Test for Self-Care for Chronic Obstructive Pulmonary Disease was included in Appendix C.

Pilot Study

The instruments to measure chronic obstructive pulmonary disease related knowledge and compliance with treatment, along with the demographic\COPD instruction data form were pilot tested during June and July 1988. Utilizing bedside interviews, the instruments were

administered to 16 COPD patients on the 9 East Respiratory Unit at UPMC. Following administration of the disease related knowledge test, the Kuder-Richardson α_1 was utilized to analyze reliability. The Kuder-Richardson α_1 provides a measure of internal consistency using test-item statistics. The formula is for use with dichotomously scored test items. (Ferguson, 1981)

The Kuder-Richardson α_1 formula used was as follows:

$$KR_{\alpha_1} = \frac{k}{k-1} \frac{(1 - m(k-m))}{ks^2}$$

where:

k = number of test points

m = mean

s = standard deviation

The Kuder Richardson α_1 revealed a reliability of .79.

Instrument reliability for data used in group description should be .70 or higher (Larson, et al, 1953).

Individuals participating in the pilot study were excluded from further participation in the study.

An item analysis examining item difficulty and discriminating power for the COPD Related Knowledge Test was also performed. The scored tests were arranged in rank order from high to low. The tests were then separated into two subgroups consisting of an upper group (approximately 33% of the total group) and a lower group (approximately 33% of the total group). For each test

item, the number of subjects in each group who answered correctly was ascertained. The difficulty index was defined as the percentage of subjects who answered the item correctly. Therefore the larger the index value, the easier the item. The formula to determine item difficulty was:

$$\frac{R}{T} \times 100 = \text{Item Difficulty}$$

where:

R = number of subjects who got item correct

T = total subjects who tried the item

Positive discriminating power of an item indicated that the item was discriminating in the same direction as the total test score. The formula used to determine discriminating power was:

$$\frac{R_u - R_l}{1/2 T} = \text{Discriminating Power}$$

where:

R_u = number of subjects in the upper group who got item correct

R_l = number of subjects in the lower group who got item correct

T = total number taking test

(Ebel & Frisbie, 1986; Gronland, 1985)

This information was provided in Appendix D.

Selection of Instrument to Measure Health Locus of Control

A review of the literature revealed a variety of instruments to measure locus of control. The Multidimensional Health Locus of Control (MHLC) was chosen because of its focus on health related behavior. Using a 6-point Likert-type format, this 18 item instrument reflects the beliefs that the source of reinforcement for health related behaviors is primarily one of three modes: 1) internal, 2) powerful others, or 3) chance. Responses range from "Strongly Disagree" with a point value of one to "Strongly Agree" with a point value of six. Items designed to identify internal orientation are 1, 6, 8, 12, 13, and 17. Powerful other orientation is identified by items 3, 5, 7, 10, 14, and 18. Chance orientation is identified by items 2, 4, 9, 11, 15, and 16. The reading level is at the fifth to sixth grade. The instrument was tested using 125 individuals over 16 years of age. Alpha reliabilities for the instrument were .673 to .767. (Wallston, et al, 1978) Following administration of the instrument to the subjects, a total score was summed for each domain (orientation). The domain receiving the most points was labeled the dominant domain. A copy of the Multidimensional Health Locus of Control Instrument was included in Appendix E.

Compliance With Treatment Form

A literature search revealed that the general comprehensive treatment plan for an individual with COPD consisted of the following elements: 1) medication(s) and maintaining pulmonary ventilation, 2) avoiding respiratory irritants, 3) avoiding acute respiratory infection, 4) maintaining nutrition, and 5) reducing secretions in lungs. (Brunner & Suddarth, 1984; De Vito, 1985; Hudson, 1984; Lertzman & Cherniack, 1976; McDonald, 1981; McDonald & Hudson, 1982; Sexton, 1981). A survey type questionnaire instrument was developed to ascertain each individual's degree of compliance with a comprehensive treatment plan for chronic obstructive pulmonary disease. The maximum degree of compliance based on the form was 100 percent. The instrument contained 23 questions. The behaviors most important to disease control (not smoking and taking medications as prescribed) were given a score of 10 points each for a correct answer. Other questions reflecting compliance were worth a maximum of 5 points each. Questions ascertaining behaviors not conducive with disease control were scored on a descending scale (3, 2, 1, 0, -1) in relation to affect on the disease process. Upon completion of the test, the points received were summed to a total score. A copy of the Compliance With Treatment Form was included in Appendix F.

Demographic and COPD Instruction Data Form

A form to collect demographic data and information concerning instruction received for self-care of chronic obstructive pulmonary disease was developed. Demographic data collected included sex, age, and educational level. Data were also collected concerning where the most instruction concerning caring for chronic obstructive pulmonary disease was obtained and how the quality of instruction content received was rated by the individual. A copy of the Demographic and COPD Instruction Data Form was included in Appendix G.

Data Collection

A Disease Related Knowledge Test, Multidimensional Health Locus of Control Scale, Compliance With Treatment Form, and Demographic\Education Form was completed for each study participant during July through October 1988. Each participant was interviewed by the researcher at the bedside on the 9 East Respiratory Unit at UPMC. A written protocol (introductory statement) was used for each interview. A copy of the protocol was included in Appendix H.

Data Analysis

Organization of Data

Following administration of the Multidimensional Health Locus of Control instrument, the scales were hand scored and each participant was assigned a score for each dimension: internal, chance, or powerful others, and the dominant dimension was identified.

The Self-Care Knowledge Test was hand scored for each individual, by the researcher. Each participant was assigned a correct score which was converted into a percentage correct score (100% possible).

The Compliance With Treatment Form for each individual was hand scored by the researcher and given a score from 0 to 100 points. A list was then constructed registering each subject's COPD knowledge level score, dominant MHLC, and compliance with treatment score. These data were included in Appendix I.

Analysis of Data

To determine the relationship between COPD related knowledge and multidimensional health locus of control, a chi-square test of independence was utilized with a significance level of .05. This nonparametric test questioned whether the variables were independent of one another or if an association existed. (Ferguson, 1981)

To determine the relationship between COPD related knowledge and the level of treatment compliance the Spearman's rho was employed. This test was designed for nonparametric ranked data (Robinson & Neutens, 1987). The Disease Related Knowledge Test scores and the Compliance With Treatment Form scores were ranked according to total test results.

To determine the relationship between the multidimensional health locus of control dimension and the level of treatment compliance, the chi-square test of independence was used at the .05 level of significance.

Summary

The purpose of this chapter was to give the reader a detailed description of the procedures used in the selection and development of the instruments used in this investigation. The chapter also presented the reader a detailed description of the sample population and procedures used in selecting the sample. Also described in the chapter was the pilot study, actual study, and statistical treatment of the data.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

The purpose of this chapter was to present an analysis of the collected data. The chapter was divided into four sections. The first section presented subject data. The second section presented instructional data. The third section presented the research questions and results and the fourth section presented interpretation of the data.

Subjects

Data were collected from a total of 30 patients at the University of Tennessee Medical Center, Knoxville. There were 13 males and 17 females in the sample. Subjects age range was from 28 years to 90 years, with a mean age of 63 years (Table 1). With regard to race, 29 subjects were white and 1 was non-white. Years of formal education ranged from sixth grade or less to more than a bachelor's degree (Table 2).

Table 1

Age of Patient Sample by Sex

Age Range	Combined Sexes		Males		Females	
	Number	%	Number	%	Number	%
20-29	1	3.3	1	7.7	0	0.0
30-39	1	3.3	0	0.0	1	5.9
40-49	3	10.0	1	7.7	2	11.8
50-59	6	20.0	2	15.4	4	23.5
60-69	9	30.0	5	38.5	4	23.5
70-79	6	20.0	3	23.1	3	17.6
80-89	3	10.0	0	0.0	3	17.6
90-99	1	3.3	1	7.7	0	0.0
Total	30	100	13	100	17	100

Average age = 63 years

Table 2

Level of Education

Formal Education	Number	%
6th grade or <	5	16.7
9th grade or <	6	20
12 grade or <	6	20
High school graduate	5	16.7
Some college	5	16.7
Bachelors degree	2	6.7
More than bachelors degree	1	3.3
Total	30	100

Instructional Data

The majority of the subjects, 23, identified a medical doctor (M.D.) as the individual providing the most information concerning COPD self-care. Three of the subjects identified a nurse as providing the most information. Four of the subjects utilized the category of other, with two identifying self, one identifying a respiratory therapist (R.T.), and one identifying an aerobic instructor (A.I.). Twenty-three of the subjects rated the quality of instruction they received concerning caring for their COPD as excellent, four rated it as good, one rated it as average, and one rated it as poor. These data are presented in Table 3.

Disease Knowledge, MHLC, and Compliance Instruments Scores

COPD knowledge level scores ranged from 36 to 100 percent with a mean of 77.73 (Table 4). In regard to the multidimensional health locus of control (MHLC), 9 subjects were identified as internal, 16 as powerful others, as 5 as being mostly influenced by chance. These data are presented in Table 5. Level of treatment compliance scores ranged from 54 to 98 points with a mean of 76.87 (Table 6).

Table 3

COPD Instruction Data

Informant	Number	Quality of Instruction				
		Excellent	Good	Average	Fair	Poor
M.D.	23	17	3	1	1	1
Nurse	3	2	1	0	0	0
R.T.	1	1	0	0	0	0
A.I.	1	1	0	0	0	0
Self	2	2	0	0	0	0
Total	30	23	4	1	1	1

Table 4

COPD Knowledge Level

Score range	Number	Percent
30-39	1	3.3
40-49	1	3.3
50-59	2	6.7
60-69	5	16.7
70-79	2	6.7
80-89	12	40.0
90-99	5	16.7
100	2	6.7
Total	30	100

Average score = 77.73 percent

Table 5

Multidimensional Health Locus of Control

Domain	Number	Percent
Internal	10	33.3
Powerful others	15	50.0
Chance	5	16.7
Total	30	100

Table 6

Compliance with Treatment

Score	Number	Percent
50-59	1	3.3
60-69	6	20.0
70-79	11	36.7
80-89	8	26.7
90-99	4	13.3
100	0	00.0
Total	30	100

Average score = 76.87 points

Research Questions and Results

The research questions to be addressed were as follows:

1. What was the significant relationship between the COPD related knowledge and the multidimensional health locus of control (MHLC)?
2. What was the association between the COPD related knowledge and the level of compliance with treatment?
3. What was the significant relationship between the MHLC and the level of treatment compliance?

To test for the relationship between the COPD related knowledge and the MHLC, the 3X3 chi-square test of independence at the .05 level of significance was utilized. This nonparametric statistical technique is based on the relationship between the observed number of subjects in a category and the expected number. With clinical data, group differences are often more important than mean differences. In order to be clinically meaningful to patient care, the relationship between nominal categories is often utilized to show group differences. Therefore, the chi-square is the test of choice. (Munro, et al., 1986) Until recently it was expected that each cell have an expected frequency of at least 5, but this requirement has been demonstrated not to be necessary (Burns & Grove, 1987). According to Shelley

(1984), expected cell frequency can never be zero and expected cell frequency of less than one can never occur in more than 20 percent of the cells.

The chi-square formula is:

$$x^2 = \frac{\text{the sum of } (fo - fe)^2}{fe}$$

where:

fo = frequency observed

fe = frequency expected

A 3X3 contingency table was constructed based on the following criteria. The COPD related knowledge results were converted into percentage correct scores and divided into three groups: 1) 80% to 100% (above average to excellent), 2) 60% to 79% (below average to average), and 3) 0% to 59% (unsatisfactory). The MHLC results were divided into three groups based on the dominant score: 1) internal, 2) powerful others, or 3) chance. Based on the analysis with 4 degrees of freedom, x^2 was equal to 3.357. The chi-square was not significant. Therefore, it was concluded that there was no significant relationship between the level of COPD related knowledge and the MHLC. These data are presented in Table 7.

To test for the association between COPD related knowledge and the level of treatment compliance, the Spearman rho formula at the .05 level of significance was used. This test was utilized to compare the rankings of

TABLE 7

Chi-Square Test of Independence for
COPD Knowledge Level and MHLC

MHLC	COPD Knowledge Level		
	80-100	60-79	0-59
I	6	2	1
P	11	4	1
C	2	1	2

df = 4

alpha level = .05

Calculated chi-square value = 3.357

Critical chi-square value = 9.488

p < .05

the two groups. The Spearman rho is a nonparametric correlational test for use with ordinal data (Seaman, 1987). The knowledge scores and treatment compliance scores were ranked from lowest to highest. Rho was calculated, based on the differences in scores for each subject.

$$\rho = 1 - \frac{6 \times \text{the sum of } D^2}{N(N^2 - 1)}$$

where:

D = difference score between the ranking of a score on variable x and the ranking of a score on variable y

N = number of subjects

The calculated rho equaled .4303 with 28 degrees of freedom (N -2) and the critical rho value was equal to .306. Therefore the correlation was significant at the .05 level. It was concluded that there was a significant relationship between the COPD related knowledge and the level of treatment compliance.

To test for the relationship between the MHLC and the level of treatment compliance, the 3X3 chi-square test of independence at the .05 level of significance was used. A 3X3 contingency table was constructed based on the following criteria. The compliance with treatment scores were divided into three groups: 1) 85% to 100% (high degree of compliance), 2) 70% to 84% (moderate degree of compliance) and 3) 0% to 69% (low degree of compliance).

The MHLC results were divided into 3 groups based on the dominant score: 1) internal, 2) powerful others, or 3) chance. The analysis revealed a calculated χ^2 value of 1.58 with 4 degrees of freedom. The chi-square was not significant. Therefore, it was concluded that there was no significant relationship between the MHLC and level of treatment compliance for patients with COPD. These data are presented in Table 8.

Interpretation of Data

Based on the statistical results, the data were interpreted as follows. The MHLC domain did not influence the amount of COPD related knowledge for these subjects. Being identified as internal, powerful others, or chance did not affect the amount of subject knowledge concerning disease control. There was a significant positive association between the amount of COPD related knowledge and the level of treatment compliance. As the level of knowledge increased, the level of treatment compliance increased. Lastly, there was no difference in the amount of treatment compliance among subjects identified as internals, powerful others, or chance. The MHLC domain did not affect the amount of treatment compliance.

TABLE 8

Chi-Square Test of Independence for Compliance
with Treatment Level and MHLC

MHLC	Compliance Level		
	85-100	70-84	0-69
I	1	5	3
P	4	9	3
C	1	3	1

df = 4

alpha level = .05

Calculated chi-square value = 1.58

Critical chi-square value = 9.49

p < .05

These data held important implications for health care delivery. Since increased COPD related knowledge resulted in an increased level of treatment compliance, health education in regard to disease control can positively impact upon the quality of life for these individuals. Therefore, emphasis should be placed on providing patient instruction. Health care professionals and institutions must accept responsibility for providing this instruction. Hospitals caring for these individuals should develop formal education programs and health care professionals should incorporate self-care instruction into the plan of care. These data also supported the importance of the health education discipline.

Since the patient's MHLC dimension did not significantly affect the amount of COPD related knowledge or the level of treatment compliance, this variable should not be addressed in the plan of care. Considering time and economical constraints associated with the delivery of health care, it is not cost effective or beneficial to devote time and energy to variables not significantly associated with improving treatment compliance.

Summary

This chapter presented the data, data analysis, and major findings derived from the study. Use of the chi-

square revealed no significant relationship between the COPD related knowledge and MHLC, nor the level of treatment compliance and the MHLC for patients with COPD. Use of the Spearman rho formula revealed an association between the COPD related knowledge and the level of treatment compliance for these individuals.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The problem for this study was to analyze the relationship among disease related knowledge, multidimensional health locus of control (MHLC), and the level of treatment compliance for patients with COPD at The University of Tennessee Medical Center, Knoxville. Specifically, the study sought to answer the following questions:

1. What was the significant relationship between the COPD related knowledge and the MHLC?
2. What was the association between the COPD related knowledge and the level of treatment compliance?
3. What was the significant relationship between the MHLC and the level of treatment compliance?

A preliminary trial of research measures and techniques was conducted on the sample population. Sixteen subjects participated in the study. A total of 30 subjects participated in the final study. Three research instruments were used: 1) Chronic Obstructive Pulmonary Disease (COPD) Related Knowledge Test, 2) Compliance with Treatment, and 3) Multidimensional Health Locus of Control

Scale (MHLC). A form was also utilized to collect demographic data and information concerning instruction received for self-care of COPD. The instruments were administered to the subjects, individually, via questionnaire-personal-interview technique.

The data obtained were compiled and analyzed. To test relationship between the COPD related knowledge and the MHLC, the chi-square test of independence was used. To assess association between the COPD related knowledge and the level of treatment compliance, the Spearman Rank-Difference Correlation (ρ) was used. To test for relationship between the MHLC and the level of treatment compliance, the chi-square test of independence was employed. For all analyses, the significance level of .05 was used to determine statistical difference.

Findings

The tests of the three research questions produced the following findings:

1. There was no significant relationship demonstrated between the COPD related knowledge and the MHLC.
2. There was a significant association between the COPD related knowledge and the level of treatment compliance.

3. There was no significant relationship between the MHLC and the level of treatment compliance.

Conclusions

Based on the findings of this study, the following conclusions were formulated:

1. The MHLC dimension of internal, powerful others, or chance had no affect on the amount of COPD related knowledge possessed by patients. The variables of MHLC and COPD related knowledge are not significantly related. Therefore, identifying the patient's MHLC dimension will not aid in predicting the amount of disease related knowledge the individual will seek or retain. Moreover, changing the MHLC dimension will not result in increased COPD knowledge levels.
2. The amount of COPD related knowledge held by these patients had a significant positive affect on the level of treatment compliance for these patients. Therefore, education concerning COPD self-care will result in increased compliance with treatment.
3. The MHLC dimension of internal, powerful others, or chance had no affect on the level of treatment compliance for COPD patients. The two variables are not significantly related. Therefore, changing

the MHLC dimension or structuring the treatment regimen to encompass differing MHLC dimension characteristics will not result in increased treatment compliance levels.

Recommendations

Based on the data produced by the study, the following recommendations were made:

1. The study should be replicated in a different geographic setting.
2. Further study into patients' reasons for failure to comply with treatment regimens should be conducted.
3. Patients with the medical diagnosis of COPD should receive instruction from health care providers concerning self-care of the illness.
4. Health care providers should accept responsibility for educating patients with COPD about self-care.
5. Hospitals caring for patients with COPD should develop formal education programs to instruct these individuals in self-care.

LIST OF REFERENCES

LIST OF REFERENCES

- American Hospital Association. (1982). Staff manual for teaching patients about chronic obstructive pulmonary disease. Chicago: Author.
- Barlow, P., Nelson, E., Howland, J., Meier, F., Brooks, A., Brent, P., Parker, M., & Secker-Walker, R. (1984). Locating community residents with chronic airway obstruction. American Review of Respiratory Diseases, 129, 361-365.
- Becker, M., Radius, S., Rosenstock, I., Drachman, R., Schubert, C., & Teets, K. (1978). Compliance with a medical regimen for asthma: a test of the health belief model. Public Health Reports, 93, 268-277.
- Brunner, L. & Suddarth, D. (1984). Textbook of medical-surgical nursing (5th ed.). New York: J. B. Lippincott Company.
- Burns, N., & Grove, S. K. (1987). The practice of nursing research. Philadelphia: W. B. Saunders Company.
- Daughton, D., Fix, A., Kass, I., Patil, K., & Bell, C. (1979). Physiological-intellectual components of rehabilitation success in patients with chronic obstructive pulmonary disease. Journal of Chronic Disease, 32, 405-409.
- Davis, M. (1968). Physiologic, psychological, and demographic factors in patient compliance with doctors' orders. Medical Care, 6(2), 115-122.
- Davis, M., & Eichhorn, R. (1963). Compliance in medical regimens: a panel study. Journal of Health and Human Behavior, 4, 240-249.
- DeBeboute, D., Hodgkin, J., Zorn, E., Yee, A., & Sammer, E. (1983). Clinical and psychological outcomes of a university-hospital pulmonary rehabilitation program. Respiratory Care, 28, 1468-1473.
- Devito, A. (1985). Rehabilitation of patients with chronic obstructive pulmonary disease. Rehabilitation Nursing, 10(2), 12.

- Diers, D. (1979). Research in nursing practice. Philadelphia: J. B. Lippincott Company.
- Ebel, R. L., & Frisbie, D. A. (1986). Essentials of educational measurement (4th ed.). Englewood Cliffs, New Jersey: Printice-Hall, Inc.
- Ferguson, G.A. (1981). Statistical analysis in psychology and education (5th ed.). New York: McGraw-Hill Book Company.
- Finlayson, M., & Rourke, B. (1978). Locus of control as a predictor variable in rehabilitation medicine. Journal of Clinical Psychology, 34, 367-368.
- Gillum, R., & Barsky, A. (1974). Diagnosis and management of patient noncompliance. JAMA, 228, 1563-1567
- Given, C., Given, B., & Simoni, L. (1978). The association of knowledge and perception of medications with compliance and health states among hypertensive prospective study. Research in Nursing and Health, 1(2), 76.
- Gronland, N. E. (1985). Measurement and evaluation in teaching (5th ed.). New York: Macmillan Publishing Company.
- Haas, A., & Cardon, H. (1969). Rehabilitation in chronic obstructive pulmonary disease. Medical Clinics of North America, 53, 593-606.
- Harris, J. (1983). Healthy tennesseans: A handbook for health care providers. Tennessee Department of Public Health.
- Hays, L. (1977). Assessment of personal health in knox county. Knoxville\Knox County Metropolitan Planning Commission.
- Howard, J., Davies, J., & Roghmann, K. (1987). Respiratory teaching of patients: how effective is it? Journal of Advanced Nursing, 12, 207-214.
- Hudson, L. D. (1984). Management of copd, state of the art. Chest, 84(6), 76s-81s.
- Hudson, L., & Pierson, D. (1981). Comprehensive care for patients with chronic obstructive pulmonary disease. Medical Clinics of North America, 65, 629-644.

- Hunter, A., Carey, M., & Larsh, H. (1981). The nutritional status of patients with chronic obstructive pulmonary disease. American Review of Respiratory Diseases, 124, 376-381.
- Kinsman, R., Yaroush, R., & Fernandez, E. (1983). Symptoms and experiences in chronic bronchitis and asthma. Chest, 83, 755-761.
- Learning the basics about copd. (1984). Patient Care, 18(9), 158-160.
- Lertzman, W. & Cherniack, R. M. (1976). Rehabilitation of patients with chronic obstructive pulmonary disease. American Review of Respiratory Diseases, 114, 1145-1165.
- Lewis, F., Morisky, D., & Flynn, B. (1978). A test of the construct validity of health locus of control: effects on self-reported compliance for hypertensive patients. Health Education Monographs, 6, 138-148.
- Lowery, B., & Ducette, J. (1976). Disease-related learning and disease control in diabetes as a function of locus of control. Nursing Research, 25, 358-362.
- Lubkin, I. M. (1986). Chronic illness, impact and interventions. Boston: Jones and Bartlett Publishers.
- Marshton, M. (1970). Compliance with medical regimens: a review of the literature. Nursing Research, 19, 312-323.
- McDonald, G. J., & Hudson L. D. (1982). Important aspects of pulmonary rehabilitation. Geriatrics, 37(3), 127-134.
- Miller, B. C. (1986). Disease related knowledge and disease control of the patient with type II diabetes mellitus. Dissertation Abstracts International, 47, 4296-A.
- MMWR. (1986). Atlanta: CDC, 35(32), 507.
- Munro, B. H., Visintainer, M. A., & Page, E. B. (1986). Statistical methods for health care research. Philadelphia: J. B. Lippincott Company.

- Openbrier, D., Irwin, M., Rogers, R., Gottlieb, G., Dauber, J., Van Thiel, D., & Pennock, B. (1983). Nutritional status and lung function in patients with emphysema and chronic bronchitis. Chest, 83(1), 17-22.
- Perry, J. (1981). Effectiveness of teaching in the rehabilitation of patients with chronic bronchitis and emphysema. Nursing Research, 30, 219-222.
- Rubinson, L., & Neutens, J.J. (1987). Research techniques for the health sciences. New York: Macmillian Publishing Company.
- Sahn, S., Nett, L., & Petty, T. (1980). Ten year follow-up of a comprehensive rehabilitation program for severe copd. Chest, 77, 311-314.
- Scieszinski, A. G. (1984). A study of patient compliance of a prescribed diet following discharge from Galesburg Cottage Hospital. Unpublished master's thesis, Western Illinois University, Macomb, IL.
- Seaman, C. H. (1987). Research methods: Principles, practice, and theory for nursing (3rd ed.). Los Altos, CA: Appleton and Lange.
- Sexton, D. L. (1981). Chronic obstructive pulmonary disease: Care of the adult and child St. Louis: The C. V. Mosby Company.
- Shelley, S. I. (1984). Research methods in nursing and health. Boston: Little, Brown and Company.
- Sitzman, J., Kamiya, J., & Johnson, J. (1983). Biofeedback training for reduced respiratory rate in copd: a preliminary study. Nursing Research, 32, 218-223.
- Unger, K. M., Moser, K. M., & Hansen, P. (1980). Selection of an exercise program for patients with chronic obstructive pulmonary disease. Heart and Lung, 9(1), 68-76.
- U. S. Department of Health and Human Services, (1985). National health survey, U. S.. Washington: Vital and Health Statistics.

- Vincent, P. (1971). Factors influencing patient noncompliance: a theoretical approach. Nursing Research, 20, 509-516.
- Wallston, B., Wallston, K., Kaplan, G., & Maides, S. (1976). Development and validation of the health locus of control (HLC) scale. Journal of Consulting and Clinical Psychology, 44, 580-585.
- Wallston K., Wallston, B., & DeVellis, R. (1978). Development of the multidimensional (MHLC) scales. Health Education Monographs, 6, 160-170.
- Williamson, Y. M. (1981). Research methodology and its application to nursing. New York: John Wiley and Sons.
- Wright, R., Larsen, D., Monie, R., & Aldred, R. (1983). Benefits of a community-hospital pulmonary rehabilitation program. Respiratory Care, 28, 1474-1479.

APPENDIXES

APPENDIX A

PANEL OF JURORS FOR COPD RELATED KNOWLEDGE TEST

Name	Position	Address
Nancy Bell	R.N. Administrator	Tri-County Respiratory Clinic 415 Central Plaza Bldg LaFollette, TN 37766
Johnnie Mozingo	Professor	College of Nursing University of TN Knoxville, TN 37996
R. A. Obenour	Pulmonary Physician	Knoxville Pulmonary Physicians' Office Bldg Suite 105 Knoxville, TN 37920
R. B. Pittman	Associate Professor	School of Education Dept. of Administration Curriculum, and Inst. Western Carolina Univ. Cullowhee, NC 28723

APPENDIX B

COPD KNOWLEDGE TABLE OF SPECIFICATIONS

Content Area	Test Objective	
	Knows Facts About Self Care	Total
Avoiding Respiratory Irritants	20% (5) *	5
Preventing Acute Bronchial Infections	16% (4) *	4
Reducing Pulmonary Secretions	20% (5) *	5
Maintaining Pulmonary Ventilation	24% (6) *	6
Proper Breathing Techniques	20% (5) *	5
Total	100% (25)	25

* Following each individual area percentage, in parentheses, is the number of questions out of 25 devoted to the specific area.

APPENDIX C

CHRONIC OBSTRUCTIVE PULMONARY DISEASE
RELATED KNOWLEDGE TEST

I am going to ask you some questions about taking care of respiratory disease such as yours (COPD, emphysema, chronic bronchitis, adult asthma) at home. If what I say is right, then you say yes. If what I say is wrong, then you say no. If you do not know if the question is right or wrong, then just say, I don't know. Do you have any questions before we start?

- T F DK 1. Smoking cigarettes makes lung disease worse.
- T F DK 2. Exposure to pollen irritates the breathing passages of individuals with lung disease.
- T F DK 3. When exposed to dust, individuals with lung disease should cover the nose and mouth.
- T F DK 4. Being out in cold weather makes it easier for individuals with lung disease to breathe.

- T F DK 5. Using aerosol spray products makes it harder for individuals with lung disease to breathe.
- T F DK 6. Being in crowds (groups of more than 10) decreases your chances of developing a respiratory infection.
- T F DK 7. Brown or green mucus from the lungs indicates that you should contact your physician.
- T F DK 8. Eating large portions of food at mealtime makes it easier for individuals with lung disease to breathe.
- T F DK 9. Getting a flu shot every year can be dangerous for individuals with lung disease.
- T F DK 10. Keeping your teeth\dentures and mouth clean will help to keep your lungs from getting infected.

- T F DK 11. Drinking a lot of liquids\fluids (8 glasses a day) makes it harder to cough up mucus\sputum?
- T F Dk 12. Postural drainage exercises helps to bring up mucus from the lungs.
- T F DK 13. Using mist therapy, like a humidifier, makes mucus harder to cough up.
- T F DK 14. To help the lungs work better, individuals with lung disease should use antihistamines to dry up mucus.
- T F DK 15. Using cough syrup to stop coughing helps the lungs to work better for individuals with lung disease.
- T F DK 16. Using breathing techniques such as pursed-lip breathing makes it easier for individuals with lung disease to breathe.
- T F DK 17. Individuals with lung disease need to control breathing while performing hard, strenuous tasks.

- T F DK 18. When performing diaphragmatic\abdominal breathing, you should breath in through the mouth and breath out through the nose.
- T F DK 19. Walking every day for exercise will help your breathing problem.
- T F DK 20. Individuals with lung disease should complete all tasks at one time and then rest.
- T F DK 21. Individuals with lung disease should use pursed-lip breathing when short of breath.
- T F DK 22. Individuals with lung disease, should work quickly when doing any activity or job.
- T F DK 23. Using pursed-lip breathing keeps more air inside the lungs.
- T F DK 24. When using pursed-lip breathing, you should blow air out of your lungs like you are trying to blow up a balloon.

T F DK 25. When using diaphragmatic or abdominal breathing you should pull in your abdomen (belly) while you inhale (breath in).

_____ Total Points (25 possible, 1 point per question)
correct)

KEY

1. T
2. T
3. T
4. F
5. T
6. F
7. T
8. F
9. F
10. T
11. F
12. T
13. F
14. F
15. F
16. T
17. T
18. F
19. T
20. F
21. T
22. F
23. F
24. T
25. F

APPENDIX D

COPD RELATED KNOWLEDGE TEST ITEM ANALYSIS

Item	Upper Correct	Lower Correct	Item Difficulty	Discriminating Power
1	5	5	100%	0
2	5	4	90%	.2
3	5	5	100%	0
4	4	2	60%	.4
5	5	5	100%	0
6	5	5	100%	0
7	4	2	60%	.4
8	5	2	70%	.6
9	5	2	70%	.6
10	5	4	90%	.2
11	4	4	60%	.4
12	5	2	70%	.6
13	5	3	80%	.4
14	2	2	40%	0
15	4	2	60%	.4
16	5	0	50%	1
17	5	3	80%	.4
18	5	2	70%	.6
19	5	5	100%	0

20	5	4	90%	.2
21	5	0	50%	1
22	5	4	90%	.2
23	4	0	40%	.8
24	5	0	50%	1
25	2	1	30%	.2

Total N = 16 subjects in pilot study (10 in item analysis)

1/3 N = 5 in upper group and 5 in lower group

APPENDIX E

MULTIDIMENSIONAL HEALTH LOCUS OF CONTROL

Form A

This is a questionnaire designed to determine the way in which different people view certain important health-related issues. Each item is a belief statement with which you may agree or disagree. At the end of each statement is a scale which ranges from strongly disagree to strongly agree. For each item, tell me the extent to which you disagree or agree with the statement. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

As much as you can, try to respond to each item independently. When making your choice, do not be influenced by your previous choices. It is important that you respond according to your actual beliefs and not according to how you feel you should believe or how you think we want you to believe.

(strongly disagree =SD= 1 point, moderately disagree =MD= 2 points, slightly disagree =SLD= 3 points, slightly agree =SLA= 4 points, moderately agree =MA= 5 points, strongly agree =SA= 6 points.)

	SD	MD	SLD	SLA	MA	SA
1. If I get sick, it is my own behavior that determines how soon I get well again.	1	2	3	4	5	6
2. No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
3. Having regular contact with my physician is the best way for me to avoid illness.	1	2	3	4	5	6
4. Most things that affect my health happen to me by accident.	1	2	3	4	5	6
5. Whenever I don't feel well, I should consult a medically trained professional.	1	2	3	4	5	6
6. I am in control of my health.	1	2	3	4	5	6
7. My family has a lot to do with my becoming sick or staying healthy.	1	2	3	4	5	6
8. When I get sick I am to blame.	1	2	3	4	5	6
9. Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6
10. Health professionals control my health.	1	2	3	4	5	6
11. My good health is largely a matter of good fortune.	1	2	3	4	5	6

	SD	MD	SLD	SLA	MA	SA
12. The main thing which affects my health is what I myself do.	1	2	3	4	5	6
13. If I take care of myself, I can avoid illness.	1	2	3	4	5	6
14. When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, and friends) have been taking good care of me.	1	2	3	4	5	6
15. No matter what I do, I'm likely to get sick.	1	2	3	4	5	6
16. If it's meant to be, I will stay healthy.	1	2	3	4	5	6
17. If I take the right actions, I can stay healthy.	1	2	3	4	5	6
18. Regarding my health, I can only do what my doctor tells me to do.	1	2	3	4	5	6

APPENDIX F

MEASUREMENT OF COMPLIANCE WITH A COMPREHENSIVE
COPD TREATMENT PROGRAM

I am going to ask you some questions about taking care of your respiratory disease (COPD, emphysema, chronic bronchitis, adult asthma). It is important that you answer each question truthfully. Do not answer the way you think you should answer or the way you think we want you to answer. I remind you that no one but me will know your answers. Do you have any questions before we start?

____ 1. Do you smoke cigarettes? ____yes(0)
____no(10) If no skip to question 5

____ 2. How much do you now smoke per day? ____less than
1/2 pack(2) ____1/2 pack(1) ____1/2 pack
but less than 1 pack(0) ____1 pack(-1)
____more than 1 pack(-2)

____ 3. Have you cut down on the amount you smoke since
your COPD was diagnosed? ____yes(3) ____no(0)

____ 4. If yes, by how much per day have you cut down?
____ less than 1/2 pack(0) ____ 1/2 to 1 pack(2)
____ over 1 pack(3)

____ 5. Do you use aerosol spray products? ____ yes(0)
____ no(5)

____ 6. Do you take the prescription medicine(s)
prescribed by your doctor? ____ yes(10)
____ no(0)

____ 7. Do you ever miss or skip a dose of your medicine?
____ yes(0) ____ no(10)
If no, skip to question 9.

____ 8. If yes, about how often do you skip a dose?
____ more than once a day(-2) ____ once a day(-1)
____ once a week(0) ____ once a month(2)
____ once every 2 months or longer(4)

____ 9. Are you ever more than 1 hour late taking your
medication? ____ yes(0) ____ no(5)
If no, skip to question 11

- ____10. If yes, about how often are you late?
____every day(-1) ____once a week(0)
____once a month(2)
____once every 2 months or longer(4)
- ____11. Do you ever take less of the medicine than you
are supposed to take? For example 1 pill
instead of 2. ____yes(0) ____no(5)
- ____12. Do you ever take more of the medicine
than you are supposed to take? For example
2 pills instead of 1. ____yes(0) ____no(5)
If no to questions 10 and 11, skip to
question 14.
- ____13. If yes to question 10 and/or 11, about how often?
____every day(-1) ____once a week(0) ____once
a month(2) ____every 2 months or longer(4)
- ____14. Do you visit with people who have colds or flu?
____yes(0) ____no(5)
- ____15. Do you get a flu shot every year? ____yes(5)
____no(0)

- ___16. How much fluid or liquid do you usually drink in a days time? ___1-3 8 oz. glasses(1)
___4-7 8 oz. glasses(3)
___8 or more 8 oz. glasses(5)
- ___17. How many meals do you usually eat in a days time?
___1(1) ___2(2) ___3(3) ___4(4)
___5- 6(5)
- ___18. Approximately how much food do you eat at each meal? ___average amount(3)
___small amount(5) ___large amount(0)
- ___19. Do you eat protein foods every day such as meat, nuts, or peanut butter? ___yes(5) ___no(0)
- ___20. Do you take rest breaks during the day?
___yes(5) ___no(0)
- ___21. Do you use pursed lip breathing? ___yes(5)
___no(0)
- ___22. Do you walk everyday for exercise? ___yes(5)
___no(0)

___23. If yes about how much do you walk every day?

___just around the house only when

necessary(0) ___around the house more than

needed(1) ___walk at least 1/2 mile per day(3)

___walk 1/2 to 1 mile every day(4)

___walk more than 1 mile every day(5)

_____Total Points (100 possible)

APPENDIX G

DEMOGRAPHIC AND COPD INSTRUCTION DATA FORM

Age: at Last Birthday_____

Sex: M_____ F_____

Race: White_____ Nonwhite_____

Educational Level: highest grade completed in school:

6th grade or less_____

9th grade or less_____

12th grade or less_____

Graduated high school_____

Some college_____

Bachelors degree_____

More than bachelors degree_____

Who has taught you the most about taking care of your
COPD?

Medical doctor (MD)_____

Nurse_____

Other(specify)_____

How do you feel about the quality of content of the COPD
instruction you have received? Do you feel that it was:

Excellent_____

Good_____

Average_____

Fair_____

Poor_____

APPENDIX H

INTRODUCTORY STATEMENT

Hello Mr., Mrs., Miss_____, my name is Ann Johnson. I am a registered nurse conducting a research study on compliance with comprehensive treatment for patients with chronic obstructive pulmonary disease. By participating in this study, you will help health care professionals to better understand and be able to assist individuals, like yourself, in complying with treatment.

Your help in this study is greatly needed. I will not record your name on any of the materials and I will not share your name with any other person. You will only be a number on paper and no one but me will know your answers. Are you willing to answer some questions for me? It will take about 30 minutes.

APPENDIX I

KNOWLEDGE, MHLC, AND COMPLIANCE SCORES
OF SUBJECTS

SUBJECT	KNOWLEDGE	MHLC	COMPLIANCE
1	60	I	82
2	80	P	95
3	100	I	84
4	68	P	74
5	36	I	67
6	92	P	77
7	60	I	67
8	88	I	82
9	80	P	74
10	80	C	86
11	84	C	70
12	68	P	71
13	84	P	65
14	84	P	75
15	88	P	80
16	52	P	54
17	52	C	70
18	76	P	84
19	88	P	85

20	100	P	93
21	88	P	92
22	76	P	76
23	92	I	98
24	88	I	78
25	64	C	75
26	92	I	79
27	80	P	81
28	96	I	66
29	44	C	61
30	92	P	65

Mean Knowledge Score = 77.73

MHLC Domains =

Internal (I) 9, Chance (C) 5, Powerful Others (P) 16

Mean Compliance Score = 76.87

VITA

Ann Putnam Johnson is the daughter of Buddy and Clovie Putnam. She was born in 1955 in Haywood County, North Carolina, and received primary and secondary education in Canton, North Carolina. In her undergraduate studies she received a Practical Nurse Diploma from Haywood Community College, Clyde, North Carolina, and a Bachelor of Science in Nursing from Western Carolina University, Cullowhee, North Carolina. Her graduate work includes a Master of Science in Nursing and a Doctor of Education in health education from the University of Tennessee, Knoxville.

She is a licensed RN in the state of North Carolina and an assistant professor of nursing in The School of Nursing and Health Sciences at Western Carolina University, Cullowhee, North Carolina.