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Fatigue in Prostate Cancer: Examining Possible Incentives and Barriers to Exercise for Reducing Cancer-Related Fatigue in Prostate Cancer Patients Undergoing Radiation and/or Hormonal Therapy

BY

Megan Doyle

**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of
Manitoba in partial fulfillment of the requirement of the degree
Of
MASTER OF NURSING**

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ABSTRACT

Fatigue has been shown to be the most common side effect of cancer and is reported to decrease the quality of life for clients suffering from the disease and its treatment (Magnan & Mood, 2003; Stone, 2002; Woo, Dibble, Piper, Keating, & Weiss, 1998). There is an increasing body of literature available concerning possible interventions to combat cancer-related fatigue. Exercise has been proposed as one such intervention; however, the majority of the previous research on this question has been performed with breast cancer clients. In order to examine the possible benefits of exercise, a further exploration of issues surrounding adherence to exercise is required, for many groups of cancer patients.

One of the purposes of this exploratory study was to measure the fatigue level of prostate cancer patients who are undergoing radiation and/or hormonal therapy. Another purpose of the study was to explore in the same population the possible incentives and barriers to exercise to help reduce cancer-related fatigue. The relationship between the self-reported level of fatigue and probable adherence levels was examined. The theoretical framework used as the basis for the study was Albert Bandura's Social Cognitive Theory, specifically Self-Efficacy.

A convenience sample of 31 men participated in the study. Three instruments were used to elicit data from participants: a demographic form, the Revised Piper Fatigue Scale (RPFS, Piper et al., 1998), and the Incentives and Barriers to Exercise Scale (IBES, Leddy, 1997). As well, an interview consisting of nine open-ended questions was conducted with a selected number of participants.

Overall, the highest rated incentives to exercise were “expectation of benefit” (32.3%) and “responsibility” (32.3%). There were more incentives than barriers for the men, with the highest rated barriers to exercise being “inertia” (6.5%) and “hard” (9.7%). An overwhelming 51.6% of the men in this study reported fatigue, with the majority (71%) reporting mild to moderate levels. Finally, there was a high significant correlation ($r = -.481$, $df = 27$; $p = 0.01$; two tailed) between the RPFS and IBES. This finding signifies that high fatigue scores will correlate with low scores on the IBES (more barriers than incentives to exercise) and vice versa.

A greater understanding of the incentives and barriers to exercise for prostate cancer patients undergoing radiation and/or hormonal therapy was gained through this study. From this data, exercise interventions can be designed that will aid in attracting clients and increasing the rates of adherence over the long term. The most significant outcome of this study was a further understanding of the meaning of fatigue for this population, which will be useful in designing possible interventions. Recommendations for future research were also identified in this study and are discussed.

Chapter 1

Statement of the Problem

This chapter will provide an overview of the prevalence of prostate cancer, a background of the issues facing men at diagnosis, and treatment options. Also included in this discussion is the purpose of the study, the proposed research questions, and the conceptual definitions of variables and the significance of the study. This discussion will provide the basis for the subsequent chapters and final conclusions.

Background

Prostate cancer is a significant health concern for males ranging between the ages of 40 to 80 years (Canadian Cancer Society, 2005). Prostate cancer continues to be the most common cancer diagnosis for men in Canada today (Canadian Cancer Society, 2005). The primary means of detecting prostate cancer is a regular physical, including a digital rectal exam (DRE) and PSA (prostate specific antigen) checks. With an expansion of technology and accessibility of information, PSA screening is gaining in popularity. An increase in the frequency and number of screenings has raised the rates of prostate cancer that are being detected.

There will be an estimated 20,500 newly diagnosed males in 2005, which is an increase from 18, 800 in 2004 (Canadian Cancer Society, 2004). The increase in prevalence of screening remains a topic of debate. The number of clinically insignificant prostate cancers being detected is increasing (Carroll & Grossfeld, 2002), which can leave the patient with the stress of knowing he has prostate cancer, and can involve treatment-related side effects that can be far worse than the disease itself.

Upon diagnosis, many issues face the patients and their partners. The most difficult of these is which treatment modality is to be chosen. The patients have stated that the prognosis, stage of disease, treatment options, and side effects are the most important issues to be addressed in their care (Davison et al., 2002). Fortunately, the majority of cases that are detected are considered clinically insignificant (Carroll & Grossfeld, 2002). Individuals with clinically insignificant tumors are in generally good health due to the fact that the tumors are of low grade and size. Treatment of the prostate cancer in these cases can result in lower quality of life and no significant change in survival rates.

The PSA level, Gleason score, age of the client, co-morbidities, tumor volume, and histological grade of prostate cancer, all play a part in the determination of the most appropriate treatment option(s). Some of the factors that play a part for the patient in deciding on the type of treatment include “cure”, quality of life, and available support (Davison et al., 2002). The range of treatment modalities that exist for patients includes surgery (prostatectomy), radiation, chemotherapy, hormonal therapy, brachytherapy, cryoblation, watchful waiting, alternative therapies, or a combination of treatments (Carroll & Grossfeld, 2002). Each treatment option carries with it benefits, and many side effects that can severely decrease the functional ability of the patient (Carroll & Grossfeld, 2002; Fieler, 1997; Nail, 1997; Weber, Roberts, & MacDougall, 2000).

The combination of radiation and hormonal therapy is one possible treatment option for prostate cancer patients. As with every other treatment modality, the side effects include bowel and urinary difficulties ranging from incontinence, urgency, and frequency to hesitancy, nocturia, and pain; sexuality difficulties; emotional distress;

nutritional deficits; and fatigue (Carroll & Grossfeld, 2002; Nail, 1997). Many of these side effects can cause a significant amount of distress for the patient, changing not only his physical functioning, but his self-image as a man. The patient can go through various emotions, ranging from anger to complete acceptance of the change in lifestyle. Recovery from treatment-related side effects can be a long process, and patients tend to equate “health” with “being back to [his] old self” (Bulter, Downe-Womboldt, Marsh, Bell, & Jarvi, 2001; Phillips et al., 2000). Health care professionals play integral roles in determining appropriate interventions in assisting patients to accept and work within their limitations.

The majority of research to date concerning the side effects of treatment has focused on urinary and sexual issues. However, there are many other side effects that can significantly affect the quality of life of the patient suffering from prostate cancer. Fatigue can be one of the most distressing and long-term side effects of treatment for prostate cancer. There are a limited number of studies measuring fatigue in this population. Most of these studies are outdated, used small samples, and were conducted following the completion of treatment. Magnan and Mood (2003) conducted a study of 122 prostate cancer patients undergoing radiation to determine the effect of “...health state, hemoglobin, global symptom distress, mood disturbance, and treatment site on fatigue onset, duration, and distress...” (p. E33). On average, fatigue appeared in the second week of treatment and continued throughout radiation, into recovery. It was also determined that patients with high levels of distress ($r = 0.20$; $r = 0.11$) and mood disturbance ($r = 0.16$; $r = 0.12$) had more severe levels of fatigue over longer periods of time. These patients were not undergoing concurrent hormone therapy, but this study

does provide insight into the possible fatigue experienced during radiation. The most significant finding was the need for further research in this area.

One proposed intervention to cope with cancer-related fatigue is exercise. There have been various debates concerning the effectiveness of exercise over rest to decrease rates of cancer-related fatigue. The small amount of research that has been conducted addressing the benefit of rest has demonstrated that rest can further decrease the functional status of the client (Dimeo, Fetscher, Lange, Mertelsman, & Keul, 1997; Graydon, Bubela, Irvine, & Vincent, 1995). The effectiveness of exercise in combating cancer-related fatigue requires further exploration.

As with most client populations in oncology, prostate cancer patients are demanding a more active role in care and in the decision-making process of treatment. Davison et al. (2002) found that 92.5% of prostate cancer patients wanted to be an active partner or work in collaboration with health care professionals in making decisions regarding their care. As previously stated, prostate cancer patients want to be fully informed regarding their prognosis, treatment options, and side effects. This information is significant for patients to make an informed decision and cope with the possible outcomes. The majority of the "vital" information regarding side effects and possible interventions is presented at time of diagnosis (Carroll & Grossfeld, 2002). The time of diagnosis can be very overwhelming for the patient and the amount of information retained may be minimal. This information may or may not be reinforced post-treatment, leaving the patient and significant others with many unmet informational needs. Patients facing a diagnosis of cancer require support and guidance from health care professionals throughout the decision-making process. Education regarding possible treatment-related

side effects can be extremely important for the patient in choosing the most appropriate treatment modality.

Purpose of the Study

The purpose of this descriptive, exploratory study was to determine the possible incentives and barriers to exercise that exist for prostate cancer patients who are undergoing radiation and hormonal treatment. In addition, this study will explore further the experience of fatigue for this population in order to determine the appropriate interventions to combat this fatigue.

Research Questions

The following were the proposed research questions for this study:

1. What is the self-reported level of fatigue of prostate cancer patients undergoing radiation and/or hormonal therapy?
2. What are the incentives and barriers to participating in an exercise program to reduce levels of fatigue among this same population?
3. Is there a correlation between the level of self-reported fatigue and probable adherence level as measured by the Incentives and Barriers to Exercise Scale (IBES, Leddy, 1997)?
4. What is the meaning of fatigue to this population? What effects does fatigue have on these individuals?
5. What are the interventions that these men prefer in combating cancer-related fatigue?

Definitions of Variables

Fatigue

Conceptual definition: Cancer-related fatigue is a multi-dimensional concept which is based on the subjective experience of the individual client. It is a negative and distressing feeling that decreases the energy level and functioning of the client. This negative feeling has varying intensities and duration, depending on the individual client and circumstances.

Operational definition: The score on the Revised Piper Fatigue Scale (Piper et al., 1998).

Adherence

Conceptual definition: The maintenance of and continued participation in an event or activity.

Operational definition: The score on the Incentives and Barriers to Exercise Scale (IBES) (Leddy, 1997).

Significance of the Study

There is a small amount of evidence-based research available for health care professionals in aiding patients with prostate cancer suffering from cancer-related fatigue. Exercise is gaining increased attention as an effective intervention in reducing fatigue; however, it requires further empirical testing. Many patients continue to struggle with fatigue and with selecting potentially effective interventions for their fatigue. Further understanding of the incentives and barriers that exist for participation in exercise programs to reduce fatigue, in this group, is needed. From this data, interventions can be designed that will attract clients and increase the adherence over the long term, and most

importantly, reduce levels of fatigue. This information will be disseminated to other health care professionals through presentations and journal publications. This dissemination of knowledge will aid in achieving standards of care and ensuring evidence-based practice by providing further evidence with respect to coping with cancer-related fatigue.

Summary

This first chapter has provided an outline of the statement of the problem, background information and statistics on prostate cancer and the purpose and significance of the study. By providing conceptual and operational definitions for significant terms, and by posing the study's research questions, this forms the basis for the following chapters.

Chapter 2

Theoretical Framework

This chapter will explore the Theory of Self-Efficacy (Bandura, 1977; 1982; 1984; 1994), which was incorporated into the present study. To begin, a short overview of the Social Cognitive Theory will be provided, from which the concept of self-efficacy was created. A definition of self-efficacy will be provided and an overview of the following: sources, processes, efficacy and outcome expectations, and characteristics of self-efficacy. As well, a brief review of the type of self-efficacy in seniors will be presented.

Social Cognitive Theory

The Theory of Self-Efficacy is part of the, larger and more extensive, Social Cognitive Theory (SCT). The SCT stems from a previous theory, Social Learning Theory, in the discipline of psychology. Bandura (1977, p. 15) described the SCT as being a "...triadic, dynamic, and reciprocal..." relationship between the environment, and the individual's behavior and personal attributes. Each component varies in the type and level of influence exerted on the individual's behavior. The level of effect each component contributes depends on the context of the environment, the individual, and the situation at hand (Bandura, 1977). SCT stresses that behavior is also largely dependent on the individual's cognitive processes. Many factors, both internal and external, influence an individual's behavior.

The Social Cognitive Theory, thus the Theory of Self-Efficacy, encompasses many of the possible factors that influence an individual's behavior. This was one of the main reasons for selecting the Theory of Self-Efficacy for the present study. The variety

of influences reflects the possible incentives and barriers to exercise identified in the IBES. One of the purposes of the study was to identify these incentives and barriers in order to obtain further understanding of possible interventions to combat cancer-related fatigue. Finally, the Theory of Self-Efficacy has been identified as requiring further exploration in relation to adherence to exercise for cancer patients. This study attempted to gather evidence for the applicability of the Theory of Self-Efficacy in the adherence domain.

Definition of Self-Efficacy

“Self-efficacy is concerned with judgments about how well one can organize and execute courses of action required to deal with prospective situations containing many ambiguous, unpredictable, and often stressful elements” (Bandura, 1982, p.23). Self-efficacy involves an individual’s beliefs in his or her abilities to perform certain actions or participate in events. These beliefs influence how individuals “...feel [s], think [s], motivate [s] themselves and behave [s]” (Bandura, 1994, p. 71). Various factors play a role in an individual’s level of self-efficacy. These factors can vary in the degree of influence on the level of self-efficacy, being either positive or negative in affect.

Sources of Self-Efficacy

The sources of self-efficacy are the following: performance accomplishments, vicarious experience, verbal persuasion, and physiological information (Bandura, 1977; 1982, Appendix A). Performance accomplishments are considered the best source of self-efficacy, as they reflect on past behaviors/experiences, both positive and negative, that the individual has performed. The phrase “we learn from our mistakes” can be used to describe a performance accomplishment; however, it also involves learning from our

successes. The learning may not result from the successful or unsuccessful completion of the action, but from how the individual perceives he or she has performed (Bandura, 1982). Bandura (1977; 1982) explained that individuals will have higher levels of self-efficacy with successful events and lower levels with failed events. It is important for the individual to have self-efficacy based on his or her own personal performance before relying on other sources to increase his or her level of self-efficacy.

Vicarious experience involves observing others perform actions, also known as modeling; unfortunately, modeling is considered to have the lowest effect on self-efficacy (Bandura, 1977; 1982). The key to increasing an individual's level of self-efficacy through vicarious experience is that the model observed be similar to the observer. This provides the individual with the belief that he or she can achieve the same results due to the similarities. Again, these results can be either positive or negative in nature, signifying that if the model fails, the level of self-efficacy of the observer is lowered. The model does have the opportunity to demonstrate to the observer different coping mechanisms to handle the negative circumstances, which can inspire the individual to try the action/event again (Bandura, 1982). The observer may differ from the model. If the differences are positive in nature, they can motivate the individual observer to modify his or her behavior.

Verbal persuasion can occur through instruction, information sessions and packages, or advice (Bandura, 1977; 1982). The objective is to verbally demonstrate and convince the individual that the action can be performed successfully. The encouragement from others is assumed to increase the individual's level of confidence in his or her capabilities, decreasing the level of doubt. Verbal persuasion requires

reinforcement from the other sources of self-efficacy in order to be an effective motivator for the individual (Bandura, 1994).

The last potential source of self-efficacy is physiological information. This involves the capacity of the physical and emotional body to perform actions, as well as the individual's perception of the possibility of performance (Bandura, 1977; 1982). With this source of self-efficacy, the individual is responding to the body's physical state, which can be severely affected by disease and treatment. Depression, fatigue, nausea, and diarrhea can all have an effect on the way an individual feels about himself or herself and views the surrounding environment (Bandura, 1994). The mood of an individual can have a significant influence on the level of self-efficacy. When an individual is in a depressed state, the level of self-efficacy may be very low. Individuals may view this depression or negative mood as a weakness in capabilities and can become debilitated (Bandura, 1994). On the other hand, when an individual has a positive outlook and mood, the level of self-efficacy may be high. The individual, even in the face of disease, learns to work with his or her modified capacities.

An individual has to process information from all sources and determine the most appropriate actions/behaviors based on this information. An individual can learn from successes and failures; "...overcoming obstacles..." (Bandura, 1994, p. 72) is just as significant as having no obstacles to overcome. The sources of self-efficacy can provide the needed encouragement and motivation for the individual to change his or her behavior and/or actions. These same sources can also create certain circumstances in which the individual will experience success (Bandura, 1994). Overall, the most

important contributor to the level of self-efficacy is the individual's perception of their capabilities.

Processes of Self-Efficacy

The sources of self-efficacy have various effects on four types of processes within the individual: cognitive, motivational, affective, and selection. Self-efficacy influences how an individual thinks, feels, makes decisions, behaves, and evaluates situations. Cognitive processes signify the ways in which the individual processes and implements information obtained through the environment (Bandura, 1994). Bandura believed that individuals with a high level of self-efficacy are goal-directed in their thought processes and subsequent actions. As well, these individuals can maintain these set goals throughout periods of stress and achieve success (Bandura, 1994).

Motivation involves the confidence that the individual has, and others have, in his or her capacities. In turn this belief "pushes" or "drives" the individual to perform certain actions, and provides an incentive for behavior (Bandura, 1994). Motivational processes are often affected by an individual's cognitive processes. An individual's level of motivation is not only influenced by how he or she perceives his or her capabilities, but also by what goals are set and by anticipated outcomes (Bandura, 1994). The individual's motivation contributes to the amount of energy he or she expends in chosen actions, the level of determination he or she exhibits, and his or her capacity to overcome failures (Bandura, 1994).

Affective processes involve an individual's belief in his or her capacity, regarding his or her emotional well-being and coping skills (Bandura, 1994). In complicated, and most times, stressful situations, an individual's coping capacity and level of self-efficacy

are important in order to deal with the issues. Higher levels of self-efficacy are associated with enhanced coping skills and confidence in one's ability to control negative thoughts (Bandura, 1994). Lower levels of self-efficacy are associated with anxiety and feelings of helplessness, hopelessness and depression (Bandura, 1994). In turn, affective processes affect the physical well-being of the individual. When individuals with low levels of self-efficacy encounter stressful events, health and well-being can be severely affected (Bandura, 1994). Successful use of coping skills in response to stressful events can increase the level of self-efficacy, thus improving health status. Occurrences similar to this can strengthen an individual both psychologically and physically, impacting both current and future well-being.

The final category, selection processes, involves how the individual constructs and controls his or her surrounding environment (Bandura, 1994). An individual can exert a certain amount of control over the environment, with his or her level of self-efficacy playing a significant role. For example, if an individual has a high level of self-efficacy, he or she may gravitate towards goal-directed individuals and demanding tasks. On the other hand, individuals with low levels of self-efficacy will avoid stressful situations or challenges that he or she feels that they cannot handle (Bandura, 1994).

Bandura attempted to define the holistic nature of a human being by examining each process. An individual's level of self-efficacy can have many effects in each process. The continuous appraisals of behavior and perception of self-efficacy conducted by the individual that can enhance his or her performance skills, can in turn influence each process.

Efficacy and Outcome Expectations

As discussed previously, motivation is an aspect of self-efficacy that involves the expectations of an individual. Two major components of self-efficacy are efficacy expectations and outcome expectations. Bandura (1982) explained that an individual must have mastery expectations (efficacy expectations), as well as outcome expectations, in order to perform actions and revise behavior. Efficacy expectations involve an individual's confidence in his or her ability to perform actions, and are affected by the environment, motivation, social reactions, and cognitive appraisals (Bandura, 1982). Outcome expectations involve the results of actions/behaviors, which may be positive or negative and can take many forms; that is, physical, emotional, or informative (Bandura, 1982). Bandura (1982) also explained that outcome expectations are directly affected by efficacy expectations and have more of an influence on the subsequent behavior than results.

Characteristics of Self-Efficacy

The level of self-efficacy varies for each individual, as do the associated characteristics. High levels of self-efficacy are associated with the following characteristics: high desires for challenges, heightened level of interest in activities, high levels of commitment and persistence, goal-setting behaviors, increase in coping skills in the face of difficult situations, lower levels of stress and depression, and increased levels of confidence (Bandura, 1994). Bandura (1994) explained that individuals will select actions that result in success and that he or she feels they have the capacity to complete based on their own level of self-efficacy. Individuals who have high self-efficacy have increased confidence in his or her capacities and are more highly motivated. These

individuals will also be encouraged to pursue activities and set appropriate goals, the results of which they envision as positive. They also have high levels of analytical thinking (Bandura, 1982). The emotional outcomes for individuals with high levels of self-efficacy are that they experience lower levels of stress, anxiety, and depression, and have better coping strategies (Bandura, 1982; 1994).

Lower levels of self-efficacy are associated with the following: avoidance of stressful and challenging tasks, low confidence levels, low aspirations, greater likelihood of quitting tasks, negative attitude, higher levels of stress and depression, and increased susceptibility to further failure following negative events (Bandura, 1994). Thus, self-efficacy clearly affects the person and his or her behavior and environment. All of these consequences vary in degree.

Self-Efficacy in Seniors

Individuals can vary in their levels of self-efficacy throughout life. In the present study, the majority of participants were seniors, ranging in age from 55 to 75 years. Elderly participants have very unique characteristics which can influence their level of self-efficacy. Over the lifespan, seniors experience many changes, specifically, declines in physical functioning. Almost all seniors go through retirement and the accompanying changes, along with possible relocation to a long-term care facility and loss of friends and/or spouse. Bandura (1994) believed that seniors go through many appraisals and reappraisals of their functional capacity and capabilities. The decrease in physical functioning, and the accompanying appraisals, can lower the level of self-efficacy of the individual (Bandura, 1994). Socio-economic status, educational level, social support network, and level of health are all factors that can influence the level of self-efficacy a

senior achieves. These factors can assist the senior through stressful situations and prevent possible social isolation and depression (Bandura, 1994).

Summary

This chapter has provided an overview of the Theory of Self-Efficacy, which is a component of the larger Social Cognitive Theory. Throughout this chapter the definition, the sources, the processes, the efficacy and outcome expectations, and the characteristics of self-efficacy have been examined. Finally, the self-efficacy held by seniors was briefly reviewed because of the fact that the present study's population was elderly men.

Chapter 3

Literature Review

This chapter will provide the rationale for conducting the present study. The major concepts of the present study are reviewed. The first review will focus on the concept of fatigue and will include definitions, etiology, signs and symptoms, assessment, measurement tools, and interventions to combat fatigue. A review of the literature pertaining to fatigue in cancer, particularly prostate cancer will be examined. In a subsequent section will be a review of the literature examining the efficiency of using exercises to combat cancer-related fatigue. In conclusion, the concept of adherence to exercise with cancer populations will be reviewed from the literature.

Fatigue

Illness-related fatigue is a multi-dimensional concept that has a wide variety of definitions depending on the disease site and patient population. A conceptual definition of fatigue, specifically cancer-related, is difficult to identify. Cancer-related fatigue has many objective and subjective components (Ream & Richardson, 1996). Various textbook definitions exist for cancer-related fatigue, ranging from physical, psychological, and patho-physiological descriptions. Nursing researchers tend to describe fatigue holistically, by looking at the entire individual and the effects that fatigue has on each part of life (Piper, 1986; Ream & Richardson, 1996). The majority of literature on cancer-related fatigue stresses that to understand fatigue, health care professionals must appreciate the patient's perspective: "fatigue is whatever the person says it is, and exists whenever she or he says it exists" (Glaus, 1993, p. 306). The subjective aspect of fatigue makes defining it difficult.

Many studies have used a variety of terms to define fatigue, such as: “energy deficit”, “response to stress”, “weakness”, “tiredness”, “malaise”, “distressing symptom”, “lethargy”, “boredom”, and “lack of energy” (Akechi, Kugaya, Okamura, Yamawki, & Uchitomi, 1998; Holley & Borger, 2001; Irvine, Vincent, Graydon, Bubela, & Thompson, 1994; Jacobs & Piper, 1996; Krishnasamy, 2000; Schwartz, 1998; Winningham, et al., 1994). Many of these concepts are confused with fatigue but are very distinct entities in and of themselves and can be considered causes or even be a consequence of fatigue (Winningham et al., 1994). The difficulty exists in differentiating fatigue from some of these concepts to be able to design an effective treatment strategy, or, more importantly, to validate a patient’s experiences of fatigue.

Etiology of Cancer-Related Fatigue

In reviewing the literature, it becomes apparent that the underlying cause(s) of cancer-related fatigue has been explored in various studies but continues to be obscure. Many possible theories exist concerning the cause(s) of cancer-related fatigue. Piper, Lindsey, and Dodd (1987) developed the Piper Integrated Fatigue Model, which describes possible cause(s) of fatigue, ranging from individual characteristics (for example, age, health status, education) to disease and treatment consequences, environmental characteristics, and social factors. Another theory, The Psychobiological Entropy Model (Winningham, 1996) explains fatigue as the result of the disease process, treatment regime, pre-existing conditions/co-morbidities, and environmental factors. In the theories of causation, many possible explanations were postulated for fatigue, such as disease process, central nervous system involvement, anemia, pain, electrolyte imbalance, and cachexia.

Fatigue resulting from the disease process can cause alterations in the physical, psychological, pathological, spiritual, social, and cognitive dimensions of an individual (Piper, Lindsey, & Dodd, 1987; Richardson, 1995). Many effects occur in bodily processes, producing, for example, changes in the central nervous and gastrointestinal systems (McDaniel & Rhodes, 2000; Nail, 1997). Changes in the GI system, such as nausea and vomiting, can have a significant impact on the amount of rest an individual receives and may thus result in fatigue.

The effects of differing treatment regimes on the patient, such as chemotherapy, radiation, surgery, hormonal therapy, or a multi-modal approach, can vary in intensity and degree depending on the stage of the disease and the type of treatment. These side-effects of treatment can also increase the effects of the disease process (McDaniel & Rhodes, 2000; Morrow, Andrews, Hickok, Roscoe, & Matteson, 2002; Piper, Lindsey, & Dodd, 1987). Chemotherapy, radiation, and hormonal regimes result in fatigue by producing anemia, accumulation of medication and/or cell lyses products, an increase in the body's energy needs, psychological distress, and alterations in sleep patterns (Jacobs & Piper, 1996; McDaniel & Rhodes, 2000; Nail, 1997). Presumed causes of fatigue resulting from surgery include tissue injury, altered organ function, decreased nutritional status, infection, impaired mobility, and residual effects of analgesics and/or anesthesia (McDaniel & Rhodes, 2000; Nail, 1997).

An assumed primary cause of fatigue is the disease process of anemia that causes hemoglobin levels to fall. Hemoglobin is the red blood cell transporter of iron that supplies the body with oxygen for life and activities (Webster's, 1995). Lower levels of hemoglobin and, in turn, lower levels of oxygen supplying the body's tissues and any

activity or demand put on the body may result in fatigue (Aistars, 1997; Brown, 2002; Littlewood & Mandelli, 2002; Ludwig & Fritz, 2002; Nail, 1997; Winningham et al., 1994). Anemia is consistently associated with nutritional deficiencies, hemorrhage, hemolysis, hemodilution, infection, and paraneoplastic syndromes (McDaniels & Rhodes, 2000), all of which can result in fatigue.

The process of physical exertion depends on both the central and peripheral nervous systems, and in turn depends on the amount of oxygen available to the body's tissues (Gibson & Edwards, 1986; Potempa, Lopez, Reid, & Lawson, 1986). Fatigue is an indirect result of the interruption of the delivery of oxygen to the body and tissues and injury to nerves and fibers. As well, the long-lasting effect of the accumulation of certain medications in the central nervous system can exert a depressing effect on the body's activity (National Cancer Institute, 2003).

Fatigue can be the result of electrolyte imbalances caused by the disease process or the treatment regime (Jacobs & Piper, 1996). For example, following exertion the body has an overabundance of lactic acid. This can result in lower levels of energy being made available to the body's muscles (Jacobs & Piper, 1996). Glycogen and hydrogen ions are other metabolites that can accumulate after exertion which can affect neurotransmission to the muscles (Jacobs & Piper, 1996).

Another proposed cause of fatigue is cachexia. Cachexia, muscle wasting, is an imbalance in an individual's energy level which occurs when the amount of energy that enters the body is insufficient to meet the requirements for any type and/or amount of physical exertion (Baracos, 2001; Portenoy & Itri, 1999). Tumor growth, fever, surgery,

and/or infection can cause excessive muscle wasting, resulting in loss of strength and feelings of fatigue (Baracos, 2001).

Pain can be either a cause or as a result of fatigue. Pain can significantly reduce the individual's level and amount of performance, in turn increasing the feelings of fatigue (McDaniels & Rhodes, 2000). Increased feelings of anxiety and uncertainty are associated with the sensation of pain, increasing the psychological stress of the individual and the level of fatigue (McDaniels & Rhodes, 2000).

Finally, various psychological aspects of cancer and cancer treatment can have direct and in-direct effects on the level of fatigue. Aistars (1987) addressed the negative effect that prolonged stress in a patient's life has on the level of fatigue. A high level of stress is associated with higher levels of fatigue. Further research in this area has explored the presence and level of fatigue in the social context of coping abilities, presence of depression, available resources, and anxiety. The patient is depicted as the expert in acknowledging the existence of fatigue, basing this acknowledgement on both psychological and presenting physical symptoms. However, many patients have a difficult time differentiating among fatigue and other symptoms, such as nausea, tiredness, malaise, depression, and/or anxiety.

Signs and Symptoms

Fatigue is a multidimensional condition that affects the physical, psychological, pathological, spiritual, social, and cognitive dimensions of an individual's functioning (Azechi et al., 1998). Fatigue has a negative overall effect on quality of life, with a wide variety of presenting symptoms unique to each patient (Lovely, Miaskowski, & Dodd, 1999). To provide a list of specific signs and symptoms of fatigue is impossible, due to

the subjective nature of the problem, but individuals suffering from fatigue may exhibit the following: muscle weakness, limb heaviness, decreased energy, tiredness, pain/aches in muscles, shallow respirations, dyspnea, body may be slumped, constant need for sleep, dull or flat voice, tired or painful eye movements, weight loss, constant yawning, difficulty concentrating, decreased smiling, and relaxed musculature (McDaniels & Rhodes, 2000, Portenoy & Itri, 1999; Winningham et al., 1994). An individual may have no motivation to complete daily activities or to participate in hobbies that may previously have been an interest (McDaniels & Rhodes, 2000). As previously stated, many of the symptoms of fatigue are seen in other medical conditions, such as depression.

There are a variety of symptoms that may be causes of fatigue, which can have a negative impact on the quality of life of the patient suffering from cancer and on his or her ability to perform self-care activities (Schwartz, 1998). Such symptoms include: nausea, vomiting, anorexia, pain, constipation, dyspnea, diarrhea, chills, perspiration, weakness, immobilization, thirst, hunger, itching, disorientation, pressure sores and insomnia. Fatigue also consists of a cluster of symptoms that may or may not be easily detected and measured. All of these possible presenting symptoms may vary in intensity in each patient.

Recently, increasing attention has been given to the effect that fatigue has on the cognitive capabilities of an individual. Fatigue has been associated with cognitive dysfunction, decreased attentional capacity, impaired short- and long-term memory, altered ability to concentrate, and decreased perception (Valentine & Meyers, 2001). Overall, the availability of research concerning the distressing effects of fatigue on the cognitive capabilities of patients with cancer is limited.

Assessment

“Fatigue is a subjective, unpleasant symptom which incorporates total body feelings ranging from tiredness to exhaustion, and creating an unrelenting overall condition that interferes with an individual’s ability to function to their normal capacity” (Ream & Richardson, 1996, p. 527). This definition attempts to capture the true nature of fatigue, involving both subjective and objective components. The assessment of fatigue in patients suffering from cancer must incorporate both components in order to provide a balance of data and allow for the design of appropriate care plans (Winningham, 1996, Winningham et al., 1994). Patients suffering from cancer-related fatigue described it as being extremely different from the “normal healthy” fatigue (Magnusson, Moller, Ekman, & Wallgren, 1999).

Certain objective measures can be used to assess patients with cancer-related fatigue. Correctly identifying the signs of cancer-related fatigue is important and the nurse should differentiate between signs of acute and chronic fatigue. Acute fatigue is short-term and can be relieved by rest, whereas chronic fatigue is long-term and is usually not relieved by rest (Winningham, 1996). Cancer-related fatigue can exist along the acute and chronic continuum.

In reviewing the literature, certain assessment data should be collected in order to obtain an understanding of the intensity and impact of cancer-related fatigue for individual patients. The overall goal of the assessment is to identify the strengths and limitations of the patient, in order to develop a care plan to enhance his or her quality of life. A thorough physical exam and patient history should be performed initially to provide baseline data, including pattern and characteristics of fatigue (signs and

symptoms, pattern, duration, onset, level, and degree); previous and present activity level; hemoglobin and hematocrit values; sleep patterns; self-care abilities; psychological issues; cognitive impairments; nutritional status; and social environment, resources and interactions (McDaniel & Rhodes, 2000; Nail, 1997; Wells & Fedric, 2001). Diagnosis and treatment regimes, pre-existing co-morbidities, aggravating/alleviating factors of fatigue, and the meaning and significance of fatigue to the patient should also be recorded (Portenoy & Itri, 1999).

For the most part, health care professionals in busy out-patient settings have short periods of time with cancer patients. These settings are not conducive to conducting a proper assessment of fatigue. This assessment requires multiple assessments over time to gain an in-depth picture of the patterns of fatigue, the effects on quality of life, and any changes in the level of fatigue. However, health care professionals in the out-patient setting might employ the three-question assessment tool developed by Piper et al. (1998) which can easily assess a patient's fatigue, in a short period of time. The health care professional by identifying the existence of fatigue, can provide a significant amount of support and recognition that can help to alleviate fears and stressors for the patient (Nail, 1997). In summary, while the assessment of fatigue should be multi-dimensional and involve the input of the health care professional, the assessment should focus on the self-report of the patient (Jacobs & Piper, 1996; Richardson, 1998; Winningham, 1996).

Measurement Tools

Certain criteria should be taken into consideration when health care professionals are determining the appropriate measurement tool for the population of interest. First, the purpose of performing the measurement of fatigue must be clarified. For example, it

might be for research, clinical practice, or patient interest (McDaniel & Rhodes, 2000). Secondly, health care professionals must also identify the population with which the tool will be used, taking into consideration the unique needs of the population of interest, the developmental stage of those within the population, and the possible care plans. Thirdly, the reliability and validity of the assessment tool should be considered in the decision-making process (Stone, 2002). This final point is significant as health care professionals must be sure that the tool implemented will elicit the data that is to be measured.

Although fatigue can be both objective and subjective in nature, the primary tools used in assessing fatigue are based on patients' self-reports (Richardson, 1998). Some limitations of using self-reports are that comparisons to other populations and patients are restricted and the research findings are not necessarily generalizable beyond the individual patient, depending on the size of the sample examined (Polit & Hungler, 1999). One of the strengths of employing self-reports is that they are less of a burden for the patient to complete (McDaniels & Rhodes, 2000; Polit & Hungler, 1999).

Many researchers recommend implementing multi-dimensional measurement tools in order to capture a holistic picture of both the subjective and objective causes and consequences of fatigue (McDaniels & Rhodes, 2000; Piper et al., 1998). The tools that are chosen to measure fatigue have to be thoroughly tested with many populations, in order to assure reliability and validity. The measurement tools, such as the Revised Piper Fatigue, that measure multiple aspects of fatigue usually consist of sub-sections. The reliability and validity of these instruments should be consistently established, so that each sub-section that elicits data on the separate components of fatigue can be used alone in measurement (Jacobs & Piper, 1996; McDaniel & Rhodes, 2000). However, multiple

tools may not be the most realistic to use in a clinical setting, due to space and time constraints.

Many tools are available to measure cancer-related fatigue and its underlying dimensions of pattern, duration, intensity, impact, and onset. These include: the Functional Assessment of Cancer-Therapy Fatigue (Yellen, Cella, Webster, Blendowki, & Kaplan, 1997), the Piper Fatigue Self-Report Scale (Piper et al., 1989), the Revised Piper Fatigue Self-Report Scale (Piper et al., 1998), the Schwartz Cancer Fatigue Scale (Schwartz, 1998), the Revised Schwartz Fatigue Scale (Schwartz & Meek, 1999), the Cancer Fatigue Scale (Okuyama et al., 2000), and the Cancer-Related Fatigue Distress Scale (Holley, 2000). A number of tools exist to measure fatigue in general, including: the Rhoten Fatigue Scale (Rhoten, 1982), the Multidimensional Fatigue Inventory (Smets, Garssen, Bonke, & De Haes, 1995), the Fatigue Symptom Inventory (Hann et al., 1998), the Brief Fatigue Inventory (Mendoza et al., 1999), and the Linear Analogue Fatigue Scale (Glaus, 1993). The Profile of Mood States (McNair, Lorr, & Droppleman, 1992) is also a tool which provides measurements of data on fatigue.

Although many of these instruments are quantitative, a few qualitative measures do exist. The majority of these instruments are multi-dimensional, measuring a variety of characteristics, and patterns of fatigue. Certain tools contain only a single measurement of fatigue that does not provide an in-depth assessment of the patient. An appropriate instrument to properly measure fatigue has to be reliable and valid, and must not be cumbersome or overburdening to the fatigued patient (Winningham, 1996). Many of the identified instruments are time-consuming, requiring a great deal of concentration, and

they do not address all aspects of fatigue nor allow for the qualitative nature of fatigue to be explored, and/or not practical for the clinical arena (Wu & McSweeney, 2001).

Interventions

The treatment of fatigue requires the collaboration of health care professionals to provide the appropriate input and to design a holistic care plan for the patient. The most appropriate plan of care for the patient with cancer-related fatigue should incorporate the multi-dimensional nature of the symptoms. A baseline assessment should include the patient's perception of fatigue, self-care abilities, and desired goals (McDaniels & Rhodes, 2000).

Some literature recommends beginning with the symptoms of fatigue that present obvious solutions, more specifically, eliminating unnecessary and sedating drugs, treating psychological disorders, and consulting a dietician to ameliorate dietary choices (Portenoy & Itri, 1999; Stone, 2002). Following this, the various treatment options should be explored with the patient. The following treatment modalities have been addressed with varying results: pharmacological methods, exercise, education, sleep and rest, energy conservation activities, psychological treatment, attention-restoring and cognitive activities, and nutritional counseling (McDaniel & Rhodes, 2000; Nail, 2002; National Comprehensive Cancer Network, 2000; & Stone, 2002). These interventions must be used with caution and tailored to the patient in order to increase the effectiveness.

Providing education to the patient and the support team is the most feasible and economical intervention (McDaniel & Rhodes, 2000). The patient and the support team must be involved in all decisions and must understand the causes and consequences of fatigue, and the possible interventions (Portenoy & Itri, 1999). This will enable the

patient and care provider to collectively agree on the appropriate course of action, but, more importantly, will allow the patient to anticipate outcomes in order to develop increased coping skills (McDaniel & Rhodes, 2000). The relationship between the patient and the health care professionals will be instrumental to the success of combating fatigue. This relationship can provide patients with the required support that will validate their existing feelings, thus helping to alleviate the stress and frustration that can increase the feelings of fatigue (Schwartz, 1998).

Studies of Fatigue in Prostate Cancer Patients

In a review of available literature that examined the concept of fatigue, it was revealed that the number of studies is increasing. However, the majority of the studies were exclusive to breast cancer patients or patients with multiple cancer sites that were undergoing various treatment modalities. A limited number of studies included prostate cancer patients and an even smaller number focused on this population alone. In the studies that involved prostate cancer patients, a number of different tools and treatment modalities were used, which makes comparisons and conclusions difficult.

Monga et al. (1997) conducted a study in which the neuromuscular fatigue of prostate cancer patients undergoing radiation was examined. The study included a sample of only 13 participants, ranging in age from 60 to 70 years of age, undergoing 68 to 70 Gy of radiation in 34 to 38 fractions. The researchers did not provide any correlation data between fatigue and these patient characteristics.

The study concluded that a notable percentage of participants did experience neuromuscular fatigue at the beginning (18.4%, $p < 0.01$) and the end of radiation (29.2%, $p < 0.001$). From this finding, neuromuscular fatigue appeared to be independent

of both cardiopulmonary and psychological-subjective fatigue, due to the fact that there were no noted differences in scores at all time points (Monga et al., 1997). A significance in this finding is that the neuromuscular fatigue was only temporary and was resolved a short period of time following the completion of radiation (Monga et al., 1997). The possibility that the fatigue in specific muscles of the body of prostate cancer patients is radiation-induced requires further exploration. This study does have many limitations, primarily the small sample size. However, the fact that the researchers attempted to measure three different aspects of fatigue provided insight into the possible relationship among each.

Monga, Kerrigan, Thornby, and Monga (1999) conducted a study to determine the level of fatigue experienced by prostate cancer patients ($N = 36$) undergoing radiation therapy. In this study, there was no control group to provide a comparison of fatigue scores, as a small homogenous sample was used to examine the relationship that existed between fatigue, depression, quality of life and sleep disturbances. A major difference with this study was that PSA and hematocrit levels, weight, and radiation dosage were included in the analysis.

Fatigue scores, on the Piper Fatigue scale, were higher at the middle ($p < 0.02$) and completion of radiation (25%, $p < 0.003$, Monga et al., 1999). In comparison, at the beginning of radiation only 8% of participants reported fatigue. These same participants rated their quality of life as being poor. With respect to the relationship between hematocrit, weight, PSA level, nutritional status, stage of prostate cancer, and the Piper Fatigue Score, no association was found at any of the time intervals. An interesting finding of the study was that levels of depression and sleep disturbance did not change

between any of the time intervals. The authors concluded that the fatigue experienced by the participants was not related to their level of depression or amount of sleep disturbance. This finding has not been reported in other studies conducted with various cancer populations.

Another study conducted by Lilleby, Fossa, Wehre, and Olsen (1999) involved a large sample of patients undergoing radiation therapy ($n = 154$) or radical prostatectomy ($n = 108$), as well as a control group ($n = 38$). The men in the radiation group were significantly older than the other two groups and had a larger number of co-morbidities; over 67% of the prostate cancers were staged at T3 (Lilleby et al., 1999). The majority (89%) of men in the radical prostatectomy group had T2 tumors.

Lilleby et al. (1999) discovered that fatigue was correlated with quality of life ($p < 0.001$), along with pain and sleep. The researchers performed logistic regression analysis with the predictors that had a p value of < 0.05 . From this analysis, fatigue, physical function, and emotional function remained significant predictors of quality of life (Lilleby et al., 1999). An interesting finding was that these three predictors were more significant than sexual, urinary and/or bowel symptoms on the patient's quality of life in the multivariate analysis. Findings from this study demonstrate that men with prostate cancer experience further symptoms outside the usual realm of urinary and bowel problems.

Van Andel, Visser, Hulshof, Horenblas, and Kurth (2003) also surveyed a population of prostate cancer patients who underwent either radical prostatectomy ($n = 65$), or external beam radiation ($n = 73$), with neither group having received adjuvant hormone therapy. The two groups examined in the study were not equal in certain

characteristics, specifically, those in the radiation therapy group had lower incomes, were older, had higher stages of prostate cancer, had higher PSA levels, and lower scores on quality-of-life questionnaires ($p < 0.001$).

One finding was that participants who had undergone radical prostatectomy had lower levels of fatigue and pain at both points in time compared to the participants who received external beam radiation. The results of the study may be explained by the fact that the groups of participants were uneven and the lower level of health was found in the group receiving radiation therapy (Van Andel et al., 2003).

In a larger study of 43 prostate cancer patients undergoing radiation therapy, quality of life (including fatigue) was examined prospectively (Janda et al., 2000). The major difference from all other studies of prostate cancer patients was that, in this case, the patients were randomized into two groups. One group rated quality of life according to the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC-QLQ), and the other group completed the Medical Outcomes Study Group Short Form Health Survey (SF-30). These questionnaires were completed at five different points in time. Randomization provided the opportunity to equally divide the participants, allowing for a variety of characteristics in both groups. This variety of characteristics provided a greater chance that the results were due to the event being examined, rather than any other “extraneous variables” of the participants (Polit & Hungler, 1999). The characteristics that were controlled through randomization in Janda et al. (2000) study were: mean age ($p = 0.3$), tumor classification ($p = 0.64$), and treatment ($p = 0.48$).

The participants in the study had cancers ranging from T1 to T3, with over half of the men receiving adjuvant hormonal therapy (Janda et al., 2000). However, there was a moderate number (36.6%) of participants who had undergone radical prostatectomy prior to radiation. All men received the same dosage of radiation: 66 Gy.

Along with fatigue, emotional and role functioning were measured by both sets of questionnaires. It was discovered that levels of emotional functioning were higher at the end of radiation than at the beginning. The scores on the SF-36 ranged from 68.2 (± 9.9) at the beginning to 93.3 (± 5.2) at completion ($p < 0.002$) (Janda et al., 2000). The scores on the EORTC QLQ-30 were 72.7 (± 5.9) at the beginning and 89.0 (± 4.4) at completion ($p < 0.01$, Janda et al., 2000). This increase in scores represents an improvement in emotional role functioning of prostate cancer patients. One possible explanation for this result may be the level of uncertainty at the beginning of therapy, which may evoke a large amount of anxiety for clients. As well, the authors postulated that the participants experienced many different changes in their lifestyle at the beginning of therapy that would affect the levels of role and emotional functioning.

Role functioning, on the other hand, declined from the beginning of radiation to completion, falling from 80.1 (± 6.5) to 62.5 (± 8.8) ($p < 0.02$). In particular, the level of fatigue experienced increased at the completion of radiation, from 26.9 (± 6.0) to 37.7 (± 7.6) ($p < 0.02$). Fatigue remained the sole component of role functioning to have a significant change in effect (Janda et al., 2000). The majority of the fatigue resolved within six weeks, following the completion of radiation. As in previous studies, fatigue was temporary and appeared to be related to the duration of radiation therapy.

Stone, Richards, Hem, and Hardy (2000) conducted an in-depth study of prostate cancer patients undergoing hormone therapy, with or without adjuvant radiation (N= 62). As seen in previous studies, the European questionnaire has been the primary tool used with this population to measure quality of life and aid in measuring fatigue; however, this tool may not be the most appropriate to provide a detailed description of the fatigue experienced and has to be supplemented with other tools.

The most significant study conducted with prostate cancer patients was done by Magnan and Mood (2003). There were many cancer patients involved (N= 384, 122 of which were prostate) over the four year collection period. In this study over 76% (n = 292) experienced fatigue by the second week of treatment, with fatigue being the highest on the first day of treatment each week. Fatigue distress and duration were significantly and negatively related to pretreatment health status ($r = -0.19, p < 0.001$; $r = 0.15, p = 0.004$) and hemoglobin levels ($r = -0.14, p = 0.012$; $r = -0.14, p = 0.012$). Both of these measures were also significantly but positively related to fatigue onset ($r = 0.15, p = 0.004$ and $r = 0.19, p = 0.001$, respectively). In regards to Global Symptom Distress, fatigue distress ($r = 0.20, p < 0.001$) and duration ($r = 0.11, p = 0.037$) were positively and significantly correlated. Meanwhile, fatigue onset was negatively and significantly correlated to Global Symptom Distress ($r = -0.11, p = 0.029$). The last measure of Mood Disturbance was positively and significantly correlated with fatigue distress ($r = 0.16, p = 0.002$) and duration ($r = 0.12, p = 0.014$), and negatively but significantly correlated with fatigue onset ($r = -0.12, p = 0.016$). These results provided further insight into possible causes of fatigue which had not been identified up to this point.

Fatigue levels increased for 66% ($n = 38$) of the participants in the study, compared to the 31% ($n = 18$) who experienced a decrease (Magnan & Mood, 2003). This finding was found in six of the eight questionnaires that measured fatigue. Fatigue had increased from an average of 24.5 (scores ranged from 9 – 50) from the beginning of hormone therapy, to an average of 30 (scores ranged from 9 – 63) at three months following therapy. The increase in the level of fatigue was not associated with the age or cancer staging of the patient population. Fatigue was significantly correlated with high psychological distress ($r = 0.46$; 95% CI 0.23 – 0.65; $p < 0.001$). The authors conducted two multiple regression analyses which indicated that 28% of the variance in fatigue scores could be related to the scores on the Hospital Anxiety and Depression Scale. This study provided further data on the possible relationship between fatigue and an individual's psychological health.

Vondermark, Schwab, Flentje, Sailen, and Kolbl (2002) conducted a similar study in Germany which specifically examined the relationship between fatigue and anorectal and genitourinary status. The study involved 103 prostate cancer patients who had undergone radiation therapy two years prior. A percentage of the participants (29.1%) were concurrently receiving hormone therapy with radiation. As well, a number of participants underwent prostatectomy prior to receiving radiation, with 94.4% of the participants in the study receiving radiation to the prostate bed and/or seminal vesicles, and 5.6% of participants who received radiation to the whole pelvis.

The findings in this study indicated a relationship between the level of fatigue and urinary and bowel functions. This is contradictory to the study conducted by Lilleby et al. (1999). A Spearman correlation coefficient was determined to be significant ($r = 0.56$; p

< 0.0001) for the relationship between high fatigue and IPSS scores. In addition, a significant correlation was found between high fatigue levels and high incontinence scores ($r = -0.31$; $p < 0.0016$). A non-significant relationship was found between fatigue and age ($r = 0.03$; $p = 0.78$). The authors were concerned that the high fatigue levels were mainly due to the nocturia that patients were experiencing which would be disruptive to sleeping patterns.

Fatigue scores were variable, in that 18.7% of the overall sample experienced severe fatigue, along with 31% of those receiving radiation alone, and 12.3% of those who underwent radiation pre-prostatectomy ($p < 0.052$). The numbers were similar for men who received hormonal therapy (27.6%) with radiation and those who did not (15.1%, $p < 0.24$). In the case of patients who were experiencing rectal bleeding, 16.6% had feelings of fatigue compared to 19.7% for those who never experienced rectal bleeding ($p < 0.87$).

In this study, higher levels of fatigue were found with doses of radiation (exceeding 60 Gy): 31.3% for doses over 66 Gy compared to 12.9% for lower doses ($p < 0.041$). This was the first study the researcher could locate that measured the fatigue level of men at various PSA levels, finding that 16.3% of men who had PSAs less than 1 had feelings of fatigue, compared to 11.1% of men who had PSAs over 1.

One study examined looked at the fatigue experienced by prostate cancer patients undergoing hormonal therapy (Herr & O'Sullivan, 2000). The study included 144 participants with locally advanced prostate cancer. It was discovered that participants who underwent any form of hormone therapy experienced greater fatigue and decreased energy; increases in sexual difficulties and increases in emotional stress; and a self-

reported decline in quality of life (Herr & O' Sullivan, 2000). As well, participants who underwent a combination hormone therapy regime had higher rates of symptom experiences. In particular, participants who received leuprolide alone rated their quality of life as $t = 1.8 / 4$ ($p < 0.05$), compared to men who received leuprolide and flutamide, whose average rating was $t = 2.7 / 4$ ($p < 0.01$).

In this study, many factors may have played a part in the high rates of fatigue and poor quality of life. The primary concern is that these participants have an advanced form of the disease which can elicit significant emotional concerns and decrease the patient's quality of life. These distresses can increase the amount of fatigue the patient may be feeling; thus, not all fatigue is necessarily due to the hormonal treatment.

The following Table 3.1 provides a condensed summary of all studies conducted with prostate cancer patients in respect to fatigue.

Table 3.1: Summary of Studies Examining Fatigue of Prostate Cancer Patients

| Authors (Year) | Purpose | Design | Sample | Instruments |
|---|---|--|--|--|
| Van Andel, Visser, Hulshof, Horenblas, and Kurth (2003) | To determine if a difference exists in baseline health-related quality of life and psychosocial profiles between prostate cancer patients undergoing surgery and radiation | <ul style="list-style-type: none"> - Prospective and longitudinal - Measurements were assessed before treatment and one year following the completion of treatment | <ul style="list-style-type: none"> - 65 patients undergoing prostatectomy - 73 patients undergoing radiation | <ul style="list-style-type: none"> - Demographic questionnaire - Social Desirability Scale - European Organization of Research and Treatment of Cancer and Quality of Life questionnaire - Life Event Scale - Social Support Questionnaire - Profile of Mood States - Impact of Event Scale - Assessment of voiding symptoms, incontinence, GI symptoms and sexual functioning |
| Magnan and Mood (2003) | Examine the fatigue experienced by prostate cancer patients undergoing radiation and to determine if any relationship exists between hemoglobin, global symptom distress, mood disturbance, and treatment site to fatigue | <ul style="list-style-type: none"> - Descriptive, longitudinal, and correlational conducted by secondary analysis - Measurements were taken at five points in time | <ul style="list-style-type: none"> - 384 participants – 175 men and 209 women - 122 prostate cancer patients | <ul style="list-style-type: none"> - Mood's Symptoms Scale - Profile of Mood States - Functional Assessment of Cancer Therapy - Attributes of fatigue-presence, date of onset, and severity of distress |

| Statistical Analysis | Results | Conclusions |
|--|--|---|
| Descriptive statistics, ANOVA, t tests, chi square, univariate analysis of variance and covariance | Patients who received radiation had a decrease in physical, role, sexual, cognitive, and social functioning. Also an increase in fatigue, and pain. These patients reported having a lower quality of life one year after completion of treatment | <ul style="list-style-type: none"> - Quality of life, before treatment, for patients who are to undergo surgery is higher than for patients who are to receive radiation. - Patients who undergo radiation report lower quality of life following treatment than patients who undergo surgery |
| Descriptive and inferential statistics, ANOVA, Correlational analyses | <ul style="list-style-type: none"> - Fatigue began in the middle of the 2nd week of radiation, was described as distressing, and remained for approx. 32 days - Lower levels of delayed fatigue that lasted for a short period of time were correlated with higher hemoglobin and health levels pre-treatment - Higher levels of immediate fatigue that lasted for a long period of time were correlated with high levels of symptom distress and mood disturbance pre-treatment | <ul style="list-style-type: none"> - Fatigue is individualized - The health status and various bodily functions affected the level, onset, and duration of fatigue experienced |

| Authors (Year) | Purpose | Design | Sample | Instruments |
|---|---|--|---|---|
| Vordermark, Schwab, Flentje, Sailer, and Kolbl (2002) | Examine chronic fatigue in prostate cancer patients who underwent radiation | <ul style="list-style-type: none"> - Retrospective - Measurements were taken 2.1 years post-treatment | 103 men | <ul style="list-style-type: none"> - Brief Fatigue Inventory - Urinary and Anorectal function questionnaires |
| Herr and O'Sullivan (2002) | Assess the quality of life of prostate cancer patients who are receiving hormonal therapy | <ul style="list-style-type: none"> - Longitudinal, prospective, and observational - Measurements were taken pre-treatment, six months and one year post-treatment | <ul style="list-style-type: none"> - 144 men from a prostate cancer support group - 79 men who received hormonal therapy - 65 men who did not receive hormonal therapy | <ul style="list-style-type: none"> - European Organization for Research and Treatment of Cancer and Quality of Life questionnaire - Intrusion subscale of the Impact of Event Scale |
| Janda, Gerstner, Obemair, Fuerst, Wachter, Dieckmemm, and Potter (2000) | Examine quality of life of prostate cancer patients pre-and-post-radiation treatment | <ul style="list-style-type: none"> - Prospective - Measurements taken pre-radiation, at three weeks, and at six weeks - Also post-radiation, at six weeks and five months | 41 men | <ul style="list-style-type: none"> - European Organization for Research and Treatment of Cancer and Quality of Life questionnaire - Medical Outcomes study group short form health survey |

| Authors (Year) | Statistical Analysis | Results | Conclusions |
|----------------------------|---|---|---|
| Vordermark et al. (2002) | Descriptive, chi square, Spearman r Correlation ($p < .05$) | A significant correlation occurred between high levels of fatigue and high IPSS urinary scores ($r = 0.56, p < 0.0001$) and low continence scores ($r = -0.31, p = 0.0016$) | <ul style="list-style-type: none"> - Fatigue levels in this study were higher than those found in healthy individuals in other studies - Significant correlations were found between fatigue, urinary and rectal symptoms |
| Herr and O'Sullivan (2000) | - Descriptive, multivariate analysis | <ul style="list-style-type: none"> - Men who received hormonal therapy reported more fatigue, less energy, emotional distress and a low quality of life - Men who received a combination treatment regime of hormonal therapy reported the same effects but higher levels | Quality of life in men with prostate cancer receiving hormonal therapy can be significantly decreased |
| Janda et al. (2000) | - Descriptive, chi square | Levels of fatigue increased from 26.9 pre-treatment to 37.7 at completion ($p = 0.02$) | Men with prostate cancer who undergo radiation experience short-term fatigue and decline in role functioning, no significant changes in quality of life |

| Authors (Year) | Purpose | Design | Sample | Instruments |
|--|--|--|---|---|
| Stone, Richards, Hem, and Hardy (2000) | Determine the prevalence, level and correlates of fatigue in prostate cancer patients who are receiving hormonal therapy | Descriptive Measurements were taken pre-treatment and three months post-treatment | Convenience sample of 62 men pre-treatment and 58 men three months post-treatment | <ul style="list-style-type: none"> - Hospital Anxiety and Depression Scale - European Organization for Research and Treatment of Prostate Cancer Quality of Life Questionnaire - Functional Assessment of Cancer Therapy-Prostate - Eysenck Personality Inventory - Nutritional Assessment - Voluntary Muscle Function and Attention Span testing |
| Monga, Jaweed, Kerrigan, Lawhon, Johnson, Valibora, and Monga (1997) | Examine the possible etiology of fatigue in prostate cancer patients undergoing radiation | Descriptive Measurements taken at three time points pre-and-post-treatment | 13 men | <ul style="list-style-type: none"> - Piper Fatigue Scale - Beck Depression Inventory - Epworth Sleepiness Scale - Assessment of neuromuscular fatigue of body muscles |

| Authors (Year) | Statistical Analysis | Results | Conclusions |
|---------------------|--|--|--|
| Stone et al. (2000) | Non-parametric, Multivariate analysis, Spearman Rank Correlation | <ul style="list-style-type: none"> - 38/58 (66%) participants reported an increase in fatigue from pre-treatment levels - A strong correlation was found between fatigue severity and psychological distress ($r = 0.46, p = 0.001$) - Hormonal therapy caused a decrease in muscle mass | The authors concluded that fatigue levels do increase following the initiation of hormonal therapy |
| Monga et al. (1997) | Non-parametric, Paired t-tests, single factor analysis of variance | <ul style="list-style-type: none"> - At the initiation and completion of radiation neuromuscular function significantly decreased, 18.4% ($p < 0.01$) and 29.2% ($p = 0.001$), respectively - Neuromuscular function returned to normal levels five to six weeks post-treatment - No changes in psychological fatigue were noted | There is a temporary reduction in the neuromuscular function during radiation for prostate cancer. |

| Authors (Year) | Purpose | Design | Sample | Instruments |
|--|---|---|---|---|
| Monga, Kerrigan, Thomby, and Monga (1999) | <ul style="list-style-type: none"> - Assess the fatigue of prostate cancer patients undergoing radiation - Determine the relationship between fatigue, depression, quality of life, and sleep disturbance | Prospective Measurements were taken pre-mid-and-post-treatment | 36 men | <ul style="list-style-type: none"> - Piper Fatigue Scale - Beck Depression Inventory - Epworth Sleepiness Scale - Functional Assessment of Cancer Therapy for Prostate Scale - Demographic questionnaire |
| Lilleby, Fosssa, Wachere, and Olsen (1999) | Examine morbidity, side effects and quality of life in prostate cancer patients undergoing radiation or surgery | <ul style="list-style-type: none"> - Descriptive, cross-sectional - Measurements taken at one year post-treatment | <ul style="list-style-type: none"> - 154 men undergoing radiation - 108 men undergoing surgery - 38 men in the control group | <ul style="list-style-type: none"> - European Organization for Research and Treatment of Cancer Quality of Life questionnaire - Assessment of lower urinary and bowel symptoms - International Prostate Symptom Score on Sexuality |

| Authors (Year) | Statistical Analysis | Results | Conclusions |
|-----------------------|--|--|--|
| Monga et al. (1999) | Descriptive, univariate analysis, Wilcoxon Signed Rank-Test, and Spearman's Rank Correlation | <ul style="list-style-type: none"> - Fatigue and functional ability scores increased at the completion of radiation - Participants that had high fatigue scores reported lower quality of life - No changes were noted in depression and sleepiness scores | <ul style="list-style-type: none"> - There is a significant relationship between fatigue and quality of life - There may not be any relationships between depression or sleep disturbance to fatigue |
| Lilleby et al. (1999) | Descriptive, multivariate and univariate analysis, Pearson Rank Correlation | <ul style="list-style-type: none"> - Significant correlations were found between physical and emotional functioning and fatigue to quality of life - No correlations were found between urinary symptoms and sexuality to quality of life - For the correlation between fatigue and quality of life, the r values include 0.67 (radiation), 0.69 (surgery), and 0.85 (control), all with $p < 0.001$ | Quality of life of prostate cancer patients is largely dependent on levels of fatigue, emotional and physical functioning rather than sexual and urinary function |

In summary, in order to draw any definitive conclusions from the studies concerning fatigue in prostate cancer, treatment conditions must be consistent as the type and level of treatment received can affect the results obtained. In each study participants received many combinations and prescriptions of treatment; however, a certain level of fatigue was seen in all treatments at many different points in time. In a large majority of the studies, fatigue had a significant impact on the quality of life of the participants. Surprisingly, in one study fatigue had a more significant effect than urinary or sexual problems on the man's quality of life. In conclusion, fatigue is a major concern for men with prostate cancer and can significantly impact their quality of life.

Exercise

In reviewing the literature related to cancer-related fatigue, there is a variety of interventions identified. However, only a small number have been tested empirically for effectiveness, specifically in prostate cancer patients. Determining the effectiveness of exercise as compared to increased rest to combat cancer-related fatigue is a continuing debate. The minimal research that has been conducted addressing the benefit of rest has demonstrated that rest can further decrease the functional status of the client (Dimeo, Fetscher, Lange, Mertelsman, & Keul, 1997; Graydon, Bubela, Irvine, & Vincent, 1995). This area of research requires further study to include larger and more varied populations of cancer clients. Researchers must also attempt to gain a further understanding of the underlying biology of fatigue, in order to determine the most appropriate exercise interventions (Winningham, 2001).

Winningham (1996, p. 18) defined exercise as "...deliberate physical activity or work of any type, intensity, frequency, or duration undertaken to elicit a beneficial or

therapeutic response”. This will have a different meaning for the patient, as there may be limitations due to the disease process. Courneya, Mackey, and Jones (2000) provided a detailed description of the possible concerns that arise for patients with cancer who are contemplating participating in exercise. The concerns include “the potential immunosuppressive effects of vigorous exercise, the increased likelihood of pathologic bone fractures arising from compromised bone integrity, possible exacerbation of cardiotoxicity from chemotherapy and/or radiation, severe pain, nausea, or fatigue that may be exacerbated by physical exercise...” (pp. 51-52). The authors further identified limitations to exercise as being, “...hemoglobin levels <8.0g/dl, absolute neutrophil count $\leq 0.5 \times 10^6/\mu\text{L}$, platelet count $\leq 50 \times 10^3/\mu\text{L}$, fever > 38 Celsius, ataxia, dizziness, or peripheral sensory neuropathy, severe cachexia, dyspnea, bone pain, severe nausea, extreme fatigue and/or muscle weakness” (p. 71). All of these concerns must be taken into account when prescribing and/or designing any type of physical exercise for patients with cancer.

Various studies have demonstrated some of the positive effects exercise can have on patients coping with cancer-related fatigue. Physical exercise can affect all the dimensions of a patient’s quality of life and, in turn, his or her cancer experience (Smith, 1996). Segar et al. (1998) determined that mild to moderate levels of aerobic activity decreased feelings of depression and anxiety in women who had undergone surgery for breast cancer. Increased psychological well-being, self-esteem, enhanced physical health, higher levels of performance/functional status, lower levels of fatigue, decreased nausea and vomiting, fewer problems with sleep, and increased levels of hope have been described by cancer patients as a result of regular, low-intensity exercise (Courneya &

Friedenreich, 1999; Courneya, Mackey, Jones, 2000; Dimeo, Stieglitz, Norelli-Fischer, Fetscher, & Keul, 1999; Dimeo, 2001; Young-McCaughan et al., 2003; Mock et al., 1994; Segar et al., 1998; Smith, 1996; Wall, 2000). Along with the physical and psychological benefits, there are social advantages to exercise. Many types of physical exercise provide individuals with the opportunity to meet other people and share experiences, thus helping to decrease the feelings of isolation that their illness may bring (Dimeo, 2001).

A patient can experience the biological effects from exercise that can play an important role in the fight against cancer-related fatigue. Winningham (2001) highlighted the possible biological effects of exercise: "...increase in muscle mass and plasma volume, improved pulmonary ventilation and perfusion, increased cardiac reserve and higher concentrations of oxidative muscle enzymes" (p. 991). Physical exercise also allows for the maintenance of muscle mass and strength which is significant for individuals undergoing any form of hormonal therapy, specifically prostate cancer patients receiving Casodex and/or Zoladex (Durak, Lilly, & Hackworth, 1999; Winningham, 2001). One of the side effects of hormonal therapy for prostate cancer is a decrease in muscle mass; therefore, performing exercise to help maintain muscle mass would be important.

Friedenreich and Orenstein (2002) examined the possible link between exercise and the prevention of various cancers. One hypothesis related to prostate cancer is that physical exercise lowers men's testosterone levels, which in turn can lead to a reduction in the risk of developing prostate cancer (Friedenreich & Orenstein, 2002). This is an area of research that is becoming increasingly popular and requires further exploration.

The effectiveness of exercise in decreasing levels of cancer-related fatigue depends on many factors, including the patient, the disease process and the treatment. One key factor in increasing the adherence of the patient and, in turn, the effectiveness of exercise, is to tailor the exercise program to the patient (Chen, Neufeld, Feely, & Skinner, 1998). Tailoring the program to the individual requires a great deal of work and collaboration on the part of many care providers. The effectiveness of the exercise program also depends on the personalities of the patients who are participating. Wahnefried, Peterson, McBride, Lipkus, and Clipp (2000) examined health behaviors and readiness to change within breast and prostate cancer patients. It was determined that these two groups of patients are "ideal" due to their high level of interest in his or her health. This can play a significant role in the adherence of these patients to exercise in order to combat cancer-related fatigue.

The sole study that involved only prostate cancer patients was conducted by Segal et al. (2003). The study included 155 patients receiving hormonal treatment who were randomly assigned to one of two groups, a control group and a resistance exercise intervention group. The intervention group was pre-assessed by a certified exercise consultant and a specific program was designed for each patient. The program consisted of sets of leg extensions, calf raises, leg curls, chest presses, latissimus pull-downs, overhead presses, triceps extensions, biceps curls, and modified curl-ups. The program was for 12 weeks and the participants were to perform sets of eight to twelve repetitions of each exercise, three times a week. The participants in the control group did not receive the same instructions and guidance until the twelve-week period was completed.

The fatigue that the participants experienced, as well as their quality of life, was measured using the Functional Assessment of Cancer Therapy Prostate Scale (Cella, 1997). The muscular fitness of the participants was assessed by a standard load test. Body weight, body mass index, waist circumference, testosterone and PSA levels and skin-fold thickness were also measured (Segal et al., 2003). Before the commencement of the study, fatigue ($p = .24$) and quality of life ($p = .27$) scores were similar for both groups.

This was the first study of its kind to examine the effects of resistance exercise rather than aerobic exercise in helping to reduce levels of cancer-related fatigue (Segal et al., 2003). This makes any comparison between the two difficult based on the fact that there is currently no study that examines solely the effects of aerobic exercise in men with prostate cancer. The study also addressed the subject of structured exercise over unstructured. However, it is difficult to determine whether it was the fact that the exercise was structured, or that it was resistance training, or that it was a combination of the two that improved fatigue scores. In this study, the participants who were in the intervention group had fewer complaints of fatigue ($p = 0.002$), as well as a higher quality of life ($p = 0.001$).

Two significant findings of the study identified concerned testosterone and adherence levels. Primarily, it was found that testosterone levels did not affect the level of muscular strength for the participants in the intervention group; muscular fitness actually improved. As previously stated, testosterone levels are maintained at low rates during hormonal therapy for prostate cancer, leading to significant muscle wasting in a number of participants. Secondly, this study also analyzed adherence rates, which were quite high indicating that the participants believed that exercise was important. High rates

of adherence will increase the effectiveness of the exercise intervention to combat cancer-related fatigue (Courneya & Friedenreich, 1999). The authors hypothesized a number of reasons for this, including high levels of fitness in participants, offering a structured exercise program and environment, low costs to the patients, and the social support of others. Further exploration of the adherence behaviors of prostate cancer patients who are participating in an exercise intervention is warranted.

The most recent study that involved a sample of prostate cancer patients ($n = 12$) in aerobic exercise was conducted by Young-McCaughan et al. (2003). The study was prospective in nature and included patients who had received a cancer diagnosis in the previous two years. The exercise program performed, adapted from a cardiac rehabilitation program, was over a 12 week period for two days per week. The specific measures of the study included quality of life, exercise tolerance, activity and sleep patterns.

The results demonstrated an improvement in quality of life scores, fitness level and sleep patterns with regular exercise for 74% ($p < 0.001$) of the participants in the program. All participants reported an increase in energy levels at the end of the 12 week program ($p = 0.004$). Participants also reported a decrease in the difficulty falling and staying asleep at night ($p = 0.03$, Young-McCaughan, 2003) and expressed concerns about taking part in an exercise program after a cancer diagnosis. The authors concluded that a multi-disciplinary approach is needed to help guide individuals through the uncertainties of the disease. One interesting finding of the study was that out of the 15 participants who were then receiving treatment, only six (40%) completed the 12 week program. In comparison, in the 47 participants who have had treatment in the past, 40

(85%) finished the program. This raises many questions with respect to attracting and retaining participants in an exercise program as they go through treatment. This is a group of individuals who have unique concerns which need to be taken into account when designing any type of exercise program.

An earlier study conducted by Durak, Lilly, and Hackworth (1999) involved a small sample of prostate cancer patients (N = 12) taking part in a 20 week structured and supervised exercise program. The participants completed quality of life questionnaires at the end of the program and then two years post-program. This study produced non-significant results, leading the authors to conclude that aerobic exercise in prostate cancer patients is not beneficial. There were many limitations in this study that must be taken into account; specifically, the small sample size and the general, non-individualized exercise program. The authors did not report if a power analysis was performed in respect to determine if a type II error might have occurred. Further studies should be done taking into consideration many additional factors, as well as a larger sample size, before it can be concluded that aerobic exercise is not beneficial to these patients.

Health care professionals must gain further understanding of the mechanisms of fatigue in clients with prostate cancer who are undergoing radiation and/or hormonal therapy, the effects experienced by the individual, and the possible adherence behaviors. This will not only allow for the design of more effective interventions, but will also validate clients' feelings of fatigue. Schwartz (1998) discovered that less than half of "active" cancer patients undergoing treatment for a variety of cancers were being advised to maintain their fitness by their health care providers.

Adherence

The topic of adherence is gaining ground as a significant concept in exercise involving cancer patients and survivors. Adherence is defined as "...the degree to which a person fulfills a given exercise prescription" (Brawley, Culos-Reed, Angore, & Hoffman-Goetz, 2002, p. 3). In order to design the most effective interventions that will increase adherence and improve quality of life, the significance that the determinants of exercise hold for the patient must be determined.

Presently, there are a small number of studies that have examined the concept of adherence in the cancer patient population. A leader in this field, Kerry Courneya, has begun to examine the determinants of exercise for cancer patients, and test possible theories to aid in understanding and explaining the concept of adherence. In a primary study, Courneya and Friedenreich (1997) examined the determinants of exercise for colorectal cancer patients who had undergone adjuvant therapy. This was the first introduction of the Theory of Planned Behavior (TPB) in order to understand exercise determinants for a group of cancer patients. The premise surrounding TPB is that individuals will participate in a behavior when they believe that it is under their control (control beliefs), and/or will affect them positively (behavioral beliefs), and/or when other individuals believe that they should participate (Courneya & Friedenreich, 1997). There are many other aspects of TPB that are beyond the scope of this paper.

Participants were randomly selected from a database list of colorectal cancer patients with a final participant number of 110, 63% of whom were male. The participants answered open-ended questions exploring exercise behaviors, demographic and medical variables and various components of TPB (beliefs, norms, intentions,

attitude, and perceived control). Unfortunately, the study was retrospective in nature, involving participants who were not actively undergoing treatment, asking them to recall past behavior and determinants. A retrospective study can have significant limitations in that participants may not accurately recall past events. This can lead to possible overestimation of behavior in order to provide the “expected” responses.

In reviewing the results of the study, there were correlations with almost all of the constructs of TPB. The following constructs demonstrated strong correlations with exercise performed during treatment: exercise pre-diagnosis ($r = 0.53$), intention ($r = 0.39$), attitude ($r = 0.38$), perceived control ($r = 0.37$), and behavioral beliefs ($r = 0.37$) (Courneya & Friedenreich, 1997). It is interesting to observe that the highest correlation lies with pre-diagnoses exercise. This provides evidence of the need to continue to promote health, especially the need to maintain an active lifestyle, to individuals of all ages.

The control beliefs of participants that were measured demonstrated strong correlations to perceived control ($r = 0.42$), intention ($r = 0.38$) and behavior ($r = 0.27$). The control beliefs that demonstrated the strongest correlations were “experienced fatigue/tiredness, had no time for exercise, and experienced pain or soreness” (Courneya & Friedenreich, 1997, p. 1720). These are possible barriers that may exist for cancer patients and such barriers require further exploration.

Another group of beliefs that may be specific to cancer patients are behavioral. In this study, there were strong correlations between behavioral beliefs and attitude ($r = 0.68$), intention ($r = 0.48$), and exercise ($r = 0.37$). The significant behavioral beliefs that were listed by the participants were: “feel better and improve my well-being, gain control

over cancer and my life, recover from surgery and treatment, cope with the stress of cancer and treatment, and get my mind off cancer and my treatment” (Courneya & Friedenreich, 1997, p. 1721). It is obvious that determinants of exercise in individuals coping with cancer are focused primarily on the disease process. This finding demonstrates the importance of not assuming that cancer patients have the same determinants as healthy individuals with respect to exercise.

In a subsequent study, Courneya, Blanchard, and Laing (2001) examined the components of TPB, past exercise behaviors and levels of adherence, in breast cancer survivors who were training for a dragon boat race. The major differences between the latter study and the previous one is that this study was prospective in nature and involved a small (N = 24) sample of highly motivated breast cancer patients. A limitation of this study was that adherence was simply a measure of the percentage of training sessions that the participants attended. The average rate of adherence in the study was 66%. This number is lower than the researchers initially believed would occur due to the fact that this was a highly motivated group of individuals. The researchers assumed that these highly motivated participants would have a high desire to stay active and thus have higher levels of adherence than 66%.

The training program consisted of two sessions each week for a total of 12 weeks. There was a mixture of cardiovascular and weight training with 20 minutes of paddling in water. This may be too high-intensity for some individuals with other cancers. This study, like the previous one, examined all of the components of TPB, with the addition of demographic information and past exercise behavior (Courneya, Blanchard, & Laing, 2001).

In this study, intention proved to be the sole determinant of exercise adherence. The authors stated that a further exploration of various medical and demographic variables (disease stage, type of cancer, etc.) has to occur in order to gain a fuller understanding of the determinants of adherence. Another interesting finding of this study was that the participants listed the support of the physician, spouse, and friends as being significant factors in their participation in physical activity. The women in this study also listed barriers that they felt prevented them from participating in exercise, including “confidence in one’s ability to exercise when having limited time, no one to exercise with, fatigue and other health problems” (Courneya, Blanchard, & Laing, 2001, p. 449).

The authors stressed that consideration of the effects of cancer and subsequent treatments have to be taken into account when exploring the determinants of exercise for cancer patients and, in turn, when designing interventions (Courneya, Blanchard, & Laing, 2001). As well, the individual participant has to be given consideration with the exercise program being tailored individually. Taking all of these factors into consideration when designing individualized interventions, will in turn increase the effectiveness and reduce the level of fatigue experienced.

Rhodes, Courneya and Bobick (2001) conducted another study involving breast cancer patients (N = 175), however, the five-factor model of behavior was implemented in lieu of TPB. The Five Factor Model consists of five components of personality, which are: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness.

The participants, who were randomly selected from a total group of 322, completed questionnaires that examined the following: demographic and medical

information, components of the Five Factor Model, and exercise behavior at three points in time (pre-diagnosis, during treatment, and post-treatment). For the Five Factor Model, each participant was asked to choose the most appropriate description of her behavior and motivation regarding exercise, at all three points in time.

The major finding of this study was that personality is a determinant of exercise for breast cancer patients, pre-diagnosis, during treatment, and post-treatment (Rhodes, Courneya, & Bobick, 2001). The various components of personality affect the degree and type of behavior with respect to exercise. In this study, neuroticism proved to represent a barrier to exercise for individuals. On the other hand, individuals who had high levels of extraversion in their personality, considered exercise to be significant and incorporated it into their daily routines. This study was the first to examine the effect of an individual's personality on his or her exercise behavior.

The first exercise study to involve prostate cancer patients was conducted in 2002 by Blanchard, Courneya, Rodgers, and Murnaghan. The study explored the determinants that breast ($n = 83$) and prostate ($n = 46$) cancer patients considered important to exercise intention and behavior, implementing the TPB. This study revealed results similar to those reported in the previous studies using TPB, in which intention was determined to be the sole significant determinant of exercise in cancer patients.

Data were collected regarding demographic and medical variables, past exercise behavior, and components of TPB. These were the same variables measured in previous studies; however, no previous study had examined them with respect to prostate cancer patients. The results demonstrated that perceived behavioral control - which is the perceived ease or difficulty in performing an action - was the lone determinant of

intention. This finding could have significant implications for increasing exercise adherence among prostate cancer patients. The surprising finding of the study, not common to previous studies in patients with other cancer sites, was that attitude was not a significant determinant of intention to exercise for prostate cancer patients (Blanchard et al., 2002). Attitude was significant in bivariate correlation with exercise intention ($r = 0.46$), which was similar to that for breast cancer patients ($r = 0.53$). Prostate cancer patients placed high emphasis on how simple or difficult they perceived the action to be and very low emphasis on surrounding social influence/pressure, and subjective norms and values. In order to determine the role that health care professionals can play in promoting physical activity among prostate cancer patients, the concept of subjective norm must be explored further.

Adherence to a moderate-intensity exercise program - brisk walking – among breast cancer patients was examined in a study done by Pickett et al. (2002). The women (N= 52) were randomly assigned to either the “usual care” or the “usual care and exercise” group. The “usual care” group received information on performing exercise at home and was provided with follow-up information during treatment. The women in the “usual care and exercise” completed an in-depth analysis with a certified instructor and an individually-tailored exercise program was designed. Both groups were followed throughout treatment, which were either radiation and/or chemotherapy. Both groups were asked to maintain a diary to monitor exercise time, pre-and post-pulse rates, fatigue levels and disease-and/or treatment-related side effects.

Over 50% of the women in the “usual care and exercise” group maintained their exercise throughout the study, increasing the intensity and frequency at certain points

(Pickett et al., 2002). In comparison, 33% of the women in the “usual care” group did not exercise at all. The number of women who continued to exercise is high, considering the fact that a significant number of women, 69% in the “usual care and exercise” group and 72% in the “usual care” group, reported experiencing disease-and/or treatment-related side effects. The assumption in this study was that a high level of side effects would interfere with participation in exercise during treatment, which was not the finding. Based on the review of past behavior, the women who exercised pre-diagnosis were more likely to continue to exercise during and after treatment. The authors concluded that women who did not participate in exercise prior to their diagnosis may require a structured exercise program to maintain adherence.

Surprisingly, over forty percent of the women in the “usual care” group maintained an exercise program without being closely monitored or receiving a tailored exercise program. It is important to point out that higher education levels and lower BMIs were found in the “usual care” group of women, which may help explain the high levels of exercise (Pickett et al., 2002). The authors did attempt to control the possible differences between groups by implementing the process of randomization; however, this inequality between groups may have influenced the final results.

TPB and the Five Factor Model were used to examine exercise adherence and possible correlations among cancer survivors, various cancer sites, in a study conducted by Courneya, Friedenreich, Sela, Quinney, and Rhodes, 2002. In this study these two theories, TPB and Five Factor Model, were examined together in respect to exercise adherence, along with past and present exercise behavior, medical and demographic

variables. A sample of 96 cancer survivors were examined, which was the first time issues for cancer survivors were addressed in respect to fatigue and adherence.

The cancer patients eligible for the study were subsequently randomized to either the waiting list group ($n = 45$) or the exercise group ($n = 51$). Participants in the exercise group received a one-on-one consultation with a certified instructor in order to tailor an individual exercise program (Courneya et al., 2002). The exercise program consisted of walking three to five times a week, for 20 to 30 minutes, at an estimated intensity. In contrast, the participants in the waiting list group received instructions not to begin any new exercise program and were not given any information about physical activity. They did, however, receive instruction about physical activity after a ten week waiting period.

The study produced many interesting findings. The factors that were correlated with exercise participation in both groups were past exercise ($r = .50, p < .001$), assignment to experimental condition ($r = .43, p < .001$), sex ($r = .38, p < .001$), intention ($r = .31, p < .10$), attitude ($r = .27, p = .008$), treadmill time ($r = .26, p = .012$), perceived behavioral control ($r = .24, p = .021$), and control beliefs ($r = .23, p = .025$). As in previous studies, intention ($B = .14, p = .080$) and past exercise behavior ($B = .36, p < .001$) were significant factors in predicting exercise participation. One interesting and significant fact is that being in the experimental group ($B = .34, p < .001$) was a predictor for physical activity (Courneya et al., 2002).

Several variables were correlated with adherence; sex ($r = .45, p = .001$), and past exercise ($r = .37, p = .007$) had the highest rates of significance. The most significant predictors of exercise were sex ($B = .38, p < .01$), extraversion ($B = .30, p < .05$), normative beliefs ($B = -.27, p < .05$), and perceived behavioral control ($B = .23, p < .10$).

The male participants in the study had the highest rates of exercise participation and adherence (Courneya et al., 2002). The concept of gender and its influence on exercise participation and adherence warrants further exploration.

The most recent study conducted by Courneya et al. (2003), examined exercise motivation and adherence in cancer survivors, various cancer sites. In lieu of utilizing TPB, Courneya et al. (2003) applied the Theory of Attribution (Weiner, 1985). The Attribution theory is based on the premise that the actions of individuals are influenced by past achievements and the probable causes of such. The authors hypothesized that this theory would provide insight into the factors influencing motivation and adherence for individuals following an organized exercise program, specifically, the influence of successes and failures.

The study involved a group of cancer survivors, whose specific cancer sites were not reported, and who were randomized into one of two groups. One group received only group psychotherapy, while the other group received the same plus a structured, tailored exercise program ($n = 60$). The exercise program consisted of a tailored walking program, the same exercise program as in the previous study. Similar variables were measured, including demographic and medical characteristics, perceived success of the exercise program, causal dimensions (reasons for successes and/or failures), affective reactions (emotional response), expected success, past and present exercise behavior, present cardiovascular health, quality of life, depression, anxiety, fatigue, and body composition.

The results provided evidence supporting the theory of Attribution. Specifically, expected success ($r = .56, p = .001$) and positive affect ($r = .42, p = .020$) were positively

correlated with post program exercise compared to negative affect ($r = -.34, p = .064$), which was negatively correlated. These results demonstrate that when individuals feel positive in regards to their performance and expect success, adherence and motivation rates may be high. Different results were found regarding correlations to the number of minutes of exercise, where expected success ($r = .43, p = -.019$), and negative affect ($r = .39, p = .036$) were significant; positive affect ($r = .29, p = .127$) was not. These results are important for health care professionals who can take them a step further and explore the factors that can increase an individual's expectations of success and positive affect.

It is evident that Courneya is a leader in the field of cancer research concerning adherence and exercise. Throughout the studies, TPB was the dominant theory incorporated and proved to be useful in understanding determinants of exercise and, in turn, adherence. Throughout the review of the literature, many areas for further study have been identified. The issue of adherence for prostate cancer patients has been only recently examined. Further studies are warranted to determine what might be appropriate interventions for these individuals.

Summary

This chapter has provided an overview of the literature review for the present study. An examination of the literature concerning cancer-related fatigue included etiology, signs and symptoms, assessment, measurement tools, and interventions to combat fatigue. A closer look was taken into the specific pieces of research that measured fatigue in prostate cancer. The literature concerning exercise in prostate cancer to combat fatigue was reviewed, along with adherence behaviors to exercise in the same population.

These reviews of the literature demonstrate the need for further research in the areas of fatigue and adherence in prostate cancer patients.

Chapter 4

Methodology

This chapter will discuss the research methods employed in this study. An overview will be provided of the research design, recruitment procedures, sample criteria, research setting, data collection tools and process, and ethical considerations.

Research Design

This was a descriptive exploratory study in which the barriers and facilitators to participation in exercise for prostate cancer patients undergoing a combination of radiation and hormonal treatment were examined. This design was selected due to the limited research available in this area, and the need to identify the meaning of fatigue in this population. Exploratory studies are useful in providing insight into events about which very little information exists because they elicit data on how and why the event occurs (Polit & Hungler, 1999). Interviews with a selected number of participants helped to capture, in the words of the men themselves, the meaning of fatigue for this group.

This study was also classified as descriptive in nature, based on the fact that information concerning fatigue in other cancer populations exists but not for prostate cancer patients. Descriptive studies elicit data through means that provide an in-depth and complete description of the event/subject, such as interviews and direct observation (Polit & Hungler, 1999). According to Polit and Hungler (1999), quantitative descriptive studies include "...the prevalence, incidence, size, and measurable attributes..." (p. 16) of the chosen event/subject. In this study, fatigue and adherence behaviors were measured using both questionnaire and interview data.

Recruitment of Subjects

The participants for the study were chosen from a convenience sample at the out-patient radiation clinic at Health Sciences Centre in Winnipeg. This clinic serves all of Manitoba and parts of Ontario. Access to participants was granted primarily by the Research Impact Committee. The researcher worked directly with one radiation oncologist and nurse throughout the entire study. The radiation oncologist was a member of the researcher's thesis committee, and as a result had a thorough comprehension of the proposed study. The radiation nurse was provided with written handouts about the proposed study.

The participants were identified by their diagnosis, chosen treatment, and prostate cancer staging as potential candidates by the radiation oncologist, in consultation with the researcher. From this identification, the participants were approached by the radiation nurse to determine interest in participating in the study. If the participant expressed an interest in the study, the researcher provided written information sheets and consent forms. The information sheets described the study, purposes, proposed involvement of the participant, and ethical considerations. Informed consent was obtained by the researcher if the participant agreed to participate.

Sample

The inclusion criterion for the study were the following: 1) medically diagnosed with prostate cancer, 2) currently undergoing any form of radiation treatment with or without hormonal therapy, 3) currently not undergoing any other form of treatment for prostate cancer, 4) between the ages of 50 to 85, 5) understands verbal and written

English, 6) approval from the radiation oncologist. The age chosen for the study was 50 to 85, as the majority of prostate cancer cases fall within this age group.

A total of 31 participants were obtained from April 7th to June 28th, 2004. All but three participants approached agreed to participate in the study. There were two participants who could complete only half of the questionnaires due to extreme fatigue. The original expected participant rate was between fifty and sixty patients. The rationale for accepting a lower number was that the patient base had been exhausted. The researcher's thesis committee approved the decision of stopping data collection at the three month point.

Setting

The setting for the study was the out-patient radiation clinic at CancerCare Manitoba. CancerCare Manitoba is located adjacent to the Health Sciences Centre in Winnipeg. The majority of interviews took place in the client conference room attached to the clinic. The conference room consisted of a table and comfortable seating for four individuals. There was soft lighting which made the room very welcoming to the participants. Two of the interviews took place in the examination room and two interviews took place in an empty waiting room. The reason for these locations was that the conference room was being utilized by another staff member. The interviews that took place in the waiting room proved to be difficult because surrounding noise was, at times, distracting for the researcher. However, confidentiality was maintained and the interviews were completed successfully.

Data Collection Tools

There were a total of four tools used in this study: demographic and health information questionnaire (Appendix B), Revised Piper Fatigue Scale (1998, Appendix C), Incentives and Barriers to Exercise Scale (IBES, 1997, Appendix D), and nine open-ended questions (Appendix E). The following section will provide an overview of the tools and appropriate statistics.

Instruments

Demographic Questionnaire

The demographic questionnaire was used to elicit the following information from participants: age, date of birth, educational attainment, occupation, occupational status, income level, marital status, race/ethnicity, diagnosis, time since diagnosis, previous treatments and start/stop dates, current treatments, current PSA level, and current testosterone level.

The researcher developed the demographic form that was utilized in the study, based on the input of the thesis committee, a demographic questionnaire created by Dr. Joyce Davison (1993), and the Statistics Canada web-site. The demographic questionnaire was completed by each participant. In some instances, the spouse of the participant aided in the completion of the form. It took the majority of the participants five minutes to fill out the questionnaire. The section concerning diagnosis and treatments was completed by the researcher from the clients' charts. Access to the charts was granted by the Resource Impact Committee at Cancer Care Manitoba.

Revised Piper Fatigue Scale (Piper et al., 1998)

To assess the level of fatigue the patient was experiencing, and answer research question number one, the Revised Piper Scale (RPFS) was utilized. This scale is a combination of closed- and open-ended questions used to capture the self-reported level of fatigue and associated symptoms. The scale consists of 22 questions, each of which requires the patient to rate their response on a zero-to-ten scale. An additional five open-ended questions are at the end of the scale in order to provide the patient with the opportunity to expand on other symptoms associated to fatigue.

The original Piper Fatigue scale has been used in various settings and populations; however, it was long and tedious for patients to complete. The RPFS was developed with fewer components for the participants to complete, while, maintaining the multi-dimensionality of the previous tool (Piper et al., 1998). The original scale was composed of 42 items that required the participant to rate responses on a 0-100 visual analogue scale. The RPFS is half the size of the original, containing 22 items. This is significant for clients suffering from cancer who have very little energy and lack the attention span to complete long questionnaires. The revised scale is less of a burden on the energy level of clients, requiring only 10 to 15 minutes to complete (Wu & McSweeney, 2001).

Following the factor analysis process, certain sub-scales were omitted and those remaining were modified to decrease the burden on the patient completing the questionnaire. The revised version contains four sub-scales, measuring the subjective fatigue of the patient: behavioral/severity (changes in ADLs due to fatigue/effects of fatigue), affective meaning (emotional meaning assigned to fatigue), sensory (mental,

physical, and emotional symptoms of fatigue), and cognitive/mood symptoms (Piper et al., 1998).

Cronbach's alpha coefficient for the internal consistency of the older scale has been estimated, ranging from 0.92 to 0.96 for the four sub-categories, in various studies (Holley, 2000; Piper et al., 1998; Woo, Dibble, Piper, Keating, & Weiss, 1998; Wu & McSweeney, 2001). The Cronbach's alpha coefficient for internal consistency was determined by a panel of experts and a thorough literature review. Construct validity of the older scale was established through a correlation to the Fatigue Symptom Checklist ($r = 0.55$), as well as with the fatigue sub-category of the Profile of Mood States ($r = 0.42$) (Mock et al., 1997).

The internal consistency for the revised scale is 0.97, which according to Piper et al. (1998) indicates a good level of reliability. Each sub-scale was also assigned a Cronbach's Alpha co-efficient, ranging between 0.30 – 0.70 (Piper et al., 1997). Piper et al. (1997) did point out certain limitations of the revised version, primarily that it was tested with breast cancer patients. The RPFS has not been used as extensively as the older version; however, it is increasing in popularity.

In order to determine the correlation co-efficients for the present study, the split-half technique was used (Polit & Hungler, 1999). The following are the correlation co-efficients for each separate sub-scale: behavioral/severity ($r = 0.81, p = 0.01$, two-tailed), affective ($r = 0.97, p = 0.01$, two-tailed), sensory ($r = 0.86, p = 0.01$, two-tailed), cognitive/mood ($r = 0.81, p = 0.01$, two-tailed). All of the alphas demonstrate very good internal consistency for each of the sub-scales. The correlation co-efficient for the entire

tool was $r = 0.66$ ($p = 0.01$, two-tailed), which again demonstrates good internal consistency (Polit & Hungler, 1999).

The scoring of the RPFS is relatively straightforward but can be slightly difficult if values are missing. The tool contains 22 items that require a visual analogue score (VAS) from zero to ten. As previously stated, four dimensions of fatigue are divided into sub-scales, with five to six scales each. The other five items provide qualitative data but are not configured into the score.

To obtain the score for each separate sub-scale, the final scores for each VAS item, in each sub-scale, are added together. This number is then divided by the total number of VAS items, which is either five or six. This final number is the total score for the sub-scale. If there are any data missing, a substitution is made of the average value of the provided answers for the missing piece. The participant should have answered at least 75% to 80% of the items in order to apply this revision. To obtain the overall fatigue score, each sub-scale's items are added together and the result divided by 22. This will allow for the score to remain on the same zero to ten VAS.

The first section of the revised scale consists of twenty-two questions in which the responses are measured from zero to ten, with zero signifying a low rating and ten a high rating. The questions are divided into four sub-categories measuring different components of fatigue: affective (emotional) meaning (five questions); behavioral/severity factors (six questions); cognitive/mood factors (six questions); and sensory (physical symptoms) (five questions) (Piper et al., 1998). Each sub-category had a unique set of questions, in which a different value was associated with zero and ten. The score from each question, in each sub-category, is added together and the result is

divided by the total number of questions in that sub-category. This is the total score for each sub-category. The score from each set of questions in each sub-category is added together and divided by four (total number of sub-categories). This overall score is considered the participant's fatigue score, with higher scores signifying higher levels of fatigue (Piper et al., 1998).

The RPFS has been used in various studies related to cancer and settings, with the majority involving breast cancer clients. One study was located that implemented the tool with prostate cancer clients and is discussed in the following chapter. Both the original tool and the revised edition were designed using breast cancer clients as participants.

Incentives and Barriers to Exercise Scale (IBES)

To measure probable adherence levels of participants to exercise, and answer research question number two, the Incentives and Barriers to Exercise Scale (IBES) created by Leddy (1997) was utilized. The IBES is a simple tool to implement and requires little effort for the client to complete. It takes an average of only five to ten minutes to complete. IBES was tested with a population of breast cancer clients. Leddy (1997) composed a list of the incentives and barriers that existed for these women and compared them to the literature in designing the IBES.

The scale is composed of eight separate incentives and eight barriers to exercise, for a total of 16 items. The incentives listed in the IBES are the following: expectation of benefit, responsibility, enjoyment, previous experience/exercise, spouse or family, professionals, fear of complications, and guilt. The barriers listed in the IBES are the following: lack of time, inertia (lack of energy), not in routine, no partner, dislike, afraid, hard, and expensive. Each incentive and barrier is rated on a zero-to-ten scale, with zero

signifying no influence on the client's decision whether to participate in exercise (Leddy, 1997).

Interrater reliability for the IBES was determined by a doctorally prepared nurse and a clinical nurse, each reviewing the interviews of the sample examined, breast cancer patients. A value of 93% was assigned to the interrater reliability of the incentive and barrier interview content (Leddy, 1997). A value of 95% was assigned to the interrater reliability of the categories that were created from the interview content. This same interview content was also compared to other studies of adherence that were not cancer-related. Alpha co-efficients were assigned to the incentive section (0.64), and the barrier section (0.79). As well, the alpha co-efficient for the internal consistency of the entire tool was 0.60. IBES, was tested with a small number of women ($N = 64$), which makes generalizing the tool and results to other populations difficult. In the present study, IBES was tested with only 31 men, an even smaller number of participants. Therefore, further studies with larger populations of participants are required.

For the present study, the reliability co-efficient of the IBES was calculated using the split-half technique. The internal co-efficient for the present study was 0.84 ($p < 0.01$, 2 tailed). This is considered a high co-efficient, which signifies good internal consistency for this study (Polit & Hungler, 1999); however, the small sample may have affected these results.

Leddy (1997) does discuss the limitations of her study. The primary limitation concerns the limited use of the tool, specifically, with one population of clients diagnosed with cancer. As well, the sample of breast cancer clients was relatively small ($N = 64$). Both of these limitations affect the generalizability of the results to other populations.

The incentives and barriers that existed for these breast cancer clients may not be the same ones that exist for men with prostate cancer.

In review, the scoring of the IBES is straightforward and is easily performed with a calculator. Each separate incentive and barrier is rated on a scale from zero to ten. Following this, the total ratings for incentives and barriers are calculated from the ratings of each individual incentive and barrier. This provides insight into whether the individual felt that there were more incentives or barriers to exercise. To obtain an overall score, known as the Decisional Balance Index (DBI), the total score for the barriers is subtracted from the total score of the incentives. The total DBI can range from - 72 up to + 72 (Leddy, 1997). A positive score indicates that there were more incentives than barriers to exercise for the individual. A negative score indicates that there were more barriers to incentives. The statistical testing of this data was performed using the SPSS for Students Program. Three men in the study refused to complete this section of the study following the Revised Piper Fatigue Scale.

Correlation Testing

To answer the third research question, the parametric test of Pearson's r was conducted. Pearson's r is a test of the possible relationship between two variables (Polit & Hungler, 1999). The correlation co-efficient that is the result signifies "...the magnitude and direction..." of the possible relationship (Polit & Hungler, 1999, p. 489). The total score for the IBES, and the total score for the RPFS and each sub-section, were analyzed to obtain the r co-efficient through the SPSS Student Program. As well, to further examine the r co-efficient, a scatter plot was generated. The purpose of the scatter

plot was to obtain a visual picture of the direction and magnitude of the relationship through the range of scores and the clustering of such.

Interview Questions

The open-ended questions were created by the researcher in collaboration with Dr. Roberta Woodgate, who is an acknowledged expert in qualitative methods. The main purpose of the open-ended questions was to explore the personal experience of fatigue in each client's own words and to answer research questions four and five.

Data Collection Process

Informed consent was obtained from all participants who agreed to be part of the study. Following this, each participant was given a folder containing the following: a demographic questionnaire, the Revised Piper Fatigue Scale, the Incentives and Barriers to Exercise Scale, a copy of the information letter (Appendix F) explaining the study, and a copy of the consent form (Appendix G) for his records. Participants were encouraged to review the contents of the package and ask any questions before beginning. An information letter (Appendix H) was also given to any health care professionals involved in the study.

For the majority of the interviews, it was only the researcher and the participant in the conference room. There were, however, five participants who requested that their spouses be present during the interview. The spouses were very supportive during the interview and provided another perspective for the client to consider when completing the questionnaires. The spouses also provided the researcher with an added perspective, and in some instances, gave a more in-depth description of the client's fatigue. The researcher answered any questions that arose during the interview, with regards to the

questionnaires. The researcher remained silent during the interview to limit possible influence on the participant's responses. All participants received the same instructions before the interview commenced. These instructions involved an overview of the questionnaires; confidentiality; and a statement that there was no obligation to answer any questions that made the participant feel uncomfortable.

As previously stated, the setting was comfortable and quiet for the participant. The participant was provided with as much time as needed. All of the interviews took under forty-five minutes. At the end of the interview, each participant was thanked for his involvement and time.

A selected group of ten participants was chosen from all of the men in the study. Again, it was a convenience sample and the interest of the participants was confirmed before informed consent was obtained. The participant was informed that the interview would be longer (approximately an additional thirty to forty minutes) and it would be tape recorded and was made aware of the questions that would be discussed. If the participant agreed to take part in the extended interview with the researcher, he checked the "yes" box on the consent form.

Ethical Implications/Considerations

Approval for the study was granted primarily by the researcher's thesis committee. Following acceptance from the thesis committee (Appendix H), the proposal was submitted to the Education/Nursing Research Ethics Board (ENREB) at the University of Manitoba for approval. This process took two months (January - February) to complete as there were issues that surrounded who would be obtaining the consent of the participants. Following the approval from ENREB (Appendix J), the study proposal

was submitted to the RIC (Resource Impact Committee) of Cancer Care Manitoba for access approval. This process took three months to complete (February – April) due to the schedule of the committee and issues surrounding obtaining informed consent from participants. Acceptance for the study by the RIC was finally granted in April (Appendix K).

As previously discussed, the participants were identified by their diagnosis, chosen treatment, and prostate cancer staging as potential candidates by the radiation oncologist in consultation with the researcher. Following this, these individuals were asked by the radiation nurse if they would be interested in participating in the study. At this time the researcher provided the potential participant with an information letter detailing the study and its purposes. As well, the information sheet provided an overview of the roles of the researcher and the participant and the possible dissemination of results following completion of the study. If the participant agreed to continue with the study, a detailed consent form was presented. The participant was given as much time as needed to read the consent form and to ask any questions before signing. The participant was provided with a copy of both the information letter and consent form for his records. The contact information for the researcher, the Ethics boards, and the researcher's thesis advisor were provided to the client in the information sheet. The participant was given the choice of participating in the study at the time or the choice of contacting the researcher at a later date. Informed consent was obtained from every participant by the researcher. The possibility of withdrawing from the study at any time, without penalty, was stressed to each participant and was stated on the information sheet. There was no risk or occurrence of harm to the participants in the study.

Confidentiality was explained and guaranteed to each participant. Participants were asked not to identify their set of questionnaires; with all information remaining anonymous. The questionnaires were given random numbers for coding purposes. The signed consent forms, with the address of each participant, were kept separate from the questionnaires. The researcher was the sole individual to access the charts of the participants with permission from the Resource Impact Committee. During the study, the researcher was the only individual to have access to the data. Data collected during the study will remain locked in a filing cabinet for five years and then will be destroyed.

There were a small number of ethical considerations to take into account. Primarily, if any of the participants revealed serious medical and/or psychological concerns, the researcher would notify the appropriate health care professionals. This was made clear in the consent forms that the participants received. Two participants identified feelings of extreme fatigue which were mentioned to the radiation oncologist. As well, a significant number of men identified problems with sexual functioning and were directed to the sexual health nurse. No other ethical concerns arose during the study.

Summary

This chapter has provided a detailed overview of the methodology of the study which included the research design, the process of subject recruitment, sample criteria, research setting, data collection process and tools, and ethical considerations.

Chapter 5

Findings

This chapter will present the findings of this exploratory and descriptive study. An overview of the demographic variables will be presented, to provide insight into the characteristics of the sample. The five research questions will be analyzed, from the two quantitative questionnaires and qualitative interviews. A power analysis will be performed at the completion of the chapter, to determine if a type II error occurred.

Demographic Data

Table 5.01 presents the participant's characteristics and treatment background. The most frequent respondent was a Caucasian man (93.5%) between the ages of 60 to 79 years of age (77.4%), who had high school education (32.3%) or less than high school (25.8%), was retired (71.0%), had an income of \$20,001 to \$40,000 (71%), was married (64.5%), and lived in Manitoba (67.7%).

Table 5.01 – Demographic Variables of Participants

| Demographic Variables | Total Sample (N = 31) |
|---------------------------------------|-------------------------------|
| Patients' Current Age (years): | |
| 40 - 49 | 1 (3.2%) |
| 50 - 59 | 1 (3.2%) |
| 60 - 69 | 12 (38.7%) |
| 70 - 79 | 12 (38.7%) |
| 80 - 89 | 6 (16.1%) |

| Demographic Variables | Total Sample (N = 31) |
|------------------------------------|-------------------------------|
| Highest Education Level: | |
| Less than junior high | 5 (16.1%) |
| Less than high school | 8 (25.8%) |
| High school | 10 (32.3%) |
| University | 4 (12.9%) |
| College | 3 (9.7%) |
| Post-Secondary | 1 (3.2%) |
| Current Employment Status: | |
| Full-time | 6 (19.4%) |
| Part-time | 3 (9.7%) |
| Retired | 22 (71.0%) |
| Current Yearly Income (\$): | |
| Less than \$20,000 | 4 (12.9%) |
| \$20,001 – \$40,000 | 17 (54.8%) |
| \$40,001 – \$60,000 | 6 (19.4%) |
| Greater than \$60,000 | 3 (9.7%) |
| Missing | 1 (3.2%) |
| Current Marital Status: | |
| Married | 20 (64.5%) |
| Common-law | 1 (3.2%) |
| Single | 3 (9.7%) |
| Widowed | 3 (9.7%) |
| Divorced | 3 (9.7%) |
| Separated | 1 (3.2%) |
| Birthplace: | |
| Manitoba | 21 (67.7%) |
| Another province | 6 (19.4%) |
| Outside of Canada | 1 (3.2%) |
| Outside of North America | 3 (9.7%) |
| Identified Ethnic Group: | |
| Aboriginal | 2 (6.5%) |
| White | 29 (93.5%) |

Disease and Treatment Data

Table 5.02 presents the data of the treatment and disease variables of the participants. In review of the data, the majority of participants had a Gleason score of 7 (22.6%) or 8 (25.8%), with 67.7% of participants having had moderately-differentiated, intermediate grade tumors. The predominant grade of tumor was T2 (48.4% of participants), Nx (35.5% of participants), Mo (32.3% of participants). PSA levels ranged from zero to 799 at diagnosis, with 41.9% of participants having levels between zero to ten. Many participants were within one year of diagnosis (38.7%) or five years (35.5%) with an overwhelming majority (90.4%) having had previous treatment. In this study, at diagnosis, 35.5% of participants received some type of surgery, 87.1% received some form of hormonal therapy, 48.4% receiving external beam radiation, and only 16.1% receiving some form of chemotherapy. In respect to current treatment, 45.2% of participants were undergoing radiation, and 54.8% were receiving some form of hormonal therapy. Finally, current PSA levels ranged from zero to ten for 93.5% of participants.

Table 5.02 – Disease and Treatment Variables of Participants

| Disease and Treatment Variables | Total Sample (N = 31) |
|--|-------------------------------|
| Gleason Score at diagnosis: | |
| 1+1 | 1 (3.2%) |
| 2+2 | 1 (3.2%) |
| 3+2 | 1 (3.2%) |
| 3+3 | 7 (22.6%) |
| 3+4 | 8 (25.8%) |
| 3+5 | 3 (9.7%) |
| 4+3 | 4 (12.9%) |
| 4+4 | 2 (6.5%) |
| 4+5 | 1 (3.2%) |
| 5+4 | 3 (9.7%) |

| Disease and Treatment Variables | Total Sample (N = 31) |
|---|---|
| Total Gleason Score at diagnosis: Well-differentiated, low grade Moderately differentiated, intermediate grade Poorly differentiated, high grade Poorly intermediate, high grade | 2 (6.5%) 21 (67.7%) 6 (19.4%) 2 (6.5%) |
| Stage/Grade (of tumor) at diagnosis: T1c – tumor found in needle biopsy, cannot be palpated T2 – tumor present clinically or grossly but limited to the gland T2a – tumor involves one lobe only T2b – tumor in more than one lobe T3 – tumor invades the prostate capsule but is not fixed T3a – extra-capsular extension (unilateral or bilateral) T3b – tumor invades seminal vesicles T4 – tumor is fixed to or invade adjacent structures | 3 (9.7%) 1 (3.2%) 6 (19.4) 9 (29.0%) 1 (3.2%) 2 (6.5%) 2 (6.5%) 3 (9.7%) |
| Stage/Grade (node involvement) at diagnosis Nx – regional lymph nodes cannot be assessed No – no regional lymph node metastases Missing | 11 (35.5%) 9 (29.0%) 11 (35.5%) |
| Stage/Grade (distant metastasis) at diagnosis Mx – distant metastasis cannot be assessed Mo – no distant metastasis M1 – distant metastasis Missing | 7 (22.6%) 10 (32.3%) 1 (3.2%) 13 (41.9%) |

| Disease and Treatment Variables | Total Sample (N = 31) |
|--|-------------------------------|
| Time since diagnosis (years): | |
| Within one year | 12 (38.7%) |
| Within two years | 3 (9.7%) |
| Within three years | 1 (3.2%) |
| Within four years | 2 (6.5%) |
| Within five years | 11 (35.5%) |
| Missing | 1 (3.2%) |
| Previous treatments: | |
| No | 3 (9.7%) |
| Yes | 14 (45.2%) |
| Multiple | 14 (45.2%) |
| Prostate Specific Antigen (PSA) at diagnosis (ng/ml): | |
| 0 – 10 | 13 (41.9%) |
| 11 – 20 | 9 (29.0%) |
| 21 – 29 | 2 (6.5%) |
| 30 – 39 | 3 (9.7%) |
| 80 – 89 | 1 (3.2%) |
| 200 – 299 | 1 (3.2%) |
| 700 – 799 | 1 (3.2%) |
| Missing | 1 (3.2%) |
| Testosterone level at diagnosis (ng/dl): | |
| 0 – 1.00 | 3 (9.7%) |
| 1.00 – 9.99 | 5 (16.1%) |
| 10.00 – 19.99 | 0 |
| 20.00 – 29.99 | 0 |
| Missing | 23 (74.2%) |
| Surgery at diagnosis: | |
| No | 20 (64.5%) |
| Prostatectomy | 4 (12.9%) |
| Pelvic Lymphadentecomy | 5 (16.1%) |
| Prostatectomy and pelvic lymphadentecomy | 2 (6.5%) |

| Disease and Treatment Variables | Total Sample (N = 31) |
|--|-------------------------------|
| Hormone Therapy at diagnosis: | |
| No | 4 (12.9%) |
| Zoladex and Casodex | 5 (16.1%) |
| Zoladex | 4 (12.9%) |
| Casodex | 4 (12.9%) |
| Lupron and Casodex | 9 (29.0%) |
| Lupron | 3 (9.7%) |
| Other | 2 (6.5%) |
| Length of first hormone therapy at diagnosis (years): | |
| 1 - 5 months | 10 (32.3%) |
| 6 - 9 months | 3 (9.7%) |
| 10 - 13 months | 7 (22.6%) |
| Missing | 11 (35.5%) |
| Second Hormone Therapy after diagnosis: | |
| No | 25 (80.6%) |
| Zoladex and Casodex | 1 (3.2%) |
| Zoladex | 3 (9.7%) |
| Lupron and Casodex | 1 (3.2%) |
| Lupron | 1 (3.2%) |
| Length of second hormone therapy after diagnosis: | |
| 1 - 5 months | 1 (3.2%) |
| 6 - 9 months | 1 (3.2%) |
| 10 - 13 months | 3 (9.7%) |
| Missing | 26 (83.9%) |
| Radiation treatment at diagnosis: | |
| No | 16 (51.6%) |
| External Beam | 15 (48.4%) |

| Disease and Treatment Variables | Total Sample (N = 31) |
|--|-------------------------------|
| Length of first radiation treatment at diagnosis: | |
| 1 month | 6 (19.4%) |
| 2 months | 6 (19.4%) |
| 4 months | 5 (16.1%) |
| 11 months | 1 (3.2%) |
| 13 months + | 2 (6.5%) |
| Missing | 11 (35.5%) |
| Radiation field size at diagnosis: | |
| Prostate bed | 8 (25.8%) |
| Prostate bed and seminal vesicles | 4 (12.9%) |
| Bone | 2 (6.5%) |
| Pelvis | 1 (3.2%) |
| Missing | 16 (51.6%) |
| Second radiation treatment after diagnosis: | |
| No | 27 (87.1%) |
| External Beam | 4 (12.9%) |
| Length of second radiation treatment after diagnosis: | |
| 1 – 5 months | 4 (12.9%) |
| Missing | 27 (87.1%) |
| Second radiation field size after diagnosis: | |
| Prostate bed | 2 (6.5%) |
| Prostate bed and seminal vesicles | 1 (3.2%) |
| Bone | 1 (3.2%) |
| Missing | 27 (87.1%) |
| Third radiation treatment after diagnosis: | |
| No | 21 (67.7%) |
| External Beam | 4 (12.9%) |
| Length of third radiation treatment after diagnosis: | |
| 1 - 5 months | 3 (9.7%) |
| Missing | 28 (90.3%) |

| Disease and Treatment Variables | Total Sample (N =31) |
|--|------------------------------|
| Third radiation field size after diagnosis: | |
| Bone | 3 (9.7%) |
| Missing | 28 (90.3%) |
| Chemotherapy: | |
| No | 26 (83.9%) |
| Zometa | 3 (9.7%) |
| Pamidronate | 1 (3.2%) |
| Other | 1 (3.2%) |
| Length of chemotherapy: | |
| 1 - 5 months | 2 (6.5%) |
| 6 – 9 months | 1 (3.2%) |
| 10 - 13 months | 1 (3.2%) |
| Missing | 27 (87.1%) |
| Other treatments: | |
| No | 23 (74.2%) |
| Yes | 8 (25.8%) |
| Length of other treatments: | |
| 1 – 5 months | 3 (9.7%) |
| Missing | 28 (90.3%) |
| Current treatments: | |
| No | 1 (3.2%) |
| Yes | 30 (96.8%) |
| Current radiation treatment: | |
| No | 16 (51.6%) |
| External beam | 12 (38.7%) |
| Brachytherapy | 2 (6.5%) |
| Missing | 1 (3.2%) |
| Length of current radiation treatment: | |
| 1 – 5 months | 14 (45.2%) |
| Missing | 17 (54.8%) |

| Disease and Treatment Variables | Total Sample (N = 31) |
|--|-------------------------------|
| Current radiation field size: | |
| Prostate bed | 8 (25.8%) |
| Prostate bed and seminal vesicles | 4 (12.9%) |
| Bone | 1 (3.2%) |
| Missing | 18 (58.1%) |
| Volume of current radiation: | |
| 2000 cGy | 1 (3.2%) |
| 4600 cGy (pelvis) + 2600 cGy (prostate & SV) | 2 (6.5%) |
| 5200 cGy | 1 (3.2%) |
| 6400 cGy | 2 (6.5%) |
| 6600 cGy | 1 (3.2%) |
| 7000 cGy | 2 (6.5%) |
| 7200 cGy | 3 (9.7%) |
| Missing | 20 (64.5%) |
| Current hormone therapy: | |
| No | 12 (38.7%) |
| Zoladex and Casodex | 3 (9.7%) |
| Zoladex | 5 (16.1%) |
| Casodex | 1 (3.2%) |
| Lupron and Casodex | 5 (16.1%) |
| Lupron | 2 (6.5%) |
| Lupron and Casodex and Zoladex | 1 (3.2%) |
| Other | 2 (6.5%) |
| Length of current hormone therapy: | |
| 1 - 5 months | 10 (32.3%) |
| 10 - 13 months | 2 (6.5%) |
| Missing | 19 (61.3%) |
| Current PSA (ng/ml): | |
| 0 – 10.00 | 29 (93.5%) |
| 100 – 199.99 | 2 (6.5%) |

| Disease and Treatment Variables | Total Sample (N = 31) |
|--|-------------------------------|
| Current testosterone (ng/dl): | |
| 0 – 1.00 | 8 (25.8%) |
| 1.01 – 9.99 | 2 (6.5%) |
| 20.00 – 29.99 | 1 (3.2%) |
| Missing | 20 (64.5%) |

The demographic data is very interesting and provides a detailed picture of the characteristics of the participants. The participants were asked to list either their current or past occupations in order to determine any trends/patterns. Occupations listed included: school director, building inspector, bushman, mechanic, salesman, carpenter, railroad supervisor, commercial pilot, farmer, bus driver, insurance agent, machinery operator, meat cutter, pastor, welding supervisor, research technician, trapper, fisherman, cattlemen, truck driver, pipe fitter/copper smelter, and watchmaker. The majority of these occupations required moderate to intense labor.

Another variable examined was the presence of pre-existing co-morbidities. Every single participant listed at least one or more co-morbidities. The following constitute a condensed list of co-morbidities: arthritis, cardiac disease, depression, diabetes, pain issues, bladder cancer, skin cancer, anemia (n =1), kidney disease, hormone therapy related-side effects, and stroke. The majority of men had some history of cardiac disease and/or diabetes, while a small number of patients (n = 2) were coping with metastasis.

Findings of the Research Questions

Research Question One: What Is the Self-Reported Level of Fatigue for Prostate Cancer Patients Undergoing Radiation and/or Hormonal Therapy?

To answer research question two, the Revised Piper Fatigue Scale (RPFS) was utilized and the final score represented the self-reported levels of fatigue of the men in this study. The following data (Table 5.09) are the total scores for each sub-section of the RPFS.

Table 5.03 – Total Scores for the Sub-Sections of the RPFS: Frequency of Scores

| Revised Piper Fatigue Scale Scores | Total Sample (N = 31) |
|---|-------------------------------|
| Total score for behavioral/severity sub-scale: | |
| 0 - .99 | 9 (29.0%) |
| 1.00 – 3.99 | 14 (45.2%) |
| 4.00 – 6.99 | 6 (19.4%) |
| 7.00 – 10 | 2 (6.5%) |
| Missing | 0 |
| Total score for affective sub-scale: | |
| 0 - .99 | 10 (32.3%) |
| 1.00 – 3.99 | 8 (25.8%) |
| 4.00 – 6.99 | 9 (29.0%) |
| 7.00 – 10 | 4 (12.9%) |
| Missing | 0 |
| Total score for sensory sub-scale: | |
| 0 - .99 | 6 (19.4%) |
| 1.00 – 3.99 | 9 (29.0%) |
| 4.00 – 6.99 | 12 (38.7%) |
| 7.00 – 10 | 4 (12.9%) |
| Missing | 0 |

| Revised Piper Fatigue Scale Scores | Total Sample (N = 31) |
|---|-------------------------------|
| Total score for cognitive/mood sub-scale: | |
| 0 - .99 | 9 (29.0%) |
| 1.00 – 3.99 | 15 (48.4%) |
| 4.00 – 6.99 | 6 (19.4%) |
| 7.00 – 10 | 1 (3.2%) |
| Missing | 0 |
| Total score for the Revised Piper Fatigue Scale: | |
| 0 - .99 | 8 (25.8%) |
| 1.00 – 3.99 | 11 (35.5%) |
| 4.00 – 6.99 | 11 (35.5%) |
| 7.00 – 10 | 1 (3.2%) |
| Missing | 0 |

Many intriguing findings are presented in Table 5.09 from the data elicited through the Revised Piper Scale. There were 51.6% of the participants in this study (n = 30) who stated that they had been experiencing fatigue of no specific intensity for months. On the other hand, 22.6% of the participants in this study stated that they were experiencing no fatigue. The most frequent overall fatigue score was between zero and four that is a mild level for 61.3% of the total sample. Therefore, a moderate percentage of participants in this study were experiencing fatigue of a mild intensity. The majority of scores, for each sub-scale in each section, fell between the zero and four, which is considered a low score. There were a small number of participants who provided high ratings in each sub-scale; and these were also the participants suffering from metastasis.

The final scores for the RPFS demonstrate that the highest percentage of participants (71%) in this study rated their fatigue as mild to moderate. The highest

scores were seen in the sensory domain with 12% of participants having severe ratings and 38.7% having moderate ratings

The following tables (5.10, 5.11, 5.12, and 5.13) detail the answers provided by the men in this study to the qualitative questions of the RPFS. The main purpose of the qualitative questions was to obtain a more detailed view of the participants' fatigue as put into their own words.

Table 5.04 – Qualitative Data of the RPFS: Causes of Fatigue

| |
|--|
| Overall, what do you believe is most directly contributing to or causing your fatigue? |
| <ul style="list-style-type: none"> - Age (n = 6) - Physical activity (n = 4) - Co-morbidities (n = 3) - Psychological distress (n = 2) - Disease (n = 1) - Radiation (n = 6) - Hormonal Therapy (n = 6) - Pain (n = 3) - No fatigue (n = 3) - No response (n = 8) |

Table 5.05 – Qualitative Data of the RPFS: Strategies to Relieve Fatigue

| |
|---|
| Overall, the best thing you have found to relieve your fatigue is? |
| <ul style="list-style-type: none"> - Physical Activity (n = 6) - Attitude (n = 2) - Rest (n = 19) - No response (n = 5) |

Table 5.06 – Qualitative Data of the RPFS: Description of Fatigue

| Is there anything else you would like to add that would describe your fatigue better to us? |
|--|
| <ul style="list-style-type: none"> - “Not the same get up and go, slows you down, make different choices in your life, only have so much energy, different ways of doing different things, priorities” - “Cannot add numbers” - “Hardly- I am getting older, slower, less able to walk as fast as I used to. Snow shoveling is harder work now. Yard work is slower and more taxing” - “Not sleeping as well” - “Mental stimulation from work, miss that, nothing to do too often” - “Nauseated when I get tired” - Nil (n = 18) - No response (n = 6) |

Table 5.07 – Qualitative Data of the RPFS: Other Presenting Symptoms

| Are you experiencing any other symptoms right now? |
|--|
| No |
| Yes, please describe |
| <ul style="list-style-type: none"> - Urinary symptoms (n = 7) - Depression (n = 1) - Pain (n = 5) - Hot flushes (n = 3) - Bowel symptoms (n = 2) - Sexual concerns (n = 1) - Swelling in feet and face (n = 1) - No (n = 12) - No response (n = 3) |

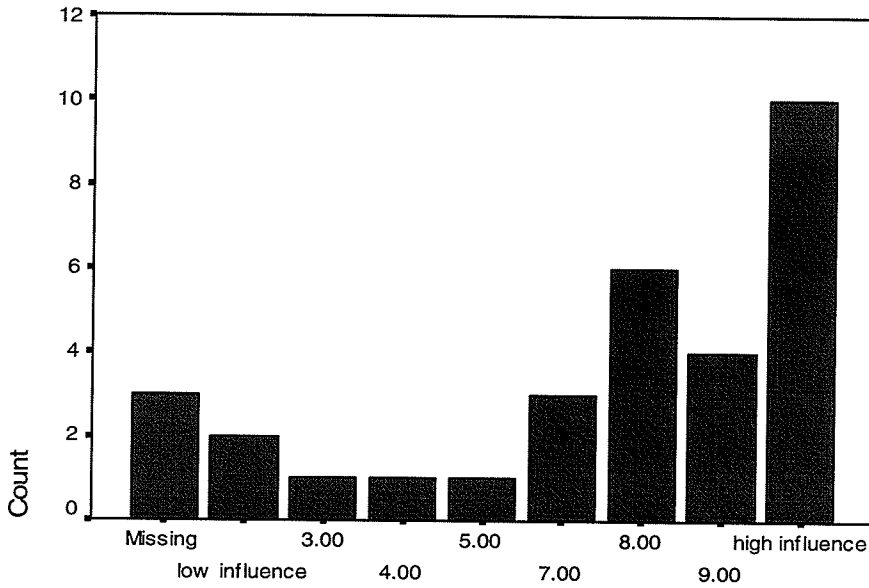
In summary, a small number of participants (n = 6), believed that fatigue was due to their older age, compared to 13 men, who believed it could be due to disease and/or treatment. Three participants stated that they had no fatigue, while seven men did not provide a response. A small number of participants described their fatigue further. The issue of age appeared in two of the statements: “not the same get up and go” and “making different choices”. Over 35.5 % of the patients experienced a level of fatigue which they felt prevented them from engaging in sexual activity. This was a surprising fact and

requires further exploration. In respect to interventions to reduce fatigue, eight men listed some type of physical activity, compared to 20 participants who listed sleep or napping. Finally, 16 of the participants reported having side-effects other than fatigue: seven had urinary symptoms, five had pain, and four had hormonal therapy symptoms.

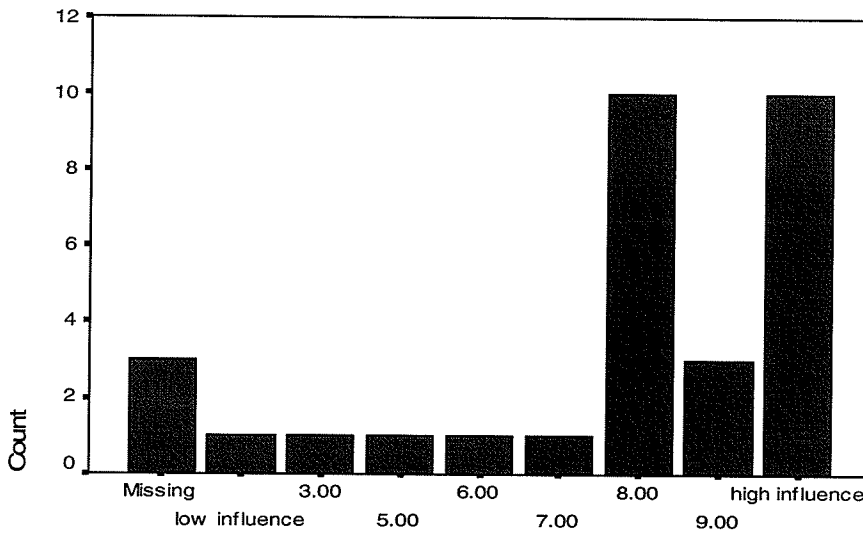
Research Question Two: What Are the Incentives and Barriers for this Population to Participating in an Exercise Program to Reduce Levels of Fatigue?

To answer the stated research question, The Incentives and Barriers to Exercise scale (IBES) was used to address this research question. This tool provided a general overview of the possible incentives and barriers to exercise for prostate cancer patients. Most participants in this study found the IBES easy to complete. Reviewing the results, the two top incentives, which ten (32.3%) of the participants felt influenced their exercise behavior, were expectation of benefit and responsibility (Table 5.03). Other highly-rated incentives were enjoyment, previous experience/exercise, spouse or family and professionals. Table 5.03 provides a graph of responses for the top two rated incentives, expectation of benefit and responsibility. The high ratings given both of these incentives signifies that participants feel that exercising is their responsibility and they believe some benefit will come from participating in physical activity.

Table 5.08 – Most Frequently Reported Incentive(s)



Reasons to exercise: Expectation of benefit

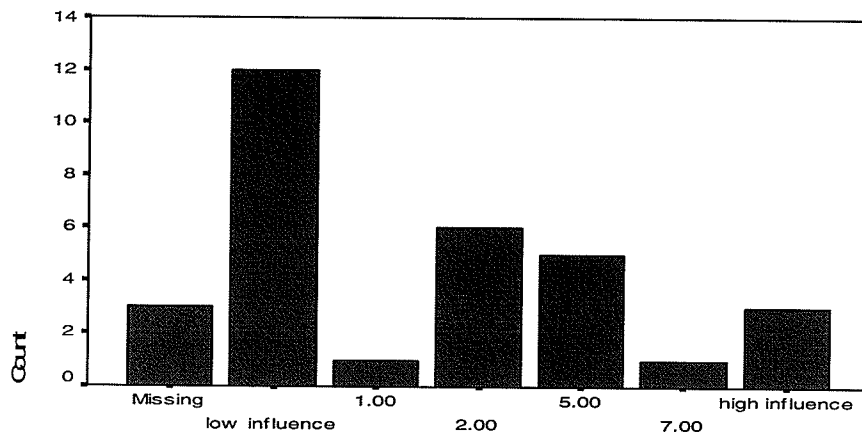


Reasons to exercise: Responsibility

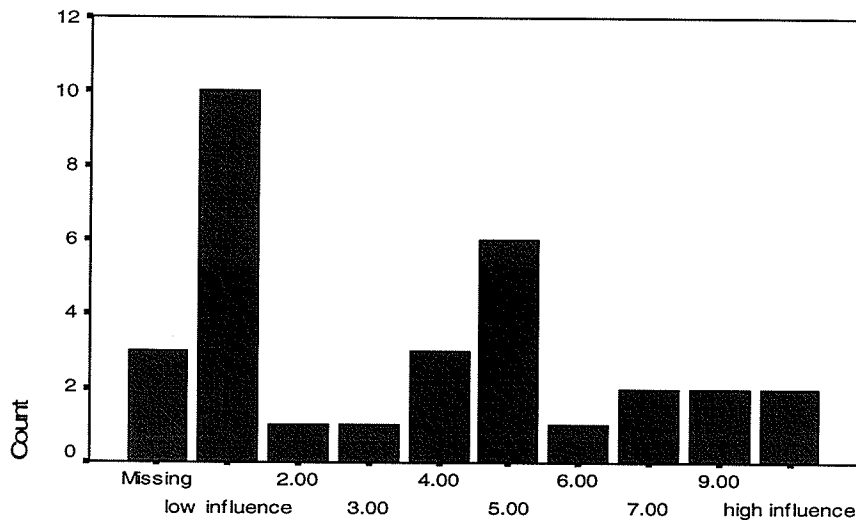
Reviewing the barriers listed by the participants, the most highly-rated were inertia (lack of energy, 6.5%) and hard (9.7%). The subsequent table provides a visual graph of the variety of ratings given by participants to the top two barriers to exercise. From these ratings a certain percentage of participants felt that they lacked the required

energy for exercise, and that exercise was simply too difficult to do. The ratings in the barriers to exercise section of the IBES were lower and highly varied, which made any conclusions difficult.

Table 5.09 – Most Frequently Reported Barrier (s)



Reasons not to exercise: Hard



Reasons not to exercise: Inertia(lack of energy)

The following data, presented in table 5.05, provides the overall scores for the IBES and for each separate sub-section, incentives and barriers.

Table 5.10 – Total Scores for the IBES

| | |
|--|------------------------------|
| Total score for the Incentives to Exercise: | Total sample (N = 31) |
| 0 – 10 | 1 (3.2%) |
| 11 – 20 | 0 |
| 21 – 30 | 1 (3.2%) |
| 31 – 40 | 6 (19.4%) |
| 41 – 50 | 10 (32.3%) |
| 51 – 60 | 8 (25.8%) |
| 61 – 70 | 2 (6.5%) |
| 71 – 80 | 0 |
| Missing | 3 (9.7%) |
| Total score for the Barriers to Exercise: | |
| 0 – 10 | 13 (41.9%) |
| 11 – 20 | 7 (22.6%) |
| 21 – 30 | 0 |
| 31 – 40 | 3 (9.7%) |
| 41 – 50 | 0 |
| 51 – 60 | 0 |
| 61 – 70 | 0 |
| 71 – 80 | 0 |
| Missing | 3 (9.7%) |
| Total Score of the IBES: | |
| -4.00 - -1.00 | 1 (3.2%) |
| 0 – 10 | 0 |
| 11 – 20 | 4 (12.9%) |
| 21 – 30 | 7 (22.6%) |
| 31 – 40 | 9 (29.0%) |
| 41 – 50 | 3 (9.7%) |
| 51 – 60 | 3 (9.7%) |
| 61 – 70 | 1 (3.2%) |
| Missing | 3 (9.7%) |

The overall IBES scores demonstrate that the majority of prostate cancer patients undergoing radiation treatment and/or hormonal therapy have positive scores ranging from 21 to 40. There was one low negative score - -4.00 generated by the participant

suffering from bone metastasis. In review, the positive sign of the score signifies having more incentives than barriers to exercise (highest and lowest score of the IBES are + - 72).

Table 5.11 – Total IBES Incentives Scores: Frequency of Scores

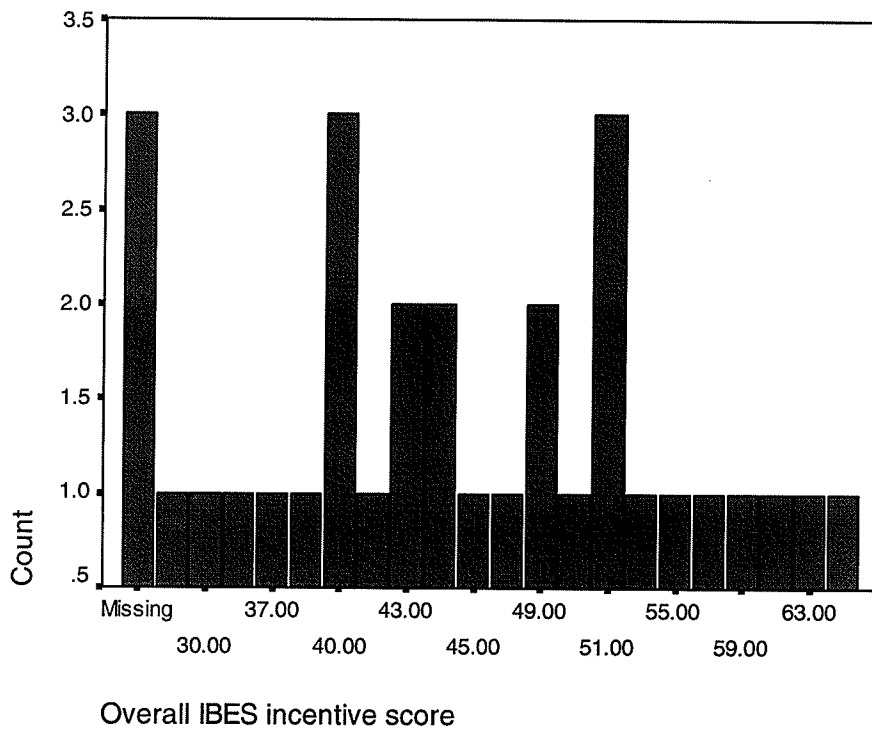


Table 5.12 – Total IBES Barriers Scores: Frequency of Scores

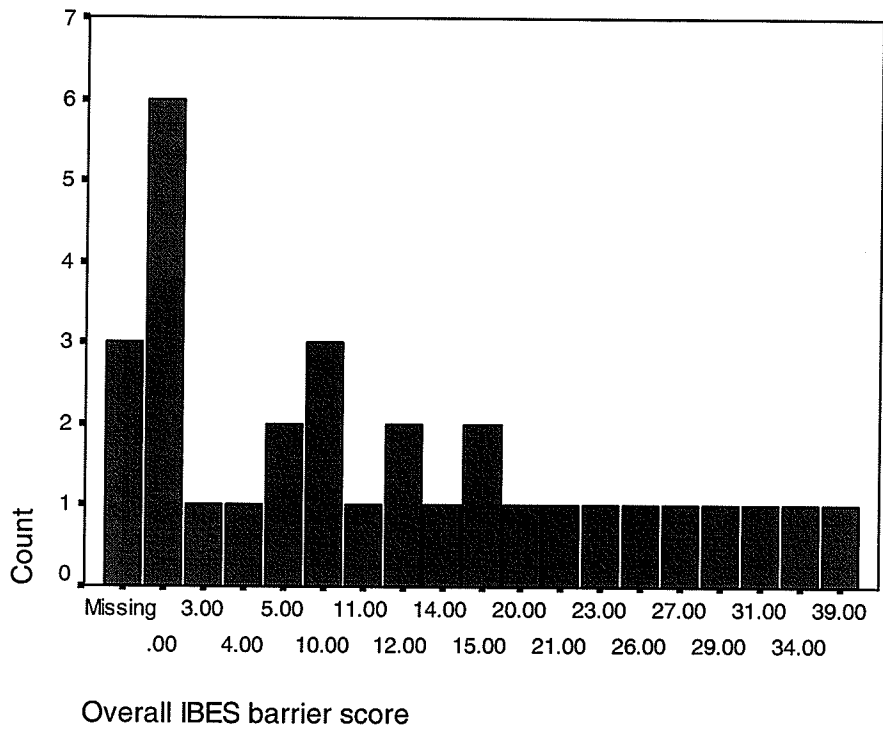
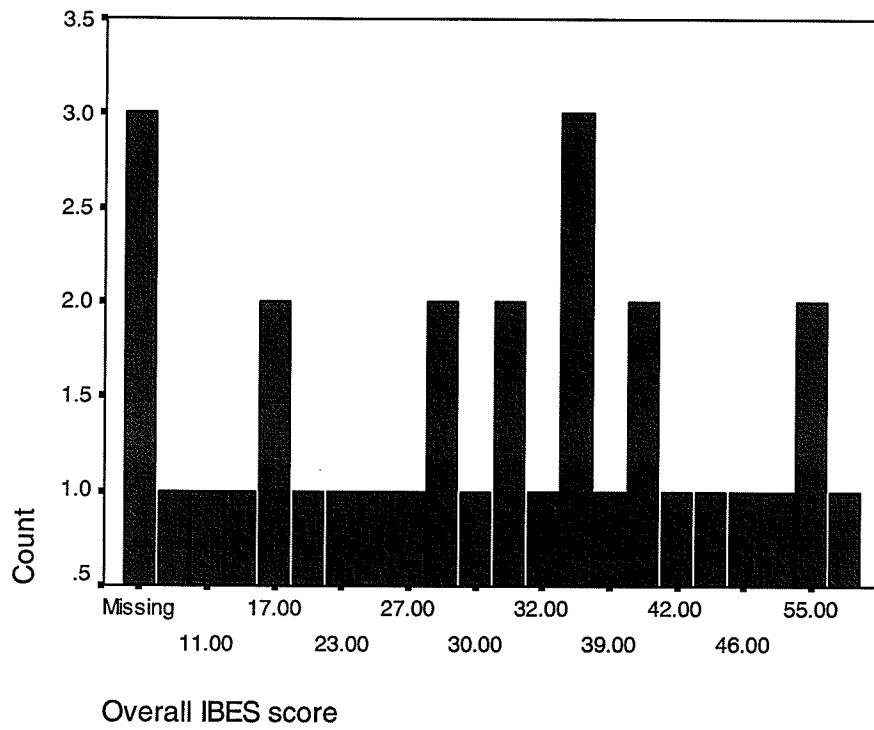


Table 5.13 – Total IBES Scores: Frequency of Scores

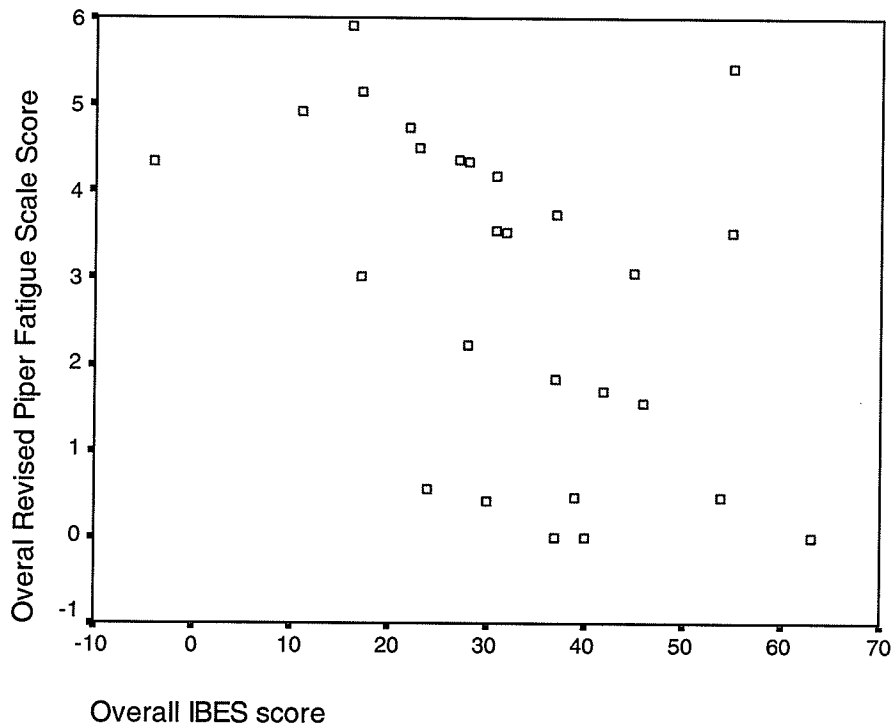


Research Question Three: Is There A Correlation Between the Level of Self-Reported Fatigue and the Probable Adherence Level?

To answer the third research question, the parametric test of Pearson's r was performed. The r co-efficient for the relationship between the IBES and RPFS, was $r = -.481$ ($df = 27$; $p = 0.01$, two-tailed). This signifies a high negative (inverse) relationship between the IBES and RPFS. The negative sign of the relationship signifies that high scores on the IBES are related to the low scores on the RPFS, and vice versa (Polit & Hungler, 1999).

Referring to the scatter plot (Table 5.14), it is obvious that there is a significant relationship between the two, due to the small amount of scattering of the scores and a low number of outlying scores. As well, the negative relationship can be seen from the scattering of scores that goes from the upper left-hand corner down to the right-hand corner.

Table 5.14 – Scatter Plot Diagram: Overall RPFS Scores versus Overall IBES Scores



To further explore the relationship between fatigue and adherence, the total IBES and each sub-section score of the RPFS, were analyzed. The following correlations were obtained: behavioral/severity ($r = -0.195$, non-significant); affective ($r = -0.502$, $df = 27$, $p = 0.01$, two tailed); sensory ($r = -0.501$, $df = 27$, $p = 0.01$, two tailed); and cognitive/mood ($r = -0.458$, $df = 27$, $p = 0.05$, two tailed). The relationship between the IBES and the behavioral/severity was non-significant, while the other relationships were moderately correlated and negative. In conclusion, there is a high, significant relationship between the IBES and the RPFS. We can, therefore, conclude that a high score on the IBES would equal a low score on the RPFS and vice versa. If an individual displays high adherence behavior, he will tend to have a low fatigue score.

Research Question Four: What is the Meaning of Fatigue to This Population?

What Effect Does Fatigue Have on These Individuals?

Unfortunately, only one patient finished the interview and another completed half. The original expected participant rate was ten. The researcher attempted to provide the patients with a variety of options in order to accrue the maximum numbers of men. The consent form contained a section requesting participation in an interview which could take up to forty-five minutes. It provided two options for participating: participate following the completion of the questionnaire, or participate at a later date and time chosen by the participant. To complicate the situation of lack of participants, during the first interview the tape recorder of the researcher would not work properly; therefore, the client's actual verbatim was not captured. However, the researcher attempted to capture as much as possible of the patient's responses by hand.

To make up for the lack of interview material, data given in the qualitative section of the RPFS will be included. Fortunately, the questions on the RPFS are similar to those created by the researcher and Dr. Woodgate.

For the primary and sole participant (Mr. N), sexual concerns outweighed fatigue-related concerns. A subsequent referral was made to the psychosocial department of CancerCare Manitoba. For the first question, Mr. N explained that he feels heavy all over when fatigued, especially in his extremities. He continued on to say that his eyelids become particularly heavy and he has a hard time keeping his eyes open. Mr. N stated that he has no other symptoms, such as nausea, but he would have to go and lay down for a nap. The second participant (Mr. A), who completed the first three questions and then decided to stop due to fatigue, was experiencing pain from bone metastasis. He stated that

his fatigue was hard to describe and differentiate from the pain. Following this, the researcher noticed that the man was struggling to complete the sentence and seemed to become frustrated with not being able to complete his thoughts. Therefore, the researcher did not ask for elaboration; as it seemed more appropriate to allow him to express his thoughts, clear or not.

Mr. N stated that he noticed a difference from the fatigue he had felt before he received his diagnosis and began treatment. Mr. N explained that he was a very active man before “all this happened”, golfing two to three times a week. At the time of the study, Mr. N was requiring a daily nap and was golfing once every second week. As well, Mr. N stated that he was going to bed earlier which was limiting his social time with friends. Mr. N. stated that he had noticed a significant decline in his activity which he attributed to his fatigue. For this second question, Mr. A described a usual day for him as being sleeping on and off in his lazy-boy, but not sleeping at all, at night. Mr. A stated that he felt tired all the time and did not feel any better, and perhaps worse, following his naps. Mr. A briefly discussed how he missed visiting the art gallery and going out to dinner with friends. This provided some insight into the activities that he once enjoyed but could no longer participate in due to his illness.

Mr. A’s fatigue proved to be too intense to continue on, therefore, he withdrew from the interview, at question three, with the intention of completing at a later date. Mr. A did not contact the researcher to set up a future time to continue with the interview. Mr. N described his fatigue as “heaviness” and “change in lifestyle”. Mr. N explained how fatigue had affected his daily life by limiting his social activity and reducing his physical activity. As well, Mr. N was going to bed earlier at night and taking a nap during the day.

It was evident that fatigue had changed the level and amount of physical activity for Mr. N.

To further expand on the experience of fatigue with the other participants in the study, results obtained through the qualitative question on the RPFS are presented in Table 5.15. As with Mr. M, these men described a decrease in energy and physical activity level. One participant described not being able to add numbers, which is the first identification of the mental/cognitive effect of fatigue.

Table 5.15 – Qualitative Data of the RPFS: Descriptions of Fatigue

Is there anything else you would like to add that would describe your fatigue better to us?

- “Not the same get up and go, slows you down, make different choices in your life, only have so much energy, different ways of doing different things, priorities”
- “Cannot add numbers”
- “Hardly- I am getting older, slower, less able to walk as fast as I used to. Snow shoveling is harder work now. Yard work is slower and more taxing”
- “Not sleeping as well”
- “Mental stimulation from work, miss that, nothing to do too often”
- “Nauseated when I get tired”
- Nil (n = 18)
- No response (n = 6)

Research Question Five: What Are the Interventions that These Men Prefer in Combating Cancer-Related Fatigue?

To answer this question, data from the qualitative interview with Mr. N were taken, along with qualitative data from the RPFS. To answer question five, Mr. N stated that the number one intervention for him was to nap. Mr. N indicated he was napping most days and golfing once every second week. Mr. N also stated that he was walking every day, for half an hour to an hour when he had enough energy. Mr. N explained that

his wife was the other major factor in “pushing” him to stay active. Mr. N stated that Mrs. N “kicks him out of the house”.

Mr. N expanded on the type of physical activity he had performed in the past and what he was doing at the present time. One thing Mr. N commented on was how busy he was when he was working full-time to his present “slower” state in retirement. Mr. N had noticed a change in his energy level shortly after his retirement. Mr. N commented that his fatigue may have something to do with his age and his retirement.

Mr. N provided excellent feedback on the final question surrounding the key features of an exercise program to combat fatigue. Mr. N preferred to be physically active with other individuals, such as his wife, who accompanies him on his walks. As well, he stated that he would like to have an organized and daily event. Setting was not important; however, weather would be a concern if the event was outside. Overall, Mr. N expressed a significant desire to be more active than he was at the time of the interview, specifically, with other individuals and in an organized manner.

To provide a brief overview of the interventions used by the other participants in this study, the qualitative data from the RPFS was examined (Table 5.11). There were 20 participants in the study listed nap, sleeping, or rest as an intervention in comparison to eight participants who listed physical activity. There were 2 participants who listed both as interventions to combat fatigue.

Power Analysis

A power analysis was performed to determine the sample size required for a Pearson’ r correlation, to determine whether a relationship exists and to detect a type II error. The sample in this study was very small ($N = 31$) which may not be large enough

to detect a type II error. Therefore, taking a medium effect size ($r = .30$), with a power of .80 and $\alpha = .05$, the necessary sample size would be 88. Maintaining the same conditions but changing the significance level to $\alpha = .01$, the necessary sample size increases to 131. In conclusion, the present study's sample size of 31 is well below both estimates, and this will affect the confidence of results and increase the chances of making a type II error.

Summary

This descriptive study has revealed some intriguing results. The typical participant was a Caucasian man between the ages of 60 to 79 years, who had high school or less, was retired, had an income ranging from \$20,001 to \$40,000, was married, and lived in Manitoba. As well, the majority of men had T2 tumors with Gleason scores ranging from seven to eight and current PSA levels ranging from zero to ten. Over half of the participants had received previous treatment for prostate cancer and were now presently undergoing either radiation therapy and/or hormonal therapy.

The scores for the IBES, which provided an overall score for adherence to exercise programs, have demonstrated low to moderate levels of adherence (21 to 40). The highest rated incentives and barriers for the men were expectation of benefit and responsibility, and inertia and hard, respectively.

The majority of fatigue ratings for this sample of prostate cancer patients fell in the mild to moderate category, with the minority having severe ratings. The major effects of the fatigue for the participants in this study were a decrease in physical activity, a decrease in activities that they enjoy and a decrease sexual activity. There was a significant negative correlation between the total IBES score and the total RPFS score. The correlation coefficient between the two tools was determined with a small sample

size ($N = 31$). Due to the small sample size further examination of the relationship between the IBES and RPFS is required with larger populations.

Unfortunately, the interview process was unsuccessful due to the low sample size of one. Reviewing the qualitative data from the RPFS, however, provided some interesting findings. The experience of fatigue for participants equates with a decrease in physical activity and change in lifestyle. The majority of patients deal with fatigue by napping or sleeping. In conclusion, the power analysis performed indicates that a larger sample is required to produce significant and sound results in future studies.

Chapter 6

Discussion

This chapter will provide a discussion of the findings of this study. Specifically, the prominent findings of the study will be addressed, along with the applicability of the theoretical framework, the appropriateness of the instruments implemented, the limitations of the study and future research recommendations.

Prominent Findings

The first prominent finding in this study was the scores of the patients on the IBES. The top-rated incentives for 32.3% of patients were expectation of benefit and responsibility. In this group 6.5% of the patients rated inertia and 9.7% of the patients rated hard as the top barriers.

Many of the patients in this study discussed, at great length, the respect and regard that they felt toward their physicians. Surprisingly, the physician and/or other health care professionals were not listed as being a top influence on exercise behavior. This finding is congruent with the findings of Blanchard, Courneya, Rodgers, and Murnaghan (2002), but incongruent with those of Courneya, Blanchard, and Laing (2001). The majority of these patients seemed to believe that exercise was their responsibility, and an activity that should have been occurring before their cancer diagnosis. Further conversation with a selected few of these patients revealed that they had great faith in the treatment recommended by the physician. This piece of data is not congruent with the low score assigned to the effect that professionals have on the patient's physical activity. There was no mention of the influence of any other health care professionals on their physical activity. This point should be explored further to determine if exercise is even being

discussed by health care professionals or if it is that patients are not retaining the information provided.

As previously discussed, past exercise behavior is a key determinant affecting pre-and-post-treatment exercise levels (Courneya & Friedenreich, 1997; Courneya, Friedenreich, Sela, Quinney, & Rhodes, 2002). The patients in this study did rate "previous exercise/experience" relatively high. However, many of them discussed having to modify their routine to allow for treatment-related side effects, and more specifically, fatigue and pain.

The incentive results were quite similar to those of the breast cancer population that Leddy (1997) surveyed with the IBES. Women in that study listed expectation of benefit, sense of responsibility, and previous exercise, as influencing their exercise behavior. Surprisingly, both groups in each study did not rate fear of complications or guilt as incentives. This result suggests that the patient's disease did not determine whether or not they exercised, but that the patients did believe that exercise would lead to some benefit. These two points require further clarification due to the fact that expectation of benefit can also be understood as surviving the disease, and/or coping with side effects.

The women in Leddy's (1997) study listed lack of time, inertia and not in routine as the top barriers to exercise. With the exception of inertia, these barriers differed from the results of the patients in this study. The patients listed hard as the second-to-top-rated barrier, which requires further exploration as to the possible reasons for why exercise is considered hard. Many of the patients listed advancing age as contributing to their fatigue and this could be one explanation of why exercise seemed hard. The majority of women

in the study by Leddy (1997) were still of working age, the average age was 47, and were more than likely the primary care-takers of any children and spouses. Most of the patients in this study were over 60, retired, and did not see lack of time as an issue. Most patients stated that "they had too much time on their hands". Lack of time actually received the lowest rating from 90.3% of the patients. Most of the patients led very active lifestyles and had retired from relatively laborious occupations.

The overall IBES scores, in this study, ranged from 20 to 40, with the average being +32 (SD + - 14). In comparison, the women in Leddy's (1997) study averaged a total score of +19. This, being quite a significant difference, shows that the patients in this study had more incentives to exercise than did the women in Leddy's study. These results are very different from what the researcher had expected. It should be noted that the majority of the men in this study and the women in Leddy's study were "healthy" cancer patients who continued to lead full lives.

The second major finding of the study was that 51.6% of patients stated that they were experiencing fatigue for months, compared to the 22% who experienced no fatigue. The majority of patients in the study (71%) rated their fatigue as mild to moderate. Recalling the demographic data collected, 96.8% of the patients in this study were undergoing active treatment, 45.2% receiving radiation, and 61.1% receiving hormonal therapy. Considering that the majority of the patients were on hormonal therapy for less than five months, the fatigue that they reported feeling for months might be due, in part, to past events and/or treatments. This finding is not consistent with the literature, which reveals that most prostate cancer patients undergoing radiation therapy did not report

fatigue until the second week or end of treatment (Magnan & Wood, 2003; Monga et al, 1999; Jonda et al., 2000).

Interference with sexual activity was another area where there was a relatively high amount of fatigue. Over 35.5 % of the patients experienced a level of fatigue which they felt prevented them from engaging in sexual activity. This is definitely an area that requires further research. Many patients expressed to the researcher that they had difficulty with sexual function (through causal conversation), and that the difficulty was due more to lack of sexual desire rather than to fatigue. The patients may not have had a clear understanding of why the problems with sexual function were occurring and may have attributed them more to fatigue than to lack of desire. There were 22.6% of the patients in the study who rated their fatigue as severe enough to interfere with the activities that they enjoy. Over 50% of the patients in this study rated their fatigue intensity as being between mild and moderate. These results indicate that fatigue is a significant side effect for prostate cancer patients undergoing radiation and/or hormone therapy.

The section that created the most difficulty for the patients involved was the rating of two opposite words that described fatigue on a scale from one to ten. The ratings were high in these categories - for example, 25.8% of the patients rated their fatigue as severe, which equated with the word "unpleasant". The majority of patients, upon completing this study, stated that they could not understand how fatigue could be pleasant or agreeable. The consensus was that the positive wording was inappropriate to describe fatigue, and, therefore, the results for this section have to be questioned for reliability.

Another interesting finding was the ratings given to feelings of depression with 41.9 % of the patients giving a moderate rating to feeling depressed. Monga et al. (1999) did not discover any significant relationship between depression and level of fatigue with prostate cancer patients. However, depression has not been a concept that has been thoroughly explored in relation to prostate cancer patients and requires further examination.

The third and most prominent finding of the study concerned the strong relationship between the total score of the IBES and that of the RPFS . The r co-efficient for the relationship between the IBES and RPFS was $r = -.481$ ($df = 27$; $p = 0.01$, two-tailed). This signifies a strong negative (inverse) relationship between the IBES and RPFS. The negative sign of the relationship signifies that high scores on the IBES are related to low scores on the RPFS and vice versa (Polit & Hungler, 1999). The correlation between the IBES and RPFS requires further exploration. This could be an instrumental finding in designing future interventions for fatigue, tested with larger samples.

The final significant finding of the study surrounds interventions to combat cancer-related fatigue. There were 20 patients in the study who listed nap, sleeping, or rest, as an intervention, in comparison to eight patients who listed physical activity. There were two patients who listed both as current interventions to combat fatigue. Further exploration to identify the type and amount of education, concerning fatigue and possible interventions, for this group, is necessary. As well, exploring sleep disturbance due to possible nocturia would be an asset. As seen in the literature review, rest is not supported

as the most appropriate intervention to combat fatigue. This is an area where health care professionals may have to modify their beliefs and care practices.

There are no studies to date that have asked prostate cancer patients about the interventions that they would like to see used in order to combat cancer-related fatigue. It is unfortunate that such a small number of patients agreed to participate in the interview. It is promising, however, that a small percentage of patients stated that they perform physical activity to combat fatigue. This finding provides evidence to support the health promotion movement, encouraging individuals of all ages to perform an appropriate amount of physical activity throughout the lifespan. As seen in previous studies with women with breast cancer, pre-diagnosis exercise behavior was a predictor of during-and post-treatment exercise (Courneya et al., 2002).

Theoretical Framework

Overall, the IBES captures certain sources of self-efficacy; however, further detailed exploration is required. The Theory of Self-Efficacy and the IBES both attempt to understand what motivates an individual to participate in exercise. IBES also does explore the possible barriers to exercise, unlike the Theory of Self-Efficacy.

One factor that was well covered by the IBES is performance accomplishments; the individual's own perceived ability to participate in physical activity. The incentives, such as expectation of benefit, previous experience/exercise, responsibility, enjoyment, guilt, dislike, not in routine, afraid and hard, assess the individual's perception of his or her ability to participate in exercise. Further questions that would help rate his or her level of confidence in exercising would also help assess the participants' perception of his or her abilities. Vicarious experience does not seem to be covered in the IBES. The

influence of performing exercise with or without a partner and the influence of the advice of health care professionals was also assessed. There was no evidence of any incentives or barriers that addressed the issue of the modeling and its' influence on exercise behavior. The IBES covered physiological information relatively well with the incentive fear of complications and the barrier inertia. As previously stated, more emphasis has to be placed on this aspect of motivation, related to urinary symptoms.

The last source of self-efficacy, verbal persuasion, requires further exploration with prostate cancer patients. The incentives that addressed this concept were partner and professionals and the barrier was no partner. The IBES does not explore the factors such as the media, pamphlets, information sessions, etc., which could have an affect on the level of motivation the individual has for exercise. This is one area in which health care professionals must perform further study in order to determine the most appropriate methods of educating patients. Overall, two barriers on the IBES do not fall into any of the sources of self-efficacy: lack of time and expensive.

In regards to the characteristics of individuals with high or low self-efficacy, the participants in this study did demonstrate certain characteristics that corresponded to IBES scores. For example, many of the patients continued to exercise throughout treatment, but modified their lifestyle and regime accordingly. This is one characteristic that highly motivated individuals possess (Bandura, 1994). These same individuals had high levels of incentives and low levels of barriers, which are expected of people with high self-efficacy. As well, with individuals with low self-efficacy, depression and/or stress can be evident (Bandura, 1994). This was true with the participants in this study

with metastasis. These participants had high levels of depression, as well as higher scores on the barriers ratings.

In conclusion, Bandura (1994) believed that older individuals would have more factors that would affect their self-efficacy-for example-retirement and changing health status. This was true for this study, as many of the participants stated that advancing age and retirement may be contributing to their fatigue. These two factors force them to modify their lifestyles. The patients, in this study, have gone through many lifestyle adjustments, while continuing to have a positive outlook. There are many possible explanations for the feelings of fatigue, such as advancing age and co-morbidities, which corresponds with Bandura's findings.

Instruments

The Incentives and Barriers to Exercise Scale (Leddy, 1997) has been incorporated in a very small number of studies of breast cancer patients. The usefulness of this tool, in understanding possible adherence issues with prostate cancer patients, is unknown.

The IBES was easy for the participants, in this study, to complete and understand compared to the RPFs. In reviewing the casual conversations with the participants in this study, clinical manifestations of the disease, especially urinary symptoms, were a significant concern when contemplating physical activity. The urinary symptoms included nocturia, which was problematic for some participants and was an interruption to their sleep habits. Nocturia was found to be a significant predictor of fatigue in a study by Vondermark et al. (2002). The IBES needs to address the urinary symptoms and their influence on participation in exercise, as it is a significant concern for these patients.

Brawley, Culos-Reed, Angore and Hoffman-Goetz (2002) criticized Leddy (1997) for not measuring the frequency at which each incentive and/or barrier occurred for the individual, which they claimed would provide insight into whether the frequency of the incentive and/or barrier influences the adherence rates (Brawley et al., 2002). To date, this is the first study to test this tool with prostate cancer patients. Based on this study, certain recommendations can now be made. The tool requires some modifications before it is able to capture the true experience of prostate cancer patients.

The RPFS proved to be a complicated tool to implement in a busy clinical setting and it appeared to be difficult for most of the participants to comprehend. The question provided the respondents with five categories of two words (“pleasant” and “unpleasant”, for example) and asked, “To what degree would you describe the fatigue which you are experiencing now as being ?”, proved to be the most difficult. Even after a brief explanation, the majority of participants had a hard time rating each category. Most participants gave the highest rating to the negative word provided, which may not have actually represented the fatigue they were feeling.

Another limitation of the RPFS is the extended length of time it takes to complete the questionnaire. Most of the participants in the study had waited to see the doctor, had an examination with, in some cases, bloodwork, after which, they agreed to participate in the study. Most of the participants, who were experiencing some level of fatigue prior to participation, completed half of the RPFS and commented on how long it was taking to complete. In one instance, one man stopped doing the questionnaire and withdrew from the study. The length of time it took to complete the RPFS may have affected the responses provided by the participants. They may have answered quickly in order to

complete the study without fully understanding the question being asked. The results may not accurately represent the actual level and type of fatigue that they were actually experiencing.

Sample Characteristics

For the most part, the sample was homogenous in terms of demographic characteristics. The majority of participants (77.4%) were between the ages of 60 – 79 years, which is consistent with other studies involving prostate cancer patients, as it is the “disease of the older man” (Carroll & Grossfeld, 2002). As well, as expected, 71% of the participants were retired and, in addition, 25.8% had high school or less for education. This is lower than that possessed by the breast cancer patients with whom the IBES and RPFS were tested. Finally, 96.8% ($n = 30$) of the participants were undergoing treatment at the time of the study, therefore, all but one participant approached met the inclusion criteria.

Limitations

This pilot study identified many issues that are important and must be addressed in future studies. As is the unfortunate case in many nursing studies, the sample size was small ($n = 31$) and would be considered a convenience sample. This limits the generalizability of the results when applied to other prostate cancer patients, as well as to other cancer patient populations. The small sample size was due partly to a short data collection period, three months, and strict inclusion criteria. The number of patients seen by the radiation oncologist during this time for treatment of prostate cancer was 34. This study was able to attain 31 of the possible 34 participants, providing a very low attrition rate.

Another possible limitation was the IBES. The scale itself was easy to administer and complete. Unfortunately, the IBES has yet to be tested with prostate cancer patients and has limited testing with other cancer populations. For the most part, the IBES captures the possible incentives and barriers for participants in this study, with the exception of the affects of urinary symptoms. This is an area that is significant for patients and can severely limit and decrease physical activity. Certain areas of the scale, that were not applicable to the participants, could be eliminated were “guilt” and “afraid”.

As well, the other tool administered, the RPFSS, was taxing for many of the participants, and this affected the number who chose to complete the qualitative interviews. Many participants would get to the section rating the two opposite words to describe fatigue, become frustrated and fatigued, and would feel like stopping. This section frustrated many participants, who wondered “how fatigue can be anything positive?” An even shorter version of the RPFSS may be needed; however, this might reduce the multi-dimensionality of the tool.

The researcher attempted to be as flexible as possible with the participants. Unfortunately, this did not increase patient participation. The number of men who completed the interviews was even smaller ($n = 2$), thus failing to provide any reliable data to make recommendations for possible interventions. The participants were given the option when providing consent whether to participate or not in the interview, at that time, or participate at a later date. The small number participating can only be hypothesized, as being related to time constraints. As well, the number of questions on each questionnaire that had to be completed was daunting, for some participants, and was a deterrent to others. Finally, the inclusion and exclusion criteria limited the type, and number of

participants. These criteria were revised twice to attempt to increase the sample size.

Future Research Recommendations

Avenues for further research have been identified in the literature review through this study. Studies in the field of fatigue, exercise, and adherence must involve a wider range of cancer sites (Brawley, Culos-Reed, Angore, & Hoffman-Goetz, 2002; Courneya, Blanchard, & Laing, 2001). This same recommendation has been made in almost all of the studies conducted by Courneya. The majority of the current research related to adherence has been conducted with breast cancer patients, who have very unique characteristics and needs. In studies that involve breast cancer patients, it has been noted that the participants are highly motivated and active, pre-diagnosis. These two characteristics are assumed to increase levels of adherence to exercise programs, both pre-and post-treatment (Courneya, Blanchard, & Laing, 2001). Participants in this study, generally, tended to be silent about treatment and related side-effects. This is a characteristic that can make studies difficult to complete, and further studies of the unique incentives and barriers to exercise that exist for prostate cancer patients is necessary.

Another group that was identified for study was prostate cancer patients who have developed and/or presented with metastasis. In the present study, two participants had metastasis beyond the prostate, which was primarily capsular then to bone. Both of these participants demonstrated significant levels of fatigue and had severely impeded physical activity. Prostate cancer patients with metastasis require special consideration when any type of physical activity is being designed. A primary concern for these patients is dealing with pain control issues before even considering physical activity.

Issues surrounding the small sample size were found in most nursing studies involving adherence and exercise. A possible solution would be to conduct a multi-site study that involves a variety of centres. This may not be possible in Winnipeg, as there is only one central site for radiation treatment. This may be feasible, however, across the provinces. Modifying the inclusion and exclusion criteria may increase study numbers.

Further study of how the incentives and barriers to exercise for prostate cancer patients might change over an extended period would be very beneficial. A longitudinal study—"a study designed to collect data at more than one point in time..." (Polit & Hungler, 1999, p. 163)-has yet to be carried out regarding adherence with cancer populations, in general, and with prostate cancer patients in particular. Longitudinal studies could provide insight into different adherence behaviors, particularly quality-of-life issues, at various points in the trajectory of illness and treatment (Courneya, Friedenreich, Sela, Quinney, Rhodes, & Handman, 2003; Van Andel et al., 2003). It would be beneficial to measure pre-diagnosis exercise behavior to allow for comparisons of the difference between during-and post-treatment levels. As seen in previous studies, in this study pre-diagnosis exercise was a predictor of during and post treatment exercise. This was one concept that the IBES attempted to address; however, it requires a more in-depth analysis. One other fact to remember is that prostate cancer patients are more likely to die from other co-morbidities (Carroll & Grossfeld, 2002). This fact signifies a definite need to determine adherence behavior in order to successfully design interventions post-treatment.

In future studies, an attempt to conduct an in-depth interview, as a single study, would probably be the most appropriate solution. In the present study, there were too

many activities for the participants to complete at once. The interviews were a significant addition to gaining a fuller understanding of the fatigue experienced by prostate cancer patients. Another possible solution would be to provide the participants with the questionnaires to be completed at home and conduct the interviews in the clinic. As well, participants could be randomized into two groups; one that completes the interview and one that completes the questionnaires.

The PSA and testosterone levels of the participants were collected; however, the numbers were too low to conduct any significant statistical testing. Specifically, with testosterone levels, it is not standard practice to obtain a serum sample at initial diagnosis, thus, only a select number of patients had a level taken. The primary intention of the researcher was to determine whether there were any correlations between these levels and the level of fatigue experienced by the participants. This is definitely an area for further study which may provide further insight into the relationship between prostate cancer and fatigue.

One final recommendation would be to include the Theory of Self-Efficacy in future studies. It has proven to be a useful theory in the present study in determining the possible incentives and barriers to exercise for prostate cancer patients. The Theory of Self-Efficacy requires further validation to gain enough credibility to be implemented in relation to other cancer sites. Courneya, Blanchard, and Laing (2001) have made similar recommendations and have implemented only the Theory of Planned Behavior, the Five Factor Model of personality, and the theory of Attribution, to date.

Summary

This chapter has provided an overview of the prominent findings of the study and comparisons with previous studies in this area of research. The applicability of Bandura's (1977; 1982; 1984; 1994) Theory of Self-Efficacy to the present study was addressed, along with the usefulness of the IBES and RPFS in capturing adherence and fatigue levels. From this data, the limitations were discussed and future research recommendations were detailed.

This descriptive study has revealed some significant data. Chapter one provided an overview of the statement of the problem, which included background information on prostate cancer, the purpose and significance of the study and the research questions that were addressed. In the following chapter two, the theoretical framework that was used in this study was detailed. The literature review which included studies examining fatigue, exercise and adherence was presented in chapter three. The methodology of the study was outlined in chapter four, which included research design, recruitment procedures, sample criteria, research setting, data collection tools and process, and ethical considerations. Chapter five presented the findings of the study including the demographic and treatment and disease characteristics of the participants. As well, the analysis of each of the five research questions was provided. In the final chapter, six, the discussion of the findings, and limitations of the study occurred, from which future research recommendations were made.

In conclusion, the scores for the IBES, which provides an overall score for adherence to exercise programs, have demonstrated low to moderate levels of adherence (21 to 40). The highest rated incentives for the participants were expectation of benefit

and responsibility and the top-rated barriers were inertia and hard. The majority of fatigue ratings for this sample of prostate cancer patients fell in the mild to moderate category, with smaller numbers having severe ratings. The major effects of the fatigue for the participants in this study were a decrease in physical activity, activities that they enjoy, and sexual activity. There was a high negative, but significant, correlation between the total IBES scores and the total RPFS scores. This results in low scores on the IBES equaling high scores on the RPFS, and vice versa.

Unfortunately, the interview process was unsuccessful due to the low sample size of one. Further studies must examine the experience of fatigue solely by conducting interviews. Overall, fatigue has been identified as a significant concern for prostate cancer patients undergoing radiation treatment and/or hormonal therapy. These patients identify exercise as being important to cope with cancer-related fatigue, but have identified a lack of energy as being a barrier to participate. Health care professionals must identify patients at risk for moderate-to-high levels of fatigue in order to aid them in determining appropriate interventions.

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Appendix A

Demographic and Health Information Questionnaire

Appendix**Demographic Information Sheet**

1. Current age _____ Date of Birth _____
2. Highest Education: Less than high school _____
High School _____
University _____
College _____
Post-Secondary _____
Other _____
3. Occupation _____
4. Employment Status: Full-time _____
Part-time _____
Retired _____
Unemployed _____
Disability _____
5. Estimated Yearly Income: Less than \$20,000 _____
\$20,000 - \$39,000 _____
\$40,000 - \$60,000 _____
Greater than \$60,000 _____
6. Marital Status: Married _____
Common-law _____
Single _____
Widowed _____
Divorced _____
Separated _____
7. Where were you born? _____
8. Which ethnic group do you identify with? (Please check one)
Aboriginal _____
White (Caucasian) _____
Other (specify) _____

Information from Client's chart:

9. Diagnosis: Gleason Score at diagnosis _____
Stage/Grade at diagnosis _____
PSA level at diagnosis _____
Testosterone Level _____

10. Time since diagnosis _____

11. Previous treatments: Surgery _____ Date _____

Hormone Therapy (specify) _____ Date _____

Radiation (specify) _____ Date _____

Chemotherapy (specify) _____ Date _____

Other _____

12. Current treatments: Radiation (specify) _____ Date _____

Volume of Radiation _____

Size of Radiation Field _____

Hormone therapy (specify) _____ Date _____

13. Current PSA level _____

Current Testosterone level _____

(Adapted from Davison, 1993)

Appendix B

Revised Piper Fatigue Scale (RPFS)

Revised Piper Fatigue Scale

For each of the following questions, circle the number that best describes the fatigue you are experiencing now. Please make every effort to answer each question to the best of your ability. Thank you very much.

1) How long have you been feeling fatigue? (Check one response only)

Minutes _____
Hours _____
Days _____
Weeks _____
Months _____
Other (please describe)

2) To what degree is the fatigue you are feeling now causing you distress?

| | | | | | | | | | | | | |
|------|---|---|---|---|---|---|---|---|---|----|--|-----------------------------|
| None | | | | | | | | | | | | A great deal of distress |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

3) To what degree is the fatigue you are feeling now interfering with your ability to complete your work or school activities?

None A great deal

0 1 2 3 4 5 6 7 8 9 10

4) To what degree is the fatigue you are feeling now interfering with your ability to visit or socialize with your friends?

None A great deal

0 1 2 3 4 5 6 7 8 9 10

5) To what degree is the fatigue you are feeling now interfering with your ability to engage in sexual activity?

None A great deal

0 1 2 3 4 5 6 7 8 9 10

6) Overall how much is the fatigue, which you are experiencing now, interfering with your ability to engage in the kind of activities you enjoy doing?

None A great deal

0 1 2 3 4 5 6 7 8 9 10

7) How would you describe the degree of intensity or severity of the fatigue which you are experiencing now?

Mild

Severe

0 1 2 3 4 5 6 7 8 9 10

To what degree would you describe the fatigue which you are experiencing now as being:

8) Pleasant

Unpleasant

0 1 2 3 4 5 6 7 8 9 10

9) Agreeable

Disagreeable

0 1 2 3 4 5 6 7 8 9 10

10) Protective

Destructive

0 1 2 3 4 5 6 7 8 9 10

11) Positive

Negative

0 1 2 3 4 5 6 7 8 9 10

12) Normal

Abnormal

0 1 2 3 4 5 6 7 8 9 10

13) To what degree are you now feeling:

Strong

Weak

0 1 2 3 4 5 6 7 8 9 10

14) To what degree are you now feeling:

Awake

Sleepy

0 1 2 3 4 5 6 7 8 9 10

15) To what degree are you now feeling:

Lively

Listless

0 1 2 3 4 5 6 7 8 9 10

16) To what degree are you now feeling:

Refreshed

Tired

0 1 2 3 4 5 6 7 8 9 10

17) To what degree are you now feeling:

Energetic

Unenergetic

0 1 2 3 4 5 6 7 8 9 10

18) To what degree are you now feeling:

Patient

Impatient

0 1 2 3 4 5 6 7 8 9 10

19) To what degree are you now feeling:

Relaxed

Tense

0 1 2 3 4 5 6 7 8 9 10

20) To what degree are you now feeling:

Exhilarated

Depressed

0 1 2 3 4 5 6 7 8 9 10

21) To what degree are you now feeling:

Able to concentrate

Unable to
concentrate

0 1 2 3 4 5 6 7 8 9 10

22) To what degree are you now feeling:

Able to remember

Unable to remember

0 1 2 3 4 5 6 7 8 9 10

23) To what degree are you now feeling:

Able to think clearly

Unable to think clearly

0 1 2 3 4 5 6 7 8 9 10

24) Overall, what do you believe is most directly contributing to or causing your fatigue?

25) Overall, the best thing you have found to relieve your fatigue is?

26) Is there anything else you would like to add that would describe your fatigue better to us?

27) Are you experiencing any other symptoms right now?

No

Yes, please describe

Appendix C

Incentives and Barriers to Exercise (IBES)

Reasons to Exercise And Reasons Not to Exercise

I want to know what are the things that you would see as possible reasons why you would perform exercise. As well as possible reasons why you would not perform exercise. This information will be helpful in creating activities, that will reduce fatigue, which better fit the needs of men with prostate cancer who are feeling fatigued.

The following reasons were given by a group of breast cancer patients. I would like you to go through each reason and decide how much it would affect your decision to exercise or not to exercise. You can use the numbers 0 to 10 to decide how much each one affects you.

Reasons to Exercise:

1) Expectation of benefit

0 1 2 3 4 5 6 7 8 9 10

2) Responsibility

0 1 2 3 4 5 6 7 8 9 10

3) Enjoyment

0 1 2 3 4 5 6 7 8 9 10

4) Previous experience/exercise

0 1 2 3 4 5 6 7 8 9 10

5) Spouse or Family

0 1 2 3 4 5 6 7 8 9 10

6) Professionals

0 1 2 3 4 5 6 7 8 9 10

7) Fear of complications

0 1 2 3 4 5 6 7 8 9 10

8) Guilt

0 1 2 3 4 5 6 7 8 9 10

Reasons Not To Exercise:

1) Lack of Time

0 1 2 3 4 5 6 7 8 9 10

2) Inertia (lack of energy)

0 1 2 3 4 5 6 7 8 9 10

3) Not in Routine

0 1 2 3 4 5 6 7 8 9 10

4) No Partner

0 1 2 3 4 5 6 7 8 9 10

5) Dislike

0 1 2 3 4 5 6 7 8 9 10

6) Afraid

0 1 2 3 4 5 6 7 8 9 10

7) Hard

0 1 2 3 4 5 6 7 8 9 10

8) Expensive

0 1 2 3 4 5 6 7 8 9 10

Appendix D

Open-Ended Questionnaire

Intervention Questionnaire

Many men with prostate cancer have the same feeling of fatigue as you. Fatigue is a very real and I want to know more about how this fatigue (tiredness) feels for you, what are some solutions that you have come up with to deal with fatigue and what suggestions you might have to reduce your fatigue.

1) Can you first tell me about your experience with feeling fatigued?

Probes:

- How often do you experience fatigue?
- What does it feel like?
- Can you tell me a time when your fatigue was not too bad..moderately...bad..really bad.
- How do you feel prior to receiving radiation, right after your radiation treatment (24 hours), and a couple of days after, and a week after..and so on.
- What things make the fatigue worse or better?

2) Can you tell me how this fatigue is different from when you have normally felt tired, before your diagnosis?

Probes:

- How different is it from feeling tired (or whatever term used by the participant that describes a "regular" tiredness)?
- Tell me about the times when you are tired and times when you are fatigued.

3) Men with prostate cancer have described their experiences with fatigue in a variety of ways. For example, some have described feeling fatigue like "living life in limbo" or "feeling like they are sleep walking day and night". What would you compare your fatigue to?

Probes:

- Please describe in your own words how you feel being fatigued or how fatigue makes you feel?

4) How does the fatigue affect your daily life?

Probes:

- What activities/things can you not do because you are fatigued?
- Are some days worse than others?

5) When you feel fatigued, what things do you do to try and feel less fatigued?

Probes:

- How do the things you do help to lessen the fatigue?
- What things have you tried that make the fatigue worse?
- Can you think of anything that you could do or that might help reduce your fatigue?

6) What things do others do to try to help you feel less fatigued?

Probes:

- Tell me the things that a) doctors; b) nurses; c) other professionals; d) friends; and family do to try to help you feel less fatigued?
- What things do others do that help to lessen the fatigue?
- What things do others do that make the fatigue worse?

7) Some experts on fatigue suggest that exercising may help lessen the fatigue. Can you tell me about your experiences with exercising?

Probes:

- Tell me about your experiences with exercising since being diagnosed with cancer (e.g. why you do or do not exercise, the type of exercise that you participated in, barriers or facilitators to exercising, benefits of exercising, etc.)

8) If you were given the opportunity to develop an exercise program for men with prostate cancer, what would be the key features of the program (e.g. type of exercise, formal vs. informal, setting, frequency, etc.)?

9) Is there anything else you would like to tell me about your fatigue or anything else that we talked about?

Appendix E

Information Letter to Participant

Information Sheet for Participant

Research Project Title: Fatigue in Prostate Cancer: Examining Possible Incentives and Barriers to Exercise For Reducing Fatigue in Men with Prostate Cancer undergoing Radiation and Hormonal Therapy

Researcher: Megan Doyle, RN, BScN

Sponsor/Advisor: Dr. Lesley Degner, RN, MN, PhD

My name is Megan Doyle, a registered nurse and a Master's of Nursing student at the University of Manitoba. The study that I am asking for your participation will help me in completing my final requirements in my program. I am interested in looking at what reasons men with prostate cancer undergoing radiation and hormonal treatment have about taking part or not taking part in activities/interventions to help them cope with fatigue.

You have been selected by your physician and I thank you for your time and attention. However, you are under no obligation to participate and withdraw from the study at any time and/or refrain from answering any questions. Feel free to express any questions or concerns throughout the study. This information sheet, a copy of which will be left with you for your records and reference, is only a process of informed consent.

As previously stated, the purposes of this research is to try and gain a better understanding of the reasons that men with prostate cancer undergoing radiation and hormonal treatment have about taking part or not taking part in activities/interventions to help them cope with fatigue. As well, a further understanding of the level of fatigue that men have will be looked at. The relationship between the level of fatigue and the reasons for participating or not participating will also be studied.

Your participation in the study will help provide important insight into the effects that prostate cancer and its' treatment has for men like you. This information will be very important in helping design different activities to help reduce the level of fatigue that many men feel.

Your participation in this research will include filling our four short questionnaires, that will take approximately forty-five minutes to finish. You can fill these out while in the clinic for your visit and/or treatment. Or, you can contact the researcher at a later date, to complete the questionnaires at another visit. You may also be asked to participate in an interview with the researcher, who will ask you nine questions concerning the fatigue that you may be feeling. These interviews will be tape recorded with your permission. Your name will not be on any of the questionnaires and only the researcher, the researcher's advisor, and statistician will view the questionnaires. Please don't put your name on any of the questionnaires given to you. The questionnaires will be locked in a filing cabinet for five years and will then be destroyed. The consent form that you will sign will not be attached to your questionnaires. And will be kept in a

locked filing cabinet as well.

You will be provided with the researcher's phone number. If you have any concerns or questions concerning the study, feel free to contact the researcher at any time. If you would like to see the results of the study, you are more than welcome to leave your contact information and the results will be mailed to you. The results of the study will be presented at the thesis defense of the researcher, and may be presented at conferences in the future. Your name will not appear on any data or in any presentations.

You can reach the researcher, Megan Doyle, at _____, if you have any concerns or questions about the study. You can reach the researcher's advisor, Dr. Lesley Degner, at (204)474-6767.

This research has been approved by the Education and Nursing Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at 474-7122. Thank you again for your time and attention.

Megan Doyle,
Researcher

Appendix F

Consent Form to Participant

Consent Form for Participation

Research Project Title: Fatigue in Prostate Cancer: Examining Possible Incentives and Barriers to Exercise for Reducing Fatigue in Men with Prostate Cancer undergoing Radiation and Hormonal Therapy

Researcher: Megan Doyle, RN, BScN

Sponsor/Advisor of Researcher: Dr. Lesley Degner, RN, MN, PhD

Dear Sir,

My name is Megan Doyle, a graduate student at the University of Manitoba in the Faculty of Nursing. This study is being done to complete my studies for my Master's degree in Nursing. This consent form, a copy of which will be left with you for your records and reference, is only a part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information. I thank you for your time and attention in participating.

The purpose of this research study is to try and gain a better understanding of the reasons that men with prostate cancer undergoing radiation and hormonal therapy have, about taking part or not taking part in activities/interventions to help them cope with fatigue. As well, a further understanding of the level of fatigue that men with prostate cancer undergoing radiation and hormonal treatment have, will be looked at. The relationship between the level of fatigue and the reasons for participating or not participating will also be studied.

Your participation in the study will help provide important insight into the effects that prostate cancer and its' treatment has for men like you. This information will be very important in helping design different activities to help reduce the level of fatigue that many men, like you, feel.

Your participation in this research will include filling out four short questionnaires, that will take approximately forty-five minutes to finish. You can fill these out while in the clinic for your visit and/or treatment. Or, you can contact the researcher at a later date, to complete the questionnaires at another visit. You may be asked to participate in an interview with the researcher, which will involve answering nine questions concerning the fatigue you are feeling. You will be asked if a tape recorder can be used to collect your answers. You can refuse to participate in either the questionnaires and/or interviews at any time. Your name will not be on any of the questionnaires and/or interviews and only the researcher will view the questionnaires. Please don't put your name on any of the questionnaires given to you. The questionnaires and interview tapes will be locked in a filing cabinet for five years and will then be destroyed. The

consent form that you will sign will not be attached to your questionnaires and will be kept in a locked filing cabinet as well. As well, I, Megan Doyle, will need to access your personal medical chart to collect the following information: PSA level, Gleason score, hormone treatments received, and type and amount of radiation treatment received. Your signature on this consent form will indicate that you have given permission for Megan Doyle to collect this information.

You will be provided with the researcher's phone number. If you have any concerns or questions concerning the study, feel free to contact the researcher at any time. If you would like to see the results of the study, you are more than welcome to contact the researcher, who will send them to you. A space will be provided for your name and contact information where the results can be mailed to you at a later date. The results of the study will be presented at the thesis defense of the researcher, and may be presented at conferences in the future. Your name will not appear on any data or in any presentations.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

You can reach the researcher, Megan Doyle, at _____ . You can reach the researcher's advisor, Dr. Lesley Degner, at (204)474-6767.

This research has been approved by the Education and Nursing Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at 474-7122. A copy of this consent form has been given to you to keep for your records and reference.

I agree to participate in a formal interview with Megan Doyle, researcher:

- No, I do not agree to participate in an interview at any time
- Yes, I agree to participate in an interview at the clinic
- Yes, I agree to participate in an interview over the phone

Contact information for phone interview:

Name _____

Phone Number: _____

Date & Time: _____

Participant's Signature

Date

Researcher and/or Delegate's Signature

Date

I would like to a summary of this study when it is available:

- Yes
- No

Contact Information: Name: _____

Address: _____

Appendix G

Information Letter to Health Care Professionals

Information Sheet for Health Care Professionals

Research Project Title: Fatigue in Prostate Cancer: Examining Possible Incentives and Barriers to Exercise for Reducing Fatigue in Men with Prostate Cancer undergoing Radiation and Hormonal Therapy.

Researcher: Megan Doyle, RN BScN

Sponsor/Advisor: Dr. Lesley Degner, RN MN PhD

Dear Sir/Madam,

This information sheet, a copy of which will be left with you for your records and reference, will provide you with an overview of the proposed research. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information. I thank you for your time and attention in participating.

The purpose of this research is to try and gain a further understanding of the determinants and deterrents to exercise, to reduce levels of fatigue, for men with prostate cancer undergoing radiation and hormonal treatment. As well, the level of fatigue experienced in this population will be assessed and the relationship to adherence levels will be measured. This data will provide insight into this significant side effect and will help in designing interventions, for example exercise regimes, that would help reduce levels of fatigue. The information attained from this study will aid to the research on quality of life in prostate cancer. This research study is also being conducted to complete the requirements for the researcher's studies at the University of Manitoba for a Master's of Nursing degree.

I am asking your assistance in attaining participants for this study. I am looking for men that meet the following criteria: 1) must be medically diagnosed with prostate cancer; 2) currently be undergoing any form of radiation treatment with hormonal therapy; 3) not currently undergoing any other form of treatment; 4) must be between the ages of fifty to seventy; 5) understand verbal and written English; 6) must have radiation oncologist's approval.

The participation of your clients will involve completing four short questionnaires, that will take approximately forty-five minutes to finish. They can complete these questionnaires while they are in the clinic for a visit or treatment. Or, they will have the option to contact the researcher at a later date to complete the questionnaires at their convenience. The client's chart will be consulted to collect the following information: Gleason score, PSA levels, testosterone

level, and previous and current treatments. As well, ten clients will be selected to participate in an in-depth interview concerning their experience of fatigue. This will be approximately thirty minutes and will be tape-recorded, following the consent of the client. The researcher will be on site the day of your clinic, and will be readily available to access participants. As well, the researcher will remain on site to answer any questions or concerns. The study will be conducted following the client's visit and will not interfere with the operation of the clinic.

The client's identity will not appear on any of the questionnaires. Their consent forms will not be attached to the questionnaires. The only individuals to view the questionnaires will be the researcher. The questionnaires will be locked in a filing cabinet for five years and will be properly destroyed at this time.

You will be provided with the researcher's phone number. If you have any concerns or questions about the study, feel free to contact the researcher at any time. If you would like to see the results of the study, you are more than welcome to contact the researcher. The results of the study will be presented at the researcher's thesis defense and may be presented at conferences in the future. Again, the participants' names will remain anonymous.

You can reach the researcher, Megan Doyle, at [redacted]. You can reach the researcher's advisor, Dr. Lesley Degner, at (204)474-6767.

This research has been approved by the Education and Nursing Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at 474-7122.

Appendix H

Proposal Acceptance Letter

FACULTY OF NURSING

THESIS/PRACTICUM PROPOSAL APPROVAL FORM

MASTER OF NURSING STUDENTS

This form is to be completed and submitted to the Graduate Program Assistant when a student has successfully defended her/his thesis or practicum proposal.

Student's Name

Megan Doyle

Working Title of Thesis/Practicum

Fatigue in Prostate Cancer: Examining Possible Incentives and Barriers to Exercise for Reducing Fatigue in Men with Prostate Cancer undergoing Radiation and Hormonal Therapy.

Thesis/Practicum Committee Chair

Date

January 7/04

Member

Date

7 January 04

External Member

Date

January 8, 04

Member

Date



UNIVERSITY
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DATE: February 6, 2004

TO: Ms. Megan Doyle

FROM: Louise Sabourin, Graduate Program Assistant, Faculty of Nursing

SUBJECT: **THESIS COMMITTEE**

This is to advise you that the Graduate Studies Committee of the Faculty of Nursing has approved your thesis committee as stated below. The Master's Thesis/Practicum Title and Appointment of Examiners' form will be signed and sent to the Faculty of Graduate Studies for processing. If there are any concerns you will be contacted.

Advisor: Dr. Lesley Degner, Faculty of Nursing

Examiner: Dr. Diana McMillan, Faculty of Nursing

External Member: Dr. Garry Schroeder
Radiology

I wish you every success in your thesis/practicum endeavour.

Cc: Dr. Lesley Degner

*lcs

Appendix I

Education and Nursing Research Ethics Board (ENREB) Acceptance Letter



UNIVERSITY
OF MANITOBA

RESEARCH SERVICES &
PROGRAMS
Office of the Vice-President (Research)

244 Engineering Bldg.
Winnipeg, MB R3T 5V6
Telephone: (204) 474-8418
Fax: (204) 261-0325
www.umanitoba.ca/research

APPROVAL CERTIFICATE

2 February 2004

TO: Megan Doyle (Advisor L. Degner)
Principal Investigator

FROM: Stan Straw, Chair
Education/Nursing Research ~~Ethics Board~~ (ENREB)

Re: Protocol #E2004:003
"Fatigue in Prostate Cancer: Examining Possible Incentive and Barriers to Exercise for Reducing Fatigue in Men with Prostate Cancer undergoing Radiation and Hormonal Therapy"

Please be advised that your above-referenced protocol has received human ethics approval by the **Education/Nursing Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement. This approval is valid for one year only.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

Please note that, if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.

Get to know Research ...at your University.

Appendix J

Resource Impact Committee (RIC) Acceptance Letter



CancerCare
MANITOBA

Action Cancer Manitoba

03 February 2004

675 McDermot Avenue
Winnipeg, Manitoba
Canada R3E 0V9

409 Taché Avenue
Winnipeg, Manitoba
Canada R2H 2A6

Megan Doyle

www.cancercare.mb.ca

Dear Megan:

Re: *Research Project: Fatigue in Prostate Cancer: Examining Possible Incentives and Barriers to Exercise for Reducing Fatigue in men with Prostate Cancer undergoing Radiation and Hormonal Therapy*

I am pleased to provide support and acceptance of your research project to be conducted at CancerCare Manitoba.

Good luck to you and I look forward to your results.

Sincerely,

Karen Fletcher
Director of Nursing
CancerCare Manitoba

KF/lp