AN ADVANCED PRACTICE NURSING APPROACH UTILIZING EXERCISE IN THE TREATMENT OF FIBROMYALGIA: A PATIENT EDUCATION BROCHURE

Scholarly Project for the Degree of M. S. N.
MICHIGAN STATE UNIVERSITY
SUSAN SUGDEN
1999

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By

Susan Sugden

A SCHOLARLY PROJECT

Submitted to

Michigan State University

in partial fulfillment of the requirements

for the degree of

MASTER OF SCIENCE

College of Nursing

1999

ABSTRACT

AN ADVANCED PRACTICE NURSING APPROACH UTILIZING EXERCISE IN THE TREATMENT OF FIBROMYALGIA: A PATIENT EDUCATION BROCHURE

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Fibromyalgia (FM) is a chronic widespread musculoskeletal pain syndrome that consists of generalized pain, stiffness, fatigue and poor sleep. Personal suffering and significant consumption of societal resources makes FM worthy of holistic treatment that will preserve functioning and personal dignity. The Nightingale theory of nursing was the conceptual framework for development of a patient education brochure about the benefits of exercise as an intervention for FM. Review of current literature provided the foundation of the advanced practice nursing approach to this problem. Research implications of the project are considered from both qualitative and quantitative perspectives. Exercise has both physical and psychological benefits for people with FM, as an intervention that may improve quality of life and limit disability.

ACKNOWLEDGMENTS

I wish to express my gratitude to Dr. Louise Selanders for her academic guidance through this project. Dr. Selanders handed me my first stethoscope twenty years ago, introduced me to the genius of Florence Nightingale, and was a source of personal and professional support during this evolution in my nursing career.

True appreciation for their time and guidance is also owed to Catherine Lein, M.S.N. and Dr. Cynthia Gibbons who served on the project committee, and to Dr. Claire Collins who guided this project through the formative stage. Thank you for your knowledge, leadership and moral support.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

Patients with chronic pain patients live with the uncertainty of finding a cure. For people living with the chronic pain of fibromyalgia the journey toward diagnosis does not always result in a positive outcome. In the process of seeking relief many fibromyalgia (FM) patients have encountered frustration with the health care system as their mental health and credibility are questioned. Health care providers become frustrated with these patients because they cannot find a cure for people with FM.

This paper will explore the use of exercise as one intervention modality that, along with medication, coping skills training and lifestyle change, may help patients live better with fibromyalgia. Nursing offers a bridge from the mind-body dichotomy of the medical model to a more holistic treatment of the bio-psycho-social-spiritual person. If we change the goal from cure to care, we can help people with FM learn ways to feel better while living with this chronic benign pain.

Statement of the Problem

Chronic benign pain is defined as any pain lasting longer than six months duration that occurs daily and is nonmalignant (McCaffery and Beebe, 1989). It is not life threatening, and it is not always responsive to current methods of pain relief. Chronic benign pain differs from acute pain in that there are no objective signs of tissue injury-no bruises or broken bones to lend credibility to the patient's complaint (Meilman, 1984). Chronic benign pain has a gloomy prognosis and may continue the rest of the patient's life. Treatment of chronic pain usually does not involve narcotics, but does use pain management techniques and skills training to help patients cope with pain. The goals of chronic pain treatment are to improve quality of life and prevent disability. Fibromyalgia is a form of chronic benign pain.

Fibromyalgia patients are intensive users of healthcare resources, averaging ten outpatient medical visits per year and one hospitalization every three years (Wolfe, Anderson, Harkness et al., 1997). The average yearly cost for service utilization among fibromyalgia patients is $2,274 (Wolfe et al., 1997) meaning fibromyalgia costs as much or more than other rheumatic conditions (Solomon and Liang, 1997).

Personal costs are high for FM patients who search for a healthcare provider who believes them: "Sooner or later, most patients with pain realize that they cannot prove their pain" (McCaffery and Beebe, 1989, p.7). Trust may be destroyed and the therapeutic relationship may become adversarial when the provider does not believe the patient. Most FM patients experience psychological distress as a consequence of chronic pain and its effects on the quality of life (Bennett, 1996). One study found that chronic musculoskeletal pain was a benchmark diagnostic feature of FM and a predictor of disability and depression (Nicassio, Schuman, Kim, Cordova and Weisman, 1997). Research describing the prevalence and characteristics of FM in the general population found that 19.7% of persons with FM had applied for, and 7.3% had received disability benefits (Wolfe et al, 1995, p.26). Personal suffering and significant consumption of societal resources makes FM worthy of holistic treatment that will preserve functioning and personal dignity.

Purpose of the Project

The purpose of this scholarly project is to develop a patient information brochure on the benefits of exercise for people with FM. The proposed project will be based on review of pertinent literature and actual experience in a practice where FM patients are evaluated and treated. FM management involves many aspects of Advanced Practice Nursing (APN) care: pharmacology, non-narcotic pain control modalities, stress management, lifestyle modifications, counseling and education. Exercise was chosen as a treatment intervention which can be self-managed and have positive effects on mental and physical health. The focus in FM is not to cure, but care, as it is in so many chronic conditions that APNs treat. Improving quality of life and preventing disability are strong nursing goals relevant to patients with FM.

APNs focus on health promotion both for persons who have no disease and for those with chronic health problems (Snyder and Mirr, 1995). Holistic assessments that encompass physiological, psychosocial, behavioral and spiritual elements are an integral part of the APN role. Nursing has a tradition of placing emphasis on education and counseling, and since APNs function on the expanding boundaries of nursing's scope of practice, they bring an armamentarium of nursing interventions to the management of health problems. Nursing is eclectic in drawing knowledge from the other helping professions including medicine, psychology, and sociology. APNs apply scientific knowledge to the processes of diagnosis and treatment; and just as important, they provide a caring relationship that facilitates health and healing (Snyder and Mirr, 1995). APNs are versatile and capable of caring for the multifaceted problem of fibromyalgia.

Many role characteristics of APNs commend them as appropriate primary caregivers for patients with FM. As an assessor the APN systematically collects subjective and objective data to formulate a clinical judgment about the care needed by the patient with FM. Using theory and advanced clinical judgment, the APN in the role of clinician promotes self-care abilities to help the patient dealing with FM maintain health, cope with their illness and manage disabilities. This may involve the APN functioning as a case manager, coordinating care amongst a team of health care professionals including Rheumatology specialists, physical or occupational therapists, and psychologists. In a chronic illness such as FM the role of educator is key to helping the person with FM understand their condition and learn a variety of treatment and coping skills. The APN functioning in the role of counselor provides the stabilizing human support that allows clients to express concerns and use problem solving skills. This role is important for the FM patient who faces an indefinite future of pain and may suffer depression. Providing hope through scientific research is another role of the APN as an investigator of clinical problems and tester of nursing theories. People living with FM have much to gain from the holistic care of an APN.

CONCEPTUAL FRAMEWORK

The conceptual model for this paper will be based on the work of Florence Nightingale. Nightingale's nursing focused on persons and their response to health problems rather than specific illnesses. The American Nurses Association defines nursing as the "diagnosis and treatment of human responses to actual or potential health problems" (American Nurses Association, 1995,p.6). This contemporary definition can be seen as an evolution of the Nightingale theory of nursing. Florence Nightingale believed in the essential unity of mind, body and spirit. She maintained that the presence of pathology was not a prerequisite for nursing care (Fitzpatrick and Whall, 1996). This concept of nursing is consistent with contemporary definitions which pay attention to the range of human experiences across the health continuum without restriction to a problem-focused orientation (American Nurses Association, 1995). An integrated approach is essential in nursing, blending objective data with an understanding of the patient's subjective experience.

Florence Nightingale suffered years of chronic pain and illness following her service in the Crimean war as a result of contracting chronic brucellosis (Dossey, 1998). Despite her chronic pain she was a prolific writer, a leader in nursing education and administration, a public health advocate and a superb statistician (Selanders, 1998 and Kopf, 1978). Nightingale utilized traditional medical therapies and explored types of nonmedical therapies during her illness—including massage, pets, nature and prayer (Dossey, 1998 and Light, 1997). Given this historical context, applying the Nightingale model of nursing to FM is especially appropriate.

Nursing has evolved greatly since the time of Florence Nightingale, and yet her ideas are the basis of modern nursing theory. The concepts of person, environment, health and nursing are known as nursing's metaparadigm (Fawcett, 1995). Many variations on the theory of nursing exist, yet theorists return to these four essential areas to define our practice. Nursing's metaparadigm is a contemporary tool used to organize and compare the various nursing theories (Lobo, 1995). Nightingale preceded modern nursing theory development by one hundred years, but she was a prolific author who left the essence of nursing's conceptual base in her writings (Meleis, 1997; Selanders, 1993). Nightingale's interpretations of the four concepts have contemporary relevance and will be applied to the use of exercise as an intervention in fibromyalgia.

Person

Nightingale asserted that medicine treated the sickness and nursing cared for the sick (Nightingale, 1992). Person is defined as the recipient of nursing care, an individual who is referred to as the patient in Nightingale's writings (Selanders, 1993). People are seen as holistic blends of the biological, psychological, social and spiritual elements (Dossey and Dossey, 1998). Holism means that the individual is more than the sum of its parts (Dossey, Guzzetta, Keegan and Kolkmeier, 1995). Utilizing this concept of person, the pathology and disability of FM become less important than the effect they have on the patient. Nightingale believed people had control of their destiny and could make choices that would lead them toward perfection-and ultimately toward God (Widerquist, 1992). She viewed patients as active participants in care, with the ability to help themselves heal using their "reparative powers" (Selanders, 1993, p.15; Dennis and Prescott, 1985, p.75).

Environment

Nightingale's work has been called an environmental adaptation theory because of the pivotal role environment plays in her view of nursing intervention (Selanders, 1993). The environment was defined in the physical sense in Victorian England and it left a lot to be desired. Sanitation issues were a major focus of Nightingale's reforms in England, the Crimea and India (Smith, 1982). Basic issues such as the disposal of human waste and purity of water sources were fundamental to her efforts to reduce disease and suffering. Nightingale also addressed the psychological and social needs of patients in an effort to remove obstacles to the natural healing force "by attending to all dimensions of a person" (Light, 1997, p.34). The essence of environmental adaptation is to help people organize their internal and external environment to facilitate their innate healing capacity (Light, 1997).

Selanders compels nurses to consider Nightingale's environmental adaptation concept in a contemporary context, comparing Maslow's hierarchy of needs to the strategies

Nightingale advocated to promote health (Selanders, 1998). In her practical, logical way Nightingale started with the basic physiological needs, then advanced to psychological care. Nightingale would treat both mind and body through manipulation of the environment, putting the patient in the best possible condition for nature to act (Selanders, 1998).

Exercise impacts the physiologic and psychological well-being of people with FM. In her Report of the Indian Sanitary Commission in 1863, Nightingale recognized "lack of suitable occupation and exercise" as a factor in camp disease rates (Kopf, 1978, p.100). Despite debate regarding the cause of FM, there are positive interventions to offer these patients. Exercise changes the physical environment by increasing muscle blood flow, flexibility and efficiency. The psychological environment is altered by exercise through increased sense of control and decreased susceptibility to pain. Exercise can be a social activity, decreasing isolation and disability. Nightingale's theory of environmental adaptation applies to this intervention's use in the treatment of FM.

Health

Nightingale was ahead of her time when she conceptualized health as more than the lack of illness. "Health is not only to be well, but to use well every power we have to use" (Nightingale, 1859/1949, p.26).

Contemporary definitions of health include the ideas of stability and self-actualization, which are compatible with the Nightingale conception of health (Pender, 1996). Natural laws were thought to govern health and Nightingale believed that altering the environment would fulfill these laws, resulting in health (Selanders, 1993). Disease was seen as a reparative process that could restore a person to wholeness (Light, 1997).

By definition, chronic pain has not resolved-that is what defines it as chronic in the first place. To live with chronic pain and be as healthy as possible means maximizing abilities and working toward an improved quality of life. By not letting pain control choices, activity and attitude, people with FM can use every power they have to optimize their lives. Each symptom of FM can be viewed as "dys-ease", or a lack of comfort that leads the patient to seek nursing care to restore health. Therefore, the discomfort of FM may rouse a patient to pursue health and in this way function as a reparative process.

Nursing

Nightingale was a devoutly religious woman who did not take credit for curing the sick. Instead, her view was that nursing "put the patient in the best condition for nature to act upon him" (Nightingale, 1859/1992, p.74). Nursing was seen as an art and a science: a goal-directed, research-driven process that restored a patient to health

(Reed and Zurakowski, 1996). Nursing could encompass health promotion, maintenance or restoration and was not limited to care of the sick or injured (Selanders, 1993). Whether nursing the individual or a population, the action of the nurse was to alter the environment so that nature could heal the patient.

Nursing in Nightingale's time consisted of a nurse acting on a patient's environment to facilitate a change. This should be understood in an historical context as typical thinking about illness in the nineteenth century. The patient was not seen as an equal partner in health care (a concept popular today), but as recipient of the administrations of the nurse who is the active participant in the relationship (Selanders, 1993). The nursing process consists of observation, documentation, and environmental alteration performed to benefit the health of the patient. Evaluation of the resulting state of health provides the nurse with feedback and then the process of assessment/observation begins again.

In a model specific to FM, the APN observes the patient's health status and identifies the discomfort or "dys-ease" of the person with FM (see Figure 1). The APN then identifies the need for environmental alteration and the desired outcome of nursing intervention.

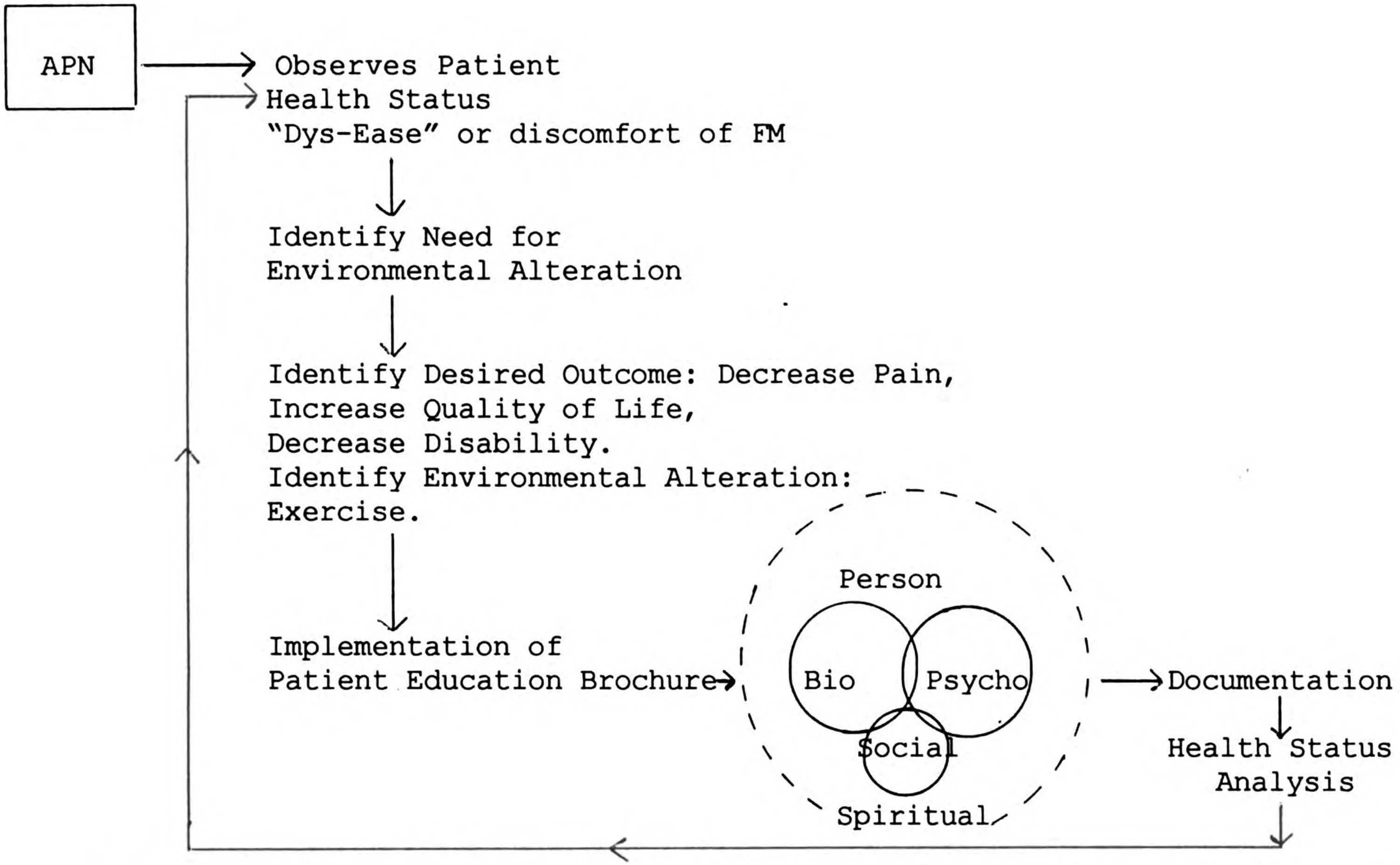

Figure 1. Nightingale's model for nursing practice. Adapted from, "The power of environmental adaptation: Florence Nightingale's original theory for nursing practice" By L. Selanders, 1998, Journal of Holistic Nursing, 16,(2) 258. Copyright 1998, American Holistic Nurses' Association.

Desired outcomes in FM are to decrease pain, increase quality of life and limit disability. Exercise is named as the environmental alteration to be accomplished, then the intervention of education is performed including the use of a patient information brochure about the benefits of exercise for people with FM. The patient is treated holistically, with attention given to the biological, psychological, social and spiritual aspects of their life. After documentation, the nurse analyzes the impact of the environmental alteration on the patient's health status; this becomes feedback for the patient observation step of the model.

REVIEW OF LITERATURE

Fibromyalgia

Fibromyalgia is a chronic pain syndrome and is the most common cause of widespread pain seen in medical practice, (Bennett, 1995) affecting an estimated three to six million people in the United States (Wolfe, Ross, Anderson, et al., 1995, p.19). Although anyone across the age span may have fibromyalgia, women are twenty times more likely to be affected than men (Ryan, 1995, p.25) with the typical patient diagnosed between the ages of thirty and fifty (Krsnich-Shriwise, 1997, p.68).

Controversy surrounds fibromyalgia as to whether it is a disease, a syndrome or a psychosomatic illness. Diseases usually have known causes and well-understood mechanisms for producing symptoms. Syndromes are collections of signs and symptoms that occur together and paint a clinical picture (Starlanyl and Copeland, 1996). Syndromes are serious problems that cause suffering and disability. Fibromyalgia was defined by the American College of Rheumatology (ACR) in 1990 as a syndrome including widespread musculoskeletal pain, multiple tender points, dysfunctional sleep, persistent fatigue and paresthesias (Yunus, 1996). The etiology and the pathology of fibromyalgia are not well understood. "The absence of an obvious physical cause, therefore, can lead to a labeling of the entire pain experience as psychopathology" (King and Goddard, 1994, p.S-9).

Fibromyalgia (FM) is not a new phenomenon. A condition known as muscular rheumatism lead Ralph Stockman to perform muscle biopsy studies in 1904(Simms, 1996). The term fibrositis was used to denote a syndrome of generalized muscular pain, tender points at multiple sites, poor sleep and fatigue until 1981 when Yunus published a study of the clinical characteristics of this syndrome (Rachlin, 1994). Fibrositis was abandoned in favor of the term fibromyalgia because research does not support inflammatory changes in muscle tissue as the source of the generalized pain (Rachlin, 1994 and Simms, 1996). In 1990 the American College of Rheumatology published Criteria for the Classification of Fibromyalgia to propose diagnostic criteria that define the syndrome (Wolfe et al., 1990). Those criteria include:

- Widespread pain in combination with
- Pain at 11 or more of 18 specific tender point sites.

Widespread pain is further defined as pain on the right and left sides, pain above and below the waist, and axial skeletal pain (cervical spine, anterior chest, thoracic spine or low back)(Bennett, R. and McCain, G., 1995).

Tender points are generally areas where muscle attaches to ligaments or bone and these areas localize pain when stimulated (Krsnich-Shriwise, 1997). That is one way to differentiate between a tender point and a trigger point. Trigger points radiate or refer pain when stimulated. Tender points are localized areas of pain associated with fibromyalgia; trigger points are dense areas of tightness within a muscle and they are associated with the myofascial syndrome (Maurizio and Rogers, 1997). Patients with FM have a generalized increase in pain sensitivity compared to unaffected individuals (Mikkelsson, Latikka, Kautiainen, Isomeri, and Isomaki, 1992). What is unique about FM is reproducible pain at specific tender points. This pain is qualitatively and quantitatively different from the pain of other chronic conditions like rheumatoid arthritis (Yunus, 1996).

Examination of tender points requires knowing where to palpate, how much pressure to apply, and how to judge a pain response in the patient. The diagnosis requires that the patient feel pain, not just tenderness, when the examiner applies four kg of pressure to the tender point (Bennett and McCain, 1995). To meet the ACR criteria, the pain must be present for at least three months (Maurizio and Rogers, 1997). Tender points may be assessed by manual palpation or by a pressure pain meter called a dolorimeter (Mikkelsson et al., 1992). A criticism of the ACR criteria is that the evaluation of tender points is not objective (Hadler, 1997) and this is a legitimate claim since the sensation of pain is a completely subjective experience. "Pain is whatever the experiencing person says it is, existing whenever the experiencing person says it does" (McCaffery and Beebe, 1989, p.7). Research has shown that the presence of tender points in combination with widespread pain provides the most sensitive, specific and accurate criteria for the diagnosis of FM (Wolfe et al., 1990).

The most common symptoms of FM are generalized pain, stiffness, fatigue and poor sleep (Rachlin, 1994). Feelings of swelling without objective signs of edema, and paresthesia are present in half the patients who have fibromyalgia (Yunus, 1996). Associated symptoms include headaches, irritable bladder and irritable bowel syndromes, dysmenorrhea, Raynaud's phenomenon, difficulty concentrating, anxiety and depression (Bennett and McCain, 1995).

Theories of Etiology

There are multitudes of theories in the literature yet the etiology of FM is unclear. Fibromyalgia has many symptoms that overlap with other disorders, such as chronic fatigue syndrome, temporomandibular syndrome and dysfunctional pain syndrome (Yunus, 1996). These syndromes occur most often in women and lack laboratory tests or pathological tissue changes that might provide verification of the patient's complaints (Rachlin, 1994). Perhaps the most controversial theory of etiology of FM is the psychosomatic postulation. Hadler declared that "these are normal people whose individual personality traits and vulnerability predispose them to learning to lead a life of somatizing" (1997, p.176). The fact that somatization is five to ten times as common in women as it is in men and correlates with high levels of depression would seem to support this line of reasoning (Eisendrath and Nye, 1997, p.50). Approximately thirty percent of FM patients have significant psychological problems—the most common diagnosis being depression (Bennett, 1995, p.271). This thirty-percent co-morbidity of depression with FM does not mean that FM is a variant of depression. "Anxiety is usually associated with brief pain, whereas depression tends to accompany prolonged pain; an element of both is usually present with all pain" (McCaffery and Beebe, 1989, p.9). An emotional reaction to pain does not mean that pain is caused by an emotional problem. The psychosomatic theory may simplify the complex relationship between pain and depression.

Fibromyalgia may be related to a sleep disorder in which non-rapid eye movement (NREM) sleep is disrupted. Moldofsky found a pattern of alpha wave intrusion in stage three and stage four sleep during electroencephalogram (EEG) studies of patients with fibromyalgia (Moldofsky, 1993). Alpha waves are "awake" type of brain waves and are not normally present during deep sleep. He also was able to demonstrate that disrupting NREM sleep in healthy volunteers resulted in development of musculoskeletal and mood symptoms similar to those seen in FM. When compared to normal or insomniac patients, the fibromyalgia group spent thirty-five percent more time in alpha wave anomaly sleep (Rachlin, 1994, p.68). Neurochemical alterations, such as lack of serotonin may be responsible for alpha wave anomaly sleep disruption (Millott and Berlin, 1997). Other causes of alpha wave intrusion are stress, trauma, biologic illness and environmental influences (Rachlin, 1994). Exercise improves sleep by increasing the amount of time spent in slow-wave or deep sleep. Slow-wave sleep is associated with a well-rested feeling upon awakening, and many FM patients wake up feeling unrefreshed (Dishman, 1992). Fatigue may contribute to complaints of memory loss, poor concentration, forgetfulness and confusion by patients with FM (Slotkoff and Clauw, 1996). Critics of this theory point out that alpha wave intrusions occur in healthy persons, and that many patients with fibromyalgia have normal EEG patterns during sleep (Slotkoff and Clauw, 1996).

Central nervous system structural changes may account for the pain perception of FM patients. The thalamus is important in integration and perception of pain signals, and sends output regulatory messages to the hypothalamic-pituitary-adrenal axis. The caudate nucleus signals the occurrence of noxious events and can produce analgesic effects (Koopman, 1997). Researchers have used single photon emission computed tomographic imaging (SPECT) to show that patients with FM have low regional cerebral blood flow to both the thalamus and the caudate nucleus (Mountz, Bradley, Modell et al., 1995). The theory is that the brain is compensating for prolonged exposure to noxious stimulation flowing up the spinal pathways. Neuroendocrine theories may also decipher the multifaceted symptoms seen in FM. Changes in the hypothalamic-pituitary-adrenal axis and the sympathetic nervous system occur in response to stress. People with FM have a hyporesponsive stress system with high levels of substance P, and low levels of serotonin availability. Substance P is a nociceptive neurotransmitter that along with dynorphin and calcitonin gene-related peptide causes hyperexcitability and hyperalgesia in the dorsal horn of the spinal cord (Pillemer, Bradley, Crofford, Moldofsky and Chrousos, 1997). Hyperalgesia is a normal stimulus such as light touch being perceived as painful. Less serotonin means less down-regulation of nocioception (Pillemer et al., 1997) and when serotonin is depleted there is a decrease in restorative NREM sleep, an increase in depression and pain (Krsnich-Shriwise, 1997). Another endocrine theory proposes that the hormonal changes of menopause may cause sleep disorders and decreased secretion of growth hormone which is necessary for repair of muscle microtrauma (Crofford and Demitrack, 1996). Hormones then, may impact a patient's ability to sleep and repair daily stresses suffered by the body and influence a person's ability to cope with pain.

A theory of muscle deconditioning weaves together the symptoms of FM in a multicausal model. Sleep deprivation leads to fatigue and inactivity, which results in unfit muscles. Muscle is thixotropic: if it is not used, it becomes shorter, stiffer and weak (Bennett, 1995). This leaves the muscle at risk for microtrauma-disruption of muscle fibers and abnormal permeability of the sarcolemmal membrane that occurs during activity (Bennett, 1989). Deconditioning leads to loss of flexibility, easy muscle strain and soreness; this pain contributes to inactivity and the feedback loop continues (Caudill, Holman and Turk, 1996).

Fibromyalgia treatment is aimed at symptoms, using concepts from proposed etiologies for direction. This is a complex syndrome offering rich opportunity for research.

Muscle Pathology

Many researchers have looked for the source of FM pain by examining the muscle tissue for signs of pathology. In Sweden studies assessed muscle morphology, metabolism and physiology attempting to explain the pain, fatigue and stiffness that accompanies FM (Bengtsson and Henriksson, 1989). They found changes indicating disturbances in microcirculation, mitochondrial damage and reduced high energy phosphates, leading to the conclusion that muscle hypoxia might be a cause of FM pain. Criticism of the Bengtsson studies include the pathologic changes found were located in only one of the sites biopsied, and changes were not replicable in multiple alternate sites on the same patients (Simms, 1996). Also, the types of muscle changes described as moth-eaten and ragged red have been found in a variety of disorders (not just FM) and can be induced in experiments that cause muscle ischemia (Heffner and Barrow, 1978).

Research by Yunus and Kalyan-Raman found no more muscle abnormalities in people with FM than in pain-free control subjects (Yunus and Kalyan-Raman, 1989). This was a welldesigned, blinded, controlled study done at the University of Illinois in 1986. Simms critically reviewed thirty-three studies in an attempt to answer the question of muscle pathology in FM syndrome, concluding that the studies failed to confirm muscular pathology (Simms, 1996). Changes in blood flow and muscle metabolism were consistent with the effects of muscle deconditioning. There is not sufficient evidence in the literature to support the presence of muscular pathology in the syndrome of FM.

Deconditioning

When muscles are not used they become tighter, stiffer and less efficient (Rosen, 1994). This concept of deconditioning as a source of the symptoms of FM surfaces in the literature with the sleep deprivation studies of Moldofsky and Scarisbrick (1976). After noting during an initial study that FM patients suffered from a characteristic pattern of sleep disruption in stage four, a second study was performed in which FM symptoms were induced by selectively interrupting the stage four sleep cycles of healthy volunteers (Moldofsky and Scarisbrick, 1976). The more aerobically fit subjects were less susceptible to developing FM symptoms. This study was the basis for much research into the fitness levels of FM patients.

Research on physical fitness has found that people with FM are less aerobically fit than average control groups.

One research team studied aerobic fitness of patients with fibrositis at The Oregon Health Sciences University at Portland. Over eighty percent of the fibrositis patients in this study were below the average level of aerobic fitness (Bennett, Clark, Goldberg, Nelson, Bonafede, Porter and Specht, 1989, p.457). This study found low clearance of a marker for muscle blood flow, lending support to the deconditioning model of etiology in FM. Another study of physical performance characteristics of women with fibromyalgia (Mannerkorpi, Burckhardt and Bjelle, 1994) found FM subjects were significantly below average in physical performance measures on muscle strength and endurance tests when compared to the healthy control group or to average age-specific norms. Thus, studies indicate that FM patients are less aerobically fit than average persons are.

Pain Control

While there are many strategies used to control pain, regular physical exercise is noted to be of great benefit for patients with FM. A two year study following forty-four FM patients discovered that time spent in exercise and aerobic activity inversely correlated with the severity of the FM symptoms (Granges, Zilko and Littlejohn, 1994). The study interventions consisted of verbal explanation and reassurance about FM, and a standardized written information sheet provided to patients. Special emphasis was given on the importance of regular physical exercise for the management of their condition. Patients also had individualized drug regimens of analgesics and antidepressants. Even though causality cannot be assumed on the basis of correlation, it is interesting that physical exercise (rather than drugs, coping skills, or specific physical therapies) was the variable correlating with better health. No specific prescribed physical activity intervention was included in this study, but the authors did advocate physical activity as a major component of the management of FM patients. When considered in conjunction with the Moldofsky (1976) studies on sleep deprivation, this study seems to support the role of physical fitness in FM symptom prophylaxis.

Other research studies confirm the benefits of exercise for the FM patient. Comparison of flexibility exercises with cardiovascular fitness training in a randomized, controlled study of forty-two FM patients showed improvements in both pain threshold scores and global assessment scores for the fitness training group vs a control group receiving flexibility exercises (McCain, Bell, Mai, and Halliday, 1988). This study also found lowered levels of psychological distress in both groups, but concluded the improvements in FM were not the result of this decrease in psychological distress. The authors attribute improvements to expected increases in betaendorphins, ACTH, prolactin and growth hormone that accompany strenuous exercise (Mccain et al, 1988). These hormonal responses to exercise are well documented elsewhere (Masironi and Denolin, 1985; and Morgan, 1997). Whatever the mechanism, these patients demonstrated less pain and felt better when they exercised.

Pain control as an effect of aerobic exercise is documented in a controlled study comparing exercise with stress management (Wigers, Stiles and Vogel, 1996). FM patients were randomly assigned to fourteen weeks of aerobic exercise, stress management or treatment-as-usual group interventions. Measurements of pain, fatigue and depression decreased for patients assigned to the aerobic exercise group; these people also experienced increased work capacity and global subjective improvements (Wigers, Stiles and Vogel, 1996). Research supports the beneficial effects of exercise on several aspects of FM including pain control, feelings of well being and reduced fatigue.

Mental Health

Exercise may be advantageous in treating depression that often accompanies chronic pain. Several studies have shown that even a moderate amount of physical exercise has an antidepressant effect on FM patients (Martinsen, Medhus and Sandvik, 1985; Clark, Burckhardt and O'Reilly, 1991; Gowans, Voss, deHueck ET al, 1996). The mechanisms proposed for this link between mind and body include psychological and physiological responses. Biological hypotheses for improved mood include increases in beta-endorphin, serotonin, and norepinephrine production associated with the stress of aerobic activity (Morgan, 1997). Mentally, exercise can be a mastery experience that boosts a person's sense of self-efficacy--the belief that one can manage a specific challenging situation (Bandura, 1977). Higher self-efficacy was associated with less pain and less impairment of physical activities in research involving seventy-nine FM patients (Buckelew, Murray, Hewett, Johnson and Huyser, 1995). Other psychological models point out that exercise provides therapeutic distraction; exercise and pain behaviors are mutually exclusive (Martinsen and Morgan, 1997). There seems to be a mind-body connection whereby exercise improves depression.

One study found approximately thirty percent of FM patients had psychological problems with the most common diagnosis being depression (Bennett, 1995, p.271). The mental health benefits of exercise are also available for the majority of FM patients who are not depressed. Secondary analysis of four population surveys of physical activity and mental health in the United States and Canada found level of physical activity was positively associated with general well-being, and lower levels of anxiety and depression (Stephens, 1988). Physical activity related strongly to mental health and "more important than the size of the treatment effect, however, is the generality of this relationship: it not only applies to the superfit and to neurotics but also extends to the general population" (Stephens, 1988, p.43).

Research studies on FM have demonstrated the benefit of promoting internal locus of control for patients who suffer chronic pain (Wells, 1994). FM patients who had a sense of coherence—confidence their environment was predictable and that they had resources to cope with life's challenges—reported they felt well despite high symptom levels (Soderberg, Lundman, and Norberg, 1997). Feelings of lack of control produced pessimism, anxiety and decreased pain tolerance in FM patients who were compared to rheumatoid arthritis patients in a study of locus of control (Gustafsson and Gaston-Johansson, 1996). Aerobically fit subjects demonstrated resistance to psychosocial stressors in a meta-analysis of thirty-four studies conducted by Crews and Landers (1987). Exercise may be an opportunity for FM patients to be active in their treatment, charting a course toward control over their symptoms that results in improved mental and physical health.

Barriers

A major problem with exercise interventions is the reversibility of the benefits associated with activity. Aerobic exercise increases blood flow to muscles and increases the ability of the mitochondria to produce ATP- the fuel for muscle activity. Within eight weeks of exercise cessation detraining occurs, and gains of exercise are not retained (Coyle, 1988). Wigers, Stiles and Vogel's research confirmed this reversibility: at four year follow-up "a considerable compliance problem may explain the lack of long-term effects on symptom severity in the aerobic exercise group as a whole" (1996, p.83). Aerobic exercise appears to be an effective treatment of FM symptoms when patients adhere to it.

Because of the reversibility of exercise's benefits and the chronicity of the pain of FM, patients may see exercise as an insurmountable project. Several studies document an initial deterioration with postexertional pain, stiffness and fatigue when these people begin aerobic activity (Martin ET al, 1996; McCain, Bell, Mai and Halliday, 1988; and Mengshoel, Vollestad and Forre, 1995). While transient in nature, this initial worsening may have a negative effect on adherence to new activity. The presence of pain is not a contraindication to exercise (Rosen, 1994; Meilman, 1984). This is a very different mindset from acute pain management where patients are often encouraged to rest. Returning the patient to a quality life and preventing disability may require the patient to exercise through the pain. The patient needs to understand that "pain relief, if it comes at all, will likely occur after the disability is alleviated" (Meilman, 1984, p.313). Exercise is a long-term commitment for people with FM that requires significant motivation both to start and to maintain new behaviors.

Factors affecting adherence to rehabilitation interventions for individuals with FM were studied and found to be multifaceted (Huyser, Buckelew, Hewett and Johnson, 1997). The highest predictors for adherence included lower levels of depression, increased outcome expectancy, higher levels of education and self-efficacy, and younger age. They concluded "general difficulties in exercise and increases in pain secondary to exercise may have mitigated adherence" (Huyser, Buckelew, Hewett and Johnson, 1997, p.84). Adherence may rest on the patient's education about pain and symptom control, supporting the expectancy the patient will have the resources to influence the course of their life. Given that the benefits of exercise are quickly reversible, adherence may be the largest stumbling block in the use of exercise in the treatment of FM.

In conclusion, FM is a pain syndrome of unclear etiology. There is no reliable evidence in the literature of muscle pathology in FM. There is evidence that aerobically fit individuals are less susceptible to developing symptoms of FM in sleep deprivation studies, and FM patients are less aerobically fit than average people are. Exercise offers the benefits of improved mental health, improved pain control and the opportunity for patients to be active participants in their care. Lifestyle change can be difficult, but the incentive to exercise includes improved quality of life and prevention of disability for people who live with FM.

PRODUCT OF THE SCHOLARLY PROJECT

The outcome of this scholarly project is a patient education brochure about exercise for people newly diagnosed with FM. Searching the literature dealing with FM revealed many scholarly journal articles and a few books written about FM that included chapters on exercise, but there was a lack of patient information specifically addressing exercise and FM on an introductory level. Given the potential benefits of physical activity in this population and the lack of available, easily accessible information for patients, there is a need for a brochure of this type. This educational brochure may function as an adjunct teaching supplement, as a motivational aid or as a source of referral to organizations offering more information. Appropriate settings for use of a brochure on exercise and FM might include primary and specialty care offices, pain management centers, community sites offering fitness programs for FM patients and in Arthritis Foundation FM classes.

APNs emphasize health promotion and have much to offer the person with FM. Exercise is an effective adjunct therapy to cognitive-behavioral therapy, medications or coping skills training. Exercise is also appropriate for the patient who may not wish to take antidepressant medication and who desires a non-pharmacologic approach to treatment. Nursing is an advocate for patient choice and education in the alternative therapies. The APN is prepared to make a holistic assessment, prescribe a course of action and coordinate the care of the person with FM. APNs take the time to educate patients, drawing on their scientific knowledge. They utilize concepts from the social and psychological sciences to address motivation and adherence issues. By maintaining an ongoing, caring relationship the APN in primary care provides an empowering environment for the FM patient who may need that stabilizing human support before they can contemplate any lifestyle change.

The Nightingale conceptual framework guides design and content of the pamphlet. In keeping with Nightingale's environmental adaptation theory which helps the patient organize the internal and external environment to facilitate their inner healing capacity, the brochure presents exercise as a way to alter both the physical and psychological environment of the person with FM. Patients will be addressed as an active participants in their own care, consistent with Nightingale's belief that all people have reparative powers and the ability to help themselves heal. The goal of this presentation is to improve the health of the person with FM, which in the Nightingale philosophy includes more than a lack of illness but self-actualization and stability. Stated in chronic pain terminology, the goal is to improve quality of life and limit disability.

Methods used to achieve this goal include education, motivation and offering resources in the community. Education begins with the title, "Fibromyalgia: feeling better with exercise" which does not imply a cure for FM, but instills the expectation that exercise can help patients improve their health. Butterfly graphic images on the title page are meant to portray the ideas of well being and optimism. Moving into the written content of the brochure, the person with FM is welcomed and then introduced to the definition of FM. This definition is taken from the American College of Rheumatology (Wolfe et al., 1990) diagnostic guidelines and has been summarized without medical terminology to be understandable for a reader in the general public. Incidence rates are given to help the person with FM see that other people share their problem and decrease their sense of isolation.

The second section of the brochure summarizes current knowledge of chronic pain and its relationship to depression, and introduces motivating factors for exercise. Chronic pain is differentiated from acute pain and the foundation is laid for the introduction of the exercise intervention. Especially important is the concept that FM is not caused by a current tissue injury or an inflammatory process (Simms, 1996; Yunus and Kalyan-Raman, 1989). The implication is to dispel the fear of harming their body by being active. Several motivating factors are introduced such as pain is made worse by immobility, improving sleep may ease the symptoms of FM, and muscles that are used are more elastic and less stiff.

The relationship between chronic pain and depression is clarified in this section of the brochure. This is a sensitive area for people with FM because chronic pain and depression both are stigmatized in our culture, and there is a relatively high co-morbidity of depression associated with FM (Bennett, 1995). The reciprocal relationships between treatment of depression and pain are explored. The concept that depression and FM may co-exist without one causing the other is presented by telling the patient the pain is real and that the depression did not cause the pain.

The purpose of section three is to educate the reader about the positive effects of exercise on FM and to motivate them with the incentive of feeling better both physically and mentally. This section describes how movement improves the function of muscles along with the beneficial effects of exercise on sleep and mental health.

These are the incentives to exercise. This section explains how exercise alters the physical environment by increasing muscle blood flow, increased flexibility, and increased efficiency. Sleep is improved by an increase in the amount of time spent in slow-wave or deep sleep following exercise (Dishman, 1992). This is important because slow-wave sleep is associated with a well-rested feeling upon awakening, and people with FM who often wake feeling unrefreshed from sleep. Exercise also alters the psychological environment by decreasing susceptibility to pain, improving mood and promoting a sense of control. Endorphins are alluded to as chemicals released by the brain (in response to exercise) that decrease pain and improve mood.

Concerns or barriers to exercise are covered in section four of the brochure. The initial training soreness associated with exercise is introduced, along with encouragement to persist and to pace activity to avoid overexertion. These are key points to improve adherence. Personal barriers may include fatigue, shyness, fear of failure or lack of coordination; suggestions are made to help the person with FM overcome these barriers. Setting an achievable goal is accomplished by having the person choose an activity that they can already do, starting slow and stressing persistence over performance. Opportunities for exercise are described in both private and group settings. Since social activity decreases isolation and may provide an external source of motivation, the reader is encouraged to find an exercise partner.

The back of the brochure is the final page of content. Referral to more information is provided with the address and phone number of the local Arthritis Foundation. Internet addresses are included for the national Arthritis Foundation and the Fibromyalgia Network which are cost-free sites offering information on FM.

In conclusion, the product of this scholarly project is a patient teaching brochure written for the newly diagnosed FM patient. The brochure will educate the reader about FM and the benefits of exercise, address areas of common concern regarding exercise, and provide resources for further information.

RESEARCH IMPLICATIONS

FM is a recently recognized syndrome, with the official diagnostic criteria published by the American College of Rheumatology in 1990. FM offers rich possibilities for research as science searches for an etiology including sources of the overlap with irritable bowel and bladders syndromes, depression, migraine phenomenon, chronic fatigue syndrome and Raynaud's phenomenon. Interventions for treatment of FM are fertile ground for research including medications, exercise, psychotherapy and the alternative therapies. There is much to learn about FM.

Qualitative and quantitative research opportunities exist in this scholarly project. A proposed qualitative pilot study could be conducted with a small group of patients who were newly diagnosed with FM, asking them to read the brochure, "Feeling better with fibromyalgia and exercise" then respond to open ended questions about how they felt afterwards. Themes that sounded hopeful or optimistic might validate the approach used in the brochure. Themes of doubt could be further explored: do patients with FM feel more comfortable with a more directive, detailed instruction booklet? Does the doubt focus on their ability to exercise, or on belief in the intervention's effectiveness? Qualitative research could describe a reader's emotional response to the content of the brochure.

Quantitative research might assess the impact of the brochure on the patient's level of commitment to exercise. The study design could be a before and after questionnaire administered to a convenience sample of newly diagnosed FM patients in a Rheumatology office. The level of commitment variable could be assessed utilizing Prochaska's Transtheoretical Model and stages of change (Prochaska, Redding and Evers, 1997), having the patient rate their intention to take action on a time line before they read the brochure and afterward. A sample question might read, "Choose the answer below which best describes your intention to exercise:

a) I have no intention to exercise in the next 6 months.
b) I intend to exercise in the next six months.
c) I intend to exercise in the next 30 days and have taken some steps in this direction.
d) I have already been exercising but only for less than the past 6 months.
e) I have already been exercising for more than 6 months."

The answers above correlate with the stages of change: precontemplation, contemplation, preparation, action and maintenance. The study hypothesis would be that the brochure's impact would result in change toward a higher level of the patient's commitment to exercise.

Confounding variables may impact results in this design and prevent generalization to a larger population. These include sample selection from a Rheumatology practice and the intrinsic variable of depression. Convenience sampling from patients in a Rheumatology practice might result in a sample that is more symptomatic than one drawn from general practice, thus these results might reflect a sicker population than the general population of people with FM in the community. Depression may also influence a subject's perception of ability to exercise, or decrease their motivation. Given the co-morbidity of FM and depression, this might be a variable to exclude using a depression scale. It might also add to our understanding to incorporate depression as a study variable and interpret results based on two subgroups of patients-depressed and not depressed. Convenience sampling and depression may limit the ability to generalize results of the study.

Another area of quantitative research interest might be to measure change in primary care provider's level of knowledge before and after reading the brochure. Using the hypothesis that knowledge of FM and exercise would increase after reading the brochure, a tool could be devised to measure the major topics covered in the pamphlet. Research on the provider perspective could also measure comfort with prescribing exercise as an intervention with FM.

In conclusion, from the perspective of the patient or the provider, there are qualitative and quantitative research opportunities in this scholarly project.

SUMMARY

FM is a chronic pain syndrome affecting two to three percent of the general population, resulting in personal suffering and disability. People with FM experience pain, stiffness, fatigue and sleep problems. Associated symptoms overlap with other pain syndromes including migraine, irritable bowel and bladder, and chronic fatigue syndrome. The etiology of FM is unclear, but research has demonstrated the benefits of exercise in the treatment of FM symptoms. The Nightingale environmental adaptation model and current literature on FM were used to design an educational brochure for people with FM. The brochure was intended to promote the use of exercise as an intervention for fibromyalgia. The brochure provides information on FM, pain, exercise and concerns, and offers resources for patients to gain further information. Research implications of this teaching tool were then explored from a qualitative and quantitative viewpoint. The goal of the advanced practice nurse is to help the person with FM maximize their abilities and improve their quality of life. Exercise improves both the physical and mental health of people with FM.

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What is Fibromyalgia

You've been diagnosed with fibromyalgia and now you are wondering what you can do to feel better.

Fibromyalgia (FM) is a chronic pain syndrome that effects an estimated three to six million people in the United States. The most common symptoms of FM include generalized pain, stiffness, fatigue and poor sleep. About half the patients who have FM also have feelings of swelling or numbness in their arms or legs. Associated symptoms include headaches, irritable bowel or irritable bladder syndromes, painful menstrual periods, circulation problems, difficulty concentrating, and anxiety or depression.

Researchers have not yet discovered the cause of FM, but we have learned some things that can help you to feel better.

What We Know

Chronic pain is different from acute pain. Acute pain often signals an injury and is treated by short-term rest. Chronic pain exists without objective signs of tissue injury and is made worse by immobility. In chronic pain you have to move despite the pain. It is only after you relieve the immobility that pain relief will come.

- FM is not an inflammatory condition so you will not harm your muscles by moving them.
- Improving the quality of sleep may ease the symptoms of FM.
- Muscles are thixotropic. That means when muscles are cold and not used, they become shorter and stiffer. Sedentary lifestyles make FM symptoms worse.
- Chronic pain may lead to depression. Treating the depression may help the pain, and treating the pain may help the depression. This does not mean that the pain is not real, or that the depression caused the pain.

Benefits of Regular Exercise and Fibromyalgia

A regular exercise program can help you to feel better.

- Movement improves blood flow to muscles, bringing in more oxygen and making muscles produce more fuel so they function more efficiently. Muscles that are used are warmer, more elastic and less stiff. People who exercise have muscles that are more flexible and less stiff.
- Exercise may improve your sleep. There is an increase in the amount of time spent in slow-wave or deep sleep following exercise. Slow-wave sleep is associated with a well-rested feeling upon awakening.
- People who exercise feel better mentally. They are less depressed and have a sense of control over their lives. Exercise releases chemicals in the brain that decrease pain and improve mood.

Concerns

- Whenever people (even trained athletes) begin a new activity they feel an initial soreness as their muscles adjust to new demands. People with FM may also feel a worsening of symptoms in the beginning of any exercise. Don't be discouraged- your muscles will adjust. Pacing yourself is important so that you don't overexert in the beginning. Persistance is the key to getting past this initial stage and the rewards will be worth the effort.
- You may not feel up to exercising, or feel uncomfortable to try in front of other people. Choose something you <u>can</u> do like walking, stretching, swimming, yoga or tai chi. Start slow (for instance ten minutes, twice a day), and exercise every day if possible. There are videos available by loan from the Arthritis Foundation which may be used at home. Exercise may also be a social activity: there are classes at local health clubs and water exercise sessions offered at the public schools. Consider finding a partner to exercise with. It can be helpful to find out you are not alone with FM.

For More Information

The Arthritis Foundation
2900 Hannah Blvd, Suite B-105
East Lansing MI 48823
Phone 517-336-4598

The Arthritis Foundation
http://www.arthritis.org/

Fibromyalgia Network
http://www.fmnetnews.com/

Fibromyalgia: feeling better with Exercise

Fibromyalgia: feeling better with Exercise