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THE EFFECT OF THE PRACTICE OF DEEP BREATHING EXERCISES ON
THE FUNCTIONAL STATUS OF PATIENTS WITH
OSTEOARTHRITIS AND RHEUMATOID ARTHRITIS

A Thesis

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ABSTRACT

This experimental study was conducted to determine if the daily practice of deep breathing exercises would have an influence on the functional capacity of patients with osteoarthritis or rheumatoid arthritis. The purpose of the study was to determine within the conceptual framework of Orem's self-care theory whether specific relationships exist between the practice of daily deep breathing exercises and (a) ability to perform activities of daily living, (b) grip strength, (c) pain level, (d) self-assessment of condition, (e) degree of limitation, and (f) satisfaction with medical condition. Of the 32 participants who completed the study, 16 practiced deep breathing exercises on a daily basis while the other 16 were not encouraged to use any coping techniques during the study.

The researcher used the Modified Health Assessment Questionnaire (MHAQ), a widely used self-report instrument, as well as the Visual Analogue Pain Scale. The grip strength was measured by a grip meter. The t test was computed for each variable.

There were no statistically significant differences between the experimental group and the control group, but some important descriptive data were reported. The researcher concluded that more research should be conducted with larger samples over a longer period of time.

TABLE OF CONTENTS

CHAPTER	PAGE
I. STATEMENT OF THE PROBLEM.....	1
Need for the Study.....	2
Purpose of the Study.....	3
Research Questions.....	4
Rationale for the Study.....	4
Theoretical Framework.....	7
Definition of Terms.....	9
Summary.....	9
II. REVIEW OF THE LITERATURE.....	11
Two Most Common Forms of Arthritis.....	11
Osteoarthritis.....	11
Rheumatoid Arthritis.....	13
Two Psychosocial Theories and Self-Control..	15
Self-efficacy Theory.....	15
Coping Theory.....	18
Arthritis Coping Strategies.....	19
Information Seeking.....	19
Intrapsychic Activities.....	21
Biofeedback.....	22
Relaxation Response.....	24
Summary.....	25
III. METHODOLOGY.....	26
Research Questions.....	26
Design.....	27
Subjects.....	27
Protection of Human Rights.....	30
Measurements.....	30
Instruments.....	31
Self-report Questionnaire.....	31
Visual Analogue Pain Scale.....	32
Grip Strength.....	33
Procedure.....	33
Data Analysis.....	35
Summary.....	35
IV. FINDINGS.....	37
Descriptive Data.....	37
Results.....	40
Question 1: Functional Capacity.....	40
Question 2: Grip Strength.....	41
Question 3: Pain Level.....	41
Question 4: Self-assessed Condition.....	42
Question 5: Satisfaction with Medical Condition.....	43
Question 6: Degree of Limitation.....	44

CHAPTER	PAGE
Summary.....	45
V. DISCUSSION OF RESULTS.....	46
Conclusions.....	46
Limitations.....	47
Implication for Nursing Practice.....	48
Recommendations for Future Research.....	49
REFERENCES.....	51
APPENDICES.....	65
APPENDIX A. CONSENT FORM.....	67
APPENDIX B. SELF-REPORT QUESTIONNAIRE.....	69
APPENDIX C. LETTER OF PERMISSION TO USE THE MODIFIED HEALTH ASSESSMENT QUESTIONNAIRE.....	71
VITA.....	72

LIST OF TABLES

TABLE		PAGE
1.	Characteristics of the Sample.....	29
2.	Descriptive Data of Variables for Both Experimental and Control Groups.....	38
3.	Differences in Functional Capacity Between Experimental Group and Control Group.....	40
4.	Differences in Grip Strength Between Experimental Group and Control Group.....	41
5.	Differences in Perception of Pain Intensity Between Experimental Group and Control Group.	42
6.	Differences in Self-assessed Condition Between Experimental Group and Control Group.	43
7.	Differences in Satisfaction with Medical Condition Between Experimental Group and Control Group.....	43
8.	Differences in Degree of Limitation Between Experimental Group and Control Group.....	44

CHAPTER I

STATEMENT OF THE PROBLEM

The person with a chronic disease is ultimately responsible for its management. This well known concept is generally accepted by health care professionals (Hawley, 1989). Chronic diseases are defined as long-term conditions which are not curable, and/or have residual effects that inflict limitations on the functional capacity of the individual (C. E. Lambert Jr. & V. A. Lambert, 1987). The rheumatic diseases, of which there are more than one hundred forms, are the most common chronic diseases in the United States today. Researchers estimate that more than 35 million Americans are afflicted with one or more of the rheumatic diseases, and this figure represents approximately 15% of our population (Spiera & Oreskes, 1991). The Bureau of the Census estimates that arthritis causes some form of activity limitation in approximately 18.9 million Americans (U. S. Department of Commerce, 1987). The two most common forms of rheumatic disease are osteoarthritis and rheumatoid arthritis (Spiera & Oreskes, 1991).

Arthritis significantly affects quality of life and productivity (Crosby, 1988; Lambert, Lambert, Klipple & Mewshaw, 1989). The person with arthritis must learn to cope with the physical problems of pain, fatigue, inflammation, and joint stiffness, as well as the psychosocial problems that these symptoms cause (Spiera &

Oreskes, 1991). Arthritis is usually accompanied by physical, psychological, as well as social stressors (Foxall, Kollasch, & McDermott, 1989).

Need for the Study

The onset of a chronic illness such as arthritis often introduces individuals to numerous difficulties and challenges (Revenson & Majerovitz, 1991). Not only must persons with arthritis include continuing medical treatments in their life-style, they must also allow for changes in their ability to complete formerly routine tasks (Revenson & Majerovitz, 1991). Pollock, Christian and Sands (1990) describe adaptation to a chronic illness as a complex process which "requires a balance between the demands of the situation and the ability of an individual to respond to the demands" (p. 300). Research has demonstrated the need for further knowledge about adaptive responses to chronic illnesses in order to plan appropriate interventions (Pollock, Christian & Sands, 1990). One of the latest developments in research into the puzzle of rheumatoid arthritis is that a feeling of being in control fosters the ability to cope with daily stress or minor hassles (Berkman, 1989; Blalock & DeVellis, 1992). Health care providers should identify and teach the most appropriate coping process for the person afflicted with a chronic illness such as arthritis, availing the patient of sufficient knowledge

to enact the coping behavior whenever necessary (C. E. Lambert Jr. & V. A. Lambert, 1987).

Increasing patient control in decision making about their treatment increases the likelihood that patients will adhere to their chosen treatments (Daltroy & Liang, 1988). Strategies that have been used by arthritis patients to give them a feeling of being in control of their disease include diverting attention and praying (Keefe et al., 1987), cognitive restructuring (Parker et al., 1988), biofeedback (Achterberg, McGraw, & Lawlis, 1981; Flor, Haag, Turk, & Koehler, 1983; Flor, Haag & Turk, 1985), and information seeking (Lorig, Lubeck, Kraines, Seleznick, & Holman, 1985; Parker, Frank et al., 1988; Parker, Smarr et al., 1988). A more detailed literature review of coping strategies used by patients with arthritis will be presented in Chapter II. However, there have been no previous studies on the use of deep breathing for coping with arthritis, although this strategy was suggested as a possible treatment for arthritis nearly a decade ago (Johnson & Repp, 1984).

Purpose of the Study

The purpose of this study was to examine the effect of the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis on the functional status of the disease in these patients.

Research Questions

1. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis improve their functional capacity to do activities of daily living?
2. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis improve their grip strength?
3. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis decrease their perceived intensity of pain?
4. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis improve self-assessment of their condition?
5. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis improve their perceived degree of limitation?
6. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis improve their perceived satisfaction with their medical condition?

Rationale for the Study

Deep breathing exercises have been used in the treatment of people in all stages of health and illness (Kolkmeier, 1988), during childbirth (Johnson & Repp, 1984; Kolkmeier, 1988), burn therapy (Johnson & Repp, 1984), the

recovery period following coronary artery bypass surgery (Miller, 1987), and during the acute phase of recovery from a myocardial infarction (Guzetta & Dossey, 1984). Johnson & Repp (1984) proposed that deep breathing exercises could be used as a self-help coping strategy for arthritis nearly a decade ago, but a literature review by this researcher failed to discover any documentation of studies on the efficacy of deep breathing exercises for coping with arthritis.

People are motivated to change their behavior if they feel in control of decisions and are convinced that their efforts will increase feelings of well-being (Feste, 1987). Deep breathing has been shown to decrease psychological discomforts as well as increase perceived sense of control over mind and body (Benson, 1975; Miller, 1987). Deep breathing is a self-care strategy which can be taught by nurses in any setting, allowing patients to actively participate in their healing process (Kolkmeier, 1988). This researcher hypothesizes that the regular practice of deep breathing exercises by patients with arthritis can evoke the relaxation response, thus increasing participants' sense of control and self-efficacy as well as their willingness to engage in effective coping mechanisms to increase their functional status. Although this is the mechanism through which this researcher believes deep

breathing will be therapeutic, the entire model is not being tested in this study. (See Figure 1.)

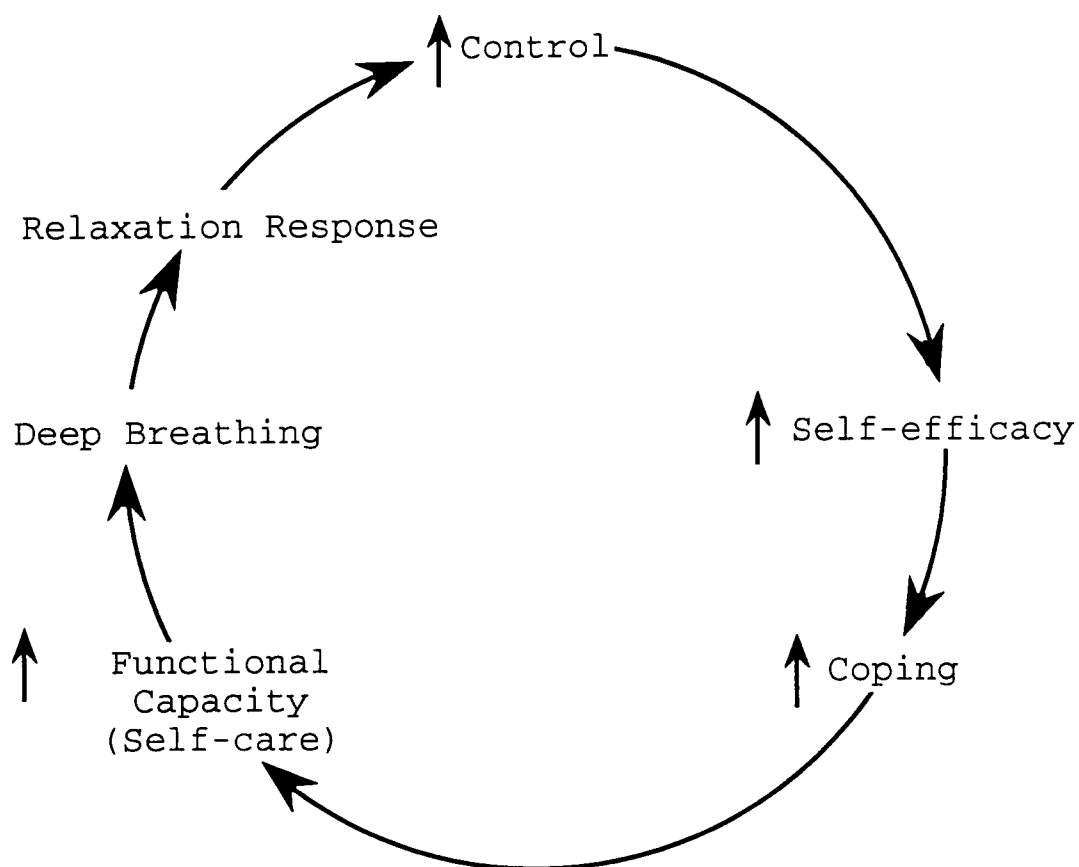


Figure 1. Graphic depiction of a conceptual model of the effect of the practice of deep breathing exercises on the functional status of patients with osteoarthritis or rheumatoid arthritis. Note: The concept of self-efficacy in psychological literature is equivalent to the concept of self-care agency in nursing literature.

Theoretical Framework

Orem's Self-Care Theory

This study is guided by Orem's (1991) self-care theory. The essence of Orem's theory is the concept of self-care agency, which Orem (1991) defined as the "power of an individual to engage in the operations essential for self-care" (p.148). Orem (1991) defined self care as those activities that individuals carry out to regulate their own functioning, health, and well being. Orem stated that all people have universal self-care requisites or needs and some people may have developmental self-care requisites. Orem described a third requisite, health-deviation self-care requisite, that "exists for persons who are ill or injured, have specific forms of pathology, including defects and disabilities, and who are under medical diagnosis and treatment" (Orem, 1991, p. 132).

According to Orem, self-care deficit exists when individuals cannot meet the demands placed on them and the desired behavior for healthy functioning is not produced. Individuals who have insufficient current or projected capability for self-care agency rely on others to assist them. The function of nursing emerges when there is a real or potential self-care deficit. Nursing care may be offered to help individuals sustain life and health, recover from disease or injury, and cope with their effects. Through

their educative function, nurses may also empower patients to increase their self-care agency.

The need for compensatory action to overcome an inability or limited ability to engage in self-care is the basis for a nursing relationship. Orem (1991) defined nursing systems as the series of practical actions of nurses often performed in coordination with actions of patients to meet the therapeutic self-care demands and to protect and regulate the exercise of the patient's self-care agency. Nursing actions include doing or acting for others, guiding and directing, providing physical support, providing psychological support, providing an environment that supports development, and teaching (Orem, 1991, p. 286).

Self-care is considered a complement to professional health care, and interventions directed at enhancing self-care agency of persons with arthritis have become an established part of comprehensive arthritis care (Goeppinger, Arthur, Baglioni, Brunk, and Brunner, 1989). Nursing interventions that promote self-care agency may result in such possible benefits as increased independent functioning, decreased reliance on family and resource services, reduced health care costs and increased feelings of well-being and harmony (Woods, 1989). Deep breathing promotes good mental and physical health by providing sufficient oxygen to tissues while removing waste products which contribute to anxiety and fatigue (Davis, Eshelman, &

McKay, 1989). Obtaining evidence that the practice of deep breathing exercises has any effect on the functional status of arthritis can expand our understanding of the extent to which people with arthritis can apply self-care strategies to modify their health status, thus increasing their self-care agency.

Definition of Terms

Functional capacity. The extent to which people are able to do activities of daily living such as washing and dressing themselves, walking on flat ground, and getting in and out of a car.

Grip strength. The amount of pressure a person is able to exert by squeezing the hand as firmly as possible.

Pain. A perceived discomfort resulting from mild to severe noxious stimuli. The perception of pain is influenced by both cognitive and behavioral components.

Self-assessed condition. An evaluation of the way subject generally feels at present compared to one month ago. The highest rating is "much better than one month ago" and the lowest rating "much worse than one month ago."

Degree of limitation. The extent of restrictions on subject's ability to do the things subject wants to do.

Satisfaction with medical condition. The amount of contentment with state of health in response to therapeutic interventions.

Summary

Chapter I identifies osteoarthritis and rheumatoid arthritis as the two most common chronic diseases and describes their prevalence as well as the impact they have on quality of life and psychosocial adjustment. This chapter also identifies the purpose of this study as well as discusses the need for this study. In this chapter are presented the research questions. Orem's self-care theory is described and the rationale for using this as a framework to guide this study is explained. Nominal definitions of dependent variables are presented.

CHAPTER II

REVIEW OF THE LITERATURE

The literature related to the psychosocial therapy of persons with arthritis is reviewed in this chapter. A chronic illness such as arthritis tends to have a significant psychosocial impact on patients due to the pain, unpredictable course of the disease, and the varying symptomatology (Bill-Harvey, Rippey, Abeles & Pfeiffer, 1989; Revenson & Majerovitz, 1991). Although there are more than one hundred forms of arthritis, the two most common forms are osteoarthritis and rheumatoid arthritis (Spiera & Oreskes, 1991). The physical as well as psychosocial impact of these two chronic illnesses are presented in this chapter.

Two Most Common Forms of Arthritis

Osteoarthritis

Osteoarthritis is the most common rheumatic disease, affecting an estimated 16 million Americans, most of whom are over age 55 (Oreskes & Spiera, 1991). Evidence of osteoarthritis has been found in all vertebrate animal species including dinosaurs, and in humans it occurs in all races (Rosner & Moscovitz, 1991). Osteoarthritis, also called degenerative joint disease, is characterized pathologically by progressive deterioration of articular cartilage and is manifested clinically by slowly developing joint pain and limitation of motion (Schumacher, Klippel, &

Robinson, 1988). In most cases osteoarthritis is mild but it can lead to significant pain and disability, especially when the involved joints are critical to activities of daily living (Sands & Matthews, 1988). The cause of osteoarthritis is not known but there appears to be an increased frequency of osteoarthritis in obese patients and those exposed to prolonged occupational or sports stress (Felson, 1992; Rosner & Moscovitz, 1991).

Treatment for osteoarthritis must be individualized. Many patients require little more than reassurance that they have a benign form of arthritis instead of the more crippling forms such as rheumatoid arthritis (Schumacher, Klippel, & Robinson, 1988). Therapeutic interventions are supportive in nature (Phillips, 1989). Patients are taught joint protection, especially if weight-bearing joints are affected. The use of assistive devices such as walkers are encouraged (Schumacher, Klippel & Robinson, 1988). Aspirin, if tolerated, is the analgesic of choice in the treatment of osteoarthritis, although the use of nonsteroidal antiinflammatory agents is receiving increased acceptance (McCarty, 1989). Research has shown that therapeutic strengthening and stretching joint exercises result in improved patient comfort and function; therefore, such exercises have become an important part of the management of osteoarthritis (Dexter, 1992). Orthopedic surgical procedures of use in treating osteoarthritis include

arthroplasty, fusion, and partial or total prosthetic replacement. Advances in hip and knee replacement surgical procedures have resulted in striking symptomatic relief and improved range of motion (Schumacher, Klippel, & Robinson, 1988). Psychological strategies for coping with osteoarthritis include participation in a support group, humor, imagery, and biofeedback (Phillips, 1989).

Rheumatoid Arthritis

Rheumatoid arthritis is a chronic, systemic inflammatory disease which has a worldwide distribution involving all racial and ethnic groups (Abruzzo & Bender, 1991). The prevalence of rheumatoid arthritis in the United States is estimated to be between 0.3 percent and 1.5 percent of the population (Zvaifler, 1989), with women being affected three times more often than men (Ignatavicius, 1987). The disease occurs in all age groups and generally increases in incidence with advancing age (Zvaifler, 1989). Although the cause of rheumatoid arthritis is unknown, researchers have accumulated much evidence to indicate "an autoimmune etiology, which may be precipitated by severe infection, a drug reaction, or stress" (Groer & Shekleton, 1989, p. 76).

Although there is no known cure for rheumatoid arthritis, there are effective treatment modalities which are directed toward controlling the disease and preventing deformities (V. A. Lambert & C. E. Lambert Jr., 1987). A

comprehensive treatment program includes drug therapy, psychosocial support, individualized physical therapy, and corrective orthopedic surgery when the disease results in painful deformities (Abruzzo & Bender, 1991).

Although persons with arthritis often must make total readjustments in their lifestyles, coping mechanisms are often overlooked in the health care practice of today (V. A. Lambert & C. E. Lambert Jr., 1987). Studies have found decreased psychosocial adjustment among people with arthritis (Parker, McRae et al., 1988). The psychosocial components of arthritis have not received adequate attention in the physician's office nor in the research literature; therefore, there is a need for further research to identify possible psychological variables that may be associated with a change in health status in people with arthritis (Regan, Lorig, Thoresen, 1988). Recent advances in behavioral medicine have stimulated new attention to the link between psychological factors and health (Beckham, Gustafson, May, and Annis, 1987). There is growing awareness of the importance of psychosocial aspects of joint disease (Spergel, 1988).

Psychosocial adjustment varies considerably among arthritis patients, with some individuals coping effectively and adjusting to the limitations of their condition while others fare poorly (Keefe, Brown, Wallston, & Caldwell, 1989). Since there is no cure for arthritis it is

especially consequential to identify and discern the psychosocial factors that mediate between this chronic disease, its associating pain, and adjustment (Smith, Dobbins, & Wallston, 1991). An understanding of factors that lead to good adjustment can possibly enable us to develop and test interventions designed to enhance the self-care agency of those with poor psychosocial adjustment (Smith, Dobbins, & Wallston, 1991).

Two Psychosocial Theories and Self-control

Two psychosocial theories with an emphasis on self-control that have the potential to guide the practice of clinicians as well as the health behavior change process are self-efficacy theory and coping theory (Gonzalez, Goeppinger, & Lorig, 1990). Self-efficacy, a behavior-specific psychological construct, was developed by Bandura (1977) and has been studied extensively by him and his colleagues. Self-efficacy has been proven to be an important determinant of outcome in coping with or overcoming illness (Allegrante, MacKenzie, Robbins, & Cornell, 1991; Abler & Fretz, 1988). The coping theory developed by Lazarus and Folkman (1984) fits well with the self-efficacy theory (Gonzalez, Goeppinger, & Lorig, 1990) and is used in this discussion.

Self-efficacy Theory.

Bandura (1990) noted that expectations of personal efficacy are determinants of whether coping behavior will be

initiated, the amount of effort that will be put forth, and how long it will be sustained. Bandura (1990) has shown that people's perception of their ability to manage a specific situation affects their behavior, motivation, thoughts, and emotions. Self-efficacy is behavior specific and thus differs from the related psychological constructs: learned helplessness, locus of control, and self-esteem (Lorig, Chastain, Ung, Shoor, & Holman, 1989). Self-efficacy deals with one's belief that one can achieve a behavior or state of mind and is therefore not a measurement of actual performance (Gonzalez, Goepfinger, & Lorig, 1990).

According to Lorig and colleagues (1989) "perceived self-efficacy for behaviors that affect health status will predict future health status, given that subjects believe that the outcome of the behavior will be improved health status and that they value health status" (p. 38). Since self-efficacy is not a static trait, it can be altered, associating enhanced self-efficacy with improved health status in areas affected by specific behaviors (Lorig, Chastain, Ung, Shoor, & Holman, 1989). One's perceived self-efficacy to cope with a particular situation or condition is influenced by both resources thought to be available and knowledge and beliefs one brings with them to the situation (Smith & Lazarus, 1990). According to Bandura (1990), successful therapies work by increasing people's sense of self-efficacy which permits participants to

exercise greater control over their behavior and environment.

There is a growing body of research in several areas which provides converging evidence that interventions can increase self-efficacy and consequently increase levels of motivation and capacity to initiate health promoting coping behaviors (Allegrante, Mackenzie, Robbins, & Cornwell, 1991; Gonzalez, Goeppinger, & Lorig, 1990; Lorig et al., 1989). O'Leary (1988) and colleagues demonstrated that a cognitive-behavioral treatment program which focused on teaching arthritis patients pain coping skills not only enhanced self-efficacy but also improved psychosocial functioning and reduced pain. This study provided empirical evidence of the relationship between perceived self-efficacy and treatment efficacy by demonstrating a significant correlation between perceived self-efficacy and magnitude of improvements (O'Leary, Shoor, Lorig, & Holman, 1988).

Lorig and collaborators also demonstrated the applicability of self-efficacy enhancement strategies in the classic work, the Arthritis Self-Management Course, designed to help arthritis patients change behavior and reduce pain by providing patients information about the disease and ways to cope with it (Lorig et al., 1989). The course has as its goal to teach people with arthritis to become self-managers in their own health care (Lorig & Fries, 1986). Lorig and colleagues developed and tested an instrument which has been

shown to be valid in assessing patient's beliefs of self-efficacy to cope with their pain and symptoms related to arthritis (Lorig, Chastain, Ung, Shoor, & Holman, 1989). A study conducted by Kovar et al. (1990) provided further support for the role of self-efficacy-based intervention in improving functional status of patients with osteoarthritis. Kovar and colleagues measured the impact of a walking and patient education program on the functional status of 102 patients with arthritis and found significant improvements in physical activity as well as pain.

Coping Theory.

There is a paucity of literature describing ways people cope with arthritis and the effect of various coping strategies on health status (Regan, Lorig, & Thoresen, 1988). Coping has been conceptualized in a variety of ways over the years and has been associated with such concepts as mastery, defense, and adaptation (Pearlin & Schooler, 1978; Smith, Dobbins & Wallston, 1991). One of the early definitions of coping in psychiatric literature is that provided by Pearlin & Schooler (1978) who referred to coping as "things people do to avoid being harmed by lifestrains" (p. 2). Coping is defined by Lazarus and Folkman (1984) as "the person's constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the person's resources" (p. 141). People cope differently in different

situations and even cope differently in similar situations at different times (Gonzalez, Goeppinger, & Lorig, 1990). Lazarus and Folkman (1984) have identified and described several coping mechanisms which include information seeking, direct action, inhibition of action, intrapsychic processes, and seeking social support. This list is not exhaustive, but does include those strategies that are known to be used by people with arthritis (C. E. Lambert Jr., & V. A. Lambert, 1987).

Arthritis Coping Strategies

Information Seeking.

Information seeking is a coping strategy highly encouraged by today's health care provider through multimedia patient education. Information seeking involves obtaining as much information as possible about the disease process and its implications so that the person will have a basis for planning strategies to cope with the illness (C. E. Lambert Jr., & V. A. Lambert, 1987).

The efficacy of information seeking as a coping mechanism has been studied by evaluating participants in the Arthritis Self-Management Program, a community based patient education program (Buckelew & Parker, 1989). These self-help courses, which are taught by laypersons, cover the disease process, basic therapies, medication, joint protection, coping with psychosocial stressors using Jacobson progressive relaxation and vivid imagery, and

unproven remedies (Lorig & Fries, 1986). Parker et al. (1984) randomly assigned 22 subjects into one of two groups, with members of one group receiving routine medical care for arthritis and members of the other group participating in a patient education program. Both treatment groups improved in overall health status but did not improve in functional status. Parker, McRae et al. (1988) evaluated the coping strategies of 84 patients with rheumatoid arthritis and found that the use of information seeking as a coping mechanism provided no psychological nor functional advantage to the patients in this sample. However, the generalizability of these findings to other rheumatoid arthritis samples is suspect since the study was conducted primarily on subjects from a lower socio-economic sample and the effects of this coping mechanism might be different in a sample with higher education and affluence (Parker et al., 1988). Other studies by Lorig et al. (1985), and Cohen et al. (1986) failed to document improvements in functional status following participation in an arthritis education program, but they did demonstrate a weak association between changes in behavior and changes in health status (Lorig et al., 1989).

Rippey et al., (1987) used computer-assisted patient teaching with 72 subjects having osteoarthritis and found an increase in the use of such coping techniques as rest and heat application. Clark et al. (1991) found better self-

management to be linked less to obtaining information about a specific condition and more to learning how to organize psychosocial resources and implementing problem-solving techniques. Much more research is needed so that patient education programs can be designed that will not only increase knowledge, but will also improve functional status and possibly inhibit disease activity (Buckelew & Parker, 1989).

Intrapsychic Activities.

Another coping mechanism includes intrapsychic activities which Lazarus (1984) described as palliative in nature because they function by increasing the person's sense of well-being through decreasing or minimizing emotional stress. Intrapsychic processes include defense mechanisms such as denial and avoidance, as well as strategies such as relaxation techniques, biofeedback, and positive reappraisal (C. E. Lambert Jr., & V. A. Lambert, 1987). Denial and avoidance can be counterproductive when dealing with most illnesses (Gonzalez, Goeppinger, & Lorig, 1990). Positive reappraisal has been used successfully by many people in coping with arthritis. This coping mechanism allows people to look at their illness as a challenge or an opportunity and enables them to focus on what they can do instead of dwelling on what they cannot do (Gonzalez, Goeppinger, & Lorig, 1990; Lewis, 1985).

Biofeedback.

Biofeedback pioneers Elmer and Alyce Green (1977) described biofeedback as "the power within the human being to self-regulate, self-heal, (and) rebalance" (p. 24). Biofeedback is based on the concept wherein information relayed to the nervous system regarding the correctness of bodily responses is used to guide behavior for more effective functioning (Spergel, 1988). Achterberg, McGraw, & Lawlis (1981) reported successful pain reduction in their study of the effects of biofeedback and relaxation techniques on 24 arthritis patients. Flor et al. (1983) conducted a study of the effects of a biofeedback program with no relaxation component on twenty-four subjects randomly assigned to three different groups and the results supported the effectiveness of a biofeedback intervention alone. A more recent study of 53 rheumatoid arthritis patients by Bradley et al. (1987) also revealed the efficacy of biofeedback as a beneficial therapy for arthritis patients. Biofeedback and relaxation techniques have resulted in significant short-term improvements in arthritis patients (Schumacker, Klippel, & Robinson, 1988), and are effective nonpharmacological independent nursing interventions which are research-based (Bower, 1989).

Rosenstiel and Keefe (1983) created another list of coping strategies which included distracting, activity, ignoring, and prayer. Bill-Harvey, Rippey, Abeles, &

Pfeiffer (1989) interviewed one hundred sixty subjects from two urban, low-income minority communities to identify treatment methods minorities believe to be effective in dealing with rheumatic disease. The sample consisted of 66% blacks and 34% Hispanics. A wide array of both conventional and nonconventional therapies were reported, including prayer, assistive devices, and application of heat. Ninety-two percent of the blacks and 50% of the Hispanics reported prayer to be the most helpful method for dealing with the pain and discomfort of arthritis. Gonzales and associates (1990) described activity as an excellent coping strategy, pointing out that "generally, doing something is better than doing nothing"(p. 197).

Strategies drawn from coping theory provide us with an increased number of possible interventions to enhance the self-care agency of the patient with arthritis, some of which can also be used to enhance self-efficacy (Gonzalez, Goeppinger, & Lorig, 1990). Psychosocial resources that enhance perceived self-efficacy and thus weaken the relationship between illness and ineffective coping await clarification. The person with increased self-efficacy views the negative situation as changeable and controllable. The thoughts and attitudes of persons with perceived self-efficacy are characterized by such statements as "This will pass and I will feel better," or "No one can cure my arthritis, but there are many things I can do" (Sands &

Matthews, 1988, p. 213). These beliefs characterize a self-efficacy approach and logically lead to active coping.

Relaxation Response

Benson (1975) describes the relaxation response as a universal innate protective mechanism which defends against a condition Benson calls overstress and returns the body to a healthier balance. The relaxation response has always existed in the context of religious teachings (Benson, 1975). The relaxation response enables the person to cope with distressing aspects of life by decreasing the effects of too much sympathetic nervous system activation (Benson, 1975). The relaxation response is an integrated hypothalamic response (Miller & Perry, 1990) resulting in a decrease in sympathetic nervous system activity which causes a hypometabolic state in which there is no increase in blood pressure, heart rate, or respiration rate (Davis, Eshelman, & McKay, 1989). Other physiological changes include decreased skeletal muscle tension, decreased epinephrine level, and decreased gastric acidity and motility (Benson, 1975). The relaxation response results in an increase in mental and physical well-being (Kolkmeier, 1988), leading to a feeling of peace of mind and a sense of increased control of bodily reactions which should promote better coping with uncertainties and frustrations (Benson, 1975).

Deep breathing relaxation can elicit the relaxation response (Benson, 1975; Kolkmeier, 1988; Miller, 1987).

Deep breathing relaxation has been found to be effective in reducing body distress in abdominal surgery (Flaherty & Fitzpatrick, 1978; Miller, 1987), during childbirth (Kolkmeier, 1988), and while undergoing cancer therapy (Mast, Meyers, & Urbanski, 1987). Deep breathing promotes tissue nourishment by increasing the supply of oxygen while removing waste products which poison the system and contribute to depression, anxiety, and fatigue (Davis, Eshelman, & McKay, 1989). Deep breathing decreases psychological discomfort and increases perceived sense of control (Miller, 1987). Deep breathing is cost effective since it requires approximately five minutes to teach and learn (Miller, 1987). Further research is needed to study the effectiveness of this simple technique as a coping strategy for people with arthritis.

Summary

Chapter II reviews the literature describing the physical as well as psychosocial impact of both osteoarthritis and rheumatoid arthritis. The two psychosocial theories of self-efficacy and coping which emphasize self-control are discussed. The application of research-based interventions for arthritis management are discussed within the framework of these two theories. The potential use of deep breathing to elicit the relaxation response and promote self-efficacy mediated coping by arthritis patients is examined.

CHAPTER III

METHODOLOGY

This chapter discusses the research design and the methodology utilized. The research questions and a description of the sample, procedures, instruments, and analysis of the data are presented in this chapter.

Research Questions

1. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis improve their functional capacity to do activities of daily living?
2. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis improve their grip strength?
3. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis decrease their perceived intensity of pain?
4. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis improve self-assessment of their condition?
5. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis improve their perceived degree of limitation?
6. Does the daily use of deep breathing exercises by patients with osteoarthritis and rheumatoid arthritis

improve their perceived satisfaction with their medical condition?

Design

An experimental research design using pre-test and post-test evaluations was used for this study. Randomization and the use of a control group were used to achieve greater confidence in the interpretability of the relationships between the variables (Polit & Hungler, 1987). The original plans for this study included the referral of subjects by four area rheumatologists. Brochures containing a brief description of the study and a request for participants were provided for the rheumatologists. During the following six months several telephone calls were made to the rheumatologists and all reported difficulty in obtaining participants. This researcher concluded that only a direct appeal by the researcher would be effective in obtaining volunteers for the study. The sample was one of convenience obtained through public service announcements in area newspapers and in the newsletter of the area support group for people with arthritis.

Subjects

The 35 subjects who volunteered to participate in the study met the following criteria: (1) diagnosis of arthritis after the participant had reached the age of 21 and at least one year prior to the study, (2) literacy, and (3) no recent or anticipated change in medication and

treatment protocol. Subjects were randomly assigned to either the experimental group or the control group according to tickets drawn at the initial meeting.

Prior to data collection an explanation of the study as well as expectations of participants were discussed. Participants were instructed to inform the researcher should a catastrophic event in their lives occur during participation in this study. Participants were asked to read and sign their informed consent form, which outlines the purpose of the study (See Appendix A). Participants received written assurance of confidentiality and freedom to withdraw from the study at any time. One subject dropped out of the study because of illness and two others quit because of "personal reasons," resulting in a sample size of 32 (N=32).

Demographic characteristics of the sample are presented in Table 1. The 32 subjects who completed this study ranged in age from 46 to 81 years; the average age was 67.78 years ($SD \pm 10.59$). The majority of the subjects were female (78.1%). Fourteen (43.8%) of the subjects completed high school, and nine (27.8%) had at least one year of college. Most subjects had osteoarthritis (59.4%) and some had both osteoarthritis and rheumatoid arthritis (21.9%). The number of years participants had been diagnosed with arthritis ranged from 2 (3.1%) to 44 (3.1%), with the mean being 14.50 years.

Table 1. Characteristics of the Sample (N = 32).

Characteristics	Frequency (percentage)
Sex	
Female	25 (78.1)
Male	7 (21.9)
Age	
Less than 65	8 (24.9)
65 thru 74	14 (43.8)
More than 75	9 (31.3)
Education	
Less than 12 years	9 (28.1)
Completed High School	14 (43.8)
Some College	5 (15.6)
Completed College	2 (6.3)
Completed Graduate School	2 (6.2)
Type of Arthritis	
Osteoarthritis	19 (59.4)
Rheumatoid Arthritis	7 (21.9)
Both	6 (18.8)
Years With Arthritis	
Less than 10	10 (31.3)
10 thru 19	15 (46.8)
20 thru 44	7 (21.9)

Protection of Human Rights

The rights of the subjects in this study are protected in several ways. The researcher obtained approval from the Human Subjects Committee of the College of Nursing and the Coordinator of Compliances at the University of Tennessee at Knoxville prior to beginning this study. Confidentiality has been maintained throughout the study by ensuring that names and data have not been recorded together. Data is stored in a locked file in the researcher's home. At no time will there be any mention of the name of the participants in the data analysis or discussion of results.

Measurements

A quantitative assessment of physical status of these patients was made using self-report activities of daily living questionnaires as well as traditional observer-reported physical measures. The introduction of questionnaires to evaluate the level of pain and functional capacity to perform activities of daily living has expanded the scope of objective assessment of physical status of both osteoarthritis (Brooks, Callahan, & Pincus, 1988) as well as rheumatoid arthritis (Pincus et al., 1989). The reliability and validity of self-report questionnaires for depicting functional status of arthritis patients have been well documented (Brooks, Callahan, & Pincus, 1987; Callahan, Brooks, Summey, and Pincus, 1987; Liang, Larson, Cullen, & Schwartz, 1985; Pincus et al., 1989; Pincus, Callahan, &

Vaughn, 1987; Pincus, Summey, Soraci, Hummon, & Wallston, 1983).

Instruments

Self-Report Questionnaire

The self-report questionnaire used in this study is a modified version (MHAQ) of the Health Assessment Questionnaire (HAQ) and was developed by Pincus, Summey, Soraci, Hummon, & Wallston (1983) (See Appendix B). The questionnaire can be completed in approximately five minutes. The instrument measures the degree of difficulty in performing 8 activities of daily living, satisfaction with medical condition, perceived degree of limitation and evaluation of present condition in comparison to the previous month. The four-point scale used in this questionnaire is analogous to the functional class developed by the Steinbrocker (1949) Committee of the American Rheumatism Association. Participants were asked to answer the question: "Are you able to..." by rating their capacities according to a four point scale: "without any difficulty" (=1), "with some difficulty" (=2), "with much difficulty" (=3), and "unable to do" (=4). The total difficulty score was expressed as the mean score for the eight responses, with a range from 1 to 4 (Pincus, Summey, Soraci, Hummon, & Wallston, 1983).

Participants were asked to indicate their self-assessed condition by answering the question: "How do you feel today

compared to one month ago?" with one of the following responses: "much better today than one month ago" (=1); "better today than one month ago" (=2); "the same today as one month ago" (=3); "worse today than one month ago" (=4); or "much worse today than one month ago" (=5).

Participants were asked to describe satisfaction with their medical condition by answering the question: "How satisfied are you with your medical condition?" with one of the following responses: "very satisfied" (=1); "somewhat satisfied" (=2); "somewhat dissatisfied" (=3); or "very dissatisfied" (=4).

Participants were asked to describe their perceived degree of limitation by answering the following question: "Which of the following best describes you today?" with one of the following responses: "I can do everything I want to do" (=1); "I can do most of the things I want to do, but have some limitations" (=2); "I can do some, but not all, of the things I want to do, and I have many limitations" (=3); or "I can do hardly any of the things I want to do" (=4).

Visual Analogue Pain Scale

The visual analogue pain scale, which is the most widely used measurement of pain (Callahan, Brooks, Summey, & Pincus, 1987), was used to assess level of pain reported by participants. The visual analogue pain scale consists of a 10 centimeter horizontal line with terminal points indicating "no pain" (=0) and "pain as bad as it can be"

(Huskisson, 1983). This study used a marked visual analogue scale, sometimes referred to as a numeric rating scale, because people sometimes have difficulty in understanding how to use the visual analogue scale which has no intermediate reference points (Sriwatanakul et al., 1983; Miller & Perry, 1991). The marked visual analogue scale correlates well with the unmarked visual analogue scale and both versions are valid and reliable for assessing pain intensity, especially as a treatment outcome (Miller & Perry, 1991). Participants were asked to mark the point which indicated the severity of their pain during the previous week.

Grip Strength

To measure grip strength, each participant was given a demonstration on the use of a grip-meter (provided by Merck Sharp and Dohme Company) and was then asked to squeeze the device as hard as possible with the dominant hand. No other encouragement was given. Each participant squeezed the grip-meter three times and the best score was recorded. The meter measures from 0 to 55 kilograms.

Procedure

Participants were invited to attend either of two identical classes which were taught at Indian Path Medical Center in Kingsport, Tennessee and the Greene County (Tennessee) YMCA. Both classes were conducted by the researcher. At the beginning of both classes participants

were randomly assigned to one of two groups by blindly drawing a ticket from a container. Demographic information was collected and participants completed self-assessment questionnaires and grip strengths were measured. Each item on the questionnaire was explained thoroughly and participants were instructed to seek clarification from researcher should any question arise while completing the questionnaire. Participants were requested not to discuss the contents of their class with anyone until the study was completed. Both groups were given basic information about the management of arthritis (Lorig & Fries, 1986). The experimental group was instructed in the use of deep breathing and asked to practice this technique in a quiet place for ten minutes twice each day to elicit the relaxation response (Benson, 1975). Participants were told to sit in a comfortable position with their eyes closed. Participants were instructed to take a long slow breath in through their nose, hold it while silently counting to 4, then breathe out through their mouth as if blowing out a candle. Participants were cautioned not to hyperventilate. Participants were asked to place a check mark on a calendar for each practice session. Both groups were asked to return to the same location of their first class at the end of thirty days for a second meeting at which participants were asked to complete a second copy of the self-assessment questionnaire and measure their grip strength. These

meetings were held one hour prior to the patient education program to be held in the same classroom so that participants could attend the support group meeting should they choose.

Data Analysis

Variables were measured comparing the experimental group which practiced relaxation breathing with the control group to which no treatment was applied. An alpha level of 0.05 was selected as the criterion of significance. All data were analyzed through the use of the SPSS/PC+ software package (Norusis, 1988). The t test for independent samples was computed to determine significant differences between the experimental group and the control group for each dependent variable (Polit & Hungler, 1987).

Summary

The convenience sample of 32 subjects were randomly assigned to one of two groups for the purpose of conducting an experimental study to answer six questions related to the functional capacity of patients with osteoarthritis or rheumatoid arthritis. The researcher used self-report questionnaires and a visual analogue pain scale to collect data. A grip meter (provided by Merck Sharp, and Dohme Pharmaceutical Company) was used to obtain the physical measure of grip strength. Protection of human rights was ensured by protecting the identity of participants and allowing participants to withdraw from the study at any

time. The researcher analyzed the data using the SPSS/PC+ software package to compute t tests for each of the research questions.

CHAPTER IV

FINDINGS

Descriptive Data

Statistics were computed for each dependent variable (See Table 2). The mean on the dependent variable functional capacity decreased from 1.74 to 1.64 (ranging from 1.1 to 2.4) for the experimental group, indicating possible improvement in the functional capacity following the practice of deep breathing, as a score of 1 indicates "without any difficulty" and a score of 2 indicates "with some difficulty." The mean for the control group remained essentially the same with the pre-test mean being 1.64 and the post-test mean being 1.67, indicating no change in functional capacity of those who did not practice deep breathing. For grip strength the mean for the experimental group increased from 17.12 pre-test (ranging from 9 to 34) to 18.12 post-test (ranging from 7 to 30). The mean for grip strength for the control group increased slightly from 16.69 (ranging from 0 to 40) pre-test to 17.25 (ranging from 0 to 38) post-test. For pain level the pre-test mean was 2.06 (ranging from 1 to 3) for the experimental group, while the post-test mean was 2.04, indicating moderate pain for the group. The mean for pain level pre-test for the control group was 1.97 (ranging from 1 to 3) and 1.69 (ranging from 0 to 2) post-test, with a score of 2 indicating moderate pain. The mean for dependent variable self-assessed

Table 2. Descriptive Data of Variables for Both Experimental and Control Groups.

		Range	Mean	SD
FUNCTIONAL CAPACITY				
Exp. Group	Pre	1.4 - 2.4	1.74	.294
Exp. Group	Post	1.1 - 2.4	1.64	.357
Con. Group	Pre	1.0 - 3.0	1.64	.574
Con. Group	Post	1.0 - 3.0	1.67	.498
GRIP STRENGTH				
Exp. Group	Pre	9 - 34	17.12	5.08
Exp. Group	Post	7 - 30	18.12	6.72
Con. Group	Pre	0 - 40	16.69	11.31
Con. Group	Post	0 - 38	17.25	9.78
PAIN				
Exp. Group	Pre	1.0-3.0	2.06	.772
Exp. Group	Post	1.0-2.5	2.04	.598
Con. Group	Pre	1.0-3.0	1.97	.826
Con. Group	Post	0.0-2.0	1.69	1.014
SELF-ASSESSED CONDITION				
Exp. Group	Pre	2.0-5.0	3.19	.911
Exp. Group	Post	2.0-4.0	2.94	.574
Con. Group	Pre	2.0-5.0	3.00	.817
Con. Group	Post	2.0-4.0	2.81	.750
LIMITATION				
Exp. Group	Pre	2.0-3.0	2.31	.479
Exp. Group	Post	2.0-3.0	2.31	.479
Con. Group	Pre	1.0-4.0	2.37	.719
Con. Group	Post	1.0-4.0	2.31	.793
SATISFACTION WITH MEDICAL CONDITION				
Exp. Group	Pre	1.0-4.0	2.37	.719
Exp. Group	Post	1.0-4.0	2.50	.894
Con. Group	Pre	1.0-4.0	2.00	.894
Con. Group	Post	1.0-4.0	2.31	1.080

Note. Possible range for functional capacity, self-assessed condition, limitation, and medical condition is 1 to 4, with higher score indicating more difficulty or greater dissatisfaction. Range for pain is 0 to 4, with higher score indicating more pain. Range for grip strength is 0 to 40, with higher score meaning better grip strength.

condition for pre-test experimental group was 3.19 (ranging from 2 to 5), decreasing to 2.94 (ranging from 2 to 4) post-test, with a score of 2 indicating participant felt better than one month ago while a score of 3 indicates no change in feeling today as compared to one month ago. The mean for self-assessed condition for the control group decreased slightly from 3.00 (ranging from 2 to 5) pre-test to 2.81 (ranging from 2 to 4) post-test, indicating a slight improvement. For the dependent variable degree of limitation the pre-test mean for the experimental group was 2.31 (ranging from 2 to 3) and remained 2.31 post-test. A score of 2 indicates that participant can do most of the things desired, but some limitations exist. The pre-test mean for degree of limitation for the control group was 2.37 (ranging from 1 to 4) while the mean decreased to 2.31 (ranging from 1 to 4) post-test, indicating a slight decrease in feelings of limitations. The mean for the dependent variable satisfaction with medical condition for the experimental group was 2.37 pre-test (ranging from 1 to 4) and increased to 2.50 post-test, indicating more dissatisfaction since a score of 3 indicates participant was "somewhat dissatisfied." The mean for satisfaction with medical condition for the pre-test control group was 2.00 and increased to 2.31 post-test (ranging from 1 to 4), also indicating increased dissatisfaction with medical condition.

Results

Question 1: Functional Capacity

The first research question inquired whether the daily use of deep breathing exercises would improve participants' functional capacity to perform activities of daily living. To answer this question, all subjects rated their ability to perform 8 activities of daily living on a scale of 1 to 4 and the mean of these 8 scores was calculated. The difference between the mean score obtained at the conclusion of the study was calculated for each participant. These scores were used to calculate a t test to detect a difference between the experimental group and the control group. Criterion for level of significance was $p < .05$. The t test did not indicate a statistically significant difference between the two groups but the descriptive data revealed potentially important differences with a positive mean for the experimental group (i. e., their functional capacity improved somewhat) and a negative mean for the control group (see Table 3).

Table 3. Differences in Functional Capacity between Experimental Group and Control Group (N=32).

	Mean	SD	t	p
EXPERIMENTAL (n = 16)	.1062	.269	1.14	.264
CONTROL (n = 16)	-.0313	.401		

Question 2: Grip Strength

The second research question asked whether the daily practice of deep breathing exercises improve the grip strength of participants. A grip-meter was used to measure the grip strength of each participant at the beginning of the study and at the conclusion of the study. The difference between the two measurements was calculated and a t test was computed to observe for differences between the two groups. Criterion for level of significance was $p < .05$. According to the t test the results were not significantly different, but the descriptive data revealed a potentially important difference between the means of the two groups (see Table 4).

Table 4. Differences in Grip Strength between Experimental Group and Control Group (N = 32).

	Mean	SD	t	p
EXPERIMENTAL (n=16)	1.000	3.52	.38	.708
CONTROL (n=16)	.562	3.01		

Question 3: Pain Level

The third research question investigated whether a difference existed between the two groups in the perceived level of pain. Participants marked a score on a visual analogue scale indicating the intensity of their pain during the previous week. Scores were obtained at the beginning of

the study and at the conclusion of the study. The difference between the two scores was computed for each participant and a t test was computed to ascertain if the control group and experimental group differed. There was no statistical difference between the two groups (See Table 5).

Table 5. Differences in Perception of Pain Intensity Between Experimental Group and Control Group (N = 32).

		Mean	SD	t	p
EXPERIMENTAL	(n=16)	.0188	.432	-1.37	.180
CONTROL	(n=16)	.2813	.632		

Question 4: Self-assessed Condition

The fourth research question asked whether participants practicing deep breathing exercises reported a better self-assessed condition than those in the control group.

Differences were calculated between scores reported at the beginning of the study and those reported at the conclusion of the study. According to the t test computed these results were not significantly different with $p < .05$ (See Table 6).

Table 6. Differences in Self-assessed Condition
Between Experimental Group and Control Group
(N = 32).

	Mean	SD	t	p
EXPERIMENTAL (n = 16)	.2500	.683	.25	.807
CONTROL (n = 16)	.1875	.750		

Question 5: Satisfaction with Medical Condition

The fifth research question investigated whether participants who practiced daily deep breathing exercises reported greater satisfaction with medical condition. Participants rated their satisfaction with their medical condition on a scale from 1 to 4 at the beginning of the study and upon completion. Differences between these scores were tabulated for each participant and a t test was computed. There was no significant difference between the experimental group and the control group statistically, but descriptive data revealed negative means for both groups. The mean for the control group was more negative which indicated that participants in the control group were more dissatisfied with their medical condition (See Table 7).

Table 7. Differences in Satisfaction With Medical Condition Between Experimental Group and Control Group (N = 32).

	Mean	SD	t	p
EXPERIMENTAL (n = 16)	-.1250	.619	.66	.512
CONTROL (n = 16)	-.3125	.946		

Question 6: Degree of Limitation

The sixth research question asked whether the daily use of deep breathing exercises decreased the degree of limitations reported by participants. Scores were tabulated at the beginning of the study and at the completion of the study. The differences between the scores were used to compute a t test for detecting a statistical difference between the means of the two groups. The t test did not indicate a significant difference between the groups with $p < .05$. Evaluation of the descriptive statistics revealed that the mean of the experimental group equaled .0000 meaning no change following the intervention (See Table 8).

Table 8. Differences in Degree of Limitation Between Experimental Group and Control Group (N = 32).

	Mean	SD	t	p
EXPERIMENTAL (n = 16)	.0000	.516	-.32	.748
CONTROL (n = 16)	.0625	.574		

Summary

In conclusion, Chapter IV reports the results of the data analysis for each of the six research questions. There were no statistically significant differences between those who practiced daily deep breathing exercises and those who did not. Some potentially important changes in status were reported, however. Implications of the study will be discussed in the following chapter.

CHAPTER V

DISCUSSION OF RESULTS

This study investigated within the conceptual framework of Orem's self-care theory whether the daily practice of deep breathing exercises would have an effect on the functional status of patients with osteoarthritis or rheumatoid arthritis. To answer this question, the researcher resolved to determine whether specific relationships exist between the daily practice of deep breathing exercises and (a) ability to perform activities of daily living, (b) grip strength, (c) pain level, (d) self-assessed condition, (e) satisfaction with medical condition, and (f) degree of limitation.

Conclusions

This study indicates that the practice of deep breathing exercises did not have a statistically significant effect on the functional status of patients with osteoarthritis or rheumatoid arthritis. The fact that no statistically significant difference existed between the experimental group and the control group may be because the sample size was too small. The extensive variation in disease activity could alter the results of behavioral studies, making a large sample highly desirable. The descriptive data showed changes in the means of both groups for each of the variables except degree of limitation, indicating a possible relationship between the practice of

deep breathing and variables tested. Since physical changes in the patient with arthritis are usually gradual, significant physical changes would not be expected in the short period of time in which this study was conducted. The increased level of pain reported by participants in the experimental group could possibly be the result of participants associating deep breathing exercises with other forms of exercises which are known to be painful at times. This study did not control for the use of analgesics and this is a possible explanation for the descriptive data for this variable. A true assessment of the effect of an intervention on pain would have to control for use of analgesics. The increased dissatisfaction with medical condition reported by both groups could possibly be due to increased scrutiny by participants. There is a possibility that selection bias affected the reported results. People who volunteer to participate in a study might have higher expectations for improvement than those who participate in a study at the encouragement of their doctors. Such possible contaminates should be controlled for in future studies.

Limitations

The findings must be interpreted within the context of the limitations of the study. The power of the study is very low due to the small sample size. Another limitation is the fact that data were derived from a one-time intervention with followup for only thirty days. Most

rheumatic diseases do not progress in a linear fashion but often follow a course punctuated with periods of relatively severe exacerbations lasting days or even months followed by periods of clinical remission (Giannini, 1988). Future studies should be conducted for a minimum period of one year with at least quarterly evaluations. Participants were volunteers who responded to a public announcement of the study. Physician referral as well as volunteers from the population at large is desirable for future studies. Future studies assessing the effect of deep breathing on pain should control for the use of analgesics.

Implications for Nursing Practice

According to Orem's (1991) self-care theory, individuals prefer to take responsibility for their well-being by engaging in activities that maintain life and promote health. Self-care is often considered to be of greater importance than health care services and has been found to be an important determinant of health outcomes (Dean, 1986). Clinical decisions regarding utility of interventions promoting self-care should not require conclusive statistical support for interventions backed by preliminary evidence of their effectiveness. Practitioners must weigh the empirical support for the use of an intervention along with knowledge of the theoretical mechanism of action and estimates of potential risks relative to potential benefits. The literature review has

demonstrated that possible benefits of incorporating deep breathing exercises in the management plan of people with a chronic disease include (a) decreased perception of pain, (b) increased feeling of a sense of control, (c) increased use of other coping mechanisms. Additional research beyond this initial study is required before definitive conclusive statements may be made regarding the relationship between the practice of deep breathing exercises and the functional status of patients with osteoarthritis or rheumatoid arthritis. Meanwhile, nurses can combine self-care strategies such as deep breathing along with the newest technology to involve patients in the healing process.

Recommendations for Future Research

This researcher suggests that future studies be conducted with larger samples over a longer period of time. An additional area for future research is investigation of the effect of deep breathing exercises on samples with only the presence of one form of disease, either osteoarthritis or rheumatoid arthritis. Scales exist to measure changes in the psychosocial variables of self-efficacy (Lorig, Chastain, Ung, Shoor, & Holman, 1989) and coping (Regan, Lorig, & Thoresen, 1988), and should be used in determining the effect of deep breathing exercises on these variables. Such research-based knowledge would contribute greatly to our understanding of theoretically derived guidelines for using deep breathing exercises to increase self-care agency

in arthritis patients. All components of the model shown in Figure 1 should be tested in future studies. A variety of interventions such as deep breathing, imagery, biofeedback should be included for participants to choose the one that works best for them. There is a paucity of evidence that self-care practices have any effect on health (Woods, 1989) and seeking such evidence should be a high priority for nurses who are in a unique position to experiment with new populations in various settings (Titlebaum, 1988).

In conclusion, it is hoped that findings from this study will promote an interest in further evaluation of interventions such as deep breathing exercises which are easily implemented by nurses, can be incorporated in a plan of care as an independent nursing action, and can increase the involvement of the patient in the healing process. Research based support for the efficacy of deep breathing exercises for increasing the self care agency of patients with arthritis could serve to promote this inexpensive and easily implemented holistic nursing intervention.

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APPENDICES

APPENDIX A
CONSENT FORM

INFORMED CONSENT STATEMENT

Dear Client:

You are invited to participate in a study to learn more about coping techniques and osteoarthritis and rheumatoid arthritis. It is your choice to be in this study. Your participation involves filling out a simple one page questionnaire in which you rate how difficult it is for you to do activities of daily living. At the beginning of the study you will be asked to grip a device which measures grip strength and the grip strength will be recorded. These same measurements will be taken at the end of the study also. I will provide you with a class about managing your disease. The study will last thirty days.

No negative effects are expected to result from your participation in the study. Your participation may provide information that would enable patients to learn more effective means of coping with their rheumatoid arthritis on a daily basis.

All data will be kept confidential and only a summary of the data will be reported in any papers or publication which may result from this study. Each questionnaire will be coded with an identification number and only the researcher will be able to identify individual responses.

You may withdraw from this study at any time. If you do withdraw or choose not to participate, you will not incur any penalty. If you have any extremely stressful events happen to you while you are participating in this study you are requested to inform the researcher.

If you have any questions about your participation in the study, please feel free to contact the researcher listed below.

Thank you,

Jimmy L. Ricker, RN
Route 8, Box 447
Greeneville, TN 37743
Telephone (615) 638-6957

I have read and understand the above statement. I freely consent to participation in this project under the above conditions.

Signed _____ Date _____

APPENDIX B
SELF-REPORT QUESTIONNAIRE

Please check (✓) the ONE best answer for your abilities.

1. AT THIS MOMENT, are you able to:

- a. Dress yourself, including tying shoelaces and doing buttons?
- b. Get in and out of bed?
- c. Life a full cup or glass to your mouth?
- d. Walk outdoors on flat ground?
- e. Wash and dry your entire body?
- f. Bend down to pick up clothing from the floor?
- g. Turn regular faucets on and off?
- h. Get in and out of a car?

Without ANY Difficulty	With SOME Difficulty	With MUCH Difficulty	UNABLE To Do
_____ 1	_____ 2	_____ 3	_____ 4
_____ 1	_____ 2	_____ 3	_____ 4
_____ 1	_____ 2	_____ 3	_____ 4
_____ 1	_____ 2	_____ 3	_____ 4
_____ 1	_____ 2	_____ 3	_____ 4
_____ 1	_____ 2	_____ 3	_____ 4
_____ 1	_____ 2	_____ 3	_____ 4
_____ 1	_____ 2	_____ 3	_____ 4

2. How do you feel TODAY compared to ONE MONTH AGO? Please check (✓) only one.

- ___ Much better today than one month ago
- ___ Better today than one month ago
- ___ The same today as one month ago
- ___ Worse today than one month ago
- ___ Much worse today than one month ago

3. Which of the following best describes you TODAY? Please check (✓) only one.

- ___ I can do everything I want to do.
- ___ I can do most of the things I want to do, but have some limitations.
- ___ I can do some, but not all, of the things I want to do, and I have many limitations.
- ___ I can do hardly any of the things I want to do.

4. How SATISFIED are you with your medical condition? Please check (✓) only one.

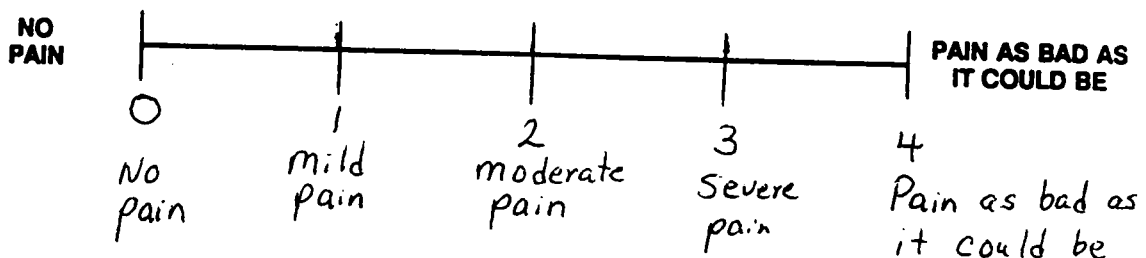
- ___ Very Satisfied
- ___ Somewhat Satisfied
- ___ Somewhat Dissatisfied
- ___ Very Dissatisfied

5. When you get up in the morning, do you feel stiff? Yes ___ No ___

6. If you answer "Yes," how long is it until you are as limber as you will be for that day?

___ minutes or ___ hours

7. How much pain have you had because of your condition IN THE PAST WEEK? Place a mark on the line below to indicate how severe your pain has been:



APPENDIX C

LETTER OF PERMISSION TO USE THE
MODIFIED HEALTH ASSESSMENT QUESTIONNAIRE

VANDERBILT UNIVERSITY



NASHVILLE, TENNESSEE 37232-2681

TELEPHONE (615) 322-7311

Department of Medicine • Rheumatology & Immunology • Direct Phone 322-4746
FAX 322-6248

August 3, 1992

Mr. Jimmy L. Ricker
Route #8, Box 447
Greeneville, TN 37743

Dear Mr. Ricker:

We are happy to have you use the Modified Health Assessment Questionnaire
in your thesis.

Sincerely,

A handwritten signature in cursive script, appearing to read "Leigh F. Callahan".

Leigh F. Callahan
Research Associate

thesis

VITA

Jimmy Lowell Ricker was born in Greeneville, Tennessee on March 15, 1943. He graduated from Greeneville High School in June 1961.

In March 1978 he received a Bachelor of Science in Nursing from East Tennessee State University in Johnson City, Tennessee. In September 1990 he began graduate studies toward a Master's degree in Nursing at the University of Tennessee, Knoxville. This degree will be awarded in December 1992. He is a member of Phi Kappa Phi National Honor Society and Gamma Chi chapter of Sigma Theta Tau International Honor Society of Nursing. Jimmy received the National Volunteer Service Citation from the Arthritis Foundation in 1987 for his volunteer work with support groups for people with arthritis in Northeast Tennessee. He currently works at Indian Path Medical Center in Kingsport.