

ASSESSMENT OF SELF-CARE AGENCY IN PATIENTS
WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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ABSTRACT

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The problem of the study was to determine if self-care agency is related to recidivism, or frequency of hospitalization. Dorothea Orem's Theory of Self-Care provided propositions upon which the study was based.

The descriptive correlational research design utilized a nonprobability, purposive sampling method to assess levels of self-care agency and demographic data in 37 patients with chronic obstructive pulmonary disease (COPD). Self-care agency was operationalized by the Assessment of Self-Care Agency (AS-CA) tool, modified from Bickel and Hanson's Perception of Self-Care Agency tool. A pilot study documented initial reliability and validity of the AS-CA tool, with a coefficient alpha of .87, and with construct validity assessed by factor analysis. The four AS-CA subscale factors are cognitive skills, mobility, motivation, and psychomotor skills. Cognitive skills and mobility account for 87.9% of the variance, indicating a

high degree of construct validity. Reliability and validity of the AS-CA in the COPD sample resulted in similar findings, with a coefficient alpha of .85, and with an intact four factor structure.

Statistical analysis included Pearson correlation coefficients and ANOVA. Analysis of the data found no significant correlation between self-care agency and frequency of hospital admissions. However, when the sample was divided into two groups (0-1 and 2 or more admissions) using discriminant analysis, statistically significant differences between the two groups were found for the total AS-CA score, and for the mobility and psychomotor skills subscale scores. Nurses should note that no significant relationship was found between cognitive skills and frequency of admission, and that no significant difference was found between the two admission groups on the cognitive subscale, because discharge planning tends to be directed toward cognitive skills rather than toward self-care deficits which have been assessed. Nurses may be better able to affect changes in mobility and in psychomotor skills through assessment of patient ability in these two areas, followed by appropriate nursing interventions, thus preventing or decreasing readmissions.

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CHAPTER I

INTRODUCTION

Promotion of self-care abilities has become an increasingly important area for intervention in nursing as treatment of patients with chronic illness becomes a major focus and as the numbers of these patients increase. However, before interventions can be effectively planned, nurses must be able to accurately assess the patient's ability for self-care. According to Dorothea Orem (1985) self-care consists of "the production of actions directed to self or to the environment in order to regulate one's functioning in the interests of one's life, integrated functioning, and well-being" (p. 31). For the purpose of this study, self-care agency (S-CA) is defined as the capability individuals have for self-care.

As clients age, their likelihood of becoming chronically ill increases, and Strauss (1975) estimated that 54% of chronically ill people over the age of 45 have a major limitation in activity. Current estimates support these statistics, and Tubkin (1986) stated that "nearly half of non-institutionalized persons over 65 are limited

by at least one chronic condition," (p. 3) as are 24% of those aged 45-65.

Individuals with chronic obstructive pulmonary disease (COPD) must constantly guard against the possibility of acute illness. The self-care necessary for COPD patients to avoid exacerbations may in effect consume all of their energy and control much of their lifestyles because individuals with COPD are prone to frequent and repeated hospital admissions, sometimes called "the revolving door syndrome" (McDonald, 1981, p. 260). To further complicate their problems, readmission, frequently called recidivism, is especially costly for the patient due to limited reimbursement by Medicare and some private insurance policies, related to the frequency and total days of admission. Readmission is also difficult for the patient, and his family, because of decreased individual productivity, and other increased stress factors.

The factors cited above require nurses to make accurate, efficient assessments not only of the patient's self-care abilities, but also about how the patient handles chronic illness. Knowledge of the patients' S-CA will allow the nurse to plan the most effective nursing system (Orem, 1985) to meet the patient's needs during and following hospitalization. Aspects of individual self-care

agency to be considered when making these assessments include cognitive and psychomotor skills, mobility, and motivation. These aspects, or concepts, related to Orem's theory, and to self-care agency, can be assessed in patients with COPD with an S-CA tool. Research related to the theory of self-care may be used not only to support and validate the existence and applicability of Orem's constructs and concepts, but also to structure nursing systems for the patient's benefit.

Problem of Study

The problem of the study was to determine if a relationship exists between self-care agency and frequency of hospitalizations in persons with COPD. Self-care agency is a construct which represents the patient's power or capability for self-care, which is comprised of four sub-concepts: cognitive skills, mobility, motivation, and psychomotor skills. Identification of a deficiency in one or more of these specific abilities for self-care agency may explain the underlying reasons for frequent hospitalizations.

Nursing research is necessary to determine the usefulness of the concept of self-care agency to clinical practice. Compared to the construct self-care, self-care agency has been discussed infrequently in the nursing

literature. For the concept of self-care agency to be useful to nursing, it must have a research base, which is then followed by dissemination to nurses in practice. A relevant question for the research study is whether this concept be readily identified in clinical practice, and if so, how significant is determination of the importance of the subconcepts to the patients' health status? An additional focus will be to examine the usefulness of nursing theory for clinical practice, which may be demonstrated through the use of the research process.

Theoretical Framework

During the process of writing a guide for curriculum development in practical nursing programs, Dorothea Orem (1959) began development of the theory of self-care. The Nursing Development Conference Group (NDCG) continued the theory's development in 1967, and their work formulated the basis for Orem's text, Nursing: Concepts of Practice (1971). In 1973 and again in 1979, the NDCG progressed towards formalizing self-care theory and related concepts in Concept Formalization in Nursing: Process and Product. while Orem worked individually to further evolve self-care theory by publishing revised editions of her original text in 1980 and 1985.

Orem defined self-care as "the production of actions directed to self or to the environment in order to regulate one's functioning in the interests of one's life, integrated functioning, and well-being" (p. 31). She noted other factors affecting performance of self-care which include age, health, patterns of response to internal and external stimuli, values, and goals, and she concluded that self-care actions should produce the following results:

1. Supporting life processes, promoting normal functions
2. Maintaining normal growth, development, and maturation
3. Preventing, controlling, or curing disease processes and injury
4. Preventing or compensating for disability.
(Orem, 1971, p. 20)

Orem proposed three types of self-care required by individuals: universal, developmental, and health deviation. Universal involves the physiological needs, developmental relates to the control of internal and external environment, and health deviation involves ability to seek and maintain medical care (Orem, 1985).

In 1979 the NDCG produced a concept analysis of the term self-care agency, which was referred to as the "power of individuals to engage in self-care" (NDCG, 1979, p. 181), while Orem defined self-care agency as "the complex capability for action that is activated in the performance of the actions or operations of self-care" (Orem, 1985, p.

31). The NDCG isolated three broad elements related to self-care agency: (a) the "power or capability to engage in two types of action," which are, (b) "the estimative operations," and (c) "the productive operations of self-care" (NDCG, 1979, p. 189). In the NDCG analysis, these elements reflect the assessment, analytic and implementation functions of the nursing process; and in addition, the NDCG implies the need for re-estimation, which is analogous to evaluation. "Individual abilities can be described in terms of development, operability, and adequacy" (Orem, 1985, p. 107). Orem defined development and operability as referring to operations an individual can perform, while adequacy involves interrelationship of the kinds and amounts of operations an individual can perform. Self-care agency requires complex personal abilities and activities in order to maintain health. Nurses may activate these in the absence of patient ability.

Self-care requires the ability to: (a) attend to, and exclude specific things; (b) understand the need for change, (c) acquire knowledge, (d) make decisions, and finally, (e) achieve change or regulation (Orem, 1985). Orem has asserted that there are five assumptions which relate to human characteristics, which are:

1. Human beings require continuous deliberate inputs to themselves and their environments in order to remain alive and function in accord with natural human endowments.
2. Human agency, the power to act deliberately, is exercised in the form of care of self and others in identifying needs for and in making needed inputs.
3. Mature human beings experience privations in the form of limitations for action in care of self and others involving the making of life-sustaining and function-regulating inputs.
4. Human agency is exercised in discovering, developing, and transmitting to others ways and means to identify needs for and make inputs to self and others.
5. Groups of human beings with structured relationships cluster tasks and allocate responsibilities for providing care to group members who experience privations for making required deliberate input to self and others. (Orem, 1985, pp. 34-35)

These five assumptions provide the framework for all three of Orem's theories about nursing--self-care deficit, self-care, and nursing systems. Using the central concept of self-care, the NDCG (1979) published a concept analysis of self-care agency. In this analysis, eight propositions were specified for self-care agency. Three of these are specifically related to hypotheses to be tested in the present research study:

1. Self-care agency is a complex acquired human characteristic or quality.
2. Self-care agency can be conceptualized as an action repertoire of an individual.
3. Self-care agency can be characterized in terms of abilities and limitations of an individual for engagement in self-care. (NDCG, 1979, p. 183)

These propositions lend support to the proposed hypotheses, and successfully supporting the hypotheses through research lends support to these propositions, as well as Orem's assumptions and theory of nursing.

Hypotheses

The Assessment of Self-Care Agency (AS-CA) questionnaire (Cleveland, 1986) represents a central concept, self-care agency, which is assessed by measuring the subjects' perception of four subconcepts (subscales): (a) cognitive skills, (b) mobility, (c) motivation, and (d) psychomotor skills. The AS-CA was used as the dependent variable for hypotheses testing in the present research study.

1. There is a significant relationships between self-care agency and the number of hospitalizations annually of patients with COPD.

2. There is a significant relationship between age and self-care agency of patients with COPD.

3. There is a significant relationship between gender and self-care agency of patients with COPD.

4. There is a significant relationship between cognitive skills and hospitalizations annually of patients with COPD.

5. There is a significant relationship between mobility and hospitalizations annually of patients with COPD.

6. There is a significant relationship between motivation and hospitalizations annually of patients with COPD.

7. There is a significant relationship between psychomotor skills and hospitalizations annually of patients with COPD.

Definition of Terms

For the research study, terms are defined as follows:

1. Self-care agency--"The complex capability for action that is activated in the performance of the actions or operation of self-care" (Orem, 1985, p. 31).

2. Self-care--"The production of actions directed to self or the environment in order to regulate functioning in the interests of one's life, integrated functioning, and well-being" (Orem, 1985, p. 31).

3. Self-care deficit--"A relationship between self-care agency and therapeutic self-care demand in which self-care agency is not adequate to meet the known therapeutic self-care demand" (Orem, 1985, p. 31).

4. Assessment of Self-Care Agency (AS-CA) questionnaire--a tool which has initial reliability and

validity, and which measures subjects' capability for achievement of self-care.

5. Chronic obstructive pulmonary disease--"A functional category designating a chronic condition of persistent obstruction of bronchial air flow" (Miller & Keane, 1987, p. 212).

Limitations

The generalizability of the proposed research will be limited to:

1. Individuals with chronic disease, specifically COPD.
2. Individuals in the age groups of middle-age, young-old, and old.

Further limitations of the study include the lack of test-retest reliability of the AS-CA tool, and the probable bias associated with the use of a purposive sampling technique.

Delimitations

The delimitations for the research were the sample of COPD patients presenting at a pulmonary clinic, and the specific criteria for patient inclusion in the study. The study was further delimited by the exclusion of patients with bronchiectasis and pure asthma from the sample.

Summary

Assessment of the self-care agency of patients with COPD can provide the nurse with a tool for designing a nursing system which is tailored to the needs of the individual. Nursing research related to self-care is also necessary for theory development and validation.

CHAPTER II

REVIEW OF LITERATURE

The literature review in this chapter will focus on three areas. The first two are studies relevant to self-care and self-care agency as conceptualized by Dorothea Orem. The third area is concerned with literature supporting the existence of self-care deficits in patients with chronic obstructive pulmonary disease.

Self-Care and Self-Care Agency

Orem's theory has generated more discussion and utilization than any other nursing theory (Meleis, 1985). Two NDCG members began testing self-care theory concepts in an ambulatory diabetic clinic, one of whom, Allison, became the first to publish research based on Orem's theory (1971). She used the theory to develop a nursing system to facilitate self-care in diabetics. Backscheider (1974) conducted a more elaborate study in the same clinic setting, and measured essential action related to self-care in four areas: physical, mental, motivational, and emotional. Diabetic patients were also the focus of Fitzgerald's (1980) educational program design using self-

care theory, and Miller's (1982) article, which described an assessment of self-care needs.

A series of articles was published starting in 1978 which used Orem's theory to focus on specific patient populations. In 1978 Anna, Christensen, Hohon, Ord, and Wells used self-care theory and nursing process to care for nursing home patients. Bromley (1980) based stomal care teaching on self-care theory, and in that same year the Nursing Clinics of North America (NCNA) published a set of similar articles, starting with Joseph's description of the theory. The NCNA (1980) issue identified two adult populations with which self-care theory was utilized, the critically ill adult (Mullin), and dying patient (Walborn). In 1983 Ayers examined the relationship of self-care, learning needs, and locus of control in coronary patients.

In 1982 and 1983, Dodd published a two part series in Cancer Nursing examining self-care behaviors of patients receiving chemotherapy. In a similar study, Fernsler (1983), compared cancer patients' and nurses' perceptions of self-care deficits in patients receiving chemotherapy. That same year, Musci examined self-care activities in cancer patients and their families and in 1984 Kubricht identified therapeutic self-care demands of cancer patients

receiving radiation therapy using open-ended interview techniques.

Hoffart (1982) examined self-care decision making in patients following renal transplant surgery. Using critical incident technique, 12 patients were studied to determine occurrences of self-care behaviors. In Hoffart's study, all subjects had taken part in discharge teaching sessions following renal transplant, and all patients were found to have performed self-care behaviors before seeking professional assistance.

In 1984 Harper published research which applied Orem's concepts to elderly, black, hypertensive patients with self-medication problems. Harper's experimental study examined the differences between compliance and self-care behaviors, and is a model for theory validation research.

The Science and Art of Self-Care, edited by Joan Riehl-Sisca in 1985, examined the use of self-care theory in nursing education, clinical practice, and research. In the research unit, Michaels (1985) summarizes her dissertation research assessing self-care needs in patients with COPD. The design of the study was methodological in nature, and has produced a tool for nurses to use in assessing self-care deficits in the COPD patient.

Other publications which are relevant to self-care theory in the analytical sense include Smith (1979) who not only proposed using Orem's theory as a metaparadigm for nursing research and theory development, but also provided a classification scheme for existing and future nursing research. In 1983 Melnyk used Barbara Stevens (1979) analytic framework to examine Orem's theory. However, Melnyk's analysis proposed that Orem's theory be limited to adults with self-care deficits caused by health deficits (1983): following this line of reasoning would eliminate the theory's application in the health prevention and promotion area of the health care system.

In Chinn (1983), Goldstein et al. published a counterpoint to Melnyk, proposing a self-care framework which would encourage the client to assume responsibility for health. This argument is significant in that it takes Orem's theory a step forward while remaining in the institutional setting, and provides assumptions for using self-care theory for health promotion and prevention (pp. 109-110). Also in Chinn (1983), Spangler and Spangler propose a testable self-care model which is designed to generate hypotheses, relate to theories of human nature, and elaborate methodological criteria.

All of these publications relate specifically to the concept of self-care. However, still another body of literature exists concerning self-care use--the lay literature--which runs parallel to the nursing literature without intersecting. A computer search for self-care literature from the years 1978 to 1985 generated a total of 118 articles, related to self-care and activities of daily living. Since the proposed research is specific to Orem's theory, these publications will not be reviewed.

A related concept, self-care agency, is also well represented in the published literature, primarily in the areas of concept analysis and instrument development. Currently no nursing literature exists which attempts to develop an instrument to measure self-care, thus some readers might perceive self-care agency to be an operational definition of self-care.

In 1979 the NDCG's analysis of the concept self-care agency generated 10 subconceptual areas or "power components" (1979). These components formed the basis for generating an instrument to measure self-care agency, but the NDCG did not take the next step. At the same time, Kearney and Fleisher (1979) developed an instrument to measure exercise of self-care agency (ES-CA), considering ES-CA to be a "dispositional trait" rather than one which

can be measured through direct observation. There are several instruments in the social science literature which use observational techniques to measure self-care (Kuriansky, Gurland, & Fleiss, 1976; Ferraro, 1980; Shamansky & Hamilton, 1979).

The ES-CA tool's construct validity was determined by using graduate students familiar with self-care to develop items for indicants of four subconstructs: "(a) active versus passive response to situations, (b) the individual's motivation, (c) the knowledge base of the individual, and (d) the person's sense of self-worth" (Kearney & Fleischer, 1979, pp. 26-27). The final tool is comprised of 43 items rated on a Likert type scale. Content validity was provided by faculty members, and further construct validity was proposed using "parallel" scales. Since no instrument existed at that time to measure self-care agency, the validity of the tool is questionable. Also, no item analytic or factor analytic techniques were reported, leaving doubt as to the instruments' reliability.

In 1980, Denyes developed an instrument to measure self-care agency in adolescents. However the usefulness of this tool is limited by the target population, and also by the fact that the completed instrument is 66 items long.

Hanson (1981) developed the Perception of Self-Care Agency (PS-CA) Questionnaire for her master's thesis. Hanson based the items on the NDCG's Ten Power Components, using currently accepted techniques for construct and content validity, with a panel of experts that included Orem and Allison, original members of the NDCG. Hanson's item analysis of the developing tool using 101 subjects provided a sound basis for Bickel's (1982) further work with Hanson's 53 item questionnaire, which Bickel reduced to 43 during factor analysis. Bickel based her data analysis on 456 subjects, and although the initial factoring revealed 11 factors, a varimax rotation was performed and subsequently five factors emerged, one of which was a negative factor. The four remaining factors are very similar to the original subconcept areas identified by Backscheider (1974), and all of the ten power components of the NDCG can be diagrammed under the identified factors.

Further development of the PS-CA questionnaire was done in a pilot study for the dissertation by Cleveland (1986). Data analysis will be fully discussed in Chapter III of this study.

Chronic Obstructive Pulmonary Disease

Chronic obstructive pulmonary disease is the fifth leading cause of death in the United States, with an estimated 150,000 deaths related to COPD in 1981 (Higgins, 1984). Characteristics of COPD are "longstanding and progressive elevation of airway resistance, irreversible lung distention, and arterial blood gas imbalance, eventually culminating in pulmonary hypertension and cor pulmonale" (Haas, Pineda, Haas, & Axen, 1979, p. 70). The diseases usually represented by the term COPD are chronic bronchitis, emphysema, asthma, and bronchiectasis (Kneisl & Ames, 1986). Usually the patient has a mixed disorder rather than pure emphysema or bronchitis.

Management of COPD must be based on a comprehensive plan of care that considers keeping the patient out of the hospital to be a major goal. Many of these patients receive a significant portion of their therapy in an office, clinic, or hospital, and some have a "revolving door syndrome of frequent hospitalizations" (McDonald, 1981, p. 260).

Because the disease progresses insidiously over a period of 20 to 30 years, it is most often a problem of middle-aged and older patients. Emphysema, particularly, is considered to be a disease of old age (Higgins, 1984).

COPD is associated with significant disability and lost work time, thus lost income.

Yearly estimates of days of restricted activity for COPD patients in 1983 were: (a) chronic bronchitis--12 days; (b) emphysema--68 days; and (c) asthmatics--17 days (Higgins, 1984), and societal costs are also significant. In 1978, the Social Services Administration estimated that yearly COPD patient disability payments were \$750 million (Haas et al., 1979).

The following year the total economic cost of COPD was \$6.5 billion, with health care alone accounting for \$2.3 billion (Higgins, 1984). Many of these costs can be attributed to our increased ability to keep these patients alive, due to effective medications and technological advances. As one can see, these interventions come at a very high price. Because the costs of health care for the COPD patient are so staggering, and because "the revolving door syndrome" contributes heavily to that cost, self-care enhancement could be a primary economic and emotional therapy for this group of patients. In a 1-year community based study, the hypothesis that a purely educational intervention would improve the symptoms and health status of COPD patients was tested. However, the researchers failed to accept the hypothesis, and so concluded that a

comprehensive program of physical reconditioning, as well as education was needed (Howland et al., 1986). However, this study failed to examine the capabilities of these patients for self-care. That same mistake is often made by nurses, whose primary intervention to prevent COPD patient readmissions is discharge teaching. Haas et al. (1979) propose that a rehabilitative plan is needed that would include: "(1) patient and family education; (2) the administration of pharmaceuticals; (3) respiratory therapy modalities; (4) physical therapy modalities; and (5) psychosocial, vocational and sexual counseling" (p. 76). This plan appears to be based on sound principles, however after the rehabilitation plan is implemented, the capability of the COPD patient for self-care still needs to be addressed. Feldman (1982) suggests that improvement in motivation and mental attitude can significantly reduce days per year in the hospital. She discusses a plan of care similar to Haas et al., and in addition, includes nutrition as a major element of rehabilitation. Feldman also emphasizes the importance of patient and family involvement in long term care, and of patients being "knowledgeable in their own long term surveillance" (p. 338).

Dorothy Sexton has published a nursing text for COPD patients, and has implemented research related to COPD patients and their spouses (1985). Based on her research and clinical experience with these subjects she published a 1983 article in Nursing Research which discusses the methodology involved in research with chronically ill populations. Using COPD patients as an example, she cited problem areas, which include difficulty in acquiring adequate sample sizes, the patient's limited ability and/or desire to participate in research due to inadequate energy reserves, and difficulties with consistent access to the patient due to frequent hospitalization and mortality.

These factors could impair the researcher's ability to involve these patients in longitudinal, experimental, or correlational studies, thus Sexton suggests using a descriptive design. She further recommends that a questionnaire be used that conserves energy, by the use of brief, clear directions, short answer responses such as check-off items, and a length appropriate for completion in one sitting. Other suggestions for research designs include short interview or case study approaches, and research involving a multicenter approach to increase the sample size. Sexton concludes by emphasizing the great need for nursing research in chronically ill populations,

since these patients and the aged will become a major domain of nursing.

In related nursing research, Linden's (1982) master's thesis, examined the effects of an educational program on perceived needs of COPD patients in a support group. A more comprehensive assessment was done by Michaels in the dissertation mentioned previously, and in which data analysis revealed an inverse relationship between self-care scores and time spent hospitalized on a pulmonary rehabilitation unit (Michaels, 1985). That is, self-care scores on admission were much higher than self-care scores at discharge using simulated patient care.

In another nursing research study of clients with COPD, Janson-Bjerkle, Carrieri, and Hudes (1986) examined sensations of pulmonary dyspnea in a sample of eight subjects with pulmonary or cardiovascular disease. The research examined variables related to dyspnea, with significant factors found to be disease group, gender, social support, and fatigue.

Summary

The previous research using self-care theory provides a basis for clinical research through investigating and substantiating the concept of self-care agency, and in which clinical research involving theory validation should

provide a firmer basis for nursing practice. Nursing research involving the chronically ill and aged populations is timely since the focus of nursing practice is beginning to change, and because the economics of health care are changing.

CHAPTER III

PROCEDURE FOR COLLECTION

TREATMENT OF DATA

A descriptive correlational survey approach is utilized in this study (Wilson, 1985). The Assessment of Self-Care Agency (AS-CA) tool is used to determine the patient's level of self-care agency. The study intended to support the existence of the construct self-care agency, and identify important dependent concepts through the process of operationalization of the AS-CA questionnaire. Correlational techniques were used to determine the relationship between the level of self-care agency and frequency of hospital admission in a chronically ill older adult sample.

The variable examined was an attribute variable rather than the classic independent-dependent variable, because the research is descriptive rather than experimental. An attribute variable is one that is not manipulated (Kerlinger, 1973). Self-care agency, as measured by the AS-CA tool, is a continuous variable. Continuous variables may have an ordered set of values within a certain range (Kerlinger, 1973). For example, a larger value (score) on

the AS-CA tool is related to a greater degree of the patient's self-care agency, and a smaller value is related to a lesser degree of self-care agency.

Setting

The setting used for the research was a pulmonary clinic. Two pulmonologists agreed to allow their patients to take part in the research study. Patients were interviewed by the researcher while they were waiting to be seen at the clinic.

Population and Sample

A purposive, sampling technique was used in the present research (Wilson, 1985). Difficulties in obtaining subjects for research in chronic illness have been substantiated in an article by Sexton (1983). Due to the need to set criteria for inclusion in the research, a random sample was difficult to obtain, therefore all subjects who met the criteria, and who agreed to complete the questionnaire were included in the study. The sample subjects included patients who met the following criteria:

1. A medical diagnosis of chronic obstructive pulmonary disease, excluding bronchiectastis and pure asthma;

2. Pulmonary function studies which support the diagnosis of COPD; and

3. Daily use of oral or inhaled bronchodilator medications.

Protection of Human Subjects

The study was limited to use of a questionnaire in an adult sample, and, therefore, was exempt from review by the Human Subjects Review Committee (Appendix A). Permission was obtained from a representative of the clinic for agency consent (Appendix B). Permission to conduct the study was also obtained from the graduate school (Appendix C).

The questionnaires were coded and placed on a clipboard for ease of subject use. The charts of the patients scheduled for appointments were scanned for criteria for inclusion in the study. Patients who met the criteria were approached in either the waiting area or an examining room, by the researcher, who introduced herself and explained the nature of the study. Complete confidentiality was insured, and the subjects were given approximately 15 minutes of privacy to complete the questionnaire. A cover letter was also attached to the questionnaire reiterating the researcher's introduction (Appendix D). Subjects were informed that completion of

the questionnaire indicated consent to be part in the study.

Instrumentation

In the current research, the method of measuring the construct self-care agency is the AS-CA tool (Cleveland, 1986) (Appendix D). The AS-CA questionnaire is a Likert type scale that was developed using instrument modification techniques.

The researcher's concept analysis of self-care was noted to be congruent with the concept analysis of self-care agency done by the NDCG (Cleveland, 1979; NDCG, 1979). The 10 power components of the construct were compatible with the concepts the researcher related to self-care. Bickel and Hanson worked together on a tool which represented these components, and development of the tool is discussed in The Science and Art of Self-Care (1985). The tool was built by developing items, 6 positive and 6 negative, for each of the 10 power components, all of which were submitted to a panel of experts, and only 59 of the original 120 items comprised the Form A of the original tool. After statistical analysis, the final form (B) of the tool resulted in 43 items. For the current research the tool needed to be shorter and more efficient, due to the limited ability of the COPD patients to complete

lengthy instruments for research studies (Sexton, 1983). Although longer tests are assumed to be more reliable by most psychometricians, tests with as few as 10 items may have very accurate estimates of reliability because the average inter-item correlation is tied directly to reliability (Michaels, 1985). Thus, the Assessment of Self-Care Agency tool was developed using instrument modification techniques from the Perception of Self-Care Agency tool. The new tool is designed for use with chronically ill, acutely ill, or elderly patients. After statistical analysis, neither tool exactly represents the ten power component, however, the four resulting factors in each tool could be used along with Gibbs (1972) techniques for theory construction to diagram the 10 power components. Using Gibbs' criteria the equality of the 10 power components might be affected by this method and further theory validation might be indicated. The AS-CA is useful as a method for theory validation at this time, and may be more useful after further reliability and validity studies are done. Thus, the usefulness of the tool for the current research study is supported by the pilot study, data analysis, and by Bickel and Hanson's previous work. Specifically, the AS-CA is designed to determine the capability for self-care agency in patients with a variety

of self-care deficits, or health deviations. Other tools have been developed to measure self-care, but were designed with limited target populations in mind which would affect generalizability of the data to other populations (Denyes, 1980; Miller, 1980; Harper, 1983; Micheels, 1985).

The AS-CA is comprised of four subscales with items representing the concepts of cognitive skills, mobility, motivation, and psychomotor skills. These subscales were also present in the PS-CA tool, however, the modified tool does not have any negative items because of the target population's potential for difficulty with completion of a tool that might be confusing. Factor analysis of both tools shows shared loading of criterion levels from factor to factor, but items clearly load at higher levels on a single factor over all of the others.

Reliability

Both the PS-CA and AS-CA tools lack test-retest reliability but internal consistency is documented in each instrument using coefficient alpha, .96 and .88, respectively, and items chosen for the AS-CA tool were obtained by examining the factor loading levels of the items. The highest loading items in each subscale were chosen to obtain a representative sample of the concept, in an attempt to produce a shorter, more efficient tool. All

items chosen had a criterion loading factor of .40 or greater.

Validity

Validity for both tools was obtained using factor analytic techniques. The ultimate subscales differed on the two tools slightly, but this may be attributable to the fact that the mean age in the PS-CA sample was 37.9 and the mean age in the AS-CA sample was 76. The subscale that changed the most in the latter research was mobility, which may be related to the age differences. The factor loadings of the AS-CA tool are discussed in the section immediately following which refers to the pilot study.

Pilot Study

The problem statements for the pilot study were:

1. Is the AS-CA tool reliable and valid for assessing self-care agency in an older population?; and
2. Is there a relationship between the score on the AS-CA tool and age, gender, and number of hospitalizations annually?

The proposition tested by the pilot study was:

Self-care agency can be characterized in terms of abilities and limitations of an individual for engagement in self-care (NDCG, 1979).

The hypotheses for the pilot study were:

1. There is a significant relationship between the total AS-CA score and number of hospitalizations annually; and

2. There is a significant relationship between the total AS-CA score and the demographics of age and gender.

The AS-CA questionnaire was piloted with a sample of senior citizens who considered themselves healthy. Sixty questionnaires were mailed, 12 to each of 5 senior citizens centers. Permission to use the agency was given by the Director of the senior citizens centers in the north central Texas area. Fifty-two questionnaires were returned, a participation rate of 87%. One of these was incomplete and was discarded.

In addition to the self-care agency scale items, the tool contains information regarding informed consent, demographic data of age, gender, and number of hospitalizations during the past 12 months. The items on the tool had responses on a Likert type scale which reflected the subject's perception of their capability to achieve the area of self-care described. The subjects chose either "always," "usually," "sometimes," "rarely," or "never," in response to each item.

The 51 completed tools were analyzed using SPSSX computer programs. Descriptive statistics indicated a mean total score on the AS-CA of 53, with a standard deviation of 7.4. The mean age was 76, with a standard deviation of 8.5. The range in age was from 65-101. There were 38 females and 13 males, and the number of hospitalizations ranged from 0-6, with a standard deviation of .53. Within the previous 12 months, 36 of the subjects had no admissions, 10 had 1, 3 had 2, 1 had 5, and 1 subject had 6 admissions.

In addition to these measures, Pearson Product Moment Correlation Coefficients were computed for the total AS-CA score, and each subscale score was correlated with the age, gender, and number of hospitalizations annually. These correlations are depicted in Table 1.

Significant correlations were noted between the total score and number of admissions at $p = .001$, $r = .42$; mobility and age, $p = .004$, $r = -.37$; motivation and admissions, $p = .002$, $r = .41$; and both cognitive and psychomotor skills with admissions, $p = .001$, $r = -.41$ and $-.43$, respectively.

Correlations were also computed between subscales, as depicted in Table 2. As might be expected, mobility and psychomotor skills were positively correlated at $p = .008$,

Table 1

Pearson Correlations Between Demographics and AS-CA Scores

	Age	Gender	Admissions
Total	-.1438 p = .157	-.1565 p = .136	-.4196 p = .001*
Mobility Subscale	-.3706 p = .004*	-.0504 p = .363	-.0746 p = .302
Motivation Subscale	-.0802 p = .288	-.2162 p = .064	-.4067 p = .002*
Cognitive skills Subscale	-.0640 p = .328	-.0643 p = .327	-.4109 p = .001*
Psychomotor skills Subscale	-.0171 p = .453	-.1227 p = .195	-.4342 p = .001*

N = 51.

* Indicates significant values.

Table 2

Pearson Correlations Between AS-CA Subscale Scores

	Mobility Subscale 1	Motivation Subscale 2	Cognitive skills Subscale 3	Psychomotor skills Subscale 4
Mobility	1.0	.2251 p = .056	.3089 p = .014*	.3341 p = .008*
Motivation	.2251 p = .056	1.0	.1482 p = .150	.6709 p = .008*
Cognitive skills	.3089 p = .014*	.1482 p = .150	1.0	.1962 p = .084
Psychomotor skills	.3341 p = .008*	.6709 p = .000*	.1962 p = .084	1.0

* Indicates significant values.

$r = .33$. Mobility was also positively correlated with cognitive skills, $p = .014$, $r = .31$. Motivation and psychomotor skills were positively correlated $p = .000$, $r = .67$. Mobility was correlated with motivation $p = .056$, $r = .2251$, not significant at the .05 level. Cognitive skills and psychomotor skills were not significantly correlated, $p = .084$, $r = .1962$, which indicates that in the pilot study sample, these subscales measured different concepts. The internal and inter-item consistency was computed and the coefficient alpha for the total tool was .88, which was representative of the inter-item coefficients. An analysis of variance within the subscales indicated an F of 31.23, $p = .0000$. A Student Newman-Keuls post-hoc test indicated significant differences between all subscale means, $p = .05$.

Factor analytic techniques were used to examine criterion levels of the items. An item loading of at least .30 was needed to retain an item, and all 16 items were retained. The technique used for final tool development was the orthogonal factor analytic method, because the items most closely resembled the original tool structure. All methods resulted in the original four factors being substantiated. The factor loadings are depicted in Table 3. The original items were all retained in the developed

Table 3

Pilot Study Factor Analysis: AS-CA

Item	Factor 1 Mobility	Factor 2 Motivation	Factor 3 Cognitive skills	Factor 4 Psychomotor skills
1	.09	-.01	.78	-.24
2	.82	.02	-.05	.18
3	.07	.93	.15	.07
4	.43	.08	.10	.73
5	-.08	.38	.64	.23
6	-.88	.00	-.14	.04
7	.02	.96	.10	.10
8	.53	.21	.32	.24
9	.16	.01	.69	.18
10	.87	.15	-.09	.00
11	.20	.66	-.08	.41
12	.36	.11	.34	.66
13	-.02	.26	-.09	.74
14	.82	.09	.29	.11
15	.81	-.05	.30	.19
16	.79	.04	.32	.25

tool, with the subscales being slightly altered to reflect the older sample, which was characteristic of the dissertation sample.

The pilot study provided reliability and validity at a level one psychometric rating. With addition of test-retest reliability measures, the psychometric rating would change to level three (Wilson, 1985). With the statistical analyses provided in the pilot study the AS-CA tool may be said to meet basic psychometric criteria for use in a major study.

Data Collection

Patients with chronic obstructive pulmonary disease were requested to participate in the research study. These patients were contacted in the pulmonary clinic. In the clinic setting two registered nurses who are former students of the researcher agreed to serve as research assistants, and assisted in gathering data at the clinic during office hours, during a 1-month period, or until the desired sample of 30 subjects was achieved.

Research Assistants

Research assistants were utilized in the clinic. These assistants were registered nurses who had a training session with the researcher, and who were instructed about

the technique of informed consent, the risk benefit ratio, and methods of presenting the questionnaire to the subject. Subjects had to be able to read in order to complete the questionnaire, and questionnaires were not read to subjects. The research assistants were directed to encourage the client to answer all items and to complete the demographic section.

Data Analysis

Data obtained from administration of the AS-CA tools were subjected to computer analysis using SPSSX (Norusis, 1983). Data were examined using descriptive measures additionally the data were analyzed to determine the relationship between the demographic data and the total and subscale scores using Pearson product moment correlation coefficients and Multiple Regression Techniques (Kerlinger & Pedhazur, 1973).

Pearson product moment correlations were used to examine the following hypotheses:

1. There is a significant relationship between self-care agency and the number of hospitalizations annually of patients with COPD.
2. There is a significant relationship between age and self-care agency of patients with COPD.

3. There is a significant relationship between gender and self-care agency of patients with COPD.

4. There is a significant relationship between cognitive skills and hospitalizations annually of patients with COPD.

5. There is a significant relationship between mobility and hospitalizations annually of patients with COPD.

6. There is a significant relationship between motivation and hospitalizations annually of patients with COPD.

7. There is a significant relationship between psychomotor skills and hospitalizations annually of patients with COPD.

In addition, since the sample for the dissertation has an age range differing significantly from the original sample in the study by Bickel and Hanson, or from the pilot, factor analytic techniques were applied to the data for further validity testing.

CHAPTER IV

ANALYSIS OF DATA

Data were collected in a pulmonary clinic from patients with COPD using the methods described in the previous chapter. More specifically, patients with chronic bronchitis and emphysema were selected for the study because they met the study criteria better than patients with either asthma or bronchiectasis. The researcher, or one of the research assistants, was present during data collection.

Thirty-seven patients who met the criteria for inclusion in the study completed the AS-CA tool. While some of the subjects did not, or could not, provide all of the demographic data, all of the subjects completed the item response section.

The questionnaires were computer coded, and analyzed using SPSSX computer programs (Norusis, 1983). Descriptive statistics, correlational statistics, analysis of variance, and statistics for reliability and validity were obtained.

An unexpected finding occurred when the factor analysis (orthogonal) resulted in five factors instead of the original four, which had been relatively stable during

instrument development and during the pilot study (Bickel & Hanson, 1985; Cleveland, 1986). Examination of the factor analysis showed that the fifth factor was a miscellaneous factor with items 1, 6, and 8 loading at .40 or higher. However, this factor contributed only 1.9% of the variance. Item 1 also loaded on factors 1 and 3, and item 6 loaded on factor 2. Item 8, however, did not load at the .40 level on any other factor. The researcher found that several subjects had commented about item 8 during data collection. The item states, "I can do all my self-care because I have enough skills." One women in particular noted that she could do all of her self-care because she had enough skills, but that she could not do all of her self-care because she did not have enough energy. Response to this particular item (and 1 and 6) resulted in the fifth subscale. Therefore, after the statistics were computed using the original subscales, the data were reanalyzed using the new subscale formations. Three items are necessary in order to retain a subscale, so in the new factors all items which loaded on any factor at .40 or greater were included in the second set of subscales (factor set 2) in order to maintain the integrity of subscale 5 (miscellaneous), despite the fact that only 1.9% of the variance was accounted for by Subscale 5. The

original, pilot, and COPD subscales are depicted in Table 4.

A comparison was made between the results before and after subscale revision, and there were significant differences. Therefore, in the presentation of the analysis of data, where differences have been found related to the subscales, both sets of data will be presented, and labeled Factor Set 1 and Factor Set 2.

Description of Sample

The sample was composed of 37 patients whose diagnoses of COPD were supported by pulmonary function studies, and who were receiving oral and/or inhaled bronchodilator drugs. All subjects completed the AS-CA questionnaire.

Description of the subjects was obtained from analysis of the demographic data. The subjects ranged in age from 50-85, with an average age of 68.4, a standard deviation of 9.34. Seventeen of the patients were female, and 20 were male. Eight of the patients were receiving steroids, and 5 had been on a ventilator at sometime in the past.

Eighteen patients had not been hospitalized in the past 12 months, 11 had been admitted once, 6 were admitted twice, 1 had been admitted 4 times, and 1 was admitted 5 times. Cross tabulations, using chi-square of the demographics by number of admissions showed no significant

Table 4

Items Loading on the Subscales of the AS-CA

Subscales	Original	Pilot	COPD
I - Cognitive	1,5,9,13	1,5,9,	1*,3, 4*,5, 9,11,12*,13
II - Mobility	2,6,10,14,16	2,6,8,10,14, 15,16	6,10*,14,15,16
III - Motivation	3,7,11	3,7,11	1,3*,7,11*
IV - Psychomotor	4,8,12,15	4,12,13	2,4,10,12*
V - Miscellaneous	--	--	1*,6*,8

*Loaded at a higher criterion level on another factor.

differences, however, the 8 patients on steroids and the 5 patients with a history of ventilator use approached significance at .09 and .08, respectively. A larger sampling of these patients would be useful in examining significant differences.

Findings

The seven hypotheses proposed in the study were analyzed using the Statistical Package for the Social Sciences (SPSSX) (Norusis, 1983). The data were analyzed using Pearson product moment correlation coefficients (Tables 5 and 6). Multiple regression was also used to determine if any of the independent variables--age, gender, steroid, or ventilator use--or the total AS-CA or subscale scores, were predictors of frequency of hospitalization.

Hypothesis 1 stated that there is a significant relationship between self-care agency and the number of hospitalizations annually of patients with COPD. Self-care agency is represented in the current study by the total score on the AS-CA. Using Pearson r the correlation between the AS-CA and number of admissions was $-.2367$, $p = .079$, not significant at the .05 level. The hypothesis was rejected.

Hypothesis 2 stated that there is a significant relationship between age and self-care agency of patients

Table 5

Factor Set 1: Correlations of Subscale Scores to Demographic Variables

	Age	Gender	Adm.	Days	Steroid	Vent.
Total	-.2586 (37) p = .061	-.0494 (37) p = .386	-.2367 (37) p = .679	-.2271 (33) p = .102	.0944 (31) p = .307	-.1181 (31) p = .263
Subscale 1 Cognitive	-.1782 p = .146	-.0375 p = .413	-.0906 p = .297	-.1556 p = .194	-.2063 p = .133	-.2042 p = .135
Subscale 2 Mobility	-.1280 p = .225	-.0266 p = .438	-.2084 p = .108	-.1850 p = .151	.3261* p = .037	-.0081 p = .483
Subscale 3 Motivation	-.3447 p = .018*	-.0287 p = .433	-.1753 p = .150	-.1315 p = .233	.0166 p = .465	-.1297 p = .243
Subscale 4 Psychomotor	-.2141 p = .102	-.0633 p = .355	-.2587 p = .061	-.2108 p = .120	.0691 p = .356	-.0548 p = .385

*Significant at the .05 level.

Table 6

Factor Set 2: Correlations of Subscale Scores to Demographic Variables

	Age	Gender	Adm.	Days	Steroid	Vent.
Total	-.2586 (37) p = .061	-.0494 (37) p = .386	-.2367 (37) p = .079	-.2271 (33) p = .102	.0944 (31) p = .307	-.1181 (31) p = .263
Subscale 1 Cognitive	-.2579 p = .062	-.0417 p = .403	-.1768 p = .148	-.1672 p = .176	-.1195 p = .261	-.1561 p = .201
Subscale 2 Mobility	-.2579 p = .062	-.0246 p = .443	-.1329 p = .216	-.1416 p = .216	.2612 p = .078	-.0609 p = .372
Subscale 3 Motivation	-.1130 p = .253	-.0402 p = .407	-.2629 p = .058	-.1671 p = .176	.2375 p = .099	-.0079 p = .483
Subscale 4 Psychomotor	-.2871 p = .042*	-.6345 p = .420	-.1706 p = .156	-.1578 p = .190	-.0150 p = .466	-.1496 p = .211
Subscale 5	-.0499 p = .385	.0000 p = .500	-.1769 p = .147	-.1851 p = .151	-.0015 p = .497	-.1487 p = .212

*Significant at the .05 level.

with COPD. The Pearson r for age correlated with the total AS-CA was $-.2586$, $p = .061$, not significant at the $p = .05$ level. However, age was correlated with motivation on the AS-CA tool on Factor Set 1, $r = -.3447$, $p = .018$, and on Factor Set 2, $r = -.2871$, $p = .042$. Although age did not significantly affect the total AS-CA score, the older the patient, the lower the score on the motivation subscale. Nevertheless, the hypothesis was rejected.

Hypothesis 3 stated that there is a significant relationship between gender and self-care agency of patients with COPD. There was no significant correlation between gender and total AS-CA score, or between gender and the AS-CA subscale scores. The hypothesis was rejected.

Hypothesis 4 stated that there is a significant relationship between cognitive skills and hospitalizations annually. There was no significant relationship between the scores on the cognitive subscale and frequency of admission. On Factor Set 1, $r = -.0906$, $p = .297$ and on Factor Set 2, $r = -.1768$, $p = .148$; therefore, the hypothesis was rejected.

Hypothesis 5 stated that there was a significant relationship between mobility and hospitalizations annually of patients with COPD. There was no significant relationship between the mobility subscale score and

frequency of hospitalization. Data analysis of Factor Set 1 showed $\underline{r} = -.2084$, $\underline{p} = .108$ and on Factor Set 2, $\underline{r} = -.1329$, $\underline{p} = .216$. Therefore, the hypothesis was rejected.

Hypothesis 6 stated that there is a significant relationship between motivation and hospitalization annually of patients with COPD. There was no significant relationship between the motivation subscale score and frequency of hospitalization. The correlation on Factor Set 1 was $\underline{r} = -.1753$, $\underline{p} = .150$, and on Factor Set 2, $\underline{r} = -.1706$, $\underline{p} = .156$. Therefore, the hypothesis was rejected.

Hypothesis 7 stated there is a significant relationship between psychomotor skills and hospitalizations annually of patients with COPD. There was no significant relationship at the .05 level between the psychomotor skills subscale score and frequency of hospitalization. The correlations on both factor sets approached significance, with $\underline{r} = -.2587$, $\underline{p} = .061$ on Factor Set 1, and $\underline{r} = -.2629$, $\underline{p} = .058$ on Factor Set 2. The hypothesis was, nevertheless, rejected.

Multiple regression was also used to analyze the data, using the stepwise method (Kerlinger & Pedhauzer, 1973). With self-care agency being represented by the total AS-CA score, the multiple $\underline{r} = .3981$ when regressed to the demographic variables, and age was the only variable

entered, $p = .0795$ (Table 7). When the subscale scores were regressed stepwise as dependent variables, two subscales were entered with age (Table 7). Cognitive skills and age had a multiple $r = .34762$, $p = .0553$, and motivation and age were correlated at multiple $r = .35277$, $p = .0516$. These findings were further supported by a significant Pearson r on both Factor Sets 1 and 2, $r = -.3447$, $p = .018$ and $r = -.2871$, $p = .042$, respectively (Tables 5 and 6).

Another significant relationship was noted, the mobility subscale score and current use of steroid drugs. The $r = .3261$, $p = .037$, a positive correlation in that increased mobility was related to steroid use, on Factor Set 1. The correlation became nonsignificant at the .05 level following analysis using the refactored subscales, $r = .2612$, $p = .078$.

One other interesting finding was noted in the correlational matrix. The cognitive skills subscale score was correlated with age at $r = -.1782$, $p = .146$ on Factor Set 1. After subscale revision, $r = -.2579$, $p = .062$, not significant at the .05 level, but approaching significance. Differences in the subscale scores are depicted in Table 8.

Table 8

Scores on the AS-CA and Subscale Items

	Factor Set 1		
	<u>Range</u>	<u>Mean</u>	<u>S.D.</u>
Total	17-64	48.676	8.370
Subscale 1 Cognitive	0-4	3.088	.744
Subscale 2 Mobility	0-4	2.638	.738
Subscale 3 Motivation	1-4	3.667	.638
Subscale 4 Psychomotor	1-4	3.034	.587
	Factor Set 2		
	<u>Range</u>	<u>Mean</u>	<u>S.D.</u>
Subscale 1 Cognitive	0-4	3.182	.690
Subscale 2 Mobility	0-4	2.968	.787
Subscale 3 Psychomotor	0-4	2.507	.841
Subscale 4 Motivation	1-4	3.480	.647
Subscale 5 Miscellaneous	2-4	3.000	.497

Reliability and Validity

Limited reliability and validity of the AS-CA was discussed in Chapter III, specifically the section on the pilot study. The AS-CA and its precursor, the PS-CA, had been tested in sample populations which were previously healthy. Since the population for the current research was known to have a chronic disease, further reliability and validity measures were necessary.

Reliability was evaluated using coefficient alpha, which was .82 in the first factor set, and .85 in the second. Test-retest reliability remains to be evaluated with the AS-CA tool.

Construct validity of the AS-CA tool was tested through factor analysis. Factor analysis reduces numbers of variables, such as test items, into a smaller number of underlying unities (Kerlinger & Pedhauzer, 1973). The variables must be correlated for these unities, or factors, to emerge. Factor analysis was used to create the PS-CA tool, and to modify the PS-CA tool into a shorter tool, the AS-CA. The original factors, or subscales, and the latter ones, are depicted in Table 4. The factors which emerged during the current data analysis are depicted in Table 9. A criterion loading level of .40 had been set for the items to be retained in a factor. All 16 items loaded on at

Table 9

Factor Analysis of the AS-CA with COPD Patients

Item	Factors				
	1	2	3	4	5
1	.489	.082	.089	.541	-.445
2	-.015	.083	.790	.021	.121
3	.736	.053	.334	.432	-.003
4	.483	-.108	.639	.358	.052
5	.820	-.009	.028	-.060	-.261
6	.072	.619	-.119	.155	.479
7	.087	.019	.025	.915	.118
8	-.069	.012	.234	.051	.853
9	.834	-.111	.060	.271	.082
10	.055	.400	.813	-.033	.010
11	.603	.281	.105	.416	.042
12	.585	.209	.531	.047	.347
13	.835	.151	-.036	-.090	-.017
14	.155	.798	.356	.078	-.020
15	.094	.946	.053	-.197	-.077
16	-.061	.888	.166	.141	.045
Items loading	1,3,4,5,9, 11,12,13	6,10,14, 15,16	2,4,10, 12	1,3,7, 11	1,6,8

least one factor at the .40 level or greater, with several items loading on more than one factor (see the X in Table 4). All four of the original, and the pilot study, factors survived the factor analysis. Some items moved from one factor to a different factor during the analysis of data. Changes in factor loading may be related to the differences in health status from the original and pilot subjects to the COPD subjects.

Differences were also noted in the subscale correlations (Tables 10 and 11), from Factor Set 1 to Factor Set 2. In the initial factoring, all of the subscales were correlated at less than $p = .05$ except cognitive skills with mobility, $r = .1153$, $p = .248$. These two subscales also accounted for 87.9% of the variance when the subscales were factored using principle components analysis (PCA). Examination of the subscales using PCA generated just two factors, indicating that the AS-CA has two major subscales, and that the remaining two subscales together account for only 12% of the variance. The data generated by the factor analysis and the PCA of the subscales indicate that the AS-CA could be shortened by deleting items which do not contribute to the variance. PCA of all items indicates that at least 4 items could be deleted (Table 12). However, the communality of each item

Table 10

AS-CA Subscale Correlations (Factor Set 1)

	Subscale 1 (Cognitive)	Subscale 2 (Mobility)	Subscale 3 (Motivation)	Subscale 4 (Psychomotor)
Subscale 1 (Cognitive skills)	1.00	.1153 p = .248	.6683 p = .000	.3909 p = .008
Subscale 2 (Mobility)	.1153 p = .248	1.00	.3343 p = .022	.7671 p = .000
Subscale 3 (Motivation)	.6682 p = .000	.3343 p = .022	1.00	.5377 p = .000
Subscale 4 (Psychomotor skills)	.3909 p = .008	.7671 p = .000	.5377 p = .000	1.00

Table 11

AS-CA Subscale Correlations (Factor Set 2)

	Subscale 1	Subscale 2	Subscale 3	Subscale 4	Subscale 5
Subscale 1 (Cognitive)	1.00	.2721 p = .248	.5904 p = .000	.8782 p = .008	.5009 p = .001
Subscale 2 (Mobility)	.2721 p = .052	1.00	.5611 p = .000	.2581 p = .062	.4974 p = .001
Subscale 3 (Psychomotor)	.5904 p = .000	.5611 p = .000	1.00	.4475 p = .003	.4101 p = .006
Subscale 4 (Motivation)	.3909 p = .008	.7671 p = .062	.5377 p = .003	1.00	p = .000
Subscale 5 (Miscellaneous)	.5029 p = .001	.4974 p = .001	.4101 p = .006	.5548 p = .000	1.00

Table 12

AS-CA Principle Components Analysis

Item	Communality	Eigenvalue	% of Variance
1	1.00	5.35783	33.5
2		3.01036	18.8
3		1.74585	10.9
4		1.26275	7.9
5		1.05024	6.6
6		.78967	4.9
7		.63399	4.0
8		.57342	3.6
9		.40838	2.5
10		.33736	2.1
11		.27331	1.7
12		.19994	1.2
13		.11689	.7
14		.09764	.6
15		.08803	.6
16	1.00	.05435	.3

considered as a variable with each other item is 1.00, indicating that the items are measuring a central concept (Kerlinger & Pedhauzer, 1973).

Additional Findings

Using frequency of admission as an ordinal variable, discriminant analysis was used on the subscale means to look for significant differences. The F score and level of significance is depicted in Table 13. Admission groups were coded 1 = no admissions, 2 = one admission, and 3 = two or more admissions. Significant differences at the .05 level were found in both Factor Sets, but the findings were different. Wilks Lambda was used to determine which admission group differed significantly (Table 13). In the first Factor Set, admission group 3 differed from groups 1 and 2 on the mobility subscale, $\Lambda = .82607$, $p = .0390$. However, analysis of the second Factor Set indicated that admission group 3 differed significantly on the psychomotor skills subscale, $\Lambda = .82107$, $p = .0350$. Statistical analysis indicates that the subjects with the greatest number of admissions had the lowest scores on the mobility and/or psychomotor skills subscales.

Analysis of variance (ANOVA) on the total and subscale means by admission group was also performed. There was no significant differences between total AS-CA scores by

Table 13

Discriminant Analysis: Admission Group by Subscales

Subscales	Factor Set 1		Factor Set 2	
	F	p	F	p
1. Cognitive skills	.309	.7362	.9111	.4117
2. Mobility	3.574	.0390	2.034	.1465
3. Motivation	.5456	.5845	.7250	.4917
4. Psychomotor skills	2.823	.0734	3.705	.0350
5. Miscellaneous	--	--	1.317	.2812

Wilks Lambda (Λ) df 1,34					
2 Mobility	$\Lambda = .82627$ X2 = 6.4885	p = .0390	4. Psychomotor skills	$\Lambda = .82107$ X2 = 6.7030	p = .0350
Admission Group	1	2	Admission Group	1	2
	2	.35615		2	.10506
	3	5.0428	6.4774	3	5.9016
					6.179

admission group, $F = 2.5631$, $p = .0919$. However, ANOVA by admission group on the subscale means, Factor Set 1 was significant, $F = 26.0610$, $p < .0001$ and on Factor Set 2, $F = 15.0503$, $p < .0001$. Post hoc tests (Student-Newman-Keuls) on the subscale mean differences indicated significant differences at the .05 (Table 14). One-way ANOVA on the first Factor Set on the mobility subscale by admission group resulted in $F = 3.7047$, $p = .0350$.

Post hoc Student Newman-Keuls on the mobility subscale mean by admission group showed that groups 1 and 2 differed from group 3 at the .05 level. On Factor Set 2 with the mobility subscale by admission group, $F = 3.5745$, $p = .0390$. Post hoc Student Newman-Keuls tests were significant at the .05 level, with the same results as the first Factor Set.

Based on the above findings, the admission groups were separated into two groups, 1 = zero to one admission, and 2 = two or more admissions, and t-tests were performed. The admission groups were compared with the total AS-CA score and the cognitive skills and mobility subscales, on the second Factor Set only (Table 15). Significant differences were noted on the total score, $t = 2.29$, $p = .028$, and on the mobility subscale, $t = 2.63$, $p = .013$.

Table 14

Post Hoc Tests on Analysis of Variance Between Subscales

		Factor Set 1				
Mean	Group	2	4	1	3	
2.6380	2 Mobility					
3.0340	4 Psychomotor skills	*				
3.0880	1 Cognitive skills	*				
3.6670	3 Motivation	*	*	*		
		Factor Set 2				
Mean	Group	3	2	5	1	4
2.5070	3 Motivation					
2.9690	2 Mobility	*				
3.0000	5 Miscellaneous	*				
3.1820	1 Cognitive skills	*				
3.3800	4 Psychomotor skills	*	*	*		

Table 15

ANOVA Between Admission Groups

Variable	F	p	T	p
Total score	3.24	.024	2.29	.028
Cognitive skills	5.04	.002	.64	.526
Mobility	2.04	.171	2.63	.013

The t was not significant on the cognitive skills subscale, but the $F = 5.04$, $p = .002$.

Summary of Findings

Analysis of the data indicates that none of the hypotheses were accepted relating self-care agency to frequency of hospitalization. However, other significant findings were noted for which hypotheses had not been proposed. Specifically, these were a change in the factor structure of the AS-CA tool, and significant differences on the mobility and psychomotor skills subscales by frequency of admission. Also significant differences on all subscale means were noted when admissions were separated into two groups, zero to one admissions, and two or greater admissions.

CHAPTER V

SUMMARY OF THE STUDY

The problem of the study was to determine if a relationship existed between self-care agency and frequency of hospitalizations in persons with chronic obstructive pulmonary disease. The study tested the construct self-care agency, using the Assessment of Self-Care Agency tool, which was developed using Dorothea Orem's Theory of Self-Care. Orem's conceptual framework is designed to help nurses diagnose and prevent or treat self-care deficits or health deviations.

The analysis of data did not provide support for Orem's Theory of Self-Care if one adheres strictly to the standards of statistical significant testing. However, many of the findings were close to the 0.05 level of significance.

In Chapter I, three propositions from Orem's theory and the NDCG were cited as a basis for the current research. Each of these propositions will be discussed in relation to the statistical analysis of the data.

Proposition 1 states: Self-care agency is a complex acquired human characteristic or quality.

The pilot data, and the current research support the proposition that self-care agency is a complex construct. Data gathered for reliability and validity of the AS-CA are particularly useful in support of Proposition 1. Specifically, there was a coefficient alpha of from .82 to .85 which supports internal reliability, and the results of factor analysis which supports the contention that self-care agency is represented by four constructs--cognitive skills, mobility, motivation, and psychomotor skills (Table 4). Since both the pilot and current research involved an elderly sample, the probability that self-care agency is acquired is supported by the fact that the average score on the AS-CA ranged from 49 in the current research to 53 in the pilot study, both greater than a 75% score.

Proposition 2 stated: Self-care agency can be characterized as an action repertoire of an individual.

Although there was no significant relationship between the mobility or psychomotor skills subscales and frequency of admission on the Pearson correlations, these two subscales were consistently statistically significant on the discriminant analysis, and on the ANOVA findings.

In addition, subsequent comparison of the pilot and current research data using multiple regression and MANOVA, indicates statistically significant findings between the

two groups on the mobility subscale, $F = 3.69$, $p = .058$, and on the psychomotor subscale, $F = 5.409$, $p = .02$. On the multiple regression analysis, $MR = .614$ for the psychomotor subscale, with $R^2 = .38$, and $F = 16.93$, $p < .0001$. The older "healthy" pilot group was more mobile and dextrous than the younger chronically ill COPD sample.

Proposition 3 states: Self-care agency can be characterized in terms of abilities and limitations of an individual for engagement in self-care.

Support for Proposition 3 can be noted in the findings cited for both Proposition 1 and Proposition 2. In Orem's theory, self-care can be provided for an individual by another individual when personal abilities are insufficient (sometimes called nursing). Provision of self-care for the subjects with COPD by a nurse or significant other was not addressed in either the pilot or current research, so support for Proposition 3 cannot be fully documented at this time. Modification of the AS-CA tool to include the amount or percentage of self-care provided by a nurse(s) or significant others, might provide additional information for support of Proposition 3, and for assessment of self-care agency.

Therefore, some of the findings may be useful for nursing, particularly in caring for chronically ill

patients, specifically those with COPD, and in assessing self-care agency.

Summary

The current research used a descriptive correlational methodology. After a reliable and valid instrument was developed, the investigator obtained permission to conduct the study in a pulmonary clinic. The investigator and research assistants gathered data from 37 subjects with chronic bronchitis and/or emphysema who met the criteria for inclusion in the study.

The patients in this sample were 17 females and 20 males between the ages of 50 and 85. Each subject completed the AS-CA tool, which was used to test the seven hypotheses.

The seven research hypotheses were:

1. There is a significant relationship between self-care agency and the number of hospitalizations annually of patients with COPD.
2. There is a significant relationship between age and self-care agency of patients with COPD.
3. There is a significant relationship between gender and self-care agency of patients with COPD.

4. There is a significant relationship between cognitive skills and hospitalizations annually of patients with COPD.

5. There is a significant relationship between mobility and hospitalizations annually of patients with COPD.

6. There is a significant relationship between motivation and hospitalizations annually of patients with COPD.

7. There is a significant relationship between psychomotor skills and hospitalizations annually of patients with COPD.

Data on Hypotheses 1 through 7 were analyzed using Pearson product moment correlation coefficients, and multiple regression. Analysis of variance was also used to examine the data for significant differences on the subscale scores by age, gender, and frequency of hospitalization.

Reliability indices were computed using Cronbach's alpha. The coefficient alpha ranged from .82 on the first Factor Set to .85 on the second Factor Set. Validity of the AS-CA was established using factor analysis, and Principle Components Analysis. All items on the AS-CA loaded on one or more factor at .40 or greater. The

subscales cognitive skills and mobility were not correlated at the .05 level, and accounted for 87.9% of the variance. Each of these two subscales was significantly correlated with the remaining two subscales, motivation and psychomotor skills, which were also significantly correlated.

Discussion of Findings

Analysis of the demographic data revealed that the average age of the patients was 68.4, with a standard deviation of 9.34. Half of the patients had not been admitted in the past 12 months, and the other half had been admitted 1-5 times. Eight were taking steroid drugs and five had been on a ventilator during admission.

The average total score on the AS-CA was 48.676, standard deviation 8.370, as compared to an average total score in the pilot study of 53, standard deviation 7.4. Analysis of variance on the total score between the two groups found an $F = 6.673$, $p = .01$.

No significant relationship was found between self-care agency and frequency of hospitalization, although there was a negative correlation accounting for 6% of the variance. When admissions were categorized into two groups, 0-1 and 2 or greater, a significant difference, $p = .028$ was noted on the total AS-CA score. This finding

was significant even though the former group accounted for 29 of the 37 patients. If equal numbers of patients had been represented in the two groups, greater confidence might be placed in these findings. However, part of the increased level of significance may be related to conversion of ratio to ordinal data, and use of a parametric statistical technique, ANOVA.

No significant relationship was noted between age and self-care agency as represented by the total AS-CA score. However, age was significantly negatively correlated with motivation. This indicates that as the patients age, they are less motivated to care for themselves.

No significant relationship was found between gender and self-care agency in any analysis. The fact that in this sample gender was divided almost equally is of interest. In the past, COPD was primarily a disease of males because more males smoked cigarettes than females (Sexton, 1985). However, in the past 3 decades smoking has increased among women, and the research sample appears to be representative of the trend. The lack of significance of the hypothesis also indicated that the construct self-care agency is stable regardless of gender.

Cognitive skills were not significantly related to frequency of admission. This finding is important in that

nurses use discharge teaching as a primary modality for decreasing hospitalization. This finding was also consistent with findings in the pilot study. Therefore, nurses may need to assess other self-care areas than knowledge level in order to affect frequency of hospitalizations.

No significant relationship was found between mobility and frequency of hospitalization. However, when discriminant analysis was performed and frequency of admission was coded into groups, the group of patients with two or more admissions scored significantly lower on the mobility subscale, $p = .0390$. This finding was evident with the first Factor Set using Wilk's Lambda, and was confirmed in the first and second Factor Sets by ANOVA. Post hoc tests indicated significant differences at the .05 level between mobility and all other subscale scores.

No significant relationship was found between motivation and frequency of admission. However, on ANOVA of the admission groups, there was a significant difference on the motivation subscale score and all other subscale scores when admissions were two per year or greater.

Psychomotor skills were not significantly correlated with frequency of admission. On analysis of variance among the three admission groups, the third group, with two or

more admissions had psychomotor skills subscale means significantly lower, at the .05 level, than the other admission groups.

Other interesting findings not tested by the research hypotheses were noted. Multiple regression analysis found a multiple r of $-.31981$ between self-care agency and age, $p = .0795$, not significant at the .05 level. Age was also negatively correlated with the cognitive skills and motivation subscales, $p = .0553$ and $.0516$, respectively. These findings suggest that as the patient ages, self-care agency decreases.

Mobility was positively correlated with use of steroid drugs, $p = .037$. That finding is consistent with the expected effects of steroids on the well-being of the patient, and on the increase in joint flexibility provided by an anti-inflammatory agent.

Conclusions and Implications

Because the research hypotheses were rejected, no conclusions may be drawn. However, some of the findings may be useful to the population from which the sample was drawn. Although none of the hypotheses were supported, other findings in the study support the existence and usefulness of the construct self-care agency. The AS-CA

tool proved to be a valid, reliable, and efficient means of assessing self-care agency.

Factor analysis indicates that tool modification would be helpful, particularly in assessing patients with chronic disease. Specifically, rewording or deletion of Item 8 might be helpful to the patients, and would result in a tool with the original four factors.

No previously published research studies dealt with patient assessment of self-care agency in a COPD population. Results from the current sample indicate that subjects with COPD respond differently to the AS-CA than the pilot study subjects, who were presumed to be healthy.

The average age of the subjects was lower than that of the pilot study, yet the mean AS-CA score was 5 points lower in the younger, chronically ill sample. Even though age was not statistically significant in relation to the AS-CA score, age was related to the subscales of cognitive skills and mobility at significance levels close to .05. Subjects with chronic illnesses may have less self-care agency than clients who are older and have decreasing cognitive skills and less motivation.

Self-care agency, in this sample, does not appear to be affected by gender, implying that men are as capable as women of maintaining self-care.

The findings in the study suggest that the less mobile the client, the greater the likelihood of hospitalizations. Subjects who received steroid drugs scored significantly higher on the mobility subscale than the other subjects. Considering that there were only 5 of the 37 in that group, this was an interesting result. Subjects on steroids were more capable of maintaining self-care because of their increased mobility.

Patients who were admitted twice or more in a 12-month period had significantly lower mean scores on all subscales, indicating an increased need for specific assessment of self-care needs, and a comprehensive plan of care designed to increase cognitive and psychomotor skills, improve mobility and determine useful motivators.

Recommendations for Further Study

As a result of the current study, the researcher determined the need for the following areas of study:

1. Replication of the study with equal numbers of patients in each admission category, and a larger total sample.
2. Comparison of the pilot study data with the current research data to determine significant differences between a "healthy" and a "chronically ill" sample.

3. Comparison of COPD patient's on self-care agency between subjects involved in a multidisciplinary rehabilitation program and those subjects receiving traditional conservative therapy.

4. Qualitative methodology to determine through interviews which areas of self-care the patients perceived the most difficulty in managing.

5. Replication of the study using subjects with other chronic diseases, particularly for reliability and validity of the AS-CA.

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APPENDIX A
Human Subjects Exemption Form

APPENDIX B
Agency Permission

APPENDIX C

Graduate School Permission



P.O. Box 22479 Denton, Texas 76204 (817) 898-3400, Metro 434-2863, Tex-An 341-3400

THE GRADUATE SCHOOL

June 3, 1987

Ms. Sheryl A. Cleveland
1565 Mesquite
Wichita Falls, TX 76302

Dear Ms. Cleveland:

I have received and approved the Prospectus for your research project. Best wishes to you in the research and writing of your project.

Sincerely yours,

A handwritten signature in cursive script that reads "Leslie M. Thompson".

Leslie M. Thompson
Provost

LMT:ccw

xc: Dr. Anne Gudmundsen

APPENDIX D

Assessment of Self-Care Agency Tool

Dear Patient:

I am a doctoral candidate at Texas Woman's University. The attached questionnaire is being used for nursing research for my dissertation. It will take approximately fifteen minutes to complete. I appreciate your participation in this study.

A handwritten signature in cursive script that reads "Sheryl A. Cleveland". The signature is fluid and elegant, with a long, sweeping tail on the final letter.

Sheryl A. Cleveland, R.N., M.S.N.
Doctoral Candidate

ASSESSMENT OF
SELF-CARE AGENCY
TOOL

COMPLETION OF THIS QUESTIONNAIRE INDICATES MY WILLINGNESS TO PARTICIPATE IN THIS RESEARCH STUDY. I UNDERSTAND THAT MY RESPONSES ARE COMPLETELY CONFIDENTIAL, AND WILL ONLY BE USED FOR THIS RESEARCH.

DEMOGRAPHIC DATA

AGE _____ MALE _____ FEMALE _____ NUMBER OF HOSPITAL ADMISSIONS IN THE PAST TWELVE MONTHS _____ USUAL REASON FOR ADMISSION _____

OF DAYS HOSPITALIZED _____ STEROIDS? _____ VENTILATOR USE? _____

PLEASE ANSWER EACH OF THE ITEMS IN THE QUESTIONNAIRE BELOW BY CIRCLING THE RESPONSE THAT IS MOST LIKE YOU BELOW EACH ITEM.

1) I USE INFORMATION I GET TO HELP ME TAKE CARE OF MYSELF BETTER.

ALWAYS USUALLY SOMETIMES RARELY NEVER

2) MY ENDURANCE FOR DOING PHYSICAL WORK IS GOOD.

ALWAYS USUALLY SOMETIMES RARELY NEVER

3) I WANT TO BE ABLE TO TAKE CARE OF MYSELF.

ALWAYS USUALLY SOMETIMES RARELY NEVER

4) I HAVE THE ABILITIES I NEED TO CARE FOR MYSELF.

ALWAYS USUALLY SOMETIMES RARELY NEVER

5) I LOOK AT THE PRO'S AND CON'S OF THE OPTIONS I HAVE WHEN I MAKE A DECISION.

ALWAYS USUALLY SOMETIMES RARELY NEVER

6) MY JOINTS ARE FLEXIBLE.

ALWAYS USUALLY SOMETIMES RARELY NEVER

7) IT REALLY MATTERS TO ME IF I CAN CARE FOR MYSELF.

ALWAYS USUALLY SOMETIMES RARELY NEVER

8) I CAN DO ALL MY SELF-CARE BECAUSE I HAVE ENOUGH SKILLS.

ALWAYS USUALLY SOMETIMES RARELY NEVER

- 9) ONCE I DECIDE ON A COURSE OF ACTION AND CARRY IT OUT I CHECK TO SEE IF IT IS WORKING.
- ALWAYS USUALLY SOMETIMES RARELY NEVER
- 10) I HAVE GOOD MUSCLE STRENGTH.
- ALWAYS USUALLY SOMETIMES RARELY NEVER
- 11) I KNOW I MUST TAKE CARE OF MYSELF.
- ALWAYS USUALLY SOMETIMES RARELY NEVER
- 12) I HAVE A COMBINATION OF SKILLS THAT HELP ME TO TAKE CARE OF MYSELF.
- ALWAYS USUALLY SOMETIMES RARELY NEVER
- 13) I CAN FIGURE OUT THE STEPS I NEED TO TAKE IN ORDER TO CARE FOR MYSELF.
- ALWAYS USUALLY SOMETIMES RARELY NEVER
- 14) I CAN BALANCE MY BODY EASILY.
- ALWAYS USUALLY SOMETIMES RARELY NEVER
- 15) IT IS EASY FOR ME TO CHANGE MY BODY FROM ONE POSITION TO ANOTHER.
- ALWAYS USUALLY SOMETIMES RARELY NEVER
- 16) I CAN MAKE MY BODY AND ALL ITS PARTS MOVE.
- ALWAYS USUALLY SOMETIMES RARELY NEVER