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AN EXERCISE PROGRAM FOR CANCER PATIENTS: PHYSICAL AND EMOTIONAL WELL-BEING AS INDICATORS OF QUALITY OF LIFE

By

Joan Marlene Borst

A DISSERTATION

Submitted to Michigan State University In partial fulfillment of the requirements For the degree of

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ABSTRACT

AN EXERCISE PROGRAM FOR CANCER PATIENTS: PHYSICAL AND EMOTIONAL WELL-BEING AS INDICATORS OF QUALITY OF LIFE

By

Joan Marlene Borst

The diagnosis and treatment of cancer often includes biological and psychological side effects that interfere with a cancer patient's quality of life. The symptoms include nausea, fatigue, weakness, depression, anxiety, helplessness, and hopelessness. Increasingly, exercise is recognized as an effective adjunctive therapy to traditional cancer treatments. Participation in a low to moderate intensity exercise program may improve physiological as well as psychological condition.

The purpose of this study was to examine the effect of a ten-week exercise program on the physical and emotional well-being of patients in active treatment for a variety of cancer diagnoses. In addition, the study examined which of the variables "physical well-being" or the "emotional well-being", improved more, and whether the change was influenced by gender, age range, cancer type, or type of cancer treatment.

Sixty-two subjects (F = 36, M = 26) between the ages of 21 and 80, and all in cancer treatment for a variety of cancer types, served as participants in the study. Before and after the exercise program, participants completed the Functional Assessment of Chronic Illness Therapy - Fatigue [FACIT -F] subsections entitled, "physical well-being" and "emotional well-being".

Results indicated that subjects experienced a statistically significant improvement in physical and emotional well-being after participation in the ten-week exercise program. The results did not demonstrate a statistically significant difference in the improvement between physical and emotional well-being, although the results did indicate the effect size for physical well-being was somewhat larger.

Gender, age range, cancer type and cancer treatment showed no statistically significant influence in the improvement of physical well-being, but the influence of cancer type on improvement of physical well-being suggested that this relationship might be worthy of additional study.

The results of this study have implications for the practice of social work in the field of health care and social policy. Exercise offers a cost-effective and an alternative way of supporting improvement in the physical and emotional well-being of people living with cancer. Low to moderate physical activity is a way for people living with cancer to be personally involved in their health care. This form of self-care may influence both the reduction of the physical side-effects of cancer and cancer treatment, but may also decrease levels of depression, hopelessness, and helplessness. Future studies should be directed toward understanding the relationship between gender, age range, type of cancer and type of cancer treatment on the improvement in physical and emotional well-being. In addition, studies should continue in understanding the role of exercise in improving the physical and emotional well-being of individuals living with other chronic illnesses.

Copyright by Joan Marlene Borst 2005 To the courageous men and women who enthusiastically participated in this project – people living with cancer and hope and the caring, professional and dedicated professionals who support them.

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CHAPTER I

INTRODUCTION

Introduction and Problem Statement

Research suggests that people diagnosed with cancer are living longer than ever before (Bohen, 2002; Burnham & Wilcox, 2002; Courneya, Mackey, & Jones, 2000). Despite this good news, people living with and being treated for a variety of cancers continue to experience physical and emotional symptoms that affect their quality of life (Courneya, 2001). The most common emotional symptoms are depression and anxiety, and the most common physical symptoms are fatigue and body weakness (Ahlberg, Ekman, Gaston-Johansson, & Mock, 2003; Courneya, 2001; MacVicar & Winningham, 1986; Richardson, 1995). Depending on the type of cancer and cancer treatments, symptoms and side effects can cause cancer patients to experience disintegration in their quality of life (Courneya & Friedenreich, 1999; MacVicar & Winningham, 1986).

Patients experiencing the physical and emotional side effects from cancer and cancer treatments are often advised to decrease activity and may choose to rest from routine activities (Courneya, et al., 2000; Watson, 2002; Watson & Mock, 2003). Research shows that inactivity in response to the increased physical and emotional weakness experienced by individuals in response to cancer and cancer treatments may exacerbate these side-effects (Courneya, et al., 2000; MacVicar & Winningham, 1986).

However, recent work suggests that rest and reduction in levels of activity add to the "de-conditioning" or loss of physical strength in cancer patients (Courneya, et al., 2000; MacVicar & Winningham, 1986; Nieman, 1999; Williamson, 1998). This inactivity leads to a need for a higher degree of effort by the patient to perform daily activities, and may explain why many patients experience persistent weakness weeks and months after the end of cancer treatments (Dimeo, Rumberger, & Keul, 1998). Courneya and Friedenreich (1999) propose that an intervention that may tackle a broad range of quality of life issues following a cancer diagnosis is physical activity or exercise.

Recent studies suggest that the symptoms of depression, anxiety, and fatigue are often reduced through the use of a well-designed exercise program for cancer patients (Courneya & Friedenreich, 1999). In fact, some cancer patients who participated in regular exercise reported a reduction in negative side effects and an improvement in their quality of life (Courneya, 2001; Schwartz, Mori, & Gao, 2001).

Because exercise appears to influence the quality of life for many people living with and receiving treatment for cancer (Courneya & Friedenreich, 1999), exploration of the role that increased activity and exercise plays in improving cancer patients' physical and emotional health is growing. However, many there are many limitations to the current body of research.

For example, few studies examine exercise as an intervention for individuals living with cancer and in cancer treatment. Most intervention studies are initiated after cancer treatment (Courneya, Mackey, & Jones, 2000). An additional limitation was noted by Courneya and Friedenreich (1999) after the examination of 24 studies on exercise and cancer. They found that a significant number of studies were small, with an average

sample size of only 25 participants per study. Studies this small interfere with the use of multivariate statistical techniques and reduce the power of a study. In addition, there are few studies that examine the relationship between individuals participating in cancer treatment and the independent variables of gender, age range, cancer type and cancer treatment. Finally, while studies exist that acknowledge the benefit of exercise for a cancer patient's physical and emotional health, no studies were discovered that explore whether physical health or emotional health improves more when using exercise as adjunctive therapy in the treatment of cancer.

Purpose of the Study

The purpose of this research study is to gain a better understanding of the effect of exercise on the quality of life for people in treatment for cancer. The pre-exercise and post-exercise test results of the quality of life variables physical and emotional well-being are examined using the Functional Assessment of Chronic Illness Therapy, with Fatigue [FACIT-F] questionnaire. The study explores change in well-being before and after an exercise program. The results are also examined to distinguish if one area of well-being (physical or emotional) improves more than the other. Finally, the purpose of the study is to examine the role of the variables gender, age range, cancer type, and cancer treatment, in improving quality of life.

Rationale for the Study

Physical exercise is an intervention therapy that addresses the broad range of quality of life issues for people living with chronic illnesses. Research indicates that exercise may also address quality of life issues for cancer patients (Courneya & Friedenreich, 1999). The rationale for the use of physical exercise in cancer patients is

very strong.

First, physical exercise is linked to many emotional and physical health benefits for people in the healthy population (Gunnarsson & Judge, 1997; Oweis & Spinks, 2001; Scully, Kremer, Meade, Graham, & Dudgeon, 1998; Shepard, 1995; Zittel, Lawerence, & Wodarski, 2002). Physicians frequently prescribe exercise for individuals with chronic illness as a means to obtain an increase in energy, improve overall health and to improve symptoms of depression (Moffat, 2001; Rochester, 2003; Prohaska & Warren-Findlow, 2002). These areas of concern are the same for people with a cancer diagnosis or experiencing cancer treatments. However, an assumption is sometimes made that cancer patients are "too ill" or do not have the stamina to participate in physical activities.

Second, physical exercise offers a natural, effective, and inexpensive way for cancer patients to participate in self-care. In addition to common cancer treatments such as chemotherapy, radiation, and surgery, exercise offers cancer patients an opportunity to actively participate in their own treatment, empowers them, and assists them in possibly controlling some of the physical and emotional symptoms caused by their cancer and cancer treatment (Zittel, et al., 2002). As an adjunctive therapy, an exercise program supports an improved quality of life (Patterson, Neuhouser, Hedderson, Schwartz, et al., 2003). People living with cancer have an opportunity to feel better, less hopeless, and more in control of their lives.

To further understand the role of exercise as an adjunctive therapy for cancer patients, in April of 2002, the Cancer Center at Mercy Health Center in Grand Rapids, Michigan, initiated a yearlong research study on the effect of an exercise program for people living with cancer. The Cancer Center was interested in learning about the effects

of exercise on the physical health and the emotional health of individuals living with and receiving treatment for a variety of cancer diagnoses. The study also examined the physical and emotional health of supporters of the cancer patients in the program and the effect of the exercise program on the patients' perception of support.

Within one year, the Cancer Center, with support from two collaborating sports centers in the city and a private grant, registered 75 cancer patients for the pilot study. All 75 participants were diagnosed with cancer and were in cancer treatment or had received cancer treatment within the previous six months.

The study offered cancer patients from any physician in Western Michigan a tenweek exercise program with the supervision and support of physical trainers. The cancer patients met in small groups, of six to eleven, with the certified personal trainers to learn about exercise and to design a plan of activity that offered the most benefits to each individual patient. Patients completed a series of standardized tests measuring their emotional and physical condition prior to the ten-week exercise program and after completing the program.

After one year of positive feedback from cancer patients, their supporters, and physicians in the community, the Cancer Center applied for and received a Lance Armstrong grant (Appendix A) allowing the Center to continue to offer this valuable adjunctive treatment at no personal cost to cancer patients in the community. As of this writing, the Cancer Center has over 300 individuals who have been involved in active cancer treatment, participate in this exercise program.

As research assistant in the original pilot study, I assisted in the initiation of the study, the coordination, the collection, and entering of the data. The study presented here

examines the effect of the ten-week exercise program on the physical and emotional health of the participants in cancer treatment in the pilot study.

Rest and other limitations that interfere with physical activity during cancer treatment may contribute to a process called "deconditioning". Deconditioning is the progressive loss of physical strength due to the underutilization of muscles and occurs to cancer patients because inactivity is frequently the cancer patient's response to the sideeffects of cancer treatment (Ahlberg, Ekman, Gaston-Johansson, & Mock, 2003; MacVicar & Winningham, 1986; Williamson, 1998).

Loss of physical strength is believed to decrease quality of life by interfering with the ability of a person to participate in physical activities previously experienced. In addition, the loss of physical strength creates a challenge for cancer patients to participate emotionally (Cohen & Herbert, 1996; Gignac, Cott, & Badley, 2000). To understand how exercise influences the quality of life for people living with and receiving treatment for cancer, it is important to examine the role of deconditioning in the cancer patients and to explore the role of increased activity and exercise in improving the cancer patients' physical and emotional health (Schwartz, 1999).

Research Questions

The overarching question for this study was: Did participation in an exercise program improve both the physical and emotional well-being for people living with a variety of cancer diagnoses? The specific questions guiding the research fell into four categories. The first category explores the physical well-being for all of the subjects in the exercise program. The second category examines the emotional well-being for subjects in the exercise program. The third category examines the area of well-being most

improved for the subjects with cancer after participation in the exercise program. The final category examines the relationship between the area of well-being exhibiting the greatest improvement and the independent variables gender, age range, cancer type, and cancer treatment.

Specifically, the following research questions guided the inquiry:

1. Will people in active treatment for a variety of cancer types who participate in a 10-week exercise program improve in physical well-being as measured by the "physical well-being" subheading of the Functional Assessment of Chronic Illness Therapy [FACIT]?

2. Will people in active treatment for a variety of cancer types who participate in a 10-week exercise program improve in emotional well-being as measured by the "emotional well-being" subheading of the Functional Assessment of Chronic Illness Therapy [FACIT]?

3. Will people in active treatment for a variety of cancer types who participate in a 10-week exercise program experience greater improvement in their physical well-being (physical well-being as measured by FACIT) or in their emotional well-being (emotional well-being as measured by FACIT) ?

4. What is the relationship between the more-improved condition (physical well-being or emotional well-being) and the variables gender, age range, cancer type, and cancer treatment?

Research Hypotheses

<u>Hypothesis 1</u>: There will be a statistically significant improvement in the posttest average scores of physical well-being reported by cancer patients who are in active treatment for a variety of cancer diagnoses and participate in a 10-week exercise program when compared to the pretest

average scores. (Higher mean score on the "physical well-being" subscale as measured by the Functional Assessment of Cancer Therapy - Fatigue [FACIT-F] will be associated with improved physical well-being.)

<u>Hypothesis 2</u>: There will be a statistically significant improvement in the posttest average scores of emotional well-being reported by cancer patients who are in active treatment for a variety of cancer diagnoses and participate in a 10-week exercise program when compared to the pretest average scores. (Higher mean score on the "emotional well-being" subscale as measured by the Functional Assessment of Chronic Illness Therapy – Fatigue [FACIT-F] will be associated with improved emotional well-being).

<u>Hypothesis 3</u>: There will be statistically significant difference in improvement in the sample mean of physical well-being when compared to the sample mean of emotional well-being reported by cancer patients who are in active treatment for a variety of cancer diagnoses and participate in a 10-week exercise program.

<u>Hypothesis 4</u>: There will be a statistically significant relationship between the variables 1) gender, 2) age range, 3) cancer type, and 4) cancer treatment and improvement in physical well-being reported by cancer patients who are in active treatment for a variety of cancer diagnoses and participate in a 10-week exercise program. The literature does not specify an identifiable direction of change.

Overview

Chapter I contained the introduction and problem statement, the description of the

original study and the plan and purpose of the study. The research question and hypotheses were also introduced. Chapter II provides a review of the relevant literature pertaining to this study. The research methodology is described in Chapter III, and the findings are presented in Chapter IV. Chapter V contains a summary of the study, major findings and conclusions drawn from the findings, implications, and recommendations.

CHAPTER II

REVIEW OF THE LITERATURE

A review of three thematic strands of research served to develop the research questions of this study: cancer, quality of life, and exercise. Each topic is explored by examining the specialized research about each area presented in the literature. These three broad research topics overlap and connect in ways that may be beneficial to the treatment of cancer. Research suggests that exercise may be an effective intervention for enhancing quality of life in cancer patients (Burnham & Wilcox, 2002; Courneya & Friedenreich, 1999; Courneya, Mackey, Lee, & Jones, 2000; Courneya, 2003;). As a case in point, Courneya (2003) provides an overview of 47 research studies and four clinical trials from the University of Alberta that examined exercise in cancer patients and the effect on quality of life. The author found that "almost all studies showed beneficial effects of exercise in breast and nonbreast cancer groups alike as well as during and after cancer treatment" (p.1).

Cancer

Overview

The diagnosis of cancer is a common occurrence. The National Cancer Institute [NCI] (2004) estimates that in 2004, 1,368,030 new cases of cancer will be diagnosed in the United States. Men and women in the United States experience an average probability

of 41% for developing cancer, with 80% of that group diagnosed before they are 55 years old (Courneya, 2001; Nieman, 1999). Living with cancer or knowing someone who is living with cancer is a familiar experience.

In the United States, there is a massive amount of information available to the general public about prevention, education, early screening, and early detection of cancer. In 2004, the American Cancer Society [ACS] issued an update on the guidelines for reducing the risk of cancer. The guidelines inform people of "healthy lifestyle choices" that could reduce the risk of cancer diagnosis. Current cancer prevention guidelines include four recommendations: 1) eat a variety of healthy foods, 2) adopt a physically active lifestyle, 3) maintain a healthy weight throughout life, and 4) limit consumption of alcoholic beverages (ACS, 2004; Ressel, 2002). Prevention of cancer is the ultimate goal, but there are additional considerations. Attention must remain on the continued research into early cancer detection, the advancement of affordable and effective cancer treatment, and improved quality of life for cancer patients and survivors. These goals remain vital.

Types of Cancer

Cancer develops as a result of a complex physiological process called transformation. The first step, or the initiation of cancer, is when a change takes place in the cell's genetic structure. The change in genetic structure may be due to a variety of reasons. Environmental factors, chemicals, tobacco, viruses, and radiation are carcinogens, or agents, that cause cancer (ACS, 2004; Baquet, 1995; Moniz & Gorin, 2003).

The second step in the development of cancer is called promotion. Promoters are defined as substances in the environment that allow an initiated cell to become cancerous.

Some carcinogens are strong enough to cause cancer without promotion. Cancer grows directly into surrounding tissues or spreads to other tissues and organs. This process is called metasticism. Cancer can also spread through the bloodstream. Malignancies, or cancerous tissues, can be divided into blood and blood forming tissues, such as leukemias and lymphomas, or into "solid tumors", also referred to as carcinomas or sarcomas (ACS, 2004; Baquet, 1995).

Cancer is diagnosed in many forms (Nieman, 1999). ACS (2004) suspects that there are more than 100 types of malignant tumors or neoplasms. The cancers most frequently diagnosed in the United States include Bladder Cancer, Breast Cancer, Colon and Rectal Cancer, Kidney Cancer, Leukemia, Lung Cancer, Melanoma, Non-Hodgkin's Lymphoma, Ovarian Cancer, Pancreatic Cancer, Prostate Cancer and Non-melanoma Skin Cancer (NCI, 2004). The process all cancers have in common is the uncontrolled growth and spread of abnormal cells (ACS, 2004; Nieman, 1999).

Cancer affects people very differently and some of the differences are related to the stage and type of the cancer. Individuals living with a less invasive cancer and treated at an early stage may benefit the most from an exercise program to improve quality of life.

Cancer Treatments

Today, cancer treatment has some proven benefits and cancer patients are far more likely to benefit and experience prolonged life than they were in the first half of the twentieth century. Historically, cancer treatment gave cancer patients little hope of long-term survival (Nieman, 1999). Cancer patients in the 1930s experienced a survival rate in which only one in five people diagnosed with cancer lived five years after

treatment. In 1999, 40 percent of patients living with cancer lived five or more years after diagnosis (Nieman).

The most common cancer treatments include chemotherapy, radiation therapy, and surgery (Baquet, 1995). Chemotherapy is drug therapy, and it is commonly associated with cancer treatment (ACS, 2004). This cancer treatment uses drugs to destroy cancer cells. The patient takes the drug either by mouth or intravenously, and the drug is administered in repeated courses over three to six months. The chemotherapy is used to interrupt the cells' ability to replicate. Chemotherapy destroys "quickly dividing cells" and does not distinguish between cancerous and non-cancerous cells. This systemic treatment results in the destruction of some non-cancer cells and accounts for the frequent side-effects of chemotherapy, such as loss of hair, mouth sores, dry skin, nausea and vomiting, and fatigue (ACS, 2004; Courneya, 2003). Side effects of chemotherapy vary in intensity and are strongly related to the type of drug being used to treat the cancer (Baquet, 1995).

Radiation therapy is a form of localized cancer therapy (ACS, 2004). Courneya (2003) suggests that radiation is experienced by about 50% of cancer patients. This treatment is targeted directly toward the area of the body where the cancer is located and it delivers radiation to destroy or shrink cancerous tumors through repeated small doses. Despite attempts to minimize damage to normal cells, toxicity to normal tissue does occur and is dependent on the site that is irradiated. Potential side effects are pain, blistering, reduced elasticity, decreased range of motion, nausea, fatigue dry mouth, diarrhea, lung fibrosis and cardiomyopathy (Courneya, 2003).

Surgery is a useful treatment for cancer and is performed on about 60% of cancer

patients (Courneya, 2003). Surgery may be recommended as a preventative measure by removing tissue at high risk of cancer, or it may be recommended to gain access to tissue sample for diagnosis. Surgery is also used to assist in the staging of the cancer, determining the extent and amount of cancer (ACS, 2004). Surgery removes affected tissue with the goal of improving patient comfort, supporting other forms of cancer treatment, and curing the disease. Curative surgery is thought of as the primary treatment when used with other types of cancer treatment such as chemotherapy and radiation (ACS, 2004). Possible side-effects of surgery include wound complications, infections, loss of function, decreased range of motion, diarrhea, dyspeanea, pain, numbness, and lymphedema (Courneya, 2003).

In some cases, an individual with cancer may experience all of these treatments, or a combination of treatments. The type of treatment is based on the cancer and stage of the disease. (Baquet, 1995; Courneya, 2003). Some cancer treatments have physical side effects that are more severe than others. The side effects of cancer treatment are often temporary, and many are successfully treated to allow the patient to feel as comfortable as possible. Despite efforts to improve patient comfort during cancer treatment, living with cancer and cancer treatment interrupts normal ways of living and is both physically and emotionally challenging (Courneya, 2003).

Research confirms that cancer treatments such as radiation, surgery, and chemotherapy, frequently last for months and may greatly reduce the quality of life (Courneya, Mackey, & Jones, 2000; Kieren, Nabholtz, Makar, Cumming, et al., 1997; Pinto & Trunzo, 2004; Rowland, Desmond, Meyerowitz, Belin, et al., 2000). Courneya and colleagues (2000) state that a reduction in the physical quality of life results in

"depression, anxiety, stress, body-image concerns, decreased self-esteem, and loss of a sense of control" and the challenging physical and functional results of cancer and cancer treatments include "asthenia, ataxia, cachexia, reduced cardiovascular and pulmonary function, muscle weakness and atrophy, weight change, difficulty sleeping, fatigue, nausea, vomiting, and pain" (p.1).

In some cases, patients with cancer may opt to not participate in the most common cancer treatments. The prognosis and their individual circumstances may cause them to decline traditional medical treatments. The side-effects of different treatments impact the quality of life and informed choices must be made (Fallowfield, Leaity, Howell, Benson, & Cella, 1999; Rowland, et al., 2000). Individuals with a health crisis such as cancer, face profound issues of life, death, and quality of life that influence the decisions made for treatment. The values and self-determination of the patient must assume a prominent role in formulating health care plans (May, 2001).

The literature is limited in the examination of physical exercise while cancer patients are in treatment and so unclear about the influence of specific types of cancer treatment on the benefit of physical exercise as an intervention to improve quality of life. Patients experiencing radiation treatment may benefit the most from exercise to improve quality of life given the treatment is not as systemic as chemotherapies nor as invasive as surgery.

Cancer and Gender

Beatty (2000) predicts that by the year 2030, more than 25% of the population in the United States will be women 65 years or older, and 13% of that group will live to be over 80 years old. Health care providers frequently fail to diagnose disease accurately and

early in women. Women continue to be under-diagnosed with diseases that are thought to be "men's disease" such as heart disease, and while women are educated to fear breast cancer and participate in breast cancer prevention, lung cancer is also a significant threat (Cooley, Short, & Moriarty, 2002).

Prior to 1986, the women's health issue given the most attention was child-birth (Beatty, 2000). Clinical trials for disease, including clinical trials for cancer, were conducted using only male participants. A clinical trial is a medical research study often conducted by a researcher, using human volunteers. These studies are federally regulated. Because the purpose of a clinical trial is to find the fastest and safest ways to find effective treatments and improve health, the results of male-only clinical trials were at best, generalized to the female population (Murthy, Krumholtz, & Gross, 2004).

In 1993, Congress enacted the National Institutes of Health Revitalization Act and encouraged equality in the representation of women and minority patients in clinical trials (Murthy, et al., 2004). Since then, the number of women participating in clinical trials and health initiatives has increased dramatically, but the use of data from these studies is slow to be implemented in cancer treatment.

After heart disease, cancer is the second leading cause of death among women in the United States (Glantz, Croyle, Chollette, & Pinn, 2003). Although the incidence of cancer diagnosis increases for both men and women as they age, The Center for Disease Control [CDC] (2000) suggests that women are at greater risk of a cancer diagnosis.

In addition to increased risk from cancer for women as they age, women also experience cancer in a unique way. Spira and Kenemore (2001) suggest that a common reaction to a cancer diagnosis for women is to feel out of control and helpless and at the

same time feel pressured to act and make decisions. Women may experience the diagnosis as "a betrayal by her body" (p. 174), a crisis, and as putting her in danger. Anxiety about her multiple roles and relationships, depression and psychosomatic complaints may accompany the disease diagnosis. The authors also found that many women are drawn to alternative types of cancer treatment and intervention because frequently the significance of relationships to enhance treatment compliance and effectiveness are missed in the more traditional and medical cancer treatments. Faller, Schilling, Otteni, & Lang (1995) found that women are drawn to alternative ways of treatment in part because they are seeking other women friends in whom they can confide. The authors state, "They are searching for both concrete solutions for their symptoms and for a context within which to integrate their new sense of self, not only as a cancer patient, but also as a real and complex person who happens to have cancer" (p. 175).

The literature is unclear about whether women or men benefit more with improved quality of life when participating in physical exercise. However, the literature does suggest that women tend to seek out relationships and often augment traditional cancer therapy with individual therapy, group therapy, support groups, and educational groups. Men may benefit more from engagement in a physical intervention when diagnosed with cancer and may experience a greater sense of improved quality of life than women.

Cancer and Age

Based on recent changes in demographics, the number of people who are 65 and older is expected to double over the next 40 years (Roux, Dingley, Lewis, & Grubbs,

2004). This fact promises to put additional stress on an already overwhelmed health care system. The CDC (2000) reports that both men and women have increased incidence of a cancer diagnosis as they age. People age 65 and older account for 62% of patients with lung, colon, breast, or prostate cancer (Gross, Murthy, Li, Kaluzny, & Krumholz, 2004; Murthy et al., 2004; Roux, et al., 2004).

Although elderly patients account for more than two thirds of cancer patients, they represent only 25%-30% of the clinical trial participants (Gross et al., 2004; Murthy et al., 2004). While a mandate for increased enrollment of women and minorities in clinical trials appeared in the National Institutes of Health Revitalization Act of 1993, a call for the enrollment of the elderly was absent. Murthy et al. (2004) found that "elderly patients, both minorities and whites, were strikingly underrepresented compared with their younger counterparts" (p. 2725).

Murthy, et al. (2004) state that men and women are equally likely to be represented in a clinical trial if diagnosed with colorectal or lung cancer, but older men are more likely to enroll than older women. Gross (2004) and colleagues analyzed data on participants in the non-surgical clinical trials of the National Cancer Institute Clinical Trial Cooperative Group. They examined the ethnic distribution data from breast, colorectal, lung, and prostate cancer clinical trials from 2000 through 2002. The researchers compared this data to data of participants enrolled from 1996 though 1998. The conclusion demonstrated that "the elderly, both minorities and whites, were strikingly underrepresented compared with their non-elderly counterparts" (p. 1063). Gross asserts that these findings are concerning given the cancer rate among the elderly.

The literature is not clear about which population diagnosed with cancer, based on

age range, experiences a more improved quality of life after participation in physical exercise. It seems likely that younger individuals diagnosed with cancer may experience a greater improvement in quality of life from physical activity because of potentially greater physical flexibility.

Aging Women and Cancer

A brief review of aging women and cancer treatment is included in this review of the literature because of the unexpected comments about this population found in the research. While this specific population is not analyzed in this study, it is important to note the challenges specific to study and inclusion of this demographic group in the examination of cancer and quality of life.

The National Cancer Institute reveals that a disproportionate number of women over 60 years of age are diagnosed with cancer. The mortality rate for cancer peaks for women over 85 (Roux, et al., 2004), but aging women are not equally represented by cancer research, and this is supported by studies (Murthy et al., 2004; Mutschler & Alcon, 1997) that find gender disparities are often a function of age.

Although many research studies examine exercise in relationship to female breast cancer patients (Mock, et al., 1994), relatively few research studies exist that examine the variables of gender and age as they relate to cancer type and cancer treatment (Kieren, et al., 1997; Murthy, et al., 2004; Pinto & Trunzo, 2004; Roux, et al., 2004; Rowland, et al., 2000). The absence of more of these studies may be the direct result of access to health care and other social forces such as sexism, ageism, and other discriminatory practices. Roux and colleagues (2004) challenge health care providers to establish research studies and improve clinical care for the increasing number of aging women, including an

enhancement of the cancer survivors' quality of life. Dr. Vivian Pinn (Roux, et al., 2004) states that understanding how the biological factors of genetics, hormones, and staging, interact with the social factors such as stress, economics, support, poverty, and discrimination, is essential in understanding the health outcomes for aging women with cancer.

Coping with Cancer

The literature regarding coping with a chronic illness indicates that the diagnosis of cancer requires a wide range of coping options to deal with shifting functional abilities, medical implications, various cancer treatments, and psychosocial reactions (Clark, Bostwick, & Rummans, 2003; Livneh, 2000; Tatsumura, Maskarinec, Shumay, & Kakai, 2003). Livneh (2000) suggests that when individuals are confronted with traumatic events such as a cancer diagnosis, they often resort to a wide array of coping strategies. Some of the coping strategies are physical in nature, such as exercise, diet, and vitamins. Some of the strategies are for the emotional trauma such as therapy, social support, and religion. However, regardless of the type of cancer, people who have been diagnosed with cancer often experience distress and make an attempt to cope (Clark, et al., 2003; Livneh, 2000;).

Individuals may prefer coping through changes in their physical life-style. Patterson (2003) surveyed more than 350 cancer patients in Washington to look at changes in health-related behaviors for up to two years following cancer diagnosis. The subjects were asked if they had made changes in diet, physical activity, or in their use of vitamins or other supplements in an attempt to keep cancer from spreading or returning. The findings show that 50% started taking supplements, 40% made dietary changes, and

20% started a new activity. The results indicate that two thirds of the subjects made a change in one area, one forth made a change in two areas and 10% made a change in all three areas (Patterson, 2003). Patterson states, "The vast majority of patients reported that these lifestyle changes improved their health and well-being" (p.167).

Strategies to cope emotionally are also used by people who have been diagnosed with cancer. Clark et al. (2003) found that psychosocial interventions, such as individual and group therapies that are structured by topic areas and issues are effective in reducing cancer related stress. The authors state that the primary goal of the psychosocial therapies should be to improve quality of life by decreasing stress and enhancing coping, rather than to increase survival from the disease. However, Tatsumura et al. (2003) suggest that the use of religion and spirituality is a way individuals cope and may prove helpful to cancer patients in issues of "control, spiritual well-being, coping, depression, decision-making, and possibly health outcomes" (p.65). Clearly, coping with cancer calls for individuals to use a variety of coping skills. Interventions are commonly targeted to improve physical or emotional well-being, variables associated with quality of life. (Burnham & Wilcox, 2002).

Quality of Life

Overview

Survival of a cancer diagnosis may not be a cancer patient's only concern. There are also concerns about the quality of life for both the cancer survivors and for those who are currently undergoing cancer treatment (Dow, 2003; MacVicar & Winningham, 1986, Rayson & Reno, 2003). Research shows that quality of life is often challenged both physically and emotionally during the diagnosis and treatment of cancer (Kieren, et al.

1997; MacVicar & Winningham, 1986; Rayson & Reno, 2003). There has been an increase of interest in quality of life for patients who are receiving cancer treatments and interest in improving quality of life for cancer patients continues to increase (Cohen & Herbert, 1996; Fitzpatrick, 1999; Gignac, et al., 2000; Litwin, 1999; Rayson & Reno, 2003).

Definition of Quality of Life

Quality of life is a measurement of the cancer patient's experience. It is a measurement that is useful in communicating patient perceptions to those involved in the care of the patient because it captures the day-to-day impact of disease and treatment on functioning and perceived well-being. Research states (Frost, Bonomi, Estwing Ferrans, Wong, & Hays, 2002) that while there is no clear definition of quality of life, it is recognized as a "multi-dimensional concept that includes physical, psychological, and social domains" (p. 489).

Research also suggests that defining quality of life is a complex task and a controversial topic (Angermeyer, Holzinger, & Kilian, 2001; Kieren, et al., 1997; Muldoon, Barger, Flory, & Manuck, 1998). There is some confusion and skepticism about how quality of life is measured, the accuracy of the measurement, and its usefulness in medical research, but it is widely acknowledged as important (Muldoon, et al., 1998).

There are many studies that attempt to understand and define the primary determinants of quality of life. Information generated from a measurement of quality of life implies that there is more than the physical body to consider in the treatment of a cancer patient (Cohen & Leis, 2002; Courneya, 2001; Muldoon, et al., 1998). Patient
condition is both biological and psychosocial. Defining the quality of life values for the cancer patient, offers the patient an opportunity to communicate with health care providers, and enables the patient and health care providers a way to communicate patient well-being to the family (Muldoon, et al., 1998).

Assuming a relationship exists between a patient and their family within which communication exists, communication may be complex. Patients may reluctantly depend on family and friends, while attempting to hide or deny negative feelings and experiences for fear of being a burden. Others fail to communicate anything about their experience, allowing the family little opportunity to understand what it means to experience cancer in their life. When a family has insight into the overall patient well-being, they are better prepared to act as a patient advocate. As decisions and concerns about appropriate care are addressed, resolution takes place in an appropriate manner if the support persons are aware of the quality of life values of the patient (Leichtentritt & Rettig, 2001). This information also helps the physician understand and work with the patient and his/her family.

Health care providers who understand quality of life issues are at an advantage working with people with cancer. It is beneficial to a health care provider to understand these issues for several reasons. It aids in the detection of physical and emotional problems that might otherwise go unrecognized, and it improves the delivery of care (Detmar, Muller, Schornagel, Wever, & Aaronson, 2002). Medical clinicians most often rely on the biomedical and the observable facets of cancer treatment and may be reluctant to ask about subjective side-effects of cancer treatment (Kieren, et al., 1997). Quality of life information offers clinicians an opportunity to integrate the changes in quality of life

with the disease process. This leads a clinician to dialogue with a patient regarding treatment or therapy (Frost, et al., 2002).

In addition, information about quality of life may improve life for various subgroups living with cancer within the general population. Definition of quality of life is largely based on the values of the various populations. Population-specific treatments may have a high probability of success in improving quality of life, and when identified, they may be valued and supported by societal resources (Frost et al., 2002). Frost and colleagues (2002) also suggest that society benefits from a healthy and productive population and that this goal is attained by maximizing the quality of life for as many people as possible.

Research shows that many have tried to define quality of life (Courneya, 2001; MacVicar and Winningham, 1986; Rummans, Bostwick, and Clark, 2000; Till, McNeil, & Bush, 1984) The World Health Organization [WHO], defines quality of life as, "psychological and social functioning as well as physical functioning and incorporates positive aspects of well-being as well as negative aspects of disease and infirmity" (Till, et al., 1984). MacVicar and Winningham (1986) were early advocates for the study of quality of life improvement for people living with cancer. They were convinced that "the ability to maintain one's pattern of life activities is an undisputed aspect of quality of life" (p. 238). Courneya (2001) has extensively researched the area of quality of life, cancer, and exercise and defines quality of life as "overall happiness and satisfaction with life" (p.60). Rummans, et al. (2000) define quality of life as " the physical, psychological, social, and spiritual domains of health that are influenced by a person's experience, beliefs, expectations, and perceptions" (p.1305). While these definitions vary in detail,

they share the concept that quality of life is about the individual patient's satisfaction with life.

Personal values are a component of quality of life and they influence the definition of quality of life. Values influence our perceptions, decisions and actions (Leichtentritt & Rettig, 2001). How someone reports the effects of symptoms and treatments for cancer varies from person to person, because of difference in their personal values (Carr & Higginson, 2001; Frost, et al., 2002). Individuals hold values influenced by culture, family, age, gender, race, economic status and a wide range of additional social, biological, and psychological determinants (Holzner, 2004; Moniz & Gorin, 2003).

Despite the challenges in defining quality of life, the results of quality of life measurement are believed to provide valuable information about the subjective experience of the cancer patient (Goodwin, Black, Bordeleau, & Ganz, 2003). Garratt, Schmidt, Mackintosh, & Fitzpatrick (2002) suggest that clinical trials should incorporate a patient's perspective on outcome, and a health related quality of life assessment can achieve this. Unlike conventional medical indicators that assess pain, fatigue, and disability, quality of life indicators also report the patient's perception of physical, emotional and social well-being. In addition, quality of life can influence the course of the disease. Because cancer treatment often begins with treatments such as radiation, surgery, and chemotherapy, and commonly lasts for months, the physical and emotional well-being of patients is important. Quality of life may support on-going treatments or may challenge investment in treatment (Pinto & Trunzo, 2004; Rowland, et al., 2000).

Assessing the quality of life experience promotes quality of life as a valuable consideration within the treatment planning (Courneya, et al., 2000). Patients experiencing multiple diseases, multiple reoccurrences of a cancer, depression, or other physical and emotional barriers, may not experience quality in their lives and may choose to cope by not seeking treatment (Livneh, 2000).

Improvement of Quality of Life

Interventions are necessary to maintain quality of life for people living with cancer. Side-effects of cancer and cancer treatment are often overwhelming, and the most common of these symptoms include fatigue, nausea, depression, and anxiety. Fatigue remains one of the most universal of cancer symptoms, and it is experienced by 70 to 100% of all patients receiving radiation (Loveland Cook, Guerrerio, & Slater, 2004; Schwartz, 1999). Research shows that poor quality of life can interfere with daily functioning, leisure activities, personal well-being, relationships, and can influence compliance with medical treatment. It can also interfere with daily living tasks and compromise a patient's independent living (Courneya & Friedenreich, 1999; Loveland Cook, et al., 2004).

Various interventions to improve quality of life exist. Current research provides many examples of psychosocial cancer support interventions (Davis, 2004; Meier, 2003; Tuma, 2004; Zimpfer, 1992). Courneya et al. (2000) recognize the variety of interventions that are available to cancer patients, including "cognitive-behavioral therapies, informational and educational strategies, individual and group psychotherapies, and other alternative treatments" (p. 2). Current research reveals that psychosocial interventions may benefit some patients with psychological and emotional support, but

frequently fail to address the physical needs of the cancer patient.

Physical Well-Being

People have an individually unique relationship with their body. It is a significant representation of their identity and worth (Thomsen, 2002). The media in the United States promotes attention to the body and gives consumers messages about how best to attain the social goals for beauty, power, and virility. The media suggests the best ways to attain these goals for specific ages, race, and gender (Botta, 1999; Englis, Solomon, & Ashmore, 1994; Halliwell & Dittmar, 2004).

The physical body responds to care and to neglect. A long continuum of body care exists, from total disregard or abuse of the body to attention and pampering of the body. Research shows that neglect of the body and abuse of known carcinogenic materials can put a person at higher risk of cancer (Moniz & Gorin, 2003). Some research suggests a link between physical inactivity and increased risk of cancer (Friedenreich & Orenstein, 2002; Lee, 1995). Risk of cancer diagnosis exists for everyone, including people who attend to their bodies.

The perception of one's physical well-being is damaged when an individual is diagnosed with cancer. There is a multitude of research studies that document the primary physical side-effects of cancer and cancer treatment as pain, weakness, fatigue, and nausea (Mock, et al., 1997; Porock, Kristjanson, Tinnelly, Duke, & Blight, 2000; Ream & Richardson, 1999; Winningham, Nail, Burke, Brophy, Cimprich, Jones, Pickard-Holley, et al., 1994;).

In addition, cancer treatments occasionally result in long-term pain (Caffo, Amichetti, Ferro, Lucenti, et al., 2004) Types of curative or reconstructive surgery may

leave a person scarred or perhaps, with chronic pain. Some surgical procedures potentially amputate a part of the body (i.e., breast, liver, kidney, lung). Changes in appearance of the body due to cancer, challenge the physical well-being and emotional well-being of people (Rowland et al., 2000). Self-esteem may be weakened, and interest and ability to perform sexually may be reduced or severely tested.

Caffo and colleagues (2004) studied 529 women who were free from cancer for one to four years. The women underwent "axillary dissection" breast cancer surgery. The authors examined the pain experienced by the women and found that regardless of the specific kind of surgery, one third of the women experienced pain distress. This distress had a significantly negative effect on their quality of life. They also found that the experience of pain represents a continuous memory for the patients, of both the treatment and the disease. Pain is believed to be a sign of incumbent disease and leads to fear of worsening or reoccurring cancer. Breast cancer patients who feel pain, even without progressing disease, suffer considerable physical and emotional distress. As a result they adjust badly in terms of quality of life (Caffo, et al., 2004).

The relationship between cancer, exercise and physical well-being is of great interest to experts in the fields of sports, medicine, rehabilitation, and counseling. Recent research explores the relationship between exercise and cancer patients and the physical side effects and symptoms they experience due to their cancer (Dimeo, Rumberger, & Keul, 1998; Mock, et al., 1997; Porock, et al., 2000; Ream & Richardson, 1999; Schwartz, 1998; Winningham, et al., 1994;). An overview of the research by Courneya (2003) examined exercise and cancer survivors. The author located and summarized forty-seven published studies. Almost all studies showed the beneficial effects of exercise in cancer survivors living with a variety of cancer diagnoses. Specific to the clinical trials of exercise during cancer treatment, the author examined a total of 24 studies; fourteen of these studies were specific to breast cancer survivors. All studies were found to be of good quality, and included supervised exercise sessions, objective fitness indicators, and validated psychometric measures. However, limitations across all of these studies included small samples, non-representative samples, and exercise interventions that did not coincide with the medical treatment in its entirety. Despite the limitations of these studies of cancer survivors and physical exercise, the conclusion of the overview conducted by Courneya (2003) suggests that exercise may be an effective intervention for enhancing quality of life in cancer survivors.

Emotional Well-Being

The diagnosis of cancer changes life. Cancer can lead to physical restrictions and disabilities that may lead to depression and other psychosocial problems. Research suggests that a reduction in a person's emotional quality of life results in depression, anxiety, stress, body-image concerns, decreased self-esteem, and loss of a sense of control (Courneya, et al., 2000).

Beyond the question of survival, cancer patients are concerned with the day-today living, about the ability to function, the dependency on others, or the fear of becoming dependent. These feelings intensify the psychological reactions to cancer, as well as cancer treatments (Davis, 2004; MacVicar & Winningham, 1986; Massie, 2004; Roberts, Cox, Shannon, & Wells, 1994). Patients may experience anxiety, depression, hopelessness and suffering (Glajchen, Blum & Calder, 1995).

Research suggests social work offers interventions to cancer patients attempting

to cope with emotional distress (Davis, 2004; Glajchen et al., 1995; Massie, 2004; Roberts et al., 1994; Targ & Levine, 2002). Social work oncology is a specialized field of practice with effective and informed methods of working with cancer patients (Tolley, 1994). While common social work methods to improve emotional well-being are frequently individual and group therapies, social workers also offer biopsychosocial interventions that seek to bring relief. These include support to families, assistance in communication, and referrals to appropriate resources. Social workers bring expertise to oncological patients in direct service, education, advocacy, and research (Glajchen et al., 1995).

One of the chief emotional symptoms of cancer and cancer treatment is depression (Akechi, Nakano, Akizuki, & Okamura, 2003; Caffo, et al., 2004; NIH, 1996; Ressel, 2003). Furthermore, NIH claims that, as cancer treatment becomes more aggressive, depression and fatigue increase. The NIH challenges physicians to be aware of these symptoms, to identify the patients most at risk, and design the best ways to "deliver interventions across the continuum of care" (p. 243).

Depression produces many dysfunctional symptoms, including thoughts of suicide, hopelessness, prolonged hospitalizations, less compliance with cancer treatment, and worry from caregivers. The psychological symptom of depression requires recognition in the treatment of cancer. Loveland Cook and colleagues (2004) state that hospitalized cancer patients experience an estimated 25% likelihood of having depression symptoms serious enough to be diagnosed with Major Depressive Disorder.

Problems with body image and sexuality also interfere with emotional well-being. Rowland and colleagues (2000) used a self-report questionnaire with 1,957 breast cancer

survivors, one to five years after their original cancer diagnosis. They collected data regarding their quality of life, body image, and physical and sexual functioning. The authors found that the psychosocial impact of cancer surgery "occurs largely in areas of body image and feelings of attractiveness" (p.1422). Research supports the claims that body image and sexuality concern women receiving surgery or other body changing cancer treatments and these concerns influence their emotional well-being (Kieren, et al., 1997; Pinto & Trunzo, 2004; Rowland, et al., 2000).

Emotional well-being and physical well-being are closely connected. Often, however, interventions to improve quality of life address either emotional well-being or physical well-being. Research implies that exercise may be one intervention that addresses a wide variety of quality of life concerns. This includes both physical and emotional well-being issues for cancer patients (Courneya & Friedenreich, 1999; Watson & Mock, 2003).

Exercise

Overview

Exercise has long been recognized as an effective way to improve and maintain health (Addy, Wilson, Kirtland, Ainsworth, et al., 2004; Pate, Pratt, Blair, et al., 1995; Spence & Lee, 2003). In addition, studies have suggested that there is a link between physical activity and the prevention of cancer (Friedenreich & Orenstein, 2002; Lee, 1995). There are several plausible biological explanations for this increased health and they include a change in hormone levels and growth factors, decreased obesity, and possibly a change in immune function (Friedenreich & Orenstein, 2002). Improvements in both physical and emotional states are associated with people who work at being

healthy and exercise (Schwartz, 1998). People interested in health are exercising in greater numbers and exercise in a variety of places such as health clubs, gymnasiums, community centers, neighborhoods, and in their homes. Exercise is prescribed for many populations that include men and women, old and young.

Moreover, exercise is now considered appropriate for some people living with chronic illnesses and is thought to be beneficial in the prevention of some diseases (Clark, 2003; Gregg, Cauley, Stone, Thompson, et al., 2003). The ACS (1997) recognizes the benefits of exercise and added regular exercise to the list of recommended cancer prevention measures. There is significant research suggesting exercise may act as a preventive measure to cancer diagnosis (Gapstur & Gann, 2001; Gottieb, 2003; Schnirring Minneapolis, 2004).

In a review of the literature regarding cancer and exercise, it is clear the word "exercise" describes a variety of activities (Burnham & Wilcox, 2002; Courneya & Friedenreich, 1999; Dimeo, et al., 1998). The actual physical activity practiced by cancer patients in the literature depends on the age, gender, cancer type or cancer stage, the patients' personal level of fitness, and the patients' exercise experience (Watson & Mock, 2003). Defining the type of physical activity most able to deliver maximum benefit and avoid harm is an area of research needing further study. For the purpose of this dissertation, references to the term "exercise" is inclusive of all of the types of physical activity used by cancer patients in the various research studies.

Exercise and Cancer

Despite the continued success of new and improved treatment methods and medicines, a diagnosis of cancer often produces damaging physical changes and

emotional distress (Courneya & Friedenreich, 1999, Burnham & Wilcox, 2002). As discussed above, cancer and the side-effects of treatment interfere with the quality of life for people living with cancer (Courneya, 2003).

In a literature review, Courneya and Friedenreich (1999) examined 18 intervention studies using exercise following cancer diagnosis. The results of the studies consistently demonstrated that exercise had a positive effect on the quality of life of cancer patients as measured by improvement in physical and functional well-being, and psychological and emotional well-being. In addition, the studies extended the research beyond breast cancer and early stage cancers and included quality of life indicators beyond physical well-being. The studies are limited by the quasi-experimental designs. The limitations of such designs include no control group, participant self-selection into groups, and the use of no-treatment control groups, or no control group at all. Additional limitations included failure to determine activity levels of participants prior to the study, and the short 10-12 week exercise intervention (Courneya & Friedenreich, 1999).

Current research confirms that over the past few years, the relationship between illness and exercise is increasingly being acknowledged (Clark, 2003; Gregg, et al., 2003; Scully, Kremer, Meade, Graham & Dudgeon, 1998). Specifically, research suggests that exercise reduces the negative physical and emotional side-effects of cancer and cancer treatment side-effects by elevating mood and building endurance and is effective in improving quality of life (Durak & Lilly, 1998; Segal, Reid, Courneya, Malone, Parliament, & Scott et al., 2003).

Nieman (1999) asserts that there are many physical benefits to exercise: 1) resting blood pressure is consistently reduced, 2) mood is effectively improved, and 3) strength

and flexibility are promoted. In addition, research suggests that in addition to the physical benefits, the psychological benefits of exercise are many and include benefits such as relaxation, increased social contact, promotion of self-care, and self-esteem (MacVicar & Winningham, 1986; Schwartz, 1998). Pinto and Trunzo (2004) suggest that breast cancer survivors who exercise can expect an increased sense of health and may improve their body strength and tone and may feel better about their body image.

Exercise is frequently prescribed as a treatment for rehabilitation after completing cancer treatment (Brown, 2004; Durak & Lilly, 1998). However, exercise is now being examined as a treatment alongside of or adjunctive to the traditional cancer treatments, such as chemotherapy, radiation, and surgery (Watson & Mock, 2003). Recent research investigates the effect of exercise on the quality of life for people living with and receiving treatment for cancer (Courneya & Friedenreich, 1999; Courneya, et al., 2000; Courneya, 2001; Durak & Lilly, 1998, MacVicar, & Winningham, 1986; Segar, Katch, Garcia, Haslanger, & Wilkens, 1998,). Physical activity, or body movement that increases energy expenditure (Pangrazi, & Corbin, 1999) affects various body systems positively, and favorably influences a wide range of disease stages (Oweis & Spinks, 2001; Shepard, 1995).

MacVicar and Winningham (1986) completed one of the first studies examining cancer and exercise. These authors found that patients who exercise during cancer treatment, experienced positive improvements in mood. Courneya (2001) examined eleven studies on the effect of an exercise intervention program during cancer treatment. All eleven studies showed statistically significant results favoring the hypothesis that exercise during cancer treatment provides beneficial effects on a wide variety of

outcomes that enhance the quality of life. Results of this meta-analysis suggest that exercise during cancer treatment improves many biopsychosocial outcomes.

In a discussion of cancer, exercise, and quality of life, fatigue must be mentioned because research states that fatigue is one of the most common and significant side effects of cancer treatments and it affects cancer patients both physically and emotionally. Common scholarly thinking is that 70-100% of all cancer patients, regardless of diagnosis, stage of disease, or type of cancer, are affected by fatigue (Dimeo, et al., 1998; Porock, et al., 2000; Schwartz, 1999; Winningham, et al., 1994). Fatigue influences a patient's sense of overall well-being, independent living skills, relationships with family and friends, and the ability for the patient to comply with treatment (Porock et al., 2000).

Research indicates that deconditioning due to inactivity after a cancer diagnosis may contribute to fatigue and add to a decrease in both physical and emotional well-being (MacVicar & Winningham, 1986; Schwartz, 1999; Williamson, 1998; Winningham, et al., 1994). Research suggests that physicians commonly advise cancer patients to limit their activities but that not using, or "disuse" of every major system in the body creates and promotes weakness and fatigue, both psychologically and physiologically (MacVicar & Winningham, 1986). Williamson (1998) examines the activity restriction model of depressed affect. The author proposes that the extent to which routine activities are restricted by a major life stressor plays a role in psychological adjustment. Major disruptions in normal activities result in poorer mental health outcomes. Illness and disability are life stressors, depression a possible reaction to this stressor, and the significance of activity restriction adds to the depression. Williamson states activity

restriction "plays an important role in the psychological adjustment, with major disruptions in normal activities resulting in poorer mental health outcomes" (1998, p. 327).

Studies about exercise and cancer commonly include the factors of patient fatigue caused by cancer treatments and a decrease in patients' quality of life. Decreasing fatigue and increasing quality of life are the goals of combining cancer and exercise. Research studies show that symptoms of fatigue for cancer patients are frequently treated with a prescription to rest (Courneya, et al., 2000; Dimeo, et al., 2000; Porock, et al., 2000). Patients in treatment for conditions such as heart disease, or surgeries, are encouraged, with supervision, to almost immediately move about. This has not been the case with cancer patients. MacVicar and Winningham (1986) state that being sedentary for a prolonged time and the treatment side effects of cancer treatment can result in "progressive physical debilitation marked by generalized weakness and rapid fatigue upon exertion" (p. 235). There is some question as to whether this inactivity may lead to deconditioning or an exacerbation of fatigue over the long term, and negatively affect the emotional and physical well-being of cancer patients (Courneya, et al., 2000; Porock et al., 2000).

Studies suggest that exercise during cancer treatment may be physically and emotionally beneficial, and that cancer patients should be encouraged to exercise during cancer treatment to maintain and improve functional ability (Courneya, 2001; Dimeo, et al., 1997; Schwartz et al. 2001; Watson, 2002). These studies claim that exercise appears to improve fatigue and functional ability. Watson (2002) states that interviews with cancer patients and randomized clinical trials repeatedly demonstrate "a decrease in

cancer-related fatigue in patients receiving exercise as an intervention, whether in the form of a community-walking program, treadmill program, or by hospital ergometer" (p.16). Structured exercise programs for previously sedentary patients with cancer demonstrate that exercise is safe and produces positive psychosocial effects (Mock et al., 1997; Schwartz, 1998).

Researchers assert that with a diagnosis of cancer, every effort should be made to maintain the highest level of physiological and psychological functioning during the course of the illness (Courneya & Friedenreich, 1999; MacVicar & Winningham, 1986). However, the type of exercise, and the level of exercise for specific cancer diagnoses, remains unclear. Watson (2002) states that the mode, intensity, duration, and frequency of physical activity for maximizing the therapeutic effect for cancer patients remains undetermined. The ACS (2004) released guidelines on nutrition and physical exercise during and after cancer treatment and stressed health care providers and cancer survivors should consider the individual cancer survivor's overall medical and health situation. Neff (2004) responds to this report and states that it remains unclear if physical activity has any effect on treatment efficacy, but supports the ACS report and suggests that cancer patients who were active remain active, and those who were sedentary, develop low-intensity activities.

Although the literature cited above has suggested an important and positive role for exercise for cancer patients in cancer treatment, few research studies were found that examine samples with more than an average of 25 participants (Courneya & Friedenreich, 1999). No research comparing the effect of exercise on the physical quality of life to the effect of exercise on the emotional quality of life for cancer patients was

discovered. Moreover, there is no research exploring whether one determinant of quality of life improves more than the other. The literature review revealed few studies that examined the influence of gender, age range, type of cancer, and cancer treatment on the improvement of physical and emotional quality of life.

This dissertation explores the relationship between a ten-week exercise program for individuals in treatment for a cancer diagnosis and the quality of life indicators, physical and emotional well-being. The study compares the change in physical wellbeing and the change in emotional well-being after participation in the exercise. In addition, the study examines the influence of variables (gender, age range, cancer type and cancer treatment) on the change in physical well-being.

Summary

In Chapter II, the relevant literature was discussed in terms of three broad topics areas. The topic areas were cancer, exercise, and quality of life. Relevant subtopics were also presented. The methodology used in the study is presented in Chapter III.

CHAPTER III

Methodology

Epistemology

The branch of philosophy that is concerned with the origins and the development of knowledge is epistemology (Hughes, 1999). Literally speaking, epistemology is the theory of knowledge that seeks to distinguish true knowledge from false knowledge. Intellectual discussions regarding what constitutes the state of knowledge have existed for centuries. Historically, the trend of epistemology is the movement away from a passive view of knowledge and progress toward a more adaptive and active view of knowledge (Heylighen, 1993). The epistemological theories of today no longer resemble the "absolute truths" once employed by Plato (Lee, 1979).

The epistemology of a discipline is characterized by the way it conceptualizes problems, provides the sources of evidence, and defines methods of analysis (Hahn, 1995). Scholars conduct research based on their professional assumptions about society and the ways in which social reality is constructed. Knowledge of the researcher's methodological stance, then, is essential in understanding all aspects of the research, from hypothesis generation to data analysis and conclusions.

Prior to the description and discussion of the actual study, it is important to

understand the perspective that led to the design and implementation of this work. This study depicting the relationship between cancer and exercise, was guided by the understanding that the epistemological concepts of health and illness are connected and influenced by the biological, the psychological, and the social aspects of an individual. The present research is based on the assumption that the biomedical model of health care fails to address many significant issues in the determination of health and illness.

The biomedical model is based on a scientific model that neglects the emotions and social conditions of the individual. Engel (1977), a physician who challenged the efficacy of the biomedical model, asserted that the biomedical model reduces the assessment, diagnosis, and treatment of illness to the biological. He states, "It [the biomedical model] assumes disease to be fully accounted for by deviations from the norm of measurable biological variables" (p. 130). The biomedical model is advantageous to the concept of disease, because it ignores the role of health, sickness, and healing (Greaves, 2002). The model provides little attention to understanding what makes life worth living or what enhances quality of life. Instead, it demands that disease be dealt with scientifically and objectively. The biomedical model separates the biological from social behavior and events, and personal feelings and thoughts (Engel, 1977).

Research shows (Cousins, 1979; Engel, 1977; Hubbard, 1995) that medical training often shapes doctors to think of medicine in a biomedical framework long before they begin to interact with patients and patient families. The result of this form of medical treatment is a public discontent with health care. The health care system is consistently perceived as impersonal, uncaring, inflexible, and rushed (Engel, 1980). However, recent modifications have occurred in medical training. During the past decade, the health care

profession has slowly emerged from the practice of the biomedical model to a more holistic form of health care practice, a model that weaves together the biological, the psychological, and the social aspects of life (Zittel, Lawerence, & Wodarski, 2002).

As the term suggests, the biopsychosocial theory incorporates the biological, the psychological and the social determinants of life, and claims that all spheres are necessary in consideration of health and illness (Moniz & Gorin, 2003). The model is holistic and resists the attempt to separate spheres of functioning. The biopsychosocial theory identifies and supports the function of quality of life as an important indicator in measuring how individuals experience illness and disease (Claiborne & Vandenburgh, 2001; Weick, 1986; Zittel, et al., 2002). The biopsychosocial theory embraces the idea that although disease is diagnosed, the individual may feel healthy, and conversely, an individual may feel ill with no evidence of a biological diagnosis (Engel, 1977; Gilbert, 2002; Moniz & Gorin, 2003).

The infusion of the biopsychosocial theory into health care is a significant step away from the narrow focus of the biomedical model (Moniz & Gorin, 2003). Recent scholarly literature reflects the increased use of the biopsychosocial theory of intervention (Claiborne & Vandenburgh, 2001; Gilbar, 1996; Gilbert, 2002; Hoffman, 2000; Hubbard, 1995; Moniz & Gorin, 2003; van der Walde, Urgenson, Weltz, & Hanna, 2002; Zittel, et al., 2002). The biopsychosocial theory is implemented in the treatment of many physical, social and emotional illnesses (Ross, 2000). The biopsychosocial model is used to treat diseases like cancer by incorporating an interdisciplinary model to assure that all biological, emotional and social aspects of the patient are receiving attention (Gilbar, 1996; Sestini & Pakenham, 2000).

There are advantages in using the biopsychosocial theory. First, the diagnoses of minority populations are treated more effectively using the biopsychosocial framework (van der Walde, et al., 2002). The theory incorporates the many unique circumstances of oppression, and stigmatization experienced by minority populations in society as well as within the health care system (Moniz & Gorin, 2003). Second, the biopsychosocial theory is successfully incorporated into the treatment of diseases with particularly challenging interventions such as treatment planning for alcoholism (van der Walde, et. al, 2002). For example, women who are addicted to alcohol experience biopsychosocial realities that are significantly different from those of men. Women experience gender-based experiences such as "social stigma, double standards, differing expectations for men and women, and the fact that women are an oppressed group in numerous cultures" (van der Walde, et. al, 2002, p. 148). Understanding these differences is an important step in the design of an accurate and beneficial treatment plan. The biopsychosocial model also assists in understanding the connections between the biological, psychological, and social components in suicide (Hoffman, 2000) and to explain the neurological, psychological, and person-environment links for people living with Alzheimer's disease (Caron & Goetz, 1998).

Finally, Morantz-Sanchez (2000) recognizes that the biopsychosocial theory offers movement toward emotional and social inclusion in the medical treatment of women. She writes that recent feminist scholarship attributes the biopsychosocial theory for progressive movement that "has begun to emphasize forms of negotiation and modes of bargaining, as the doctor and patient assess the illness experience and transform it into the diagnosis of disease, an agreed-upon course of action, and a particular mode of

treatment" (p. 294).

The biopsychosocial model stands in stark contrast to the reductionist philosophy of the biomedical theory of health care (Weick, 1986). The biopsychosocial theory offers scholars an opportunity to fuse emotional health with physical health for patients, and examines the changes in feelings and physical conditions in the patients' overall experience of quality of life (Claiborne & Vandenburgh, 2001).

As discussed previously, research reveals that exercise has a positive effect on a broad range of quality of life indicators for people living with cancer (Courneya, Mackey, & Jones, 2000; Lee, 1995). Courneya, et al. (2000) suggests that exercise for cancer patients is as beneficial physically as it is psychologically when it adds to patient levels of confidence. Exercise may elevate mood, stimulate appetite, and increase the cancer patient's positive experience with quality of life (Nieman, 1999; Shepard, 1995). Exercise is a potentially beneficial adjunctive therapy, treating the physical and emotional wellbeing of people living with cancer.

This study is guided by the perception that the relationship between cancer and exercise and the concepts of health and illness are linked. The connection is based on the biological, the psychological, and the social facets of the cancer patient. For purposes of this inquiry, the psychological and the biological perceptions of well-being of cancer patients are targeted to determine if these perceptions improve after participation in an exercise program. Data were collected from cancer patients regarding their perceptions of quality of life before and after participating in the ten-week cancer "Wellfit" program. The biological (physical well-being) and psychological (emotional well-being) results are explored. Furthermore, the study investigates whether greater change occurs in physical

well-being or greater change occurs in emotional well-being after exercise participation and if the variable changing the most is influenced by gender, age range, cancer type, or cancer treatment.

Description of the Program

In the present study, quantitative methodology is used to understand the relationship between exercise and the cancer patients' quality of life. This relationship is based on their self-report of physical well-being and emotional well-being.

This study is based on the results of data collected by research staff from Mercy Health Services members: St. Mary's Cancer Center, The Michigan Athletic Club [MAC], and East Hills Athletic Club [EHC]. The original study, named the "Cancer Wellfit Program", was conducted between August, 2002 and April, 2003. The Cancer Wellfit Program received funding from a private foundation to implement a ten-week exercise program for cancer patients and their support person.

The exercise program for cancer patients was developed from a belief that the resources of the Mercy Health Services could offer more support to people living with cancer. Mercy Health Services includes St. Mary's Hospital, St. Mary's Cancer Center, many ambulatory care clinics, and two health clubs. Both health clubs enjoy a good reputation in the community, where middle to upper middle class populations utilize the clubs as a convenient and luxurious environment to physically "work out." Both health clubs offer many opportunities for members to exercise in a variety of ways; using a gym, exercise rooms, weight rooms, tennis courts, racket-ball courts, an indoor running track, and a swimming pool. Mercy Services was convinced that these facilities could provide the opportunity to offer beneficial health services to individuals living with chronic

illnesses.

The Director of Research of the Cancer Center at St. Mary's Hospital believed that a partnership between the Cancer Center and the two health clubs would be beneficial for people living with cancer and an appropriate use of the health clubs. The director was convinced that the health clubs could be an asset to oncologists as a treatment option for people who were emotionally and physically struggling with cancer. The director at the cancer center and his research assistant (this author) designed the data collection techniques, chose the standardized tests, created the consent forms, and received approval from St. Mary's Human Subject Review Committee (Mercy Health Services). In August of 2002, the Mercy Health Services Cancer Center's "Cancer Wellfit Program" began.

The "Cancer Wellfit" program implemented by Mercy Health Services Cancer Center is a recognized program for people living with cancer. It was first implemented in 1990 in Santa Barbara, California (Appendix L). This program uses a four-component approach for exercise (Durak, 2001). The first component concentrates on progressive resistance "strength training" as the primary training regime. Patients select stations that fit their initial fitness level and medical concerns, and progress to higher weight levels and additional stations as pain free fitness levels and strength improves. The second component concentrates on aerobic training using machines, step classes, and group walking. The important aspect about training in a community health club environment is that patients can select from a variety of classes that are specifically designed for them. They can also use aerobic machines so they can improve their aerobic capacity during their initial 10 weeks of supervised exercise.

The third component of the Wellfit program is range of motion and flexibility. This component concentrates on working out scar tissue deficits, and balancing out general musculature. The final component is mind/body fitness. This component consists of breathing, relaxation, one or two yoga classes within the 10 weeks, and some meditation programs (Durak & Lilly, 1997). All of these components are part of the health club programming at the two health clubs, and are offered to cancer participants along with water exercise, and other club programs (Appendix D).

Many health clubs and clinics in the United States are examining the Cancer Wellfit program as the model to emulate. The Wellfit program is now used in Southern California, Colorado, and Illinois. Wellfit has trained hundreds of cancer survivors, and outcomes of the trainings have been published regarding the participants' increase in strength (over 45%), aerobic capacity (30%), and multitude of quality of life improvements (in general, over 29%) (Durak & Lilly, 1997). The results of training and exercise continue after treatment of cancer. Research found that after 5 years in remission, over 90% of participants continue to exercise either self-paced or in a club. Their level of vigor is over 80% and almost all use some type of complimentary therapy to enhance their recovery progress (Durak & Lilly, 1997). Since its creation, the Wellfit program has grown, offering the cancer and exercise program in over 25 different locations throughout the United States. As part of the orientation to the Wellfit program, the personal trainers from the two health clubs in Grand Rapids visited the original site of Cancer Wellfit in Santa Barbara. They participated in training sessions and observed the Wellfit program in action.

Mercy Health Services introduced the Cancer Wellfit Program to the Grand

Rapids community as a research study for people living with cancer, and invited any adult being treated for cancer within the last six months to participate. Patients learned about and gained access to the program application process through a variety of information sources. News of the program traveled by way of physicians, nurses, social workers, and other medical professionals. Promotion of the program also occurred through TV news clips, two newspaper articles, the health club newsletter, and a brochure mailed to all the Grand Rapids oncologists' offices.

Subjects and Sampling

Subjects for this study were also recruited from the local community hospitals, referred by nineteen different doctors and cancer treatment professionals, and through the subject's self-referral. Brochures were delivered to physician offices describing the program and explaining the referral process.

All interested patients were routed through a consent process at Saint Mary's Cancer Center. The Cancer Center Director of Research carefully controlled subject suitability, as described below, for the program, ensured physician knowledge and endorsement of patient participation, and explained the exercise program and research benefits, risks, and obligations to the appropriate subjects. The patient signed a consent form for treatment (Appendix B). Subjects signed and received a copy of the informed consent form in full compliance with the procedures approved by the institutional review board at St. Mary's Mercy Services, Grand Rapids, Michigan.

Not all patients referred to the Cancer Wellfit study were included in the program. To ensure the safety of each participant, exclusionary criteria were developed in consultation with the Director of Oncology at the St. Mary's Cancer Center. The criteria

for exclusion from the Cancer Wellfit research program included: diabetic patients, class III cardiac patients, patients physically incapable of exercise due to advanced disease, lung irradiation, late stage cancer patients, patients under the age of 18, and patients who did not obtain physician endorsement. In addition, patients who admitted to back pain or pain in their bones or joints, sudden dizziness or dypsnea were excluded. Patients experiencing extreme muscle weakness and patients experiencing severe nausea were also counseled out of the study. Data were not collected on the patients counseled out of the Wellfit program.

Subjects who did not complete both the FACIT pretest and posttest were not excluded from the Cancer Wellfit program but were excluded from the statistical analysis. The physical trainers participating in the program distributed and when complete, collected the FACIT pretest at the first group meeting and the FACIT posttest at the last meeting. Thirteen subjects did not complete both the pre and post testing components of the FACIT. Completion of the tests may not have occurred for a variety of reasons including, drop-out from the Wellfit program, absence on the day the test was given, or an incomplete pre or posttest escaped the attention of the trainer.

The final sample included 62 individuals living with cancer. The participants were 26 men and 36 women, between the ages of 21 and 79, with a mean age of 54.5. The participants were living with 10 different cancer types: breast (24), colon (1), lung (2), ovarian (3), brain (2), melanoma (1), testicular (2), lymphoma (5), leukemia (2), prostate (10), and other types (10). All patients were in cancer treatment, anticipating cancer treatment, or had been in treatment within six months prior to beginning the Cancer Wellfit exercise program. The participant's cancer treatments included: surgery (2),

chemotherapy (14), radiation (17), combination of 2 or more therapies (13), other (7), and nine subjects did not answer the question.

The Wellfit program was offered without cost to program participants due to a grant from the Doran Foundation and in-kind membership gifts from East Hills and Michigan Athletic Clubs. The only cost incurred by participants was for transportation to and from the health clubs.

Design and Procedures

The subjects were assigned to one of nine exercise groups based on the numerical capacity of the next exercise group offered. The assignment to a group was not random, and assignment often depended on the presence or absence of health complications of the subjects. For example, once a patient was admitted into the program, they occasionally experienced a severe response to a cancer treatment and requested a later start date with a later group. Ethically, this request superceded the need to assign patients to an exercise group based on an opening in the next exercise group, or any attempt at random assignment.

The groups were made up of six toll individuals. Each exercise group participated in a ten-week group that was directed by two or three professional exercise trainers. The Fitness and Personal Training Director of the health clubs was responsible for the quality and delivery of the Wellfit exercise program. The qualifications of the Director include: certification by the American College of Sports Medicine as a Health Fitness Instructor, certification by the American Council on Exercise, as a Clinical Exercise Specialist, and a Lifestyle and Weight Management Consultant.

The groups met on various times and days of the week to accommodate work

schedules. The program sessions were held at an athletic club with each group remaining intact with the same group of participants and the same group of trainers. The trainers followed a previously organized training and education schedule. The schedule was shared with the participants in the program as an informational handout (Appendix D).

The exercises consistently used by the trainers were divided into two main areas, resistance training exercises and abdominal exercises. The resistance training exercises were: 1) the Cybex leg press, 2) the Cybex chest press, 3) the Cybex seated row or lateral pulldown, 4) the Cybex shoulder press, 5) the Cybex leg curl, 6) the cable tricep pushdown, and 7) the dumbbell bicep curl. The abdominal exercises included: 1) isometric contractions, 2) crunches or forward crunches, 3) pelvic tilt, 4) alternative supine leg lowering (with progress to reverse crunch), 5) the proned hover, and 6) bridges.

The aerobic-exercise program was performed on treadmills, stationary bicycles, and stair-climbing machines. The participants were also trained on the weight machines and the free-weights. In addition to the small group supervision sessions with the Wellfit program, participants were offered free services throughout the health clubs for the entire 10-week program.

Data were collected by the Wellfit trainers prior to beginning the first session of the ten-week exercise program and during the last session of the program. Color-coded packets were designed to ensure all the questionnaires were given to each participant and that the pretest and posttest information was accounted for. The questionnaires and other subject information were assigned to a subject file. The subject files were all assigned unique numbers based on four-digits. The first two digits were for the chronological

number of the group, while the next two numbers were for the participant number. The file number assigned to the participant and dispensed by the Wellfit trainers was based in alphabetical order, and the list of participant names and numbers was kept separate from the data files and from the research team to assure confidentiality. The research assistant collected the data from the athletic clubs and stored the paper data in files in a locked room in the Research Center. The research assistant transferred all data into the statistical program, Statistical Program for Social Sciences (SPSS) computer software.

Instrumentation

Before and after a ten-week exercise program, the subjects completed four surveys: 1) Profile of Mood States [POMS], 2) Functional Assessment of Chronic Illness Therapy with the Fatigue subscale [FACIT-F], 3) Social Inventory, and 4) Exercise Questionnaire. In addition, the club trainers conducted a preliminary physical strength baseline. The decision was made, for purposes of this study, to examine the results of the FACIT-F, version 4. The study did not examine the results of the POMS, the Social Inventory, or the Exercise Questionnaire.

The FACIT questionnaire is a collection of health-related quality of life questionnaires and it has been under development since 1987. This questionnaire has several advantages for measuring quality of life. First, the items in the questionnaire were developed with both patient and expert input. This collaborative effort improves the goal of including patient relevant factors in quality of life. Second, there are several hundred publications detailing its performance as well as many formal validation studies (Overcash, Extermann, Parr, Perry, & Balducci, 2003; Webster, Odom, Peterman, Lent, & Cella, 1999; Winstead-Fry & Schultz, 1997). Third, there is availability of cross-illness

comparative scores, and finally, there is a body of research that illustrates clinically significant differences and changes in scores in FACIT scales that aids in study sample size determination and interpretation of study results (Webster, Cella, & Yost, 2003).

The FACIT-F is a standardized questionnaire used to collect and analyze relevant quality of life data and is divided into five primary quality-of-life domains; physical wellbeing, social/family well-being, emotional well-being, functional well-being, and additional concerns (fatigue) (Webster, et al., 2003). The present study gives attention only to the sub-scores of the "physical well-being" and "emotional well-being" domains of quality of life.

The FACIT-F questionnaire is designed to be appropriate for measurement of quality-of-life for patients with any form of cancer (Webster, et al., 2003). The FACIT-F is a combination of the CORE questionnaire called the Functional Assessment of Cancer Therapy-General (FACT-G) of 27-items, with the addition of 13 questions regarding the assessment of fatigue on the quality of life. Extensions of this questionnaire have also been used and validated with other forms of chronic illness, such as Acquired Immuno-deficiency Virus [AIDS], Parkinson's disease, multiple sclerosis, and rheumatoid arthritis.

The FACIT-F can be administered by self-report with paper or computer, or by interview (face-to-face or telephone). For this study, the FACIT-F was administered to subjects using pencils with the printed questionnaire. The pretest was administered during the first day of the first week of the Wellfit program and the posttest was administered during the second day of the tenth and final week. The 6-11 subjects in each group completed the questionnaires in a large conference room located in the health center. The

FACIT-F assessment is written at the 4th grade reading level and is designed to take less than fifteen minutes to complete (Webster, et al., 2003). The Wellfit trainers handed out the FACIT-F assessments to each subject and collected them when the subjects had finished. After each 10-week Wellfit program, the research assistant collected the data completed by the group and the results were entered into the Statistical Program for Social Sciences computer program.

The FACIT-F questionnaire has five sections and in each section there is a list of statements to which the subject can respond by circling one of the following answers in a 5-point Likert-type scale: 1 = Not at all, 2 = A little bit, 3 = Somewhat, 4 = Quite a bit, or 5 = Very much. The physical well-being section has 7 items, the social/family well-being has 7 items, the emotional well-being section has 6 items, the functional well-being section has 7 items and the fatigue section has 13 items. Each item is stated as a fact regarding the cancer patients' quality of life and they respond to that statement by circling a response that is the closest to matching their feeling about the statement. For instance, in the physical well-being section, the first statement is "I have a lack of energy". The total questionnaire is 3 pages in length.

The FACIT-F subheadings, or the total of all subheadings, are scored so that a higher score indicates improvement in quality of life. The scores on negatively-phrased statements are reversed, and all items within the subheading are then added for a subheading final score. The subheading scores of physical well-being, emotional well-being, social/family well-being, functional well-being and the additional score of fatigue are added together for a total FACIT-F score (Webster, et al., 2003). Missing scores were created by using the average of the other answers in the scale. Subheading scales can be

created for missing data as long is there are no more than 50% of the data missing.

FACIT-F subheading scores reveal even minimal differences in quality of life. Minimal differences in quality of life that are worth noting by a cancer patient, offer clinicians an opportunity to adjust treatment (Brady, et al., 1997; Webster, et al., 2003).

Seventy-five subjects completed the pre-tests, but only 62 subjects completed the posttests. The 13 subjects who did not complete both the pretest and the posttest were excluded from the analysis.

Validity and Reliability

The goal of using quantitative methodology was to gain a statistical analysis of the subjects' report of difference in physical and emotional well-being before and after participating in the Cancer Wellfit exercise program. The FACIT-F is a standardized tool developed to measure quality of life. The literature recognizes this questionnaire to have good reliability and past use of the FACIT-F reports the reliability to coefficient alpha range = .69-.82 (Cella, 1997).

Using SPSS, the Cronbach alpha reliability range was used to determine the alpha range for the subscales "physical well-being", "emotional well-being", and the total FACIT score. The results of the Cronbach alpha reliability based on the FACIT-F total score with 40 items is .7015. This reliability score is within the reliability range cited in the literature. The results of the "physical well-being" subsection of the FACIT-F questionnaire are alpha = .6437 and the "emotional well-being" subsection with 6 items reveals an alpha = .6761.

Again, as with the physical well-being subsection reliability test, the alpha falls somewhat lower that the reliability range cited in the literature because of the brevity of

the test.

Given the length of the questionnaire subsections used in this study to examine the physical and emotional well-being aspects of quality of life, the reliability range of these questions is acceptable. In addition, the results of this study are generalizable to other cancer and exercise studies if the Cancer Wellfit program, or a similar program, is used for the exercise component and if the other sample resembles the one that received the Cancer Wellfit program for this study in terms of gender, age range, cancer type, and cancer treatment. Because there are a number of similar programs meeting these two criteria, it is likely that there will be some generalizability from this study.

Assumptions of the Study

The research methodology was based on certain assumptions that if violated, would affect the validity of the study. It was assumed, and there was no reason to doubt, that the respondents were sufficiently knowledgeable to respond accurately to the standardized tests and to honestly respond about their experience, perceptions, and feelings. It was assumed that the survey items were clear enough for the subjects to answer the research questions. Finally, it was assumed that the findings of this study would be useful to the social work profession and to other disciplines such as sociology, kineseology, and physical rehabilitation.

Summary

Chapter III contained a discussion of the study's epistemology and methodology, subjects and sampling, procedures, instrumentation, data analysis, and assumptions. The results of the study are presented in Chapter IV, including the characteristics of the subjects, general findings, and results based on the research

hypotheses.

CHAPTER IV

RESULTS

Overview

Sixty-two subjects participated in the "Cancer Wellfit" research project, conducted under the auspices of St. Mary's Health Services Cancer Center in Grand Rapids, Michigan. The participants were assigned to nine exercise groups that met in one of two hospital owned health clubs for a ten-week supervised program. The groups participated in the ten-week programs over the course of one year, April 2002 through April, 2003. Four of the nine exercise groups met at one health club and five exercise groups met at the second health club. Originally, seventy-five participants enrolled in the study, but due to incomplete pre and post-test results, the results of the thirteen subjects were excluded, as described in Chapter III.

The thirteen participants excluded from the study included men (7) and women (6) between the ages of 35 and 74. These subjects were diagnosed with breast (4), lung (1), ovarian (1), melanoma (1), testicular (1), pancreatic (1), prostate (2), and other (2) cancers. They were in a variety of treatments for cancer: namely, surgery (2) chemotherapy (4), radiation (3) and a combination of treatment types (4). The excluded participants identified a variety of treatment goals including palliative care (3), curative (6), adjunctive (1) and other (3). The data did not suggest unique demographic

characteristics in the excluded subjects. The remaining sixty-two subjects form the sample for this study.

Characteristics of the Study Sample

The study sample contained 36 women (58.1%) and 26 men (41.9%) and was composed of participants representing a wide age range.



Figure 1. Percentage of Participants Based on Age Range.

The subjects (see Figure 1) ranged from twenty to eighty years in age (N = 62, M=54). It was expected that the subjects in the study would be middle-aged and older given the increase risk of a cancer diagnosis as a person ages. In fact, twelve of the 62 subjects (19%) were 70 or older. It was not expected that the high percentage of the
subjects in this age range would volunteer to be in an exercise program during their cancer treatment.

The sample was composed of individuals (N=62) receiving cancer treatment for nine different cancer types (see Figure 2).



cancer type

Figure 2. Percentage of Participants Based on Cancer Type.

The types of cancer included breast (24, 38.7%), colorectal (1, 1.6%), lung, (2, 3.2%), ovarian (3, 4.8%), brain (2, 3.2%), melanoma (1, 1.6%), testicular (2, 3.2%), lymphoma (5, 8.1%), leukemia, (2, 3.2%), and prostrate (10, 16.1%). Ten subjects (16.1%) indicated that they had a diagnosis of a form of cancer not listed.

All participants were required to be in cancer treatment during the Wellfit program. This was a unique feature of the study because often exercise as an intervention

for cancer patients is examined as part of cancer treatment rehabilitation. The subjects indicated they were recipients of a variety of cancer treatments (see Figure 3).



type of treatment



Nine participants (14.5%) responded to the question about type of cancer treatment with "no answer". The short answer question "Current treatment" (Appendix J) could have been confusing or misleading for those anticipating or just completing active treatment. The other responses to the cancer treatment item included surgery (2, 3.2%), chemotherapy (14, 22.6%), radiation (17, 27.4%), a combination of therapies (13, 21%) and other treatments not listed (7, 11.3%).

Participants in the study (N=62) were referred to or volunteered to participate in the Wellfit program for a variety of reasons. While it was suspected that the goal for participation was curative in nature, participants responded to the item asking about the goal of cancer treatment with a variety of answers (see Figure 4).



goal of cancer treatment

Figure 4. Percentage of Participants Based on Goal of Cancer Treatment.

Sixteen participants (25.8%) responded to the question about their goal for cancer treatment with "no answer." This relatively high response may indicate emotional discomfort with this question or it could indicate the cancer patients' uncertainty about the goal of treatment for their cancer diagnosis. Seven (11.3%) of the participants indicated that the goal of their cancer treatment was palliative and 37 (59.7%) responded that their goal for cancer treatment was curative. Other participants (2, 3.2%) stated the treatment goal was to support other forms of treatment. The strong response indicating the cancer treatment goal as curative was not surprising. It was expected that participation

in cancer treatments would be offered to and described to cancer patients primarily as a way to oppose the presence of cancer in their bodies.

The two primary criteria for enrollment in the Cancer Wellfit program were 1) the participants' diagnosis of cancer and 2) their participation in a form of cancer treatment. Cancer treatment was defined as treatment prescribed by their "cancer doctor." The treatment was to be received during the Cancer Wellfit exercise program, scheduled to begin during the Cancer Wellfit program, or treatment within the six months prior to the beginning of assignments to the Cancer Wellfit program group session.

The subjects were required to sign a physician release of information (Appendix G) allowing the Cancer Wellfit staff to notify and consult with the subject's physician. The physician was asked to sign a form acknowledging their comprehension of Cancer Wellfit program and their support for the subject's participation.

The Cancer Wellfit program was facilitated by St. Mary's Cancer Center and there was a concern that research subjects would only be referred to the program only by oncologists or other physicians associated with St. Mary's Cancer Center. This was not the case. Subjects participating in the program were patients of nineteen physicians in the West Michigan area. The Medical Director and Chief Oncologist of the Cancer Center was the only physician working as an employee of St. Mary's Cancer Center and his referrals accounted for many of the referrals (23%) and he referred the most participants when compared to other physicians. However, 77% of the referrals came from physicians working primarily outside of the St. Mary's Cancer Center.

The impression is that the Cancer Wellfit brochures, a health club newsletter communication, a newspaper article, and community media were effective and influenced

people living with cancer to seek out the Cancer Wellfit program. In addition, it appears that a number of physicians were influenced by their awareness of the program and referred their patients to the program.

General Findings

Findings will be presented by discussing each research hypothesis in terms of the quantitative findings. The statistical results of the quantitative findings reveal two of the four hypotheses to have statistical significance. One additional hypothesis demonstrates a trend. Analyses were conducted to provide descriptive information (means, standard deviation) and insure that data met assumptions to perform regression analyses. The rejection level used in statistical analysis was .05.

Results Presented by Research Hypothesis

Physical Well-Being

Hypothesis one examined data collected using the "physical well-being" quality of life domain as measured by the FACIT – F. Values within this subsection of the FACIT – F included the following responses: 0 (Not at all), 1 (A little bit), 2 (Somewhat), 3 (Quite a bit), and 4 (Very much). The physical well-being subsection contains seven statements with a total possible sum score of 28. The higher score indicates improvement in physical well-being. The questionnaire asked each subject to indicate the level of truth about each of the following statements: 1) I have a lot of energy, 2) I have nausea, 3) Because of my physical condition I have trouble meeting the needs of my family, 4) I have pain, 5) I am bothered by side effects, 6) I feel ill, and 7) I am forced to spend time in bed.

Hypothesis 1

There will be a statistically significant improvement in the posttest average scores of physical well-being reported by cancer patients who are in active treatment for a variety of cancer diagnoses and participate in a 10-week exercise program when compared to the pretest average scores. (Higher mean score on the "physical wellbeing" subscale as measured by the Functional Assessment of Cancer Therapy - Fatigue [FACTLFF] will be associated with improved physical well-being).

Results 1

The data did not reveal any evidence against normal distribution. The statistical analysis employed the paired samples t-test was used to determine if the mean posttest results of physical well-being of the sample demonstrated a statistically significant difference from the mean pretest results of physical well-being.



pre FACIT physical well-being

pre FACIT physical well-being

Figure 5. Frequency of Physical Well-Being Pretest Scores.

Descriptive statistics revealed the pretest scores (M = 21.2, SD = 4.1) and the actual total values ranging from 11-28. The frequency table (see Figure 5) indicates that 38 of the subjects (59%) responded with a score falling between 22 and 28 on the FACIT pretest physical well-being questionnaire.



post FACIT physical well-being

post FACIT physical well-being

Figure 6. Frequency of Physical Well-Being Posttest Scores.

The means and standard deviations for the posttest scores were (M = 22.7, SD = 4.7) and the actual total values ranged from 9.30 to 28. The frequency table (see Figure 6) indicates that 43 of the subjects (67%) responded with a score falling between 22 and 28 on the FACIT posttest physical well-being questionnaire.

The range of the posttest physical well-being scores is larger and includes a lower score for one subject. However, the mean score of posttest results (22.7) are almost 1.5 points higher than the pretest scores (21.2).

Findings based on the difference in means between the mean pre and posttest results of the FACIT-F, physical well-being subsection, suggest that participants reported improved physical well-being after participation in the Cancer Wellfit exercise intervention. The quantitative results demonstrate a statistically significant improvement in participant physical well-being after participation in the Cancer Wellfit program (see Table 1).

 Table 1. Paired Sample T-Test Statistics based on Pre and Posttest Results Measuring Physical Well-Being.

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	post FACIT physical well- being pre FACIT	22.7145	62	4.69851	.59671
	physical well- being	21.2323	62	4.10964	.52192

Paired samples t-test statistics physical well-being

Paired samples test physical well-being

Paired Differences			
Std. Doviction	t	df	Sig (2 tailog)
	2 570	61	
	Std. Deviation 4.5246	Std. Deviation t 4.5246 2.579	Std. Deviation t df 4.5246 2.579 61

The statistical test, as shown in Table 1, revealed a difference in the mean of 1.48, and standard deviation of 4.52 (p = .012). The results support the hypothesis.

The improvement in physical well-being was expected and supports the results of current research. The results support studies that suggest that people live with a variety of different cancers with less nausea, weakness, pain, and fatigue and are better able to live with the ravaging effects of fatigue and nausea when they engage in physical activity (MacVicar & Winningham, 1986). However, threats to internal validity of the results exist and will be discussed in Chapter V.

Emotional Well-Being

The data were collected using the "emotional well-being" quality of life domain as measured by the FACIT – F. Values within this subsection of the FACIT – F included the following responses; 0 (Not at all), 1 (A little bit), 2 (Somewhat), 3 (Quite a bit), and 4 (Very much). The emotional well-being subsection contains seven statements with a total possible sum score of 28. The higher score indicates improvement. The questionnaire asked each subject to indicate the level of truth of each of the following six statements: 1) I feel sad, 2) I am satisfied with how I am coping with my illness, 3) I am losing hope in the fight against my disease, 4) I feel nervous, 5) I worry about dying, and 6) I worry that my condition will get worse.

Hypothesis 2

There will be a statistically significant difference in the posttest average scores of emotional well-being reported by cancer patients who are in active treatment for a variety of cancer diagnoses and participate in a 10-week exercise program when compared to the pretest average scores. (Higher mean score on the "emotional well-being" subscale as measured by the Functional Assessment of Chronic Illness Therapy – Fatigue [FACIT-F] will be associated with improved emotional well-being).

Results 2

The data did not reveal any evidence against normal distribution. The statistical test employed was the paired samples t-test. It was used to determine if the sample mean posttest results of emotional well-being demonstrated a statistically significant difference from the mean pretest results of emotional well-being (see Figure 7).



Figure 7. Frequency of Emotional Well-Being Pretest Scores.

Descriptive statistics (see Figure 7) revealed the mean pretest scores (M = 19.5, SD = 3.68) and the actual response values ranged from 8 -26. Figure 7 indicates that 38 of the subjects (59%) responded with a score falling between 22 and 28 on the FACIT pretest emotional well-being questionnaire.

Descriptive statistics (see Figure 8) revealed the mean emotional well-being posttest scores (M = 20.48 SD = 3.18) and the actual total values ranged from 5 to 24. Figure 8 shows that 54 of the subjects (84%) responded with a score falling between 20 and 28 on the FACIT posttest emotional well-being questionnaire. This signifies a shift to higher FACIT scores.



Figure 8. Frequency of Emotional Well-Being Posttest Scores.

The range of posttest emotional well-being scores is larger and includes a lower score for one subject (5). However, the mean of the posttest result (20.5) is approximately 1 point higher than the pretest result (19.5).

Findings, based on the difference in means between the pre and posttest results of the FACIT-F, emotional well-being subsection, suggest that subjects reported statistically significant improvement in their emotional well-being after participation in the Cancer Well-fit exercise intervention (see Table 2). The statistical test results, as shown in Table 2, revealed a difference in mean of 1.00, and a difference in standard deviation of 3.40 (p = .023).

Table 2. Paired Sample T-Test Statistics Based on Pre and Posttest Results Measuring Emotional Well-Being.

		Mean	N	Std. Deviation
Pair 1	post FACIT emotional well- being	20.4839	62	3.17646
	pre FACIT emotional well- being	19.4806	62	3.67561

Paired samples t-test statistics emotional well-being

	Paired Differences				
	Mean	Std. Deviation	t	ďf	Sia. (2-tailed)
Pair 1 Emotional well-being	1.0032	3.3982	2.325	61	.023

The improvement in emotional well-being was expected based on research studies. The results supported studies that demonstrate that people with emotional distress associated with cancer experience improved emotional well-being when involved in increased physical activity. The results are subject to the threats to internal validity make it impossible to determine if the improvement was due solely to the exercise intervention. Issues relating to internal validity will be discussed further in Chapter V.

Difference between Physical Well-Being and Emotional Well-Being

Results from the t-tests for hypotheses 1 and 2 demonstrated participants reported statistically significant improvement in both physical and emotional well-being. The research question in hypothesis three seeks to determine if there is a statistically significant difference in the improvement change between physical and emotional wellbeing.

Hypothesis 3

There will be a statistically significant difference in improvement in the sample mean of physical well-being when compared to the sample mean of emotional well-being reported by cancer patients who are in active treatment for a variety of cancer diagnoses and participate in a 10-week exercise program.

Results 3

The side-by-side boxplot (see Figure 9) demonstrates that the means of

physical and emotional well-being are very close. The boxplot also demonstrates the

presence of outliers and an extreme outlier.



Figure 9. Difference Between the Means in Improved Physical Well-Being and Improved Emotional Well-Being.

To ascertain the difference in improvement, a paired sample t-test measuring the difference between group means was employed. The results conclude there was not a statistically significant difference of improvement between physical and emotional well-being.

Table 3. T-Test for Improved Physical Well-Being and Improved Emotional Well-Being.

		Mean	N	Std. Deviation
Pair 1	Improve emotion	1.0032	62	3.39826
	Improve physical	1.4823	62	4.52467

Paired Sample Statistics

Paired Samples

		t	df	Sig. (2-tailed)
Pair	emotional - physical	681	61	.499

The results indicated the statistical change for physical well-being (M = 1.48, SD = 4.52) and emotional well-being (M = 1.0032, SD = 3.40). The statistical test reveals t = -.681, p = .499 (two-tailed). These results indicated there is no statistically significant difference in change reported between physical and emotional well-being.

To determine if one area of well-being had improved more than the other, the Cohen's measure of effect size was applied. The Cohen's Effect-size statistical test indicated that the improvement in physical well-being had a slightly larger effect size. The effect size assumes that one variable has an effect on another variable. One of the main effect statistics is the difference in means between two variables. It is calculated by dividing change in mean by standard deviation. The results express the difference in means as a fraction of the standard deviation. For instance, a change in one standard deviation is a moderate effect and anything less than 0.2 standard deviation is very small (Hopkins, 2000). The result of this test indicates that the effect size of improvement in emotional well-being was d = 0.295. The effect size of improvement in physical well-

being was d = 0.328. While the difference in mean improvement was not statistically

significant, the effect size of improvement in physical well-being is slightly greater.

Influence of Variables on Improvement in Physical Well-Being

The variables of age, gender, cancer type, and cancer treatment of the sixty-two

subjects were explored to determine if they were significant in influence on improvement

in physical well-being.

Hypothesis 4

There will be a statistically significant relationship between the variables 1) gender, 2) age range, 3) cancer type, and 4) cancer treatment and improvement in physical well-being reported by cancer patients who are in active treatment for a variety of cancer diagnoses and participate in a 10-week exercise program. The literature does not specify an identifiable direction of change.

Results 4.1: Gender

The distribution of the gender variable was examined by application of the sideby-side box plot (see Figure 10). Figure 10 shows that the distribution is somewhat skewed: therefore, the Mann-Whitney statistical test was used to compare means.



Figure 10. Difference in the Means of Improved Physical Well-Being Between Female and Male Participants.

The findings of the Mann-Whitney Test (see Table 4) indicated that men (N = 26)

had a mean rank of 34.48 and women (N = 36) had a mean rank of 29.35. (p = .265) and

sum of ranks = 1056.50.

Table 4. Difference in Improvement Between Genders.

Mann-Whitney Test

Ranks

	gender	N	Mean Rank	Sum of Ranks
Improve	male	26	34.48	896.50
physical	female	36	29.35	1056.50
	Total	62		

Test Statistics(a)

	Improved physical
Mann-Whitney U	390.500
Wilcoxon W	1056.500
Z	-1.114
Asymp. Sig. (2-tailed)	.265

a Grouping Variable: gender

The results suggested that while there is a small difference in improved physical well-being based on gender, gender is not a significant variable in improvement (U = 390.50, T = 1056.50) The test results revealed z = -1.114 (p = .265). There is no statistically significant difference between the mean change in physical well-being and gender. There was an expectation that there would be a difference in the perception of improved physical well-being being between men and women, but this hypothesis was not supported.

Results 4.2: Age Range

The variable age range was examined for influence on the improvement of physical well-being using simple linear regression. The scatterplot (see Figure 11) examined sample distribution and indicated a negative correlation between change in physical well-being and age range and shows that as the subjects increase in age, improvement in physical well-being is slower.



Figure 11. Scatterplot of Improved Physical Well-Being and Age Range.

The statistical test of linear regression, as displayed in Table 8, was applied to determine if age range was a predictor of change in improved physical well-being.

The regression summary (see Table 5) revealed p = .364 (t = -.914). The results suggest age range is not a predictor of improvement in physical well-being after participation in a physical exercise program. These results are surprising because it was expected that there would be a significant difference in the perception of well-being based on age range after participation in the Wellfit program.

Table 5. Regression Summary of Age Range.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.117 ^a	.014	003	4.53077

a. Predictors: (Constant), Age Range

Coefficients^a

		Unstandardized Coefficients			
Model		В	Std. Error	t	Sig.
1	(Constant)	2.837	1.590	1.785	.079
	Age Range	181	.198	914	.364

a. Dependent Variable: difphysi

The results indicated a weak correlation between age range and improvement in physical well-being (R square = .014) and no statistically significant relationship. The results do not defend the hypothesis.

Results 4.3: Cancer Type

The relationship between the type of cancer and the improvement in physical well-being was examined. Cancer types identified in the data included, breast, colorectal, lung, ovarian, brain, melanoma, testicular, lymphoma, leukemia, prostate, and other cancer.

The side-by-side box plot (see Figure 12) examined the distribution of the mean of physical well-being change. The mean appears similar for many types of cancer, particularly breast, ovarian, testicular, lymphoma, and prostate. Figure 12 also indicates that the mean for subjects living with leukemia improved in physical well-being more than the average diagnostic categories and the mean for subjects living with brain cancer improved in physical well-being less than most diagnostic categories.



Figure 12. Side-by-Side Boxplot of Improved Physical Well-Being and Type of Cancer.

The statistical test, one-way analysis of variance [ANOVA], was conducted to determine if the means of cancer types significantly varied from each other in their relationship to changed physical well-being. Due to single responses, colorectal and melanoma cancer were not included in the analysis, so the remaining nine cancer diagnoses are included in the statistical test.

Variations in sample size (see Table 6) for cancer types indicate some cancer groups had better representation than other groups, for example the breast cancer sample N = 24, and in contrast, lung cancer sample N = 2. Results of the analysis showed that mean difference in improvement in physical well-being varied based on the type of cancer diagnosis. The least improvement in physical well-being was reported by subjects with brain cancer (M = -3.85). The most improvement in physical well-being was reported by subjects with leukemia (M = 9.00).

Table 6. ANOVA	Test Results on	Improved Physical	l Well-Being by	y Type of Cancer.

cancer type	Mean	N	Std. Deviation	
breast	1.1667	24	4.96655	
colorectal	2.0000	1		
lung	7.5000	2	.70711	
ovarian	.0000	3	3.00000	
brain	-3.8500	2	8.69741	
melanoma	6.0000	1		
testicular	.5000	2	.70711	
lymphoma	2000	5	3.83406	
leukemia	9.0000	2	5.65685	
prostate	1.4000	10	2.87518	
other	1.6600	10	3.84713	
Total	1.4823	62	4.52467	

The test statistics, (see Table 7) of the ANOVA revealed no statistically

significant relationship of cancer type to improved physical well-being, but did indicate a

possible trend. The results between groups (df = 8 and MS = 33.418) and the results

within groups (df = 51 and MS = 18.831) revealed F = 1.775 and p = .104.

Table 7. ANOVA Test Statistics of Improved Physical Well-Being by Type of Cancer.

ANOVA

Improved physical well-being

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	267.34	8	33.41	1.775	.104
Within Groups	960.38	51	18.83		
Total	1227.73	59			

The Kruskal-Wallis nonparametric statistical test (see Table 8) was conducted to test if the population distribution for cancer types were similar by comparing the sum of ranks. The results also indicated no statistically significant relationship (df = 8, p value = .311).

 Table 8. Kruskal Wallis Test Statistics of Improved Physical Well-Being by Type of Cancer.

Kruskal Wallis

	Improved physical
Chi-Square	9.387
df	8
Asymp. Sig.	.311

The results of the statistical testing suggested there may be a trend toward a relationship between cancer type and a change in physical well-being. The result of the type of cancer diagnosis influencing physical well-being would not surprising. For

instance, people diagnosed with brain cancer may be at risk for aggressive treatment to an area of the body that has significant influence over physical and emotional well-being. A cancer diagnosis such as brain cancer may be accompanied by high-risk treatments or a poor prognosis for recovery. In comparison, people diagnosed with one of the variety of leukemia diagnoses may be faced with a more optimistic prognosis. The more optimistic prognosis based on type of cancer may influence a change in physical well-being or perhaps a better functioning level. However, the results do not indicate a significant relationship between type of cancer and improved well-being. The hypothesis was not supported.

Results 4.4: Type of Cancer Treatment

The type of cancer treatment was also examined to discover if it influenced sample report of improved physical well-being. The types of treatment examined included no answer, surgery, chemotherapy, radiation, a combination of treatments, and other treatments. The results of a side-by-side scatterplot, as shown in Figure 13, examined the sample distribution of mean difference between cancer treatments and improved physical well-being.



Figure 13. Side-by-Side Boxplot of Improved Physical Well-Being by Type of Cancer Treatment.

The results of Figure 13 showed the mean differences between types of cancer

treatments to appear very similar, however, the results also indicated extreme outliers

from the mean.

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Table 9. ANOVA Test Statistics of Improved Physical Well-Being and Type of Cancer Treatment.

|--|

unpriya					
	Sum of				
	Squares	df	Mean Square	F	Sig.
Between Groups	58.032	5	11.606	.546	.741
Within Groups	1190.798	56	21.26 4		
Total	1248.830	61			

The statistical test ANOVA (see Table 9) was performed to determine if type of cancer treatment influenced improved physical well-being. The results of the ANOVA

indicated p = .741. In addition, due to the extreme outliers from the mean, the

nonparametric statistical test, the Kruskal Wallis (see Table 10) was employed.

Table 10. Kruskal Wallis Test Statistics of Improved Physical Well-Being and Type of Cancer Treatment.

Kruskal-Wallis Test

Test Statistics(a,b)

	difphysi
Chi-Square	2.774
df	5
Asymp. Sig.	.735

a Kruskal Wallis Test

b Grouping Variable: type of cancer treatment

Both the ANOVA and the Kruskal Wallis test (see Table 10) results revealed (df = 5, p value = .735) that the type of cancer treatment was not statistically significant in relationship to improvement in their physical well-being. It was expected that the type of cancer treatment a participant was engaged in would effect the perception of improved physical well-being, particularly given the often tenacious side-effects that can result from treatment. However, this was not the case and the hypothesis was not supported.

Summary

The results of this study indicated that people in treatment for cancer and participating in a ten-week exercise program reported statistically significant improvement in both their physical and emotional well-being. The difference in improvement in physical versus emotional was not statistically significant.

Improvement in physical well-being was examined to explore whether or not the variables gender, age range, cancer type, and type of cancer treatment influenced the

improvement. The statistical tests reveal that these independent variables did not have a statistically significance effect in the improvement of participants in physical well-being. However, the type of cancer diagnosis appears to indicate a trend toward a relationship in the improvement of physical well-being.

CHAPTER V

DISCUSSION AND IMPLICATIONS

Overview

Cancer and cancer treatment contribute to a number of negative side-effects that influence physical and emotional well-being of people in cancer treatment and diminish their experience of quality living. Individuals in cancer treatment experience symptoms that decrease physical function, alter body composition, decrease strength and physical ability, increase fatigue and emotional distress, and contribute to an overall decrease in quality of life (Burnham, 2000).

This exploratory study examined the physical and emotional well-being of people living with and being treated for cancer. Specifically, the researcher examined the pretest and posttest results of physical well-being and emotional well-being, after participation in a ten-week exercise program, as measured by the Functional Assessment of Chronic Illness Therapy – Fatigue (FACIT-F) for 62 individuals diagnosed with cancer.

This study provides support to the growing body of literature that reports that during cancer treatment physical activity is beneficial to the quality of life for cancer patients. Prior to this study, no research was discovered that examined the difference in pre and posttest scores between the FACIT- F subsections entitled physical well-being and emotional well-being. In addition, few studies were located that examined the

influence of gender, age range, cancer type, and cancer treatment on the improvement of physical well-being.

The quantitative findings of four hypotheses were examined in this study. The results of the statistical analyses of hypotheses one and two found the results to be statistically significant. The quantitative findings of hypothesis three and four were not statistically significant, however, hypothesis 4.3 did suggest a trend.

The findings show there were statistically significant improvements in both physical and emotional well-being of the participants. In addition, the results revealed that the difference in improvement between physical and emotional well-being was not statistically significant. However, using the Cohen's Effect-size statistical test indicated that the improvement in physical well-being had a slightly larger effect size and that therefore the improvement in physical well-being was examined for influence by the independent variables, gender, age range, cancer type, and type of cancer treatment.

The variables gender, age range, cancer type, and type of cancer treatment were explored to see if these variables influenced an improvement in physical well-being, but no significant relationships were discovered. However, there was a trend toward a significant relationship between improved physical well-being and the type of cancer.

The discussion and implications of this dissertation are presented below. This chapter includes a summary and discussion of the study's major findings, the limitations of the study, the implications for practice, and policy, recommendations for future study and concluding remarks.

Major Findings

Improvement in Physical Well-Being

Research claims that to achieve a healthy U.S. population, there must be an increase in exercise (Brisson & Tudor-Locke, 2004; Morrow, Krzewinski-Malone, Jackson, Bungum, & FitzGerald, 2004; Vuori, 1995). Exercise is recognized as an effective prevention method for disease, like diabetes and obesity, and an effective method in improving the condition of people living with chronic illnesses such as heart disease. In addition, research asserts that physical activity, when performed on a regular basis, need not be strenuous to achieve health benefits (Nies & Kershaw, 2002; Vuori, 1995).

For individuals living with chronic illnesses like cancer, this news about exercise offers hope for physical benefits from exercise because vigorous exercise may not be well tolerated by people surviving cancer treatment. Moderate physical activity may be an effective way to improve cancer patients' quality of life and the lower intensity level of the exercise program may allow cancer patients to adapt more easily to exercise programs and so participate more frequently. This study suggests consistent and moderate levels of exercise, as offered through exercise programs, like "Cancer Wellfit," may assist cancer patients to experience an improved quality of life through improved physical and emotional well-being.

The side-effects of cancer and cancer treatments plague individuals and may result in times of prolonged inactivity. However, it seems clear that this inactivity may contribute to a decline in physical functioning and fatigue (MacVicar & Winningham, 1986) and that increased low to moderate physical activity, may lead to an increase in

physical capacity and functioning. Increased functioning by participation in the Cancer Wellfit program may have been a contributing factor in the patients' reports of improved physical well-being and research. Courneya, 2003, suggests that an increase in physical well-being may lead to an improvement in quality of life.

Although improvement in physical well-being was significant after participation in the Cancer Wellfit program, causality cannot be asserted because this study did not successfully control for the multiplicity of variables influencing the study participants during their participation in the ten-week Wellfit program. Potentially, participants were influenced by a variety of experiences during this study that may have contributed to their perception of improved physical well-being such as the encouragement and praise of a support person, a change in diet or appetite, or previous positive experiences with exercise. In addition, some participants may have had less disabling side-effects from their specific cancer diagnosis and type of cancer treatment, allowing them to participate more fully in the planned exercise sessions of Wellfit. Feeling better would also enable some participants to exercise more on their own between scheduled exercise sessions. This study, however, provides support for past research findings (Durak & Lilly, 1998; Segal, et al., 2003) that suggest a strong relationship between increased physical activity and improved physical well-being.

Improvement in Emotional Well-being

Emotional well-being improved significantly for the participants over the course of the Cancer Wellfit exercise program. Subjects reported improvement in emotional well-being, a state that is often assaulted by the common emotional side effects of cancer treatment, fatigue, depression, anxiety, confusion, body image concerns, and a sense of

loss of control over normal activities (Burnham, 2000). The activity associated with the exercise program appears to have influenced the improvement of emotional well-being for the cancer patients participating in the program.

The results of this study support the growing body of research (Courneya & Friedenreich, 1999; Nies & Kershaw, 2002; Pinto & Trunzo, 2004; Watson & Mock, 2003) that suggests physical activity is influential for improved emotional well-being. This area of study is not as well developed as the area examining the relationship between physical activity and improvement in physical well-being. However, the evidence is growing that there are emotional benefits for cancer patients involved in low to moderate physical activity.

A main focus of cancer rehabilitation has been the effort to improve quality of life and there are currently many interventions available for social workers to assist cancer patients to cope with the emotional distress related to disease and treatment (Graydon, 1994). Many of the interventions are psychological in nature and include education, support and therapy groups. The goal of these interventions is to increase quality of life by decreasing distress and enhancing the coping strategies of cancer patients (Clark, et al., 2003). Interventions like the Cancer Wellfit Program examined in this study, suggest that this type of exercise program for people in treatment for cancer, may also be a successful alternative or adjunct treatment to improve the quality of their lives.

Difference in Improvement Between Physical and Emotional Well-being

In this study, there was no statistically significant difference between the improvement reported in physical well-being and the improvement reported in emotional well-being. However, while the differences are not statistically significant, the results

may be significant when examined through the lens of prescribing exercise as an adjunct therapy for cancer patients while in treatment.

Results of this study have noteworthy implications for health care professionals and for social workers treating patients with cancer. In addition to the traditional methods of emotional support currently utilized by social workers, physical activity should also be considered as an effective support intervention. The results of this study suggest that crucial indicators of quality of life, physical and emotional well-being, both significantly improved after participation in physical activity.

The complexity of how humans cope and manage to find hope makes it difficult to ascertain the specifics of the relationship between the perception of improved quality of life and physical activity. However, improving quality of life may be influenced by an increased sense of hopefulness, the perception of personally altering one's cancer, the self-directed treatment and care of one's body, and a change in the sense of isolation with the cancer (Davis, 2004). It is possible that variables such as the distraction, the potential social support, and the maintenance of social roles (father, mother, wife, etc.), independence in the physical activity, or by acting as a "time out" from appointments and medical treatments may be reflected in this improvement in quality of life. The results of this study support the literature that suggests that physical activity may improve quality of life in the spheres of both physical and emotional well-being. Courneya et al. (2000) found that an exercise program for people with cancer "builds confidence, develops new skills, incorporates social interaction, and takes place in an environment that engages body and spirit" (p. 54). For individuals able to participate, physical activity is an important complementary intervention for the experience of emotional distress. People

living with cancer may improve in physical and emotional quality of life by increased participation in low intensity physical activity.

Health care social workers have a unique position in their work with multidisciplinary teams in the treatment of cancer. They represent the consistent voice seeking to balance attention to the treatment of the both physical and emotional health of the individual with cancer. Exercise and forms of physical activity represent a method to address both of these domains influencing quality of life. Further research into the relationship between increased physical activity and improved emotional well-being represents a multi-disciplinary frontier in which social workers must be present. Social workers must offer leadership and assistance in the development and evaluation of programs that address quality of life issues through physical exercise.

Social workers should consider physical activity as an intervention because there are benefits from physical activity to cancer patients beyond the improvement in physical and emotional well-being. For instance, physical exercise is natural in that it does not require more medication. In addition, the intervention is safe, particularly when participants experience support from their physicians and when the physical activity goals are developed within the context of participants' physical ability. Not one of the 62 participants in the Wellfit exercise program experienced an injury due to participation in the exercise program. This low level of risk is supported by other studies (Courneya, 2003).

In addition, physical exercise places people living with cancer in a visible position in society. For example, while the Wellfit program was in process, participants with visible signs of their cancer or cancer treatment came to the health clubs. They

participated in exercise with no hair, surgery scars, or while sitting in a wheelchair. They were present and visible in the weight room, the pool, the shower room, and the aerobic health room. The inclusion of the ailing within our population fits well with social work values and ethics. Instead of populations perceived as different being "shunned" or invisible, exposure to our universal humanity helps break down stigmatization by society and reduces shame. Isolation by individuals living with disease frequently separates community from the reality lived by many societal members. Concrete images humanize the frequently terrifying concept of cancer for people who live in fear of their own diagnosis someday.

Influence of the Independent Variables on Improved Physical Well-Being

This study also sought to discover if the independent variables gender, age range, cancer type or type of cancer treatment influenced the improved physical well-being of participants. The first variable the study examined was gender. The results suggest that men and women did not significantly vary in their perception that physical well-being improved after their participation in Cancer Wellfit and the results do not indicate that one gender experienced a significant improvement in physical well-being more than the other gender.

This finding was unexpected because of societal norms for gender. The societal expectation is that men will perceive improvement in physical well-being significantly more than women if both genders participate in physical activity. This expectation is based on the antiquated stereotype for proper gender behavior that exists in the United States. Sports have been and still are considered a male domain (Koivula, 1999). The gender norm includes the assumption that women prefer therapeutic talk to physical

activity and engage in relationships to deal with stress. Studies (Tegerson & King, 2002) suggest that individuals participate in exercise for different reasons and that the reasons are related to gender. Tergerson and King (2002) found that women tend to exercise "to stay is shape", while men exercise "to become strong." The expectation was that men would more eagerly take part in a physical intervention based on their personal experience with physical activity as a way to strengthen the body and to deal with stress and report greater improvement in physical well-being than women. The findings of this study suggest that both men and women with cancer who were able to engage in physical activity experienced improvement in physical and emotional well-being during their cancer treatment. The study also suggests that when doctors, and trainers, and social workers encourage and support physical activity as a method to feel better physically, both women and men achieve benefits. The Cancer Wellfit program combined physical activity with confirming and empowering relationships between participants, trainers, and staff. The impact of these relationships results in trainers thinking about additional services for people other than athletes or people in relatively "good" health. In addition, individuals with disease experience the warmth, respect, and personal regard from trainers. This positive attention encourages participants in their exercise program.

Doctors and other health care providers should therefore include both genders when recommending low intensity physical activity during cancer course of treatment. Social workers know that empowerment is associated with expectations that one can achieve higher levels of self-efficacy. Empowerment is key to health promotion and disease prevention. In addition, there is considerable support for the idea that social support plays a major role in prevention and health promotion (Cowles, 2003). It is

understood that social support can come from a variety of sources, but the Wellfit exercise group offered social support and contributed to both men and women experiencing improvement in quality of life. Further study is necessary to understand the influential role of social support and the attention of the care providers in improved quality of life for people living with cancer.

Next, the study examined the influence of the variable of age range on the perception of improved physical well-being. The findings suggest that there was no relationship between subjects based on age range and improvement in physical wellbeing. No specific age range experienced a more significant statistical improvement in their physical well-being after participation in the Cancer Wellfit than any other age range.

It was expected that older participants would perceive less improvement in physical well-being than the younger participants. This expectation was based on age stereotypes that perceive younger participants as more physically fit upon beginning the program and more experienced with exercise as a health intervention than the older participants. However, the study suggests that despite age, when the beliefs and expectations are related to the capability of successfully executing necessary courses of action to satisfy the situational demand, people will participate willingly in an exercise program. Bandura (1986) emphasizes that self-efficacy can influence health-related behavior, including physical activity. Individuals with high self-efficacy expectations tend to approach more challenging tasks, put forth more effort, and persist longer in the face of barriers (Mculey, Katula, Mihalko, Blissmer, et al., 1999). Research suggests that
self-efficacy is a key predictor of whether older adults, as well as other age groups, will adopt and maintain physical activity (Netz & Raviv, 2004).

The results suggest that all adult cancer patients, regardless of age range, who were able to engage in physical activity experienced improvement in physical well-being during their cancer treatment. Disease may be a powerful equalizer in regard to age. While further research is necessary in this area of study, findings suggest that physical activity, tailored to the level of ability, supports successful participation in exercise programs and may influence perceived improvement in physical well-being. Doctors and other health care providers should include adults of all ages with cancer when recommending physical activity during the course of cancer treatment.

Next, the study examined the influence of the variable of cancer type. The results of this analysis suggested that the type of cancer diagnosis may mildly influence the perception of improved physical well-being for a person participating in an exercise program. Specifically, the results were based on the examination of the types of cancer examined in this study, breast colorectal, lung, brain, melanoma, testicular, lymphoma, leukemia, prostate, and the category "other". Due to insufficient data (only one participant with the specific cancer diagnosis) colorectal and melanoma were not included in the statistical analysis. The findings suggest that brain cancer patients were somewhat less likely to experience significant improvement in physical well-being than other cancers. In addition, subjects with a diagnosis of leukemia were somewhat more likely to experience improvement in physical well-being.

The results suggest that certain types of cancer influence the impact of physical activity as a successful intervention for improved physical well-being more than others.

Perhaps the more invasive cancers or the stage of a cancer interferes with significant quality of life issues and is a barrier to effective interaction with physical activity. For example, during the Wellfit program, a participant came to the health club who was diagnosed with brain cancer. During the course of the program, her health and strength and ultimately her prognosis worsened. The participant had a support person to assist with her wheelchair and she continued to participate in very low intensity physical activity. It seems unlikely that this individual would report an improvement in physical well-being at the end of the ten-week program.

On the other hand, at least 1 participant reported to a trainer that the Wellfit program had dramatically influenced his improved physical well-being and that "good reports" from the doctor were evidence of the physical improvement. In both examples, it seems likely that a powerful influence on the perception of physical well-being was the type of cancer, or perhaps the stage of the cancer, and not the Wellfit program alone.

The effect of a type of cancer diagnosis on the improvement in physical wellbeing needs to be studied based on subjects with a shared type of cancer diagnosis and current research supports this claim (Courneya, 2001). Doctors and health care providers may find cancer patients with certain types of cancer are less able to benefit from an exercise program during their cancer treatment, but perhaps there is still some advantage to participation. The findings call for increased research in the area of study pertaining to specific types of cancer, physical activity and quality of life.

Finally, this study examined the influence of the variable, type of cancer treatment, on the report of improved physical well-being. The findings suggest that based on type of cancer treatment, there was no statistically significant difference in improved

physical well-being between types of treatment. Subjects did not significantly vary in their report that physical well-being improved after their participation in Cancer Wellfit. This finding promotes the idea that despite type of cancer treatment, adult cancer patients who were able to engage in physical activity experienced improvement in physical wellbeing during their cancer treatment. Doctors and other health care providers should consider being inclusive of cancer patients receiving a variety of cancer treatments when recommending physical activity during the course of treatment. Further research is necessary in the study of the influence of type of cancer treatment, increased physical exercise and improved physical well-being.

Implications

Practice Implications

The results of improved emotional well-being after participation in physical activity has significant implications for social workers. The design of interventions for many social workers in primary health care settings are in direct service roles and are likely to include provision of counseling and linkage to community services (Cowles, 2003). Support groups are frequently viewed as an active way to engage patients to take an active role in their health care. Support groups for people sharing a common physical disease are not uncommon. This is a traditional intervention for social workers practicing in clinical oncology. However, the results of this study imply that a physical intervention, such as an exercise program, may offer patients an additional active role in their health care.

Cowles (2003) suggests that the mental, physical, and social health of an individual affect each other. For instance, depression may cause biochemical changes that impair the immune system and increase susceptibility to disease. Depression related to social isolation can contribute to the inability to concentrate and to increased injury or accident. On the other hand, disease can produce strong adverse emotional reactions due to actual or perceived threat to a normal social role. Because of the interaction of biopsychosocial spheres, high quality health care requires simultaneous examination and treatment of the whole person and this examination must include the physical symptoms, emotional states, social and physical environment conditions, cultural influences, and cognitive interpretations (Cowles, 2003). Social workers are trained in the examination and assessment of human behavior within a social environment. The implementation of holistic assessments is a critical role best done by professionals with this training. A biopsychosocial assessment potentially steers an accurate and healthful intervention plan.

The Wellfit program appears to be a productive method of treatment for the emotional side-effects due to cancer treatment, in part, because of the balance of attention to the psychological, the biological and the social needs of the patient. The programmatic blend of individually tailored and supervised exercise with the talking, listening, and group support, served to benefit the biopsychosocial needs of the participants.

An important element of group interventions is the influence of the care-givers or support persons. This phenomenon is called the "attention effect" and is frequently experienced by people experiencing dependency due to illness (Ross & Mirowski, 2002). Research suggests that social support consistent with what the individual needs has been empirically shown to buffer the stress impact of some diseases and life experiences

(Hoffman, 2000). Attention, as offered in traditional counseling groups or within exercise groups, may assist in the alleviation of cancer related stress. Exercise groups, like any kind of support groups, are conducted and supervised by various professionals and as one might expect, personalities and personal philosophies vary greatly. Although the influence of the trainer on the subjects was not examined in this study, it seems likely that the trainer, and other social support providers influenced the participants' perception of improved physical and emotional well-being. For instance, an empathic and attentive trainer could possibly create participant feelings of being cared for, supported, and encouraged, and thus feeling an overall improvement in their well-being.

The role of the supportive relationship between the professional trainer and other health care professionals and the cancer patient may influence the patient's perception of improved quality of life. Also, the addition of physical activity may complement traditional interventions and offers participants a sense of independence, self-efficacy, and mutual aid. The exercise groups offer participants with cancer concrete examples of others coping with cancer both physically and emotionally. While differences exist between individual coping styles based on the variable gender, age range, race and ethnicity, cancer diagnosis and type of cancer treatment, there may be commonalities in the human experience with disease that lends a sense of mutuality.

Finally, the results suggest a need for social workers to be active in the formation of interdisciplinary groups as an approach to cancer treatment. Multidisciplinary groups are a common way for social workers to practice, but interdisciplinary groups are unique. Cowles describes an interdisciplinary group as having four distinctive features. The features include (1) small group size, (2) the operation of small-group dynamics or

bonding, (3) shared decision-making, and (4) more frequent, regular, and direct face-toface communication. The rationale for interdisciplinary groups in the treatment of cancer is that multiple systems of knowledge and skill serve to maximize efficacy and effectiveness. The result is both a treatment that works well and costs less. Patients being treated for cancer will benefit from the increased partnership with experts from all spheres including the biological, the social, and the emotional.

This study suggests that creative and successful interventions created to improve patient quality of life are possible with teamwork. The national health care trend toward chronic disease case management, the need for greater coordination and cooperation across professional services and informal social supports is vital to know and understand because it is the future of health care. Social workers can offer a variety of skills in the leadership of interdisciplinary teams because social workers are trained to assess individuals using a biopsychosocial model. They are knowledgeable about social policy and programs, understand and practice evidence based theories and methods and are prepared to design and implement the evaluation and research process.

Policy Implications

Health care in the United States is in turmoil. It is the most expensive care in the world and the examination of current health care strategies is vital. Clearly, the U.S. health care system is at a crossroads (Cowles, 2003). While cost effectiveness of health care interventions is frequently recognized as a vital issue, the United States health system continues to prefer treatment instead of prevention (Dobelstein, 2003). Questions about delivery of services and alternative treatments drive national discussions about how effective treatment can be delivered in the least expensive manner possible. Exercise

programs for populations with chronic illness may be an effective and efficient alternative treatment.

The results of this study suggest that the role of exercise and increased physical activity in the treatment of the physical and emotional effects of cancer and cancer treatment may assist in improvement of, or perhaps prevention of the side-effects associated with cancer. This study took place in a community health center and was funded through a private grant. However, many hospitals and communities have access to community centers or health centers. Exercise as a prescribed intervention could be funded or covered by health insurance as an alternative to or as an in-home treatment. Low intensity physical activity is an intervention that can be practiced by patients in cancer treatment in home, church, school, or community center settings. As with other forms of group therapy, the cost for provision of services is lessened by the participation of multiple members.

Emerging trends in health care delivery shift care from the hospital in-patient setting to the community as the center of health care delivery, increase emphasis on the health care market and cost control, increase emphasis on the measurement of outcomes related to health care interventions and increased patient participation in health care decisions (Cowles, 2003). In addition, there is a trend toward gradually transforming once terminal health problems into more chronic long-term care issues. These trends, along with the growing expectation that families and individuals will have to do more of the care-giving of the sick, strengthen the need for innovative programs like cancer exercise groups. As experienced case-managers, social workers have an integral role to

play in both the development and maintenance of physical and emotionally supportive health care programs.

Health care policy and government funding for the inclusion of exercise as an influential tool in the treatment of physical and emotional side-effects of cancer, the diagnosis and treatment, gives patients and cancer treatment specialists an inexpensive and effective alternative. Physicians and human service workers, such as social workers and psychologists in conjunction with physical trainers, may prescribe physical activity as an opportunity for cancer patients to be physically and emotionally involved in their cancer treatment in a way not offered by such treatments as radiation and chemotherapies.

The National Association of Social Workers (NASW) NEWS has reported on a number of recent studies from the National Institutes of Health and National Academics with the common theme of "the need for emphasis, not just on medical interventions, but on the social, cultural, economic, family and community factors in prevention and treatment of health conditions" (O'Neill, 2001, p. 3). As a response to this need and because of the values and ethics of the social work profession, social workers ought to consider what is really needed for lasting change and improvement in our health care system. Cowles (2003) offers a number of goals for social workers which include, (1) the elevation of the health status of populations, (2) the reduction of social inequality, (3) increased funding and programs for health promotion and disease prevention, (4) improved quality and accessibility of publicly supported care services, (5) promotion in social work of more research of an experimental design nature to develop a solid body of effective social work interventions in health care, and (6) further development of a body

of knowledge about the social and environmental determinants of disease and about effective interventions to promote health and prevent disease at a population level.

The work ahead for social work is immense and must be multi-pronged. To engage in these tasks, graduate schools must offer health care education and the education must be extensive in terms of the number and range of classes. Classes in health care must be contemporary, relevant and reflect the reality of today's health care system. Population specific education targeting the disenfranchised and people living with chronic illness and stigma would infuse social workers with important knowledge for health care program assessment, development and evaluation. Social workers must prepare for the realities of the complex nature of health insurance and national health care policy. Social work graduate schools must create and maintain field education experiences for social work students in health care settings. The settings should include both ambulatory care settings and in-patient facilities. Most importantly, social workers must continue to learn how to perform evaluation and research on health care interventions. This dissertation is an example of how pre- and post-intervention testing adds to the body of practice knowledge.

Limitations of the Study

There are several limitations to this study that are essential to note. The limitations are clustered in terms of study design and confounding factors.

First, the credibility of an outcome study depends, in a great degree, on the sample size (Montcalm & Royse, 2002). The sample of participants in this study was 62 and this size sample increases the validity of the testing in comparison to other published studies where sample sizes were smaller (Courneya & Friedenreich, 1999). However, the

sample, when examined by a range of cancer types, excluded certain cancer types from meaningful representation because of small group size such as melanoma (N = 1) and offered other cancer types such as breast cancer (N= 24) larger representation.

An additional study design limitation was sampling error. First, the sample for this study was not random. The study relied on the participation of people often exhibiting significant side-effects from cancer and treatments. The first concern was the health needs of the subjects. Subjects frequently requested assignment to a specific exercise group because of a more convenient or reasonable start date. This allowance offered subjects an opportunity to schedule around tough medical therapies or extended visits to or from family and friends. It interfered with the original plan to assign participants to the next available group based on the date they signed up to participate in Wellfit. This adjustment may have altered results by surviving participants when they felt better, more rested, or were assured of social support of loved ones.

In addition, the sample was referred from physician offices in West Michigan. This fact limited the sample of cancer patients geographically, but perhaps also economically. The offices referring patients to the research study all practice from offices that accept minimally or do not accept Medicaid or other forms of public assistance and insurance as the primary method of payment. This means that patients being treated for cancer in neighborhood clinics or those unable to afford any cancer treatment are not included in the sample. The exclusion of clinics and other environments may have affected the economic, racial and ethnic composition of the sample.

The present study does not examine the variable of race and this exclusion calls for comment. The absence of racial diversity in the sample was a significant, although not

a totally unexpected, limitation. Of the 75 participants initially enrolled in the study, only two noted being of a race other than Caucasian. This variable, because of the lack of racial diversity among the subjects, was not selected for further study at this time. However, the fact representation from racial/ethnic minorities was so small is worth noting, and should be considered along with socioeconomic class in future studies.

Research suggests (Murthy, et al., 2004) that minorities are faced with barriers to clinical trials and other forms of health initiatives. First, minorities are subject to ongoing patterns of discrimination and this results in a distrust of the health care system. Second, given the history of unethical and exploitive clinical studies including minority members in the past, minorities are likely to have significant concerns about exploitation, dishonesty, and the motivation of the researchers. Third, minority patients may be offered access and information regarding clinical trials and health initiatives less often than Caucasians. In addition, socioeconomic factors may be a barrier to participation, perhaps lacking access to health care in general. Social and cultural barriers may play a role in enrollment in health studies. Language, culture, and customs may interfere with social comfort in health study participation (Murthy, et al., 2004).

Populations who are not represented in clinical trials, but are treated using the results of clinical trials are at risk of harm. "It has been promulgated that 'appropriate' representation of specific patient subpopulations is necessary to further understanding of race/ethnicity based differences in presentation, prognosis, and response to therapy" (Murthy, 2004, p. 2726). The lack of racial diversity in this study interferes with the applicability of the results to more than Caucasians.

Moreover, the dissertation studied the results of one treatment group. The findings regarding the physical intervention would be stronger if they were compared to a second non-intervention group. The exploration of a comparison between two groups would better identify the influence of the Cancer Wellfit program as a determinant in improvement of physical well-being. This, however raises a potential ethical dilemma in that one group would not receive an intervention that was hypothesized to be helpful in their treatment.

The short ten-week time period of the Cancer Wellfit program was also a limitation. Additional confounding factors in this study were related to the different types of cancer and types of cancer treatments the subjects were experiencing. Various cancers and their accompanying treatments influence the body in different ways. Perhaps, the more tenacious the cancer, the higher the cancer stage, and the more vigorous the cancer treatment, the more challenging it is for a cancer patient to experience an improvement in physical and emotional well-being. The variation in the severity of the cancer was not controlled for in this study.

Lastly, as with all intervention research, there are potential threats to internal validity. Because this was not a controlled laboratory study, there may have been other variables, in addition to exercise, that influenced the subject's perception of improved physical and emotional well-being. For example, the time and vigor of exercise of the subjects independent of the study was not controlled for in the statistical analysis. Differences in physical activity during the exercise program could have occurred due to individuals' experience using exercise as an intervention in their pre-cancer lives or due to natural individual variations of activity in daily living.

Recommendations

First, research into increasing the frequency of an exercise program being used as an intervention due to cancer diagnosis fits well with the call from the public for complementary and alternative interventions in addition to, or in place of, medical interventions. It is well established and highly researched that physical activity results in a wide range of health benefits (Oweis & Spinks, 2001).

Second, the cancer and exercise intervention research agenda fits well with the social push to control health care costs. An exercise program is a potentially low-cost intervention for both physical and emotional well-being. Social workers must continue to do research on the effect of low to moderate exercise on the physical and emotional well-being of people being treated for cancer.

Third, the study of exercise as an intervention would benefit by continued examination of this intervention in the treatment of other chronic illnesses. As citizens in the United States experience an increase in life expectancy, many live longer, and many live with and potentially die from a chronic illness. Exercise programs may be useful in influencing improvement of physical and emotional well-being for more of the many chronic illnesses.

In addition, it is unknown whether or not any differences in fitness outcomes would have been evident had the exercise treatment continued beyond the ten-week duration of this study. More studies are needed to evaluate the effectiveness of a similar exercise program over a longer period of time and with a larger population of cancer survivors. Finally, participants in exercise programs living with cancer may experience an increase in hope when they are supported in their efforts to survive their disease. Research into the relationship between empowerment and increased physical activity may suggest that this intervention offers a unique way for cancer patients to personally participate in their cancer treatment. Exercise may be a unique way for a person with cancer to be involved in their treatment in a way that is not possible with the more common interventions of chemotherapy, radiotherapy, and surgeries. Further research is necessary to examine the relationship between independent variables of gender, age range, types of cancer and cancer treatments and the experience of improved physical well-being and increased physical activity. Results may indicate that a safe, natural, and self-directed intervention to improve quality of life is within the grasp of the people living with cancer.

Conclusion

Physical and emotional symptoms of distress are present in cancer patients due to their diagnosis and treatment. This distress is present in the lives of thousands of people living in the United States. The symptoms of cancer and cancer treatment affect both the individual with the cancer as well as the family and community caring for and supporting them.

This study has presented and examined the results of an exercise program developed and administered to 62 people living with cancer. For most of the subjects, this study offered a unique way for them to practice self-efficacy through participation in their treatment and helped improve their perception of physical and emotional well-being.

Overall, the findings of this study support the claim made by previous researchers that the physical and emotional disruption of well-being injures quality of life. Improvement in quality of life for people living with cancer may be influenced by their participation in an exercise program. Furthermore, it suggests that cancer patients may perceive similar improvement in both physical and emotional well-being. The results suggest that both men and women, adults from all age ranges, with a variety of cancers, receiving a variety of cancer treatments, may all benefit similarly from increased physical activity and experience an improved quality of life. **APPENDICIES**

APPENDIX A

LANCE ARMSTRONG FOUNDATION GRANT

FOR IMMEDIATE RELEASE

Contacts: Bianca E. Rodriguez Director of Communications and Outreach Lance Armstrong Foundation (512) 236-8820 x103

LANCE ARMSTRONG FOUNDATION AWARDS COMMUNITY SERVICE GRANT TO MICHIGAN NON-PROFIT TO ENCOURAGE CANCER SURVIVORS TO GET FIT

AUSTIN, Texas – July 16, 2003 – The Lance Armstrong Foundation (LAF) recently selected the Cancer Center at Saint Mary's Mercy Medical Center in Grand Rapids, Mich., as a partner for its 2003 Community Program. A grant from the LAF will further St. Mary's work to help cancer survivors with, through, and beyond cancer by promoting health and fitness.

The grant from the LAF will enable the continuation and expansion of Cancer Wellfit, a free, 10 week program. The only structured exercise program of its kind in the community, Cancer Wellfit focuses on individualized progressive strength training and aerobic and flexibility exercises and promotes an environment of mutual support and encouragement among participants. The program offers 20 supervised exercise sessions for adult cancer patients and their primary supporters, who play an important role in encouraging and motivating their lived ones to engage in an exercise program.

"This project will provide a structured exercise program for those with cancer, and for a supporter they designate. Exercise has demonstrated value for many with cancer in terms of strength, stamina, and mood. We believe that by also providing exercise opportunities to key supporters, their quality of life will improve and they will be more effective supporters as they walk through the cancer experience with those they love," said Mark Eastburg, director of research and psycho-oncology.

As part of its 2003 Community Program, the LAF partnered with a variety of organizations that provide programs that are positively impacting the quality of life today for those living with, through, and beyond cancer. The LAF awarded more that \$605,000 in grants to 43 community non-profit organizations across the country, representing 22 states and Washington, D.C. The LAF seeks to fund innovative projects, such as these, that promote the optimal physical, psychological, and social recovery and care of cancer survivors and their loved ones. Through their unique work these organizations address the following survivorship issues: adolescent/young issues, physical activity and survivorship education.

About the Lance Armstrong Foundation

Founded in 1997 by cancer survivor and champion cyclist Lance Armstrong, the lance Armstrong Foundation exists to enhance the quality of life for those living with, through, and beyond cancer. The LAF seeks to promote the optimal physical, psychological and social recovery and care of cancer survivors and their loved ones. The LAF focuses its activities on survivor resources and support, community survivorship programs, national advocacy initiatives, and scientific and clinical research grants. For more information, call the LAF at 512-236-8820.

About the Cancer Center at Saint Mary's Mercy Medical Center

At The Cancer Center at Saint Mary's, it's our mission to provide state-of-the-art, effective, and personal care for cancer patients, their families, and their community. We work as a team of competent and compassionate practitioners committed to the treatment of cancer's effect on mind, body, and spirit. For more information call the Cancer Center at 616-752-5222.

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APPENDIX B

PATIENT INFORMATION AND CONSENT FORM

Patient Information and Consent Form

Title:	An Exercise Program for Cancer Patient and their Primary Supporters to Improve Quality of Life
Sponsor:	St. Mary's Mercy Medical Center Grand Rapids Clinical Oncology Program
Investigator:	Dr. T. Gribbin

This consent form may contain words that you do not understand. Please ask your doctor or the study staff to explain any words or information that you may not understand.

Background

You are being asked to take part in a research study. The purpose of this study is to examine the effect of exercise on the physical and emotional health of a person diagnosed with cancer and their support person.

Before you decide whether or not to take part in this study, we would like to explain several things to you. This form will:

- explain the purpose of this study
- explain how this study may help you
- tell you how this study will be done
- tell you about any risks that may be involved in taking part of this study
- tell you what will be expected of you during this study

Purpose of this Study

The purpose of this study is to improve the health and lives of the citizens of Michigan. We want to do this by improving the physical and emotional health of people who have been diagnosed with cancer and their support person.

We want to improve the physical and emotional health of people diagnosed with cancer and their support person by offering a 10-week exercise program. The physical problems cancer patients may experience include fatigue and nausea. The emotional problems cancer patients and their support persons may experience include depression and social isolation. These emotional and physical problems, when combined, may lead to a less enjoyable quality of life. We want to find a way to reduce these problems. There will be about 70 patients in the study.

Estimate of Time Involvement

You will be asked to answer questions in four short surveys before the exercise program and after the exercise program. The surveys will be lists of questions that have several answers for you to chose from. You will select the answer that seems right for you. There are no right or wrong answers to the questions. The answers to the questions will help us find out how people with cancer and their support person feel emotionally and physically before the exercise program and after the exercise program. You will also complete a brief physical assessment.

The exercise program will be designed and monitored by certified trainers at one of two health clubs in Grand Rapids, Michigan. The trainer will carefully work with you to develop an exercise plan that matchers your ability. You will be asked to participate in an exercise class 3 times a week.

The surveys will take about 30 minutes at the beginning and at the end of the study. The exercise will take at least 60 minutes once a week.

Your Rights

This consent form gives you information about this research study. You will be able to discuss the study with the study staff before you will be asked to sign the consent form. If you agree to do the study, then you will sign the consent form. You will receive a signed copy of the consent form to keep for your records. If you do not want to join the study, you do not sign the consent form.

You need to know that:

- Your taking part in this study is voluntary
- You may decide not to take part in this study. You may also decide that you no longer want to take part in this study after it has begun. You may stop the study at any time without losing the benefits of your medical care.
- If you do want to take part in this study, you may refuse to answer any questions you do not want to answer without penalty. You may also refuse to participate in any exercise or physical activity at any time without penalty.
- You will be told about any changes in the study. If changes occur, you may be asked to sign a new consent form.

Confidentiality

Your medical records and any records generated in this study will be confidential to the extent permitted by law. You will be identified by a code. Personal information about your records will not be released without your written permission and will be kept ina locked and secure environment. You will not be personally identified in any publication about this study.

Eligibility

You must meet certain standards to take part in this study. You must speak English or Spanish to participate and you must be able to consent to be in this study. Your physician must consent to your participation in this study. You will not be able to participate if you have any physical conditions that might put you at any risk.

Risks and Discomforts

We do not anticipate any more risks for you during this study thanyou would experiences if you were involved in any supervised exercise program. If you should experience pain, bleeding, nausea, shortness of breath, or persistent soreness, please report this to your physician or physical trainer.

Payment for Medical Care and Injury Related to This Study

Physical injury related to this study is not expected, but possible without any fault of you, the study staff, the clinic, hospital, or health club. If you are injured as a result of your participation in this research project, Saint Mary's Mercy Medical Center will provide emergency medical care if necessary. If the injury is not caused by the negligence of Saint Mary's Mercy Medical Center, you are personally responsible for the expense of this emergency care and any other medical expenses that happen as a result of this injury.

Legal Rights

The above section does not take away your right to seek legal assistance.

Benefits of This Study

We hope to gain facts about the effect of exercise on the physical and emotional quality of life for people who have cancer and their support person and by identifying these facts, improve their life.

Additional Information

You will be asked for your consent if you complete any of the surveys before or after the exercise program. You will also be asked for your consent to participate in the Wellfit exercise program. If you do not want to participate in the surveys or in the exercise program, then do not sign the consent form to complete a survey or to participate in the exercise program.

Your decision to take part in this research study is **completely voluntary**. There will not be any penalty or loss of benefits to you if you decide not to take part. In addition, **you**

may withdraw from the study at any time. If you decide to withdraw from the research study, there will be no penalty or loss of benefits to you.

Costs to You

There is no cost to you for this study.

Questions or Research Related Problems

For questions about research and your rights as a patient in this study, contact: Sister Myra Bergman at the IRB (Telephone – 616-752-6567).

Statement of Consent

I consent to take part in this research study. My taking part is completely voluntary. I may decide not to allow myself to take part or to withdraw myself form the study at any time without penalty or loss of benefits to which I am entitled. This study may be stopped without my consent by the doctor conducting the study, or by study staff.

I have opportunity to ask the study staff questions about this study and have received satisfactory answers to all my questions in a language I can understand. I will have the opportunity to have all my future questions answered in a satisfactory way in a language I can understand. I will be given a signed copy of the consent form. I understand the conditions and procedures and I know what the possible risks and benefits are from taking part in this research study. I do not give up my legal rights by signing this form. I give my voluntary informed consent to take part in this research study.

The Wellfit Exercise Program

My initial and signature below indicates release of St. Mary's Mercy Medical Center and any of their agents, directors, subsidiaries, officers, employees, or instructors from and all claims, costs, liabilities, expenses, judgments, including legal fees and court costs I may have against the same for injuries, of any nature whatsoever, sustained by me as a result of my participation in the Exercise and Wellness Program for cancer Patients in which I am enrolling.

I also acknowledge the following:

- 1. My physician will be consulted before my participation in this study. He/She will clear me for exercise medically, and his/her permission will be obtained to perform the routines I this study.
- 2. I agree to limit my participation to the level of activity that is tolerable to my physical condition and medical situation at that time.
- 3. I understand that I am waiving and releasing St. Mary's Mercy Medical Center and their agents, directors, subsidiaries, officers, employees, or instructors from any legal fees and court costs arising out of participation in this program. I further agree to indemnify and hold harmless from any and all claims the sponsoring facility.
- 4. This represents that I am participating in this program for the purpose of improving my overall health, and not with the intent to teach this program on my own or for a similar organization. I further represent that I am not presently employed or associated with another company or organization that conducts programs similar to this program. I understand that all materials and exercise routines are the exclusive property of Medical Health and Fitness, and I will not make use of the information and/or instructions except for personal use.
- 5. I understand that I would not be accepted on this study without the execution of this waiver and release.
- 6. I acknowledge that I have read and understand this waiver and release.

APPENDIX C

PHYSICAN RELEASE OF INFORMATION

Physician Release of Information

This information allows us to obtain permission from your physician to participate in the Cancer Wellfit Progam, and allows us to obtain information that will be used as part of the program evaluation (if you have agreed to participate in the study).

By my signature, I authorize the release and exchange of any medical or other information necessary for my treatment and/or involvement in the Exercise and Cancer Study implemented by St. Mary's Mercy Medical Cancer Center and East Hills/Michigan Athletic Clubs.

Patient's Name (type or print)	Patient's Signature			Date	
Your address:					
Home Phone	e Phone Work Phone				
Other medical conditions you have	(besides c	ancer):			
Your Age: Your Race/E	thnic back	ground:			
My Oncologist's name is:	<u></u>				
My Primary Care Physician's name	e is:				
Address:					
Phone Number:					
Supporter Name/Phone Number:					
Relationship to You (circle one):	Spouse	Child	Sibling	Friend	
Witness' Name (type or print)	Wit	ness' Sign	ature	Ι	Date

APPENDIX D

CANCER WELLFIT TRAINING AND EDUCATION SCHEDULE



WELLFIT TRAINING AND EDUCATION SCHEDULE

Week 1	(Day 1)	Meet in conference room Complete standardized testing Introduction of instructors, the program, and participants Tour of the facility (2 trainers and 1 director)
	(Day 2)	Testing – heart rate, blood pressure, height weight, waist and hip measurements, Harvard step test, and the prone hover (4 trainers and 2 directors) Meet with trainers for one-hour exercise session Handout on the benefits of cardiovascular exercise
Week 2	(Day 1)	Cardio setup/biomechanical assessment, group core (2 trainers and 1 director)
	(Day 2)	Cardio setup/biomechanical assessment and/or strength setup, group core (2 trainers and 1 director) Meet with trainer for one-hour exercise session Handout on benefits of strength training, info on increasing weight and repetitions
Week 3	(Day 1)	Strength set up group (to include leg press, chest press, & rowing)
	(Day 2)	Strength/group core (2 trainers and 1 director) Meet with trainer for one-hour exercise session Handout on the benefits of nutrition, info on importance of Nutrients
Week 4	(Day 1)	Strength/group core (2 trainers)
	(Day 2)	Nutrition (1 dietitian) Meet with trainer for one-hour exercise session Handout on the importance of core strength with examples for home
Week 5	(Day 1)	Strength/group core (2 trainers)
	(Day 2)	Strength/group core (2 trainers) Handout on stress reduction/relaxation techniques
Week 6	(Day 1)	Strength/group core (2 trainers)

	(Day 2)	Strength/group core (2 trainers) Handout on mind/body medicine and info on yoga/pilates
Week 7	(Day 1)	Strength/group core (2 trainers
	(Day 2)	Yoga/Pilates specialty class (1 GF instructor) Handout on home strengthening program
Week 8	(Day 1)	Strength/group core (2 trainers)
	(Day 2)	Strength/group core (2 trainers) Handout on home stretching program Meet with trainer for one-hour session
Week 9	(Day 1)	Strength/group core (2 trainers)
	(Day 2)	Strength/group core (2 trainers) Handout on putting it all together and journaling goals
Week 10	(Day 1)	Strength testing for leg press, chest press, rowing, & hover step test (2 trainers and 2 directors)
	(Day 2)	Assessment of heart rate, blood pressure, height, weight, hip measurements, and the Harvard step test Standardized testing (2 trainers and 2 directors)

APPENDIX E

MSU HUMAN SUBJECTS REVIEW APPROVAL

MICHIGAN STATE

UNIVERSITY

October 17, 2003

- TO: Rena HAROLD 232 Baker Hall
- RE: IRB# 03-817 CATEGORY: EXEMPT 1-4

APPROVAL DATE: October 16, 2003 EXPIRATION DATE:September 16, 2004

TITLE: AN EXERCISE PROGRAM FOR CANCER PATIENTS AND THEIR PRIMARY SUPPORTERS TO IMPROVE QUALITY OF LIFE

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project.

RENEWALS: UCRIHS approval is valid until the expiration date listed above. Projects continuing beyond this date must be renewed with the renewal form. A maximum of four such expedited renewals are possible. Investigators wishing to continue a project beyond that time need to submit a 5-year application for a complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please include a revision form with the renewal. To revise an approved protocol at any other time during the year, send your written request with an attached revision cover sheet to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at (517) 355-2180 or via email: UCRIHS@msu.edu. Please note that all UCRIHS forms are located on the web: http://www.humanresearch.msu.edu

Sincerely,

Pair B

Peter Vasilenko, Ph.D. UCRIHS Chair

APPENDIX F

CANCER WELLFIT PHYSICIAN NOTIFICATION

Wellfit Exercise Program for Cancer Patients Physician Notification for Participation

Dear Dr._____,

Your patient______, has asked to enroll in the Cancer Wellfit Exercise Program offered by the Cancer Center at St. Mary's in conjunction with East Hills/Michigan Athletic Clubs. Recent studies have shown that many people with cancer experience physical and emotional benefits from participating in a structured exercise program.

Cancer Wellfit is a recreational exercise program specifically designed for cancer patients. The program has been used successfully for several years with hundreds of cancer patients in Santa Barbara, California. It emphasizes strength, flexibility, and aerobic training, individually tailored to the patient's capacity.

Before proceeding, we wanted to make sure that there were no medical concerns that you would have regarding your patients' participation. We would appreciate your help by answering the following questions.

Cancer Diagnosi	8	Stage	
Current Treatme	ent		
Surgery	Radiation Therapy	Chemotherapy	Other
Goal of Cancer 7	[reatment		
Adjuvant	Curative	Palliative	
Do you have any	concerns regarding this p	atient's participation in (Cancer Wellfit?

Some patients enrolled in the program have agreed to participate in a study that will track their response to the program. Check here is you would like to be sent the results of the study when it is complete. _____ Yes, please send me a copy of the results

Physician Signature

Date

Please FAX or return this form to Rebecca Philbrook at The Cancer Center at St. Mary's, 616-752-5260

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