Quality of Life After Radical Prostatectomy

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ABSTRACT

The purpose of this study was to examine the physical and psychosocial factors that affect the quality of life for men 12 to 24 months after radical prostatectomy treatment for prostate cancer. The major study hypotheses in the causal model were that age, sexual function, urinary function, and sexual function appraisal would only have indirect effects on quality of life, while urinary function appraisal, self-esteem, anger suppression, perceived social support, depression, and health locus of control would directly affect quality of life.

An entire population of men 12 to 24 months after radical prostatectomy for prostate cancer from one tumor registry was given the opportunity to participate in the study. Of the 97 men who responded to the mailed survey, 91 met the analysis requirements. The analysis was completed on the all-White sample (n = 88), with a mean age of 66. Most of the men were married, living with spouse or partner, and had a high level of education as compared to state and local census figures.

Path analysis indicated that the hypothesized causal model explained 72% of the variance in the quality of life variable. Perceived social support, self-esteem, and health locus of control were significant predictors of quality of life. The urinary function appraisal contributed indirectly through health locus of control. Contrary to the hypotheses, anger suppression and depression were not significant predictors of quality of life.

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CHAPTER I

QUALITY OF LIFE AFTER RADICAL PROSTATECTOMY

Cancer touches the lives of many people every year. Prostate cancer is one of the most frequently diagnosed cancers in men. There are 165,000 new diagnoses of prostate cancer every year, which affects the lives of one in 10 American men aged 50 years and older. This dreaded disease is indexed as the second leading cause of cancer deaths in men. Killing 25% of those who are diagnosed with it, prostate cancer is responsible for the loss of 43,000 lives every year (Boring, Squires, & Tong, 1993; Littrup, Goodman, Mettlen, & Investigators of the American Cancer Society-National Prostate Cancer, 1993; Marshall, Chapin, Shapiro, & Rigberg, 1993).

The presence of prostate cancer may be insidious, as some men do not experience symptoms from it. Rather, the diagnosis is based on the results of a digital rectal examination (DRE) or a prostate specific antigen (PSA) blood test. These tests are usually followed by ultrasonography, biopsy, MRI, and/or a bone scan to confirm the presence of prostate cancer (Gittes, 1991).

Certain factors increase the risk for prostate cancer. These are age, race, and family history. It occurs rarely under the age of 50, but every decade of aging doubles the incidence of prostate cancer. Thus, for men who are in their fifth decade of life, the incidence rate is 10%, while for those in their eighth decade, it rises to approximately 70% (Gittes, 1991). African-American men have an incidence rate nearly twice that of the general population (Littrup et al., 1993). Men who have both a first-degree relative (a brother or father) and a second-degree relative (an uncle or grandfather) who are affected have an eightfold increase in risk (Gittes, 1991). Beyond these stark statistics and the medical treatments lie a number of quality of life issues that profoundly affect the everyday lives of those who live with this disease or the sequelae from the treatment.

Quality of Life and Prostate Cancer

In the past decade, efforts have been made to explore the health-related quality of life for men after treatment for prostate cancer (Braslis, Santa-Cruz, Brickman, & Solloway, 1994; Fowler et al., 1995; Gburek, Harmon, & Chodak, 1992; Herr, 1994; Heyman & Rosner, 1996; Kornblith, Herr, Ofman, Scher, & Holland, 1994; Krongrad et al., 1997; Lim et al., 1995; Litwin et al., 1995; Pedersen, Carlsson, Rahmquist, & Varenhorst, 1993; Rieker et al., 1993; Rossetti & Terrone, 1996). These study findings indicate that treatments have affected the health-related quality of life for those with prostate cancer, including psychological and disease-specific variables such as sexual and urinary function.

Litwin et al. (1995) found no differences in health-related quality of life among the three prostate cancer treatment groups of prostatectomy, radiotherapy, and watchful waiting as compared with a comparison group. However, differences were seen between cancer and noncancer groups in the sexual, urinary, and bowel function and appraisal areas.

Rieker et al. (1993) found the prostatectomy group had better physical functioning and general health perception scores on the Short-Form 36 (SF-36) health-related quality of life measure than the radiotherapy group. However, no significant differences in health-related quality of life were found when comparing prostatectomy and the radiotherapy groups (Lim et al. 1995).

Four studies have examined the health-related quality of life of post-prostatectomy men (Braslis et al., 1995; Fowler et al., 1995; Herr, 1994; Pedersen et al., 1993). Braslis et al. (1995) reported that: "Overall, 15 parameters of quality of life were evaluated in this study. Statistically significant changes were encountered in five variables" (p. 53). Braslis and his colleagues may have overstated their findings when they concluded that prostatectomy patients "seem to adjust well to alterations in lifestyle accompanying radical prostatectomy and the diagnosis of prostate cancer" (p. 53). Although tension did diminish after surgery, other variables such as sexual function, continence function, and hardship were adversely affected. In addition, there was increased symptom severity in feelings about sex and sexual problems. Other studies have reported that men have been found to have suffered from severe overall distress after their prostatectomy (Pedersen et al., 1993, Herr, 1994). Prostatectomy incontinence was found to have adverse effects on the General Health Index and Mental Health Index scores (Fowler et al., 1995). Activity limitations have also been identified in post-prostatectomy patients (Herr, 1994).

Considerable descriptive research has been done on various aspects of health-related quality of life for men with prostate cancer. Conceptually, previous studies have included only one domain of life quality such as health, but not the contribution of multiple factors on quality of life. The present study included other significant domains that are meaningful within a broader definition of life quality and examined the relative contribution of each element included in the study's model as it affected quality of life of post-prostatectomy patients 12 to 24 months after treatment.

Purpose of the Study

The purpose of this study was to examine physical, psychological, and social factors that affect the quality of life for men 12 to 24 months after radical prostatectomy treatment for prostate cancer. A model was then developed to assist members of the health care team in understanding men's experiences after one specific prostate cancer treatment and in developing treatment regimens that will enhance the life quality of these men.

Significance for Nursing and Health Care

Quality of life and health of patients, communities, and populations are important. Knowledge obtained from research regarding the life quality of men with prostate cancer can assist clinicians to: (a) become more responsive to the issues that should be addressed during the informed consent process, (b) identify pertinent issues in teaching for patients and family members, and (c) provide applicable information to professionals involved in support groups that help men cope with prostate cancer and its treatment after-effects.

The health care system has designed interventions with the intention of not only prolonging the patient's life, but also improving and promoting the quality of life (Guyatt, Feeny, & Patrick, 1993). In addition to determining disease effects, quality of life is useful for assessing health promotion and intervention benefits from the patient's perspective and for assisting in clinical decision-making. Interventions should be directed toward specific goals, focus on the capacity, potential, and opportunity for health (Patrick

& Bergner, 1990), and demonstrate positive differences in a patient's quality of life (Guyatt, Bombardier, & Tugwell, 1986). Therefore, it is important to measure the patient's quality of life to assess the benefits of health promotion and interventions.

Finally, although patients and clinicians are concerned with specific intervention outcomes, policy researchers are more interested in program evaluation and resource allocation (Patrick & Bergner, 1990). Quality of life information assists program evaluators in understanding the effects of surgical prostatectomy treatment on the patient's quality of life.

Nursing is not only concerned with curing, but also caring about their patient's ability to live life to its fullest. Health care faces the dilemma of balancing the saving of life with maintaining a high quality of life. The goal of examining the factors that influence quality of life was to develop nursing interventions to maintain and improve the quality of life for men affected by prostate cancer.

CHAPTER II

REVIEW OF LITERATURE

This chapter was designed to include several general topic areas. It includes a review of research outcomes of selected physical, psychological, and social factors posited to influence the quality of life of men after radical prostatectomy treatment for prostate cancer. At the conclusion of each review, the conceptualization of the factor as it was used in this study is stated. Finally, the entire model is presented.

Radical prostatectomy is a common surgical approach to treating localized prostate cancer and is considered the gold standard (Wasson et al., 1993). This procedure involves the removal of the prostate gland, seminal vesicles, and regional lymph nodes (Marshall et al., 1993).

No treatment decision should be made without reviewing the risks and benefits. One recognized benefit with the prostatectomy approach is that the vast majority of men with an organ-confined disease may experience more effective control of the cancer (Walsh & Partin, 1994). Impotency and incontinence are major concerns for men who are considering prostatectomy surgery. The concern of many American males regarding these treatment side effects can be observed in the recent media attention given to prostate cancer. A recent letter to the editor of Fortune stated, "For some men with prostate cancer, the simplistic decision is die with an erection or live without one" (Pence, 1996, p. 20).

Morbidity and mortality issues for prostate cancer have been thoroughly studied (Catalona & Bigg, 1990; Leandri et al., 1992; Rossignol et al., 1991). Incidence and the extent of sexual problems associated with radical prostatectomy treatment vary from study to study. The structured literature review conducted by Wasson et al. (1993) revealed that the typical rates of impotence for radical prostatectomy has been as high as 85%. In 1982, Walsh and Donker discovered the anatomical location of previously overlooked nerve bundles that affect the normal erection process. This breakthrough led to improved rates of post-prostatectomy potency. Nevertheless, one-third of the men undergoing nerve-sparing prostatectomy continue to suffer from impotence (Catalona & Bigg, 1990; Fleming, Wasson, Albertsen, Barry, & Wennberg, 1993; Quinlan, Epstein, Carter, & Walsh, 1991; Wasson et al., 1993).

The occurrence of incontinence associated with a radical prostatectomy procedure remains at a significant level. Wasson et al. (1993) found that 27% of 301 men experienced some incontinence and approximately 7% had complete incontinence. The time interval from prostatectomy to measurement can affect the potency and the continence assessment. However, one year after prostatectomy surgery, both potency and continence rates have stabilized (Leandri et al., 1992; Rossignol et al., 1991; Steiner, Morton, & Walsh, 1991).

A primary goal of these treatments is to cure the patient of prostatic cancer by extending life years. Actuarial analysis, which documents the survival of prostate patients, is one measure of successful outcomes for prostatic treatments. It is clear, however, that survival or satisfaction with treatments are not synonymous with quality of life. Research already indicates that health-related quality of life is adversely affected by prostate cancer treatments (Braslis et al., 1995; Fowler et al., 1995; Gburek et al., 1992; Herr, 1994; Heyman & Rosner, 1996; Litwin et al., 1995; Pedersen et al., 1993; Rieker et al., 1993). The impact of the selected physical, psychological, and social factors upon overall quality of life for men treated with radical prostatectomy for prostate cancer was examined in this literature review.

Conceptual Model

This review of literature was presented according to the significant parts of the conceptual model depicted in Figure 1. Each section describes the relationships between the parts of the model presented. In addition, variables that were considered relevant to quality of life, and more specifically to the quality of life for prostate cancer men, are included.

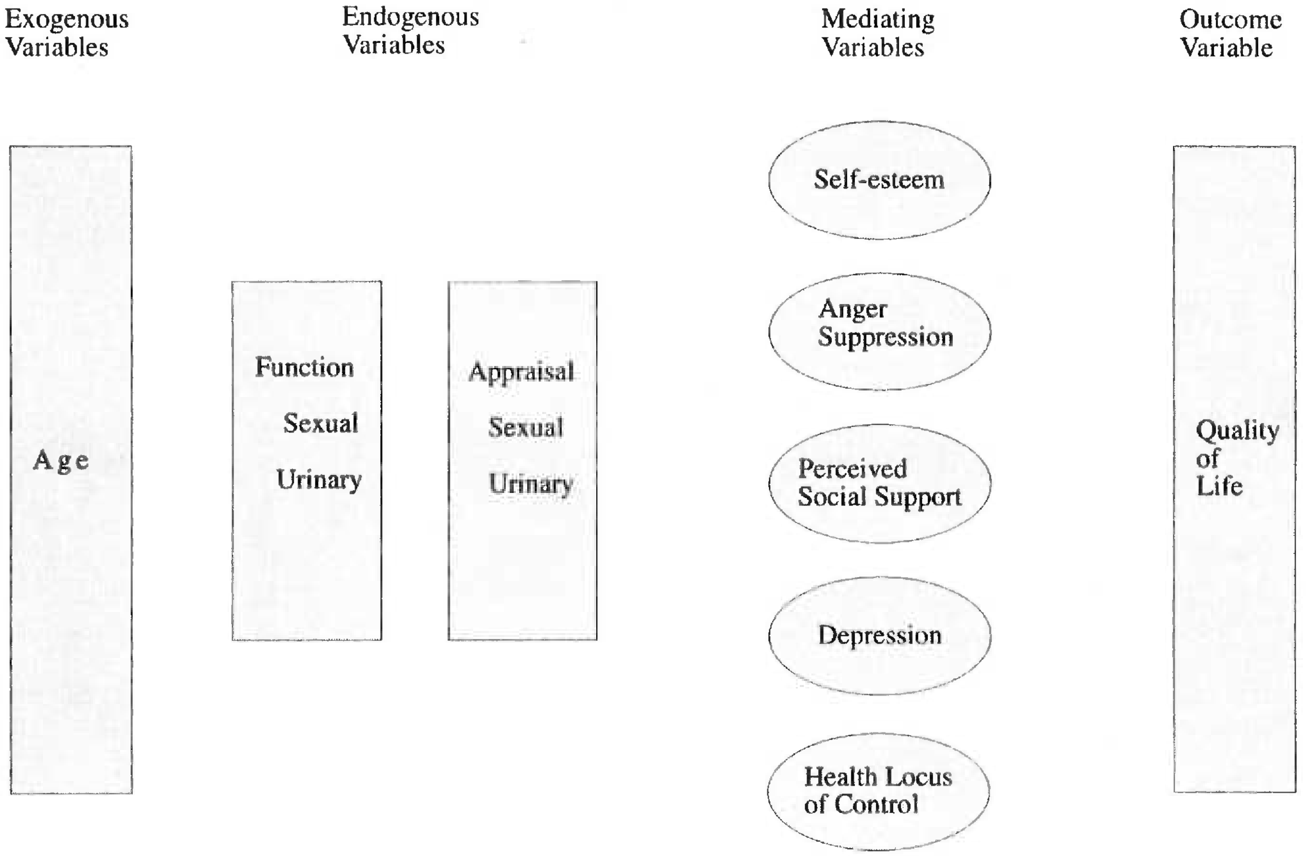
Demographic Variables

Age

Age and Disease Variables

The model contained one exogenous variable--age--that has been found to be associated with sexual function in the prostatectomy population (Braslis et al., 1995). Some studies indicate that age had a significant association with recovery of potency after a prostatectomy (Catalona & Bigg, 1990; Walsh & Donker, 1982). On the other

Figure 1. Causal Model Factors for Quality of Life of Men with Prostate Cancer After Prostatectomy



hand, Walsh, Partin, and Epstein (1994) found a nonsignificant relationship between age and recovery of continence, but minimized the significance of their results because the sample size was too small. Although the younger age groups may recover potency or continence faster, studies have found that at 1 year post-prostatectomy no differences were found among age groups (Leandri et al., 1992; Rossignol et al., 1991; Steiner et al., 1991). Thus, in the present study, age was not expected to be a significant predictor of sexual or continence function or appraisal.

Age and Psychosocial Factors

Studies have determined that psychosocial factors may change during the aging process. Age differences in a post-myocardial infarction (MI) population were specifically studied in relation to psychosocial condition, health state, and therapeutic regimen adherence among MI survivors. Increased age was associated with higher depression scores and less social support (Conn, Taylor, & Abele, 1991). Specifically, social support has been found to change with advanced age. A study of elderly men and women with newly diagnosed cancer examined the relationship between age and social support. Increased age was found to be a predictor of having a poor social support network (Goodwin, Hunt, & Samet, 1991).

Age and Quality of Life in Society

The findings of one study did not support any relationship between age and quality of life. Demographic variables, including age, were not significantly correlated with the measures of subjective well-being in a study of elderly medical patients (Snow & Crapo, 1982).

A 13-nation well-being study surveyed four age groups (under 25, 25-34, 35-49, and more than 50 years of age) on the indices of satisfaction with job relations, satisfaction with human relations, and satisfaction with material needs. Those more than 50 years of age obtained higher scores on satisfaction with human relations and satisfaction with material needs, as compared with those under 25 years of age (Butt, & Beiser, 1987).

In a large Australian sample, Hong and Giannakopoulos (1994) found age to be one of seven predictors of life satisfaction in independent analyses. Because age shared variance with self-esteem, it was not found to be a significant predictor of life satisfaction in stepwise multiple regression.

Univariate findings indicated that older cancer patients had less life satisfaction than younger patients. Nevertheless, the overall multivariate findings indicated that the main effect of age was not significant (Linn & Linn, 1981).

Age and Quality of Life in Chronic Illnesses

Age has been found to be a significant predictor of life satisfaction and quality of life in specific populations. The indirect, rather than the direct, effects of age upon the quality of life of those with arthritis were found in a model developed by Burckhardt (1985). These effects exerted through four separate pathways were: (a) perceived support via the social network configuration, (b) negative attitude either by a direct effect or indirectly via severity of pain, (c) self-esteem indirectly via severity of impairment, or (d) internal control over health indirectly via severity of impairment.

A study of a post-MI population indicated that increased age was associated with diminished quality of life (Conn et al., 1991). In contrast, Baker et al. (1994) found that younger age at transplant contributed to life satisfaction. Anderson (1995) also hypothesized that age would have an indirect effect upon quality of life, but found that age had a direct effect on perceived quality of life in chronic obstructive pulmonary diseased (COPD) patients.

Variable Definition

In this study, age was computed (in years) from the month and year of birth until the time of survey. Although the majority of the empirical research indicates that age was an important variable for inclusion in the model, this study posited that the indirect rather than the direct effects of age will affect quality of life.

Hypothesis 1	An increase in age will lead to a decrease in perceived social support.
Hypothesis 2	An increase in age will lead to more depression.

The Null Hypotheses

Null Hypothesis 1	An increase in age will not lead to a change in sexual function.

Null Hypothesis 2	An increase in age will not lead to a change in urinary function.
Null Hypothesis 3	A change in age will not lead to a change in sexual appraisal.
Null Hypothesis 4	A change in age will not lead to a change in urinary appraisal.
Null Hypothesis 5	An increase in age will not lead to a change in self-esteem.
Null Hypothesis 6	An increase in age will not lead to a change in anger suppression.
Null Hypothesis 7	An increase in age will not lead to a change in health locus of control.
Null Hypothesis 8	An increase in age will not lead to a change in quality of life.

Disease Variables

Relationships Among Disease Variables

The most frequently measured variables in health-related quality of life research in post-treatment prostate cancer patients have been bowel, sexual, and urinary function (Braslis et al., 1995; Gburek et al., 1992; Kornblith et al., 1994; Lim et al., 1995; Litwin et al., 1995; Rieker et al., 1993). Minimal bowel dysfunction has been exhibited in those men treated with prostatectomy (Braslis et al., 1995; Litwin et al., 1995). Compared with the prostatectomy group, the radiotherapy group has consistently displayed worse bowel function (Gburek et al., 1992; Lim et al., 1995; Rieker et al., 1993). Bowel appraisal was worse in the radiotherapy group as compared with the other three groups, including the prostatectomy group in the study by Litwin and his colleagues (1995); however, the prostatectomy patients did not experience significant bowel distress. Therefore, bowel function and appraisal were not included in this study's model as they have not been found to be a significant factor in determining the quality of life of post-prostatectomy patients.

Sexual and urinary function pertain to the quantitative function from the patient's perspective, while the sexual and urinary appraisal are the patient's qualitative judgment of whether or not sexual or urinary function has been a problem. Some studies have used the terms of sexual and urinary bother or distress to refer to the appraisal of sexual or urinary function (Herr, 1994; Litwin et al., 1995).

Sexual Function and Appraisal

Sexual dysfunction has been reported as decreased frequency and quality of erections, decreased morning erections, decreased intercourse, and decreased ability to achieve sexual climax (Litwin et al., 1995). Litwin et al. referred to sexual appraisal as bother, others have referred to this concept as distress (Braslis et al., 1995; Pedersen et al., 1993).

Sexual function has been a profound concern for many men after prostate cancer treatment, but the research results have not been uniform from study to study.

Sexual function deterioration has been reported among those undergoing a prostatectomy, with many men voicing dissatisfaction (Braslis et al., 1995; Fowler et al., 1995; Heyman & Rosner, 1996; Kornblith et al., 1994; Pedersen et al., 1993). Two studies compared the radiotherapy group with the prostatectomy group and found the prostatectomy group demonstrated worse sexual function after treatment (Lim et al., 1995; Rieker et al., 1993). Two other studies found no significant differences between the sexual function of these two groups (Litwin et al, 1995; Gburek et al., 1992). Men treated with prostatectomy or radiotherapy have displayed worse sexual function after treatment than a comparison group (Litwin et al., 1995). Previous sexual function was also found to influence the patient's assessment of the bother after treatment (Fowler et al., 1995). Increased sexual symptom severity has been associated with an increase in sexual problems and distress (Braslis et al., 1995; Pedersen et al., 1993). Litwin et al. (1995) found that the sexual appraisal of those undergoing prostatectomy was not significantly different from the radiotherapy group. Approximately one-fourth of the prostatectomy and radiotherapy men with poor or very poor sexual function were moderately bothered (Litwin et al., 1995). No research has linked sexual function to urinary appraisal.

Urinary Function and Appraisal

The symptoms relating to urinary function have included frequency, greater leakage, more pads used per day, and more interference with sexual function due to leakage (Litwin et al., 1995). Dripping urine, especially when pads had to be worn, had a more significant effect on patients than did diminished sexual function in a national Medicare survey (Fowler et al., 1995). Several studies found urinary function to diminish in the prostatectomy group after treatment (Braslis et al., 1995; Herr, 1994; Heyman & Rosner, 1996; Pedersen et al., 1993). Compared with the radiotherapy group, the prostatectomy group has demonstrated worse urinary function (Gburek et al., 1992; Rieker et al., 1993; Lim et al., 1995). The prostatectomy treatment group displayed worse urinary function than the other three groups in Litwin's (1995) study. Litwin et al. also demonstrated that urinary function was significantly different from urinary appraisal. Although there was a significant difference in level of function between the prostatectomy and radiotherapy groups, incontinence equally bothered these two groups. Similar results were found by Herr (1994) who identified a relationship between incontinence and distress. No research has indicated a connection existed between urinary function and sexual appraisal.

Relationships Among Disease and Psychological Variables

No quantitative research exists regarding self-esteem and localized prostate cancer after treatment. Qualitative research indicates that the side effects of prostate cancer treatments, such as impotence and incontinence, may cause a loss of self-worth (Heyman & Rosner, 1996).

Health-related quality of life studies in prostate cancer indicate anger suppression was a pertinent variable. Studies in other populations, such as COPD patients, indicate that more symptoms were predictive of patients experiencing more anger (Lane, 1991). Qualitative interviews with post-treatment prostate cancer patients indicated early phase issues included feelings of anger, and early phase coping strategies involved feelings of anger when expectations were not met (Heyman & Rosner, 1996). Treatment side effects, specifically incontinence, have been associated with anger in prostate cancer (Braslis et al., 1995; Lim et al., 1995).

Little research exists regarding men with prostate cancer and their social support systems. The findings of Kornblith et al. (1994) do indicate, however, that the social support system may be altered by the prostate cancer treatment as evidenced by: (a) the perception of sexual problems differing in the dyads, and (b) the partner having had more psychological distress and intrusion from the disease. Heyman and Rosner (1996) found that there were changes in the intimacy of the relationship. These issues resulted in coping strategies, that included learning new ways to express intimacy.

Depression has been associated with prostate cancer treatment side effects. In the prostatectomy population, depression was associated with incontinence (Braslis et al., 1995; Lim et al., 1995) and with decreased sexual function (Lim et al, 1995).

No research has measured health locus of control in patients after treatment of localized prostate cancer; however, the qualitative work done by Heyman and Rosner (1996) indicates that locus of control may be a factor in the lives of these men. Their findings demonstrated that a common reaction to treatment side effects was loss, related to a sense of control. In addition, early and late phase coping strategies were concerned with acquiring information to gain mastery of their situation.

Disease Variables and Quality of Life

After radical prostatectomies some men were found to experience diminished sexual function and diminished appraisal of sexual function (Braslis et al., 1995; Fowler et al., 1995; Gburek et al., 1992; Herr, 1994; Heyman & Rosner, 1996; Lim et al., 1995; Litwin et al., 1995; Pedersen et al., 1993; Rieker et al., 1993). The relationship between sexual function and appraisal and the dependent variable of health-related quality of life has been studied. Rieker et al. (1993) found that men who had a radical prostatectomy had greater sexual dissatisfaction but better general health perceptions. Sexual function among the radical prostatectomy group was worse than the comparison group, but no differences were found on health-related quality of life assessments (Litwin et al., 1995).

Some prostate cancer patients treated with radical prostatectomy have diminished urinary function, as evidenced by the use of protective incontinence pads (Gburek, 1992). Subsequently, the effects of the urinary function were associated with diminished health-related quality of life (Rieker et al., 1993; Fowler et al., 1995). Specifically, incontinence has been inversely correlated with emotional distress, perceived physical, social and psychological well-being (Braslis et al., 1995; Fowler et al., 1995; Herr, 1994; Lim et al., 1995).

Variable Definitions

The following definitions were proposed for the variables in the model. Sexual function was characterized as the frequency and adequacy of erections, frequency of intercourse, and ability to achieve sexual climax. Sexual appraisal was defined as whether or not sexual function has been a problem to the patient (Litwin et al., 1995). Urinary function was used to describe the voluntary control of urine storage and timely expulsion of urine (Doughty, 1991). Urinary appraisal was defined as whether or not urinary function has been a problem to the patient (Litwin et al., 1995).

Hypothesis 3 A decrease in sexual function will lead to lower sexual appraisal.

Hypothesis 4 A decrease in urinary function will lead to lower urinary appraisal.

Hypothesis 5 A decrease in sexual appraisal will lead to a decrease in self-esteem.

Hypothesis 6 A decrease in sexual appraisal will lead to more anger suppression.

Hypothesis 7 A decrease in sexual appraisal will lead to a decrease in perceived social support.

Hypothesis 8 A decrease in sexual appraisal will lead to more depression.

Hypothesis 9 A decrease in sexual appraisal will lead to a decrease in health locus of control.

Hypothesis 10 A decrease in urinary appraisal will lead to a decrease in self-esteem.

Hypothesis 11 A decrease in urinary appraisal will lead to more anger suppression.

Hypothesis 12 A decrease in urinary appraisal will lead to a decrease in perceived social support.

Hypothesis 13 A decrease in urinary appraisal will lead to more depression.

Hypothesis 14 A decrease in urinary appraisal will lead to a decrease in health locus of control.

Hypothesis 15 A decrease in urinary appraisal will lead to a decrease in quality of life.

The Null Hypotheses

Null Hypothesis 9 A decrease in sexual function will not lead to a change in urinary appraisal.

Null Hypothesis 10 A decrease in sexual function will not lead to a change in self-esteem.

Null Hypothesis 11 A decrease in sexual function will not lead to a change in anger suppression.

Null Hypothesis 12 A decrease in sexual function will not lead to a change in perceived social support.

Null Hypothesis 13 A decrease in sexual function will not lead to a change in depression.

Null Hypothesis 14 A decrease in sexual function will not lead to a change in health locus of control.

Null Hypothesis 15 A decrease in sexual function will not lead to a change in quality of life.

Null Hypothesis 16 A decrease in urinary function will not lead to a change in sexual appraisal.

Null Hypothesis 17 A decrease in urinary function will not lead to a change in self-esteem.

Null Hypothesis 18 A decrease in urinary function will not lead to a change in anger suppression.

Null Hypothesis 19 A decrease in urinary function will not lead to a change in perceived social support.

Null Hypothesis 20 A decrease in urinary function will not lead to a change in depression.

Null Hypothesis 21 A decrease in urinary function will not lead to a change in health locus of control.

Null Hypothesis 22 A decrease in sexual appraisal will not lead to a change in quality of life.

Psychosocial Variables

Self-esteem

Self-esteem in Society

The concept of self-esteem has been studied in-depth in the literature. Campbell (1981) determined that self-esteem was the strongest predictor of life satisfaction in an American national sample. Diener (1984) established that self-esteem was one of two variables related to quality of life.

In their cross-cultural studies, Diener and Diener (1995) found that self-esteem and life satisfaction were correlated in a sample of 13,118 college students from 31 nations. Hong & Giannakopoulos (1994) also found a relationship between self-esteem and life satisfaction in a study using a large sample of 1,749 adult Australians between the ages of 17 and 40 (Hong & Giannakopoulos, 1994). In fact, self-esteem and one other variable in the study were found to have the most significant effect on levels of life satisfaction.

Self-esteem in Chronic Illnesses

Self-esteem has also been linked to life satisfaction and quality of life in a number of disabled and chronically ill populations, such as post-MI, COPD, and cancer populations. Leisure satisfaction and psychosocial aspects, including self-esteem, were related to perceptions of life satisfaction in adults who had some physical disabilities (Kinney & Coyle, 1992). Self-esteem was also found a significant predictor of quality of life in post-MI and arthritis patients (Burckhardt, 1985; Wingate, 1995). In a path analysis model, self-esteem was one of four variables having mediating effects on life quality in COPD patients (Anderson, 1995).

Each year many persons diagnosed with cancer undergo treatments that can alter body images and diminish self-esteem (Fawzy, Secher, Evans, & Giuliano, 1995). Cancer population studies often include self-esteem as a predictor of life satisfaction and quality of life. Lewis (1982) hypothesized, that late-stage cancer patient's, greater control would be associated with a higher quality of life as measured by perceived self-esteem, anxiety, and perceived meaningfulness. As predicted, the measure of experienced personal control over life was significantly correlated with scores on the self-esteem scale. A considerable amount of research indicates that self-esteem continues to be a major predictor of quality of life.

Variable Definition

For this study, self-esteem was defined as a product of an implicit evaluation of self-approval or self-disapproval made by the person concerning personal judgment of general self-worth (Joubert, 1990). After conducting a review of the research, self-esteem was hypothesized to be a mediating variable in this study.

Hypothesis 16 An increase in self-esteem will lead to an increase in quality of life.

Anger Suppression

A majority of the anger research has focused on the assessment of state and trait anger. Differentiation between the experience and expression of anger has prompted research in the area of anger expression (Spielberger, 1996).

Research findings suggest that anger and hostility contribute to many common medical conditions, such as cardiovascular reactivity, hypertension, heart disease, and post-MI arrhythmias (Booth-Kewley & Friedman, 1987; Engebretson & Matthews, 1992; Engebretson, Matthews, & Scheier, 1989; Frasure-Smith, Lesperance, & Talajic, 1995; Markovitz, Matthews, Wing, Kuller, & Meilahn, 1991; Mittleman et al., 1995; Suls, Wan, & Costa, Jr., 1995). The Framingham study found a significant relationship between the extent of coronary heart disease and anger suppression in both men and women (Haynes, Feinleib, & Kannel, 1980). More specifically, an association between the potential for hostility and coronary heart disease indices was found only in those who were rated high on the suppression of anger (Dembrowski, MacDougall, Williams, Haney, & Blumenthal, 1985).

Men with an opportunity to express anger showed better recovery on heart rate and blood pressure readings than men without the opportunity for anger expression (Lai & Linden, 1992). Gentry, Chesney, Gary, Hall, and Harburg (1982) found evidence that suppressed anger was an etiological component to elevated blood pressure and consequently to hypertension. Suppressed anger and job stressors were found to be significant predictors of hypertension in male workers between the ages of 40 to 63 years (Cottington, Matthews, Talbott, & Kuller, 1986). Two relaxation treatment groups reported lowered tendencies to suppress anger in one of the few intervention studies in this area of research (Deffenbacher & Stark, 1992).

Anger Suppression in Society

Few quality-of-life studies have included anger expression. In one study, low anger arousal was related to high well-being for university students (Biaggio, 1980). Among Australians, trait anger was found to be one of the five variables predictive of life satisfaction (Hong & Giannakopoulos, 1994). To date, no quality of life studies have studied anger suppression.

Anger Suppression in Chronic Illness

Different approaches to conceptualizing anger expression in quality of life issues have been used in various studies. As previously mentioned in this chapter, lack of social support predicted anger in bone marrow transplant survivors (Baker et al., 1994). In a study of the quality of life for terminal cancer patients, a model of dying provided the specific hypotheses about differences in quality of life among those in specialized palliative care units as compared to those in the general hospital. Those in the special care units showed less indirectly expressed anger, indicating they were psychologically healthier (Viney, Walker, Robertson, Lilley, & Ewan, 1994).

Research has also been conducted in the area of cancer and anger suppression. It has been hypothesized that cancer-prone individuals have Type-C characteristics that consist of anger suppression. Type-C individuals were found to have higher anger suppression scores (Shigehisa, 1995). Anger was considered an important variable for inclusion in this study's model because of its relevance to quality of life issues in prostate cancer patients.

Variable Definition

Negative anger aspects, like anger suppression, produce opposite effects in life satisfaction (Hong & Giannakopoulos, 1994). Anger suppression in this study was defined as "an unwillingness in a variety of circumstances to express frustration-induced hostility and/or anger overtly, especially if the potential for interpersonal conflict would be heightened by such behavior" (Dembrowski et al. 1985, p. 230).

Hypothesis 17 An increase in anger suppression will produce a decrease in quality of life.

Perceived Social Support

Perceived Social Support in Society

Interest in social support has been fueled by empirical evidence that it has beneficial effects on health. Levitt, Clark, Rotton, and Finley (1987) explored social support, health, and personal control beliefs in relation to well-being, and the unresolved issue of the sufficiency of one support figure in the aged population. Health, control, and social support emerged as predictors of life satisfaction. The findings of their study also suggested that one close support figure may be sufficient to promote well-being.

Dalgard, Bjork, and Tambs (1995) found evidence that supported the "buffer hypothesis" that social support protects against the development of mental disorder only when the individual was exposed to stressors, such as negative life events. This buffering effect was especially strong for depression. One specific finding in this research relates to the issue of locus of control. Specifically, the buffering effect applied only to persons with external locus of control or those who have personality-related feelings of powerlessness and lack of control over their own lives. Those with internal locus of control did not require social support to contend with life stressors and have low symptom scores even when negative life events were combined with relatively weak social support.

Perceived Social Support in Chronic Illnesses

Social support has been studied in relation to quality of life for those with chronic diseases. Perceived support was also found to be a significant predictor of quality of life in a study of arthritis patients by Burckhardt (1985). Social support was one factor found to have positive direct effects on life quality in COPD patients (Anderson, 1995).

One focus of a study by Doeglas et al. (1994) was an examination of the main effect versus the buffering effect of social support on rheumatoid arthritis patients. Persons receiving daily emotional support were found to have positive psychological well-being, whereas those receiving problem-oriented emotional support showed a negative relationship to psychological well-being. Those receiving more social companionship were less depressed. These researchers concluded that social support has a major effect on psychological well-being, but the buffering effect of social support was not demonstrated.

Social support has also been found to influence the quality of life for those encountering life threatening illness, such as cancer or a MI. Three variables were identified as significant predictors of quality of life in post-MI women by Wingate (1995). These variables--employment status, self-esteem, and social support--accounted for 45% of the variance in quality of life.

A theoretical model posited cancer survivorship as a function of selected age, marital status, life satisfaction (quality of life, social support, self concept and spirituality), and physiological status (immune status, disease stage, and treatment modality) in African American women diagnosed with breast cancer. Life satisfaction was found to be directly related to cancer survivorship. Life satisfaction was the only latent variable to merge in the Linear Structural Relationships (LISREL VII), indicating a relationship between the variables of quality of life, social support, self-concept, and spirituality. In fact, social support, rather than quality of life, provided most of the variance in the life satisfaction score (Guillory, 1996).

Godding, McAnulty, Wittrock, Britt, and Khansur (1995) studied factors that predicted depression in chronically ill patients. Social support and quality of life accounted for 31.5% of the variance in the depression scores in male cancer patients. Results of a study of adult survivors of bone marrow transplantation not in life threatening relapses indicated lack of social support was predictive of anger. This study also demonstrated the importance of social support for satisfaction with life domains (Baker et al., 1994). Thus, there was convincing empirical evidence that perceived social support was an important concept to be included in the model for this study.

Variable Definition

The definition of social support selected for this study, which originated from Cohen and Willis (1985), focused on the perception of social support. Perceived social support was defined as the person's perception of the adequacy of available support and the degree to which these resources are responsive to the demands elicited by recognized life stressors.

Hypothesis 18 An increase in perceived social support will lead to an increase in quality of life.

Depression

Depression in Society

In a large Australian sample of nonill persons, Hong and Giannakopoulos (1994) concluded that depression was one of two factors found to significantly effect the levels of life satisfaction.

Depression in Chronic Illnesses

Research has also identified that depression may affect quality of life after diagnosis and treatment of chronic illnesses, such as COPD, post-coronary artery bypass, and cancer patients. In a path analysis model, depression was also one of four variables having mediating effects on life quality in COPD patients (Anderson, 1995).

A prospective study of reactions to coronary artery bypass surgery identified three subgroups of patients who differed with respect to their emotional status and life satisfaction. One group was characterized by high levels of depression and life dissatisfaction. The other two groups reflected normal values (Strauss et al., 1992).

As previously mentioned, quality of life was used to predict depression in a sample of older male cancer patients. Depression was common, but not a universal response to a diagnosis of and treatment for cancer. Moderate depression was present in approximately 40% of the participants, and nearly 20% produced scores indicating clinical depression. Quality of life and social support accounted for a significant proportion of the variance in the depression scores in male cancer patients (Godding et al., 1995).

One study (Kaasa, Aass, Mastekaasa, Lund, & Fossa, 1991) examined the relationship between life satisfaction and depression, but the results were not in accordance with other findings. One group of testicular cancer patients was found to have more life satisfaction, but reported more depression. Patients with testicular cancer who had been treated with either surgery, radiotherapy, or chemotherapy were compared with age-matched controls. Those who had been treated were found to be less exhausted after working, more satisfied with life, and felt stronger and more fit than the controls. However, the cancer patients reported a significantly higher incidence of depression than the normal population (Kaasa et al., 1991). Based upon these works, depression was considered an important variable for inclusion in the model.

Variable Definition

In this study, depression was defined as depressed mood or loss of interest or pleasure persisting over a 2-week period. At least four of the following symptoms accompany these manifestations: (a) change in weight or appetite; (b) change in sleep patterns, usually insomnia; (c) psychomotor agitation or diminishment; (d) fatigue or loss of energy, (e) feelings of worthlessness or guilt; (f) inability to concentrate or make decisions; or (g) recurrent thoughts of death with or without suicidal ideation (American Psychiatric Association, 1994).

Hypothesis 19 An increase in depression will lead to a decrease in quality of life.

Health Locus of Control

The concept of locus of control alludes to a general supposition that events, actions, and behaviors are controlled by internal and external forces (Rotter, 1966). Locus of control focuses on the person's perception of relationships between behavior and events that follow a behavior. Internal control persons believe that their actions control their lives. External control persons believe exterior forces control their lives (Seligman, 1973). Those with external control typically perceive their lives as under the control of other contributing behavior and events from luck, chance, or fate (Hong & Giannakopoulos, 1994).

Health Locus of Control in Society

Results of an Australian study indicated that locus of control was one of five factors found to predict life satisfaction (Hong & Giannakopoulos, 1994). The relationship between locus of control and life satisfaction was also examined in the aged population. A strong locus of control effect was found to be associated with life satisfaction in this population as well (Hickson, Housley, & Boyle, 1988). In another study of elderly persons, perceived control emerged as an independent predictor of life satisfaction (Levitt et al., 1987).

Health Locus of Control in Chronic Illnesses

Two studies did not find a relationship between health locus of control and quality of life. Health locus of control was not a consistent predictor of perceived quality of life in late-stage cancer patients or in post-MI women (Lewis, 1982; Wingate, 1995).

Laborde and Powers (1985) assessed the relationship between life satisfaction and health perception, health locus of control, and illness-related factors in osteoarthritis patients. Life satisfaction was found to be related to internal locus of control. Control was also examined from the internal control over health perspective in arthritis patients (Burckhardt, 1985). Internal control over health was a direct contributing factor to a perception of higher quality of life. Based on these empirical findings, it was hypothesized that health locus of control was an important mediating variable for the present study.

Variable Definition

The definition of the variable provided by Wallston, Maides, and Wallston (1976) was used for the present study. This definition states that there was a generalized expectancy of internal control in relation to health behaviors.

Hypothesis 20 An increase in health locus of control will lead to an increase in quality of life.

Dependent Variable: Quality of Life

The concept of quality of life is very complex. Different diseases affect different bodily functions, leading to different physical and emotional problems (Guyatt et al. 1986). From the individual's perspective, clinicians need to attend to what a patient says, what a patient considers important, and what factors may alleviate a patient's suffering from the disease. The variety of approaches which examine the quality of life of localized prostate cancer after treatment will be surveyed.

Quality of Life in Society

Reference to the term "quality of life" began in the 1960s during fledgling efforts to assess a variety of social and environmental factors. August Heckscher (1960) observed that America had reached the pinnacle of success, with abundant wealth, leisure time, and a rising standard of living. One concern during the industrial era was that there might be a lessening of moral intensity and a lack of experiential social engagement. If the "great society" was to be the ultimate way of living, satisfaction should not be based on consumption, an objective measure, but rather on an inward quality and ideal, that is, subjectively.

How a researcher views quality of life, either subjectively or objectively, contributes greatly to its definition. The objective view of quality of life includes indicators such as employment status and functional ability, while the subjective view includes indicators such as well-being, life satisfaction and happiness. Subjective measures can complement traditional statistics by providing direct access to the personal values about life priorities and feelings of discomfort or distress that may impair the person's ability, regardless of age, to live life to its fullest (Evans, 1991). From the patient's subjective perspective, quality of life is multidimensional (Cella, 1994; King, 1994; Padilla, Ferrell, Grant, & Rhiner, 1990; Ware, 1995). The multidimensional approach specifies that more than one domain, such as physical function, be measured. Instead, multiple dimensions are assessed. This approach complements research by yielding a more comprehensive measurement of these quality of life dimensions.

The concept of quality of life is very broad and crosses many domains. Most patients consider quality of life as representative of their life priorities. The concept of quality of life generates thoughts of value (Patrick & Erickson, 1993). Dubos (1976) stated, "quality of life involves value judgments that are highly subjective," equating it with "profound satisfactions from the activities of daily life" (p. 8).

Several hallmark studies have contributed to the development of more specific formulations of the nature of life quality. These included Gurin, Veroff, and Feld (1960), Bradburn and Caplovitz (1965), and Campbell, Converse, and Rogers (1976) who began to explore the socially constructed themes that compose an individual's quality of life. In a study conducted by the University of Michigan Survey Research Center, Gurin et al. (1960) investigated Americans' views of their mental health, asking them to describe their happiness, worries, and experiences about life. In a sample of 2,460 interviewed persons, participants reported feelings of adjustment and their methods of handling emotional problems. Feelings of well-being and distress were measured in terms of happiness and worries.

Building on the research of Gurin et al. (1960), Bradburn and Caplovitz (1965) conducted a pilot study in four small towns to observe the phenomena "avowed happiness." The participants were observed for a full week and asked whether during this time period they had felt proud or happy, lonely or depressed. The data analysis led to the conceptualization of two dimensions--positive and negative affect--of psychological well-being. A full study was then conducted by Bradburn (1969) on a sample of 2,787 participants from 10 communities, with repeated interviews conducted over a 1-year study period.

Campbell et al. (1976) collected data in 1971 on a nationwide sample of 2,164 adults to measure their perceptions of socio-psychological condition, life needs and expectations, and the degree to which those needs were satisfied. The following 15 factors were included in the research: marriage, family life, friendship, neighborhood, housing, housework, job, nonwork, health, American life, the city or country, usefulness of education, amount of education, standard of living, and savings. Items were given an excellent, good, or poor overall rating. Research limitations were noted because subjective perceptions of well-being and quality of life may have meant different things to different people. Historically, the research conducted during this time period was a revolutionary new approach coming from a different perspective. In defense of these limitations, the necessity for the measurement of these subjective perceptions of personal values and the extent to which these needs were being met was an important accomplishment in quality of life research.

By collecting data from 3,000 persons from regional samples and diverse groups, Flanagan (1978) accumulated more than 6,500 critical incidents about American life components from people in their 30s, 50s, or 70s. These incidents were elicited by using a variety of questions, such as, "Think of the last time you did something very important to you or had an experience that was especially satisfying to you" or "What did you do or what happened that was so satisfying to you?" (p. 57). Through an inductive process of gradual refinement, these incidents were clustered into categories, arranged into 15 quality of life components, and listed under five domains. This resulted in the Flanagan (1982) Quality of Life Scale which has been used to evaluate proposals for improving quality of life.

In summary, Flanagan's research contributed several landmark elements to quality of life research. They included: (a) utilization of in-depth interviews to identify the determinants of quality of life, (b) development of the empirical definition of the quality of life of adults, (c) analysis of specific factors that tend to improve quality of life, (d) analysis of different age groups showing their ratings of importance and assessments of needs met for the factors defining quality of life, and (e) formulation of quality of life models and instruments (Flanagan, 1982).

Quality of Life for Prostate Cancer Patients and Their Partners

Both quantitative (Kornblith et al., 1994) and qualitative (Heyman & Rosner, 1996) research has been conducted on prostate cancer patients and their partners. These studies provided the first glimpse of the effects of prostate cancer treatments upon patients and their families.

Quantitative Research for Prostate Cancer Men and Their Partners

Kornblith and her colleagues (1994) studied prostate cancer treatment adaptation and health-related quality of life. The purpose of the study was to compare the health-related quality of life dimensions among the 172 patients and their 82 partners, to examine the extent to which the problems changed over time, to evaluate the effects of disease stage and different regimens on health-related quality of life, and to identify the adjustment problems that required interventions. The primary instrument was the original EORTC Prostate Cancer Quality of Life Questionnaire comprised of 32 items and 2 additional prostate items: hot flashes and breast enlargement. This instrument measured physical function, physical symptoms, fatigue/malaise, psychological distress, sexual problems, and family impact of the disease. Additional instruments included the Intrusion Subscale from the Intrusion of Event Scale to measure emotional distress, the Marital Communication Problems Scale to assess openly discussed feelings, the QL Uniscale to measure overall effects of cancer, and the QL Problem Index to sum scale scores so higher scores reflected worse health-related quality of life.

The data analyses were based on three groups: no treatment, prostatectomy with/without radiotherapy, and medical and/or surgical hormonal therapy. Patients rated their sexual problems worse than their partners, but their partners had more psychological distress and intrusion from the disease or treatment effects. The most frequent patient problems were less erection ability (78%), less sexual enjoyment (74%), less sexual interest (58%), tiredness (48%), needing rest (31%), urinary frequency (38%), difficult urinary control (25%), worry (29%), and sleep trouble (29%). The prostatectomy and radiotherapy groups had more negative sexual problems than the no treatment group had. The hormonal therapy group had significantly worse health-related quality of life. Those experiencing adaptation problems with worse health-related quality of life ratings were more likely to have been treated with surgical or medical hormonal therapy, and they reported having more pain, lack of energy, and increased urinary frequency (Kornblith et al., 1994).

These findings indicate that for the duration of the study the group receiving no treatment experienced a higher health-related quality of life than those who received either hormonal treatments or prostatectomy with or without radiotherapy. Two-thirds of the sample consisted of those with advanced stage prostate cancer. Generally, the advanced stage or hormonal treatment group experienced more pain, fatigue, and hot flash symptoms than did the localized prostate cancer groups receiving either prostatectomy or radiotherapy (Fossa et al., 1990). It should be noted that confidentiality between the patients and their partners was not always protected, and this may have affected the self-reports (Kornblith et al., 1994).

Qualitative Research for Prostate Cancer Men and Their Partners

Qualitative research also shows that prostate cancer adversely affects the daily lives of the marital dyad. Same-sex interviewers used a semi-structured interview guide to elicit responses regarding the perceptual experiences about prostate cancer from 20 volunteer referrals originating from either a support group or urologists. The topics included an overall description of situations, differences between the pre-cancer to the post-cancer diagnosis, and the impact on the partner. Thematic emerging techniques were used to review the entire transcription, analyze sentences for meaning, identify units of meaning, and define and organize themes (Heyman & Rosner, 1996).

Participant experiences were clustered into either early or later phases of adapting to living with cancer and treatment side effects. Early phase issues were the reality of diagnosis, fear of cancer, and feelings of anger and vulnerability. Early phase coping strategies were: information to gain mastery regarding the situation, seeking out caring professionals, and anger when expectations were not met. Late phase issues were: reaction to treatment side effects, loss related to self-worth and sense of control, impotence linked to loss of manhood, changes in intimacy relationship, and incontinence as it influenced routine daily living. Late phase coping strategies were: trying to maintain a positive outlook, learning new ways to express intimacy, and information seeking (Heyman & Rosner, 1996).

The treatment and stage of prostate cancer were not specified for these 20 dyads. Because only a small sample participated in the study, findings were limited. Therefore, the emergent overall themes may not be generalizable (Heyman & Rosner, 1996).

Quality of Life of Prostate Cancer Patients

In the past two decades, major efforts have been expended to advance the quality of life research into other areas of research such as health status research. The instruments used to measure this phenomenon are referred to as health surveys (Ware, 1995).

A health survey is not merely a measurement of physical symptoms. Rather, it is a comprehensive examination of patient values reflected in a number of health-related quality of life domains. First, health perceptions include two areas: general health perceptions and satisfaction with health. Second, opportunity for health consists of resilience and social or cultural disadvantage, including social stigma. Third, impairment of health is reflected by symptoms and self-reported diseases. Fourth, and probably the most commonly reported domain, is functional status, consisting of the physical, psychological, and social function (Patrick & Erickson, 1993).

A general consensus now exists that the comprehensive health-related quality of life assessments usually include: (a) measures of physical-functional well-being, (b) psychological well-being, and (c) social-interpersonal well-being (Padilla et al. 1990). Other definitions of health-related quality of life have included role functioning, cognitive function, productivity, intimacy, and symptoms considered significant to life quality, such as pain or sleep disturbances (Berzon, & Shumaker, 1990; Ware, 1995).

Factors affecting quality of life outcomes in prostate cancer include time since treatment, different definitions of symptoms, instruments utilized, and interpretation of findings (see Appendix A). This research will be reviewed with a specific focus on these factors and on the relationships between potential predictor variables and quality of life.

General Health Surveys

Two studies combined general health-related quality of life surveys with a disease-specific symptom inventory (Fowler et al., 1995; Rieker et al., 1993). Fowler et al. (1995) assessed 1,072 Medicare recipient responses to the prostatectomy treatment. The findings indicated incontinence had significant adverse effects on health-related quality of life, with participants scoring lower on both the General Health Index and the Mental Health Index. Dripping urine, especially to the degree that participants needed to wear pads, affected patients more than loss of sexual function. Two important observations from this study were: (a) that those with incontinence had diminished health-related quality of life and were less satisfied with treatment, and (b) that while those with no sexual function before treatment reported no concern regarding sexual function. More than one-third of the men who had some sexual function prior to surgery considered the lack of sexual function to be a medium or big problem (Fowler et al., 1995). The authors compared these patients with men who had undergone a transurethral resection of the prostate (TURP) for benign prostatic hyperplasia (BPH). The conclusions reported that the health-related quality of life scores of prostate cancer patients were indistinguishable from the BPH patients. However, the researchers failed to mention that the only BPH patients who had improved health-related quality of life after the TURP were those with acute retention or severe symptoms before surgery (Fowler et al., 1988). It was concluded that most patients adjusted well to prostate cancer treatments; however, 19% of the patients were not positive regarding the prostatectomy, and an additional 11% stated that they would not choose surgery again (Fowler et al., 1995).

A general health survey, the SF-36, was used to assess 207 patients treated with prostatectomy or radiotherapy who were at least 12 months post-diagnosis with early stage prostate cancer. When compared with a noncancer community sample, the scores indicated the prostate cancer patients experienced better health-related quality of life than the community sample. The surgery group had better physical functioning and general health perceptions but worse sexual satisfaction than the radiotherapy group. More serious comorbidity was found in the radiotherapy group, as was more bowel symptoms. While there was no significant difference in urinary symptoms between the two groups, the radiotherapy group was found to have more activity limitation due to incontinence, and the surgery group more frequently indicated the current use of pads. After adjusting for age at diagnosis, time since diagnosis, current symptoms, comorbidity, employment status, and education, the surgery group was associated with greater sexual dissatisfaction but better general health perceptions (Rieker et al., 1993).

General and Cancer-Specific Health Surveys

One study combined both general and cancer-specific health-related quality of life surveys with a disease-specific symptom inventory (Litwin et al., 1995). The purpose of the study was to assess the health-related quality of life in men treated for localized prostate cancer and to determine whether new and established health-related quality of life measures could be developed and reliably used in the population. The sample was comprised of 528 men randomly selected from a large health maintenance organization (HMO). The participants included: 214 (79% response rate) prostate cancer patients with a mean time since diagnosis of between 5 and 6 years; and 273 (46% response rate) age-matched, ZIP code-matched comparison patients without prostate cancer. Cancer patients were analyzed in three treatment groups: (a) prostatectomy (n = 98), (b) radiotherapy (n = 56), and (c) observation (n = 60). Instruments consisted of the SF-36; two cancer-specific instruments, the Cancer Rehabilitation Evaluation System-Short Form or CARES-SF and the Functional Assessment of Cancer Therapy-General form or FACT-G; and the new disease-targeted sexual, urinary, and bowel function and bother scales (Litwin et al., 1995).

The sexual, urinary, and bowel questionnaire was developed with three focus groups that included 36 prostate cancer patients and their partners. Face validity was established with 16 patients and their partners, as well as eight experts. The instrument was further refined and pretested with a sample of 40 Veterans Affairs patients who had either prostatectomy or radiotherapy treatments. The final instrument consisted of 20 items: 9 sexual, 6 urinary, and 5 bowel items. Test-retest reliability among cancer patients ($\underline{n} = 66$) was consistent overtime ($r \geq 0.70$ or more). Internal consistency reliability was established (Cronbach's $\propto$ coefficient $r \geq 0.70$ for 14 of the 18 scales and for two of three multi-item prostate-targeted function scales). The 59-item CARES-SF was abridged to 45 items to eliminate prostate cancer-irrelevant items, but no psychometrics were reported on this variation (Litwin et al., 1995).

Differences were seen between cancer and noncancer groups in the sexual, urinary, and bowel function and bother areas, but not in the general health-related quality of life measures of the Rand SF-36 and FACT-G scales. The sexual function scale indicated that the surgery and radiotherapy groups scored worse than the observation and comparison groups. Although cancer-free men were found not to have full potency or continence, prostate cancer patients treated with surgery or radiotherapy reported significantly worse sexual, urinary, and bowel function than men without cancer. Men who had undergone nerve-sparing prostatectomy did not differ significantly from those who had undergone standard prostatectomy. There was an adequate response rate for the cancer group (79%); however, low response rates for the comparison group (46%) may have affected the outcomes. From the results, the authors were able to conclude that the general health-related quality of life among these treatment groups was similar, but there were significant differences in sexual, urinary, and bowel function (Litwin et al., 1995).

Psychological and Cancer-Specific Health Surveys

Psychological measures, cancer-specific health-related quality of life surveys, and a disease-specific symptom inventory, were used in three studies (Braslis et al., 1995; Krongrad et al., 1997; Lim et al., 1995). Braslis et al. (1995) assessed the treatment impact on the health-related quality of life in patients with prostate cancer 12 months after prostatectomy. Two groups of patients were recruited, those who were ≥ 12 months post-prostatectomy and those who were approximately 1 month pre-prostatectomy. A cancer-specific instrument--the Functional Living Index: Cancer (FLIC)--was used to measure the vocational, psychological, social and somatic function of cancer patients undergoing treatment. The domains of health-related quality of life measured with the FLIC included the psychosocial function related to nausea and vomiting, as well as freedom from pain. The Profile of Moods States (POMS) was used to evaluate the six individual mood states of depression, anger, tension, confusion, fatigue, and vigor. To assess the sexual and urinary function, an inventory was constructed with each section having four to six questions consisting of Likert-type responses--Never (0) to Always (5)--with a sum for each symptom domain. The four sections of the symptom inventory--bladder irritability, urinary incontinence, sexual dysfunction, and bowel dysfunction--were reviewed. However, no information on psychometrics was described in the publication (Braslis et al., 1995).

Scores for the pre- and post-prostatectomy groups were compared in the Braslis et al. (1995) study. The tension scores improved significantly after surgery. However, hardship scores, suggesting poorer family/situation interaction, increased following surgery. There was significant deterioration in sexual function and continence following surgery. Incontinence was associated with increased confusion, depression, and anger, and inversely correlated with perceived physical and psychological well-being. Many were dissatisfied with sexual function and with increased symptom severity in feelings about sex and sexual problems (Braslis et al., 1995).

The convenience sample group was similar on socioeconomic status, staging, and histological characteristics. Because this was a cross-sectional design and not a pre- and post-test design, no psychosocial characteristics were available to determine if the two groups were comparable. While the FLIC items relating to nausea, vomiting, and freedom from pain may be related to metastasized cancers, these domains may not be related to localized prostate cancer treated with radical prostatectomy. The validity and reliability of the symptoms instrument were not addressed. As previously stated, the conclusions indicated that prostatectomy patients adjust well to lifestyle alterations, yet statistically significant changes were noted in 5 of 15 health-related quality of life parameters (Braslis et al., 1995).

Lim et al. (1995) also administered the FLIC, the POMS, and a symptom inventory to assess the impact of prostatectomy and radiotherapy on health-related quality of life. A symptom inventory to evaluate bladder continence and sexual function was constructed, but no validity or reliability data were reported.

Problems with incontinence, sexual, and bowel function have all been reported to be associated with depression, tension, and fatigue. Radical prostatectomies had worse incontinence and sexual function. Prostatectomy patients wore incontinent pads (43%) and reported difficulty with erections (98%) more often than radiotherapy patients (respectively, 0%, 54%), although the radiotherapy group had worse bowel function. Sexual function among men in the prostatectomy group was positively associated with vigor, but negatively associated with incontinence and depression. Incontinence among this group was positively associated with tension, fatigue, and depression, but negatively associated with vigor and social well-being. The sexual function of the radiotherapy group was negatively associated with voiding difficulties. Incontinence for this group was positively correlated with tension, anger, and fatigue, but negatively associated with vigor and social well-being. Finally, using the FLIC, no significant differences were found between these two groups in the overall health-related quality of life measurements (Lim et al., 1995).

Krongrad et al. (1997) also used the FLIC, but included the Rand Mental Health Index-17 to create models, logistic regression and neural network of health-related quality of life. The study population was comprised of patients with prostate disease including both prostate cancer and BPH. Krongrad and his colleagues defended the combining of these two groups by stating, "the general quality of life scores of men with BPH and prostate cancer are statistically indistinguishable" (p. 534). To identify potentially significant inputs for the models, focus groups were convened. These focus groups consisted of professionals from the following disciplines: urology, geriatrics, sociology, nursing, radiation oncology, statistics, and psychology. A self-report questionnaire was developed with items in the following areas: perceived age, judgment of overall health, educational level, retirement status, living situation, satisfaction with support from friends and relatives, medical care, joy, retirement, relationship with women and sex life, use of alternative medications, importance of religion, distress from urinary problems, and physical activity. Validity or reliability data for the questionnaire were not reported.

The neural network was established by the usual procedures of training, feed-forward, and back propagation. In addition, the neural network was compared to Baye's classifiers linear and quadratic discriminant function analysis. The 1-month quality of life scores had an overall correct classification of 89%; 6-month scores had an overall correct classification of 90%. The post hoc 1-month analyses revealed four significant variables: judgment of health, satisfaction with medical care, retirement status, and ability to make meals or minor household repairs. However, the 6-month analyses did not produce any significant variables (Krongrad et al., 1997).

One variable, localized prostate cancer, was identified in both the 1- and 6-month logistic regression. The 1-month logistic regression revealed four significant variables: coping with stress, satisfaction with relationships with women, satisfaction with work around the house, and localized prostate cancer. The 6-month logistic regression generated 14 significant variables: self-perception of overall health, coping with stress, feelings of depression, living with spouse, satisfaction with friends and relatives, satisfaction with job or retirement, degree illness imposed hardship on those closest to you, school completed, localized prostate cancer, degree illness disruptive to those closest to you, ability to make a meal or do minor household repairs, living alone, white race, and satisfaction with medical care. While Krongrad and his colleagues acknowledged that mixing the BPH and prostate cancer groups confounded the results, their conclusion that localized prostate cancer patients may have a relatively labile health-related quality of life was a significant finding (Krongrad et al., 1997).

Disease-Specific Health Surveys

Health-related quality of life for prostate cancer patients has also been examined using factor analysis for instrument development. A study by Pedersen et al. (1993) examined changes in health-related quality of life perception for post-prostatectomy men. The sample included 182 patients, 131 were assessed on 272 occasions. Of these 272 questionnaire occasions, 35 were completed 2-3 weeks before surgery, 64 at 3 months, 70 at 6 months, 64 at 12 months, and 39 at 18 months. The self-administered questionnaire was developed at York University (Gudex & Kind, QUALY Toolkit, Discussion Paper 38) and was modified to test the patient's perception of side-effects after prostatectomy. Tool modifications were made based on patient responses at an interview with senior urologists, and the final version consisted of 20 questions regarding psychological state and disease-specific complications. One question was presented regarding the overall feeling of distress in patients' everyday lives. The patients' feelings of distress were rated on a 100-mm visual analog scale, with 0 mm as no distress and 100 mm as severe distress. The initial factor analysis with Varimax rotation reduced the 20 variables to five factors concerning: (a) distress included anxiety, (b) voiding disorders including incontinence, (c) potency, (d) pain and discomfort, and (e) frustration (Pedersen et al, 1993).

The responses of 24 patients who answered questions on at least three consecutive occasions were analyzed to determine if these patients were representative of the whole study population. Only minor differences were found between this group and the other measurement groups. The most significant conclusion drawn from the responses of these 24 patients was that they suffered increasing distress during the first year. Overall, anxiety was only slightly greater after surgery, with no significant distress from anxiety during the first year. Those with voiding disorders encountered the worst distress at 3 months, but by 18 months most were not distressed. At 3, 6, 12, and 18 months, half the patients experienced major or severe distress over lack of erectile potence that did not improve with time. Prior to surgery, patients did not experience distress. However, during the first year after surgery, patients experienced increasing distress. Overall results indicated that some patients suffered severe overall distress, with a median value higher than for single factors. Over time, the overall distress showed slight decreases (Pedersen et al., 1993).

Generally, a factor analysis with a sample of 182 would be considered an adequate sample size (Tabachnick & Fidell, 1996). However, no confirmatory analysis was mentioned. The data collection for this study took place over a 2-year time span. In addition, no techniques were reported to indicate that the authors attempted to collect data from nonresponders. These deficits weakened the study results; however, the prospective, longitudinal approach is cautiously informative about the long-term effects of prostatectomy treatment (Pedersen et al., 1993).

Gburek et al. (1992) assessed the impact of local treatment for prostate cancer on health-related quality of life using a questionnaire containing items about urinary control, bowel function, sexual function, and overall satisfaction with therapy. Treatments were completed within the 5-year period preceding initiation of the study and consisted of 38 patients who had prostatectomy treatment, 27 with radiotherapy, and 23 who received both treatments (Gburek et al., 1992)

Problems with urinary control were found to be worse in the surgical group (38%) and the combined treatments group (53%), as compared with the radiotherapy group (16%). Bowel problems were rated worse in the radiotherapy group (5%), as compared to the surgical (3%) and combined treatment (0%) groups. Sexual problems were rated similarly in the surgical (33%), combined treatment (24%), and radiotherapy (33%) groups. More surgical patients ($\underline{n} = 4$) and combined treatment patients ($\underline{n} = 3$) used incontinent pads on a daily basis than the radiotherapy ($\underline{n} = 0$) group in this small study (Gburek et al., 1992).

This study had several limitations. First, few health-related quality of life domains were measured, but no descriptions of the instrument development or psychometrics were given. Second, the comparison groups were small as were sample groups. Finally, results may not be representative of the larger population of prostate cancer patients (Gburek et al., 1992).

It is worthwhile to mention one other study (Herr, 1994) that examined the impact of incontinence on health-related quality of life after prostatectomy. The sample ($\underline{N}= 50$), with an average age of 68 years, consisted of post-prostatectomy men with moderate to severe incontinence who were recruited from a larger group of 650 men participating in an ongoing psycho-educational support program for prostate cancer patients and their partners. A self-administered questionnaire was designed to evaluate the degree of incontinence, the global impact upon activities of daily living, and satisfaction regarding results of surgery. The instrument was validated by retesting in 20 patients, and reliability ranged from good to excellent (Cronbach's $\propto$ range 0.77 to 0.93) (Herr, 1994).

Incontinence episodes occurred several times per week in 25% of patients, once per day in 31%, and 44% had constant dribbling. Incontinence did not restrict the majority; however, 26% of the men reported limitations in their usual physical activity, and more than half reported moderate to severe emotional distress. The perception of incontinence was reported to adversely affect the health-related quality of life (Herr, 1994).

Incontinence was self-classified as moderate to severe from the population of 650 men. Then, samples of only urinary incontinent participants were stratified into years since surgery. This approach was in concert with the purpose of the study. However, a comparison group of participants without symptoms would have strengthened the design. Also, the author acted on the assumption that there would be no improvement of incontinence after 1 year, but did not provide adequate rationale for this assumption. A conceptual limitation of the study was that it measured only the patient's self report as to the degree of incontinence and its global impact upon activities. These physical activity and symptom domains reflect only a few of the health-related quality of life domains (Herr, 1994).

The important gaps in the research were addressed in the literature review. First, the level of research moved beyond the descriptive level to the level of causal modeling. Second, the important exogenous, endogenous, and mediating variables were included in the causal model. Finally, the dependent variable of quality of life was broadly defined to include the contribution of multiple factors. This definition of quality of life included other significant domains that are meaningful within a broader definition of life quality.

Based upon the findings in the literature review, the hypothesis that the principle bodily functions affected by the radical prostatectomy treatment were sexual and urinary function was developed. It was hypothesized that these functional changes then led to alterations in sexual and urinary appraisal. Subsequently, it was hypothesized that this appraisal then influenced psychosocial responses. In the hypothesized path analytic model, the direct effects of urinary appraisal, self-esteem, anger suppression, perceived social support, depression, and health locus of control on quality of life were posited.

Variable Definition

Finally, the present study used the quality of life definition provided by Young and Longman (1983) and delineated as "the degree of satisfaction with the perceived present life circumstances" (Young & Longman, 1983, p. 220). Flanagan (1978) clustered the quality of life concepts into five common domains: (a) physical and material well-being; (b) relations with others; (c) social, community, and civic activities; (d) personal development and fulfillment; and (e) recreation. The definition and domains guided this present investigation of quality of life for post-treatment prostate cancer men.

Causal Model

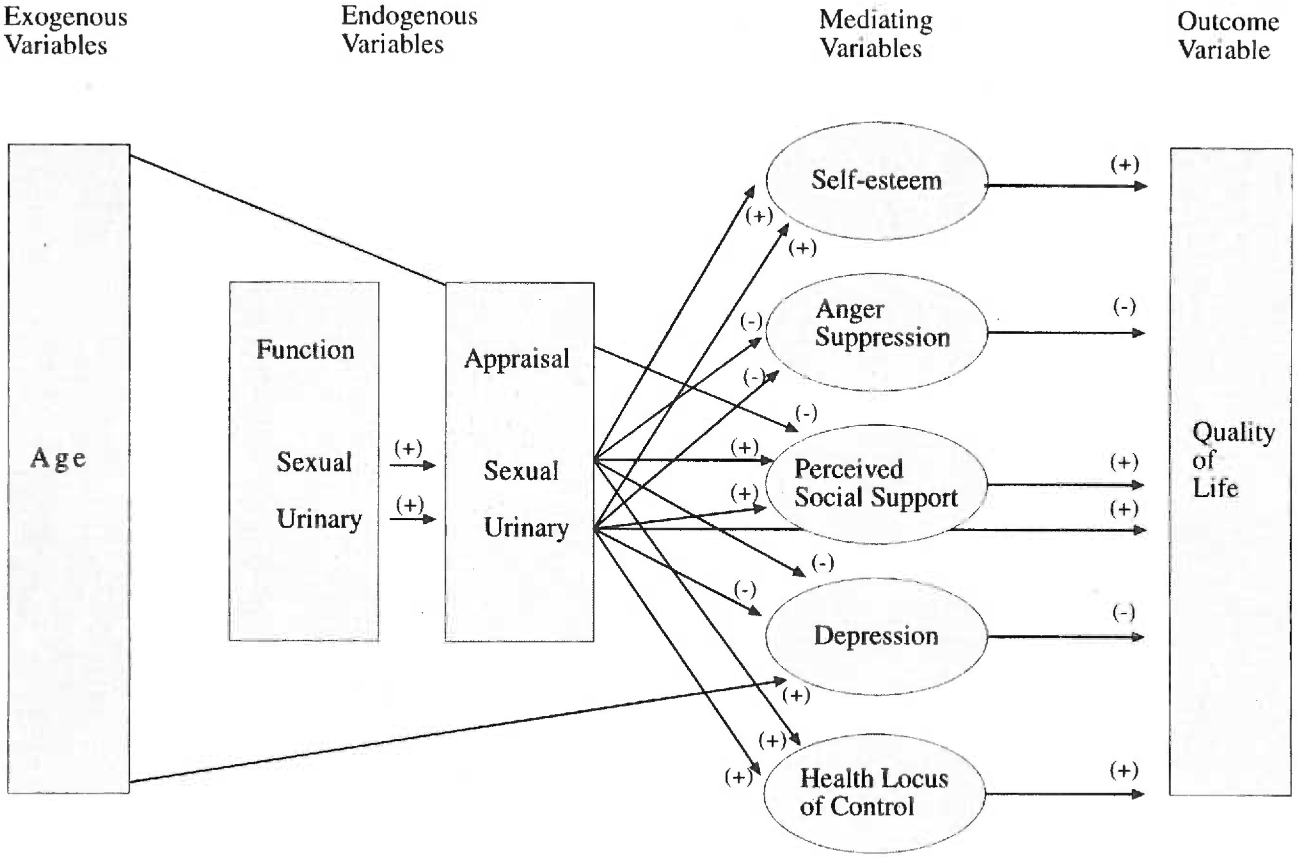
The relationships between quality of life and other variables are complex and multifaceted. Based upon the literature review, the proposed model of quality of life in localized prostate cancer patients after treatment and the hypothesized relationships is presented in Figure 2 (see also Appendix B for causal hypotheses). Causal modeling was selected to clarify and explain these complex relationships.

Causal modeling is an approach to test the hypothesized causal pathway that was developed. Chosen variables were selected from one of two sources: (a) empirical findings, or (b) theoretical postulates. Theoretical views were chosen when no empirical findings were available. Empirical findings from the literature support several relationships.

The proposed recursive model was unidirectional and without feedback loops. Temporal relationships were presented in the model. The model contained three types of variables: (a) exogenous variables, (b) endogenous variables, and (c) mediating variables. Negative and positive relationships are indicated by minus (-) and plus (+) signs. Path analysis was used to study the patterns of causation among the set of variables. These procedures were used to test whether the hypothesized pathway from the causes to the effect was consistent with the data (Polit & Hungler, 1995).

There are many psychosocial and physical characteristics that may affect an individual's quality of life. The variables that were considered germane to this study were gathered as a result of an exhaustive review of both qualitative and quantitative research literature in the area of prostate cancer, as well as previous quality of life research. One demographic characteristic was proposed: age. The selected disease variables were: (a) sexual function and appraisal, and (b) urinary function and

Figure 2. Causal Model for Quality of Life of Men with Prostate Cancer After Prostatectomy



appraisal. The selected mediating variables consisted of individual psychological characteristics of: (a) self-esteem, (b) anger suppression, (c) perceived social support, (d) depression, and (e) health locus of control.

Summary and Study Aims

In summary, the literature review supported the significance of the problem to health care and nursing. The examination of the research assisted in the development of the model. Each variable presented in the model was explored in the review, but no study had attempted to examine these elements in an inclusive model. The aims of this study were to: (a) examine the contribution of each variable in the model on the quality of life for prostate cancer patients, and (b) assess the extent to which individual psychological mediating variables contribute to the patient's quality of life.

CHAPTER III

METHODOLOGY

In this chapter, the methodology utilized for this study is described. Specifically delineated are the research design with controls in the research process, protection of human subjects, setting, population, sample, sampling method, instrumentation, and data collection procedures.

Research Design

The cross-sectional design was chosen to provide a representative model of personal characteristics, behaviors, and functioning as they occurred in a natural setting. The study utilized an ex post-facto or correlational design to examine the individual study hypotheses. Path analysis was used to examine the patterns of causation among the variables in a nonexperimental context (Pedhazur, 1982).

Protection of Human Subjects

This study was designed to meet the Department of Health and Human Services' human subjects regulations for an exempt study under category 2 of the Exemption Categories 45CFR46.101(b) section (U.S. National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1978). Prior to initiation of the study, the Oregon Health Sciences University's Institutional Review Board examined and approved the research to assure protection of the participants' rights.

One identified risk was the possibility that the participants might experience some emotional discomfort when they answered questions about their lives. Participants were thus informed that if they were uncomfortable or upset, they did not have to answer a question. The participants were also informed that although they would not directly benefit from participating in this study, the information could be used to assist health care workers in caring for future patients by giving them a better understanding of the effects of radical prostatectomy. Participation in the research was voluntary, and participants were informed they could withdraw from participation at any time.

The study participants were assured anonymity, confidentiality, and informed of the right to know the results and the method used to disseminate the findings. A Participant Information Sheet (see Appendix C), which complied with the informed consent requirements, was sent to all participants. Informed consent was inferred from the participants' return of the completed questionnaires. Each questionnaire was assigned an identification number. Using this number, the data from the questionnaires was encoded into a personal computer. The original records were kept in a locked cabinet only accessible to the investigator. The only document that listed the identification number assigned to each participant was kept by the Tumor Registry. Participants were assured that information obtained from the questionnaire was kept confidential and accessible only to the researcher. Only grouped data were reported.

Setting and Sample

Sample Size

An a priori power analysis was conducted to determine the size of the sample needed for the study. Theoretical models have explained 45% to 53% of the total variance in quality of life among different groups (Anderson, 1995; Burckhardt, 1985; Wingate, 1995). The 90% confidence intervals (CI) were estimated for effect size using these similar quality of life models constructed in different populations. The lower 90% CI of 30% total variance in quality of life explained by these variables was approximated. Assuming a moderate effect size, cumulative power from .63 and .92, and alpha .05, the desired sample size was estimated to be approximately 80 (see Appendix D for power analysis calculations).

Over sampling

Response rates for mailed questionnaires tend to be low. However, response rates from 60% to 75% can be achieved in surveys of the general public using the Total Design Method recommended by Dillman (1978) which involves multiple reminders to increase responder rates. Both Litwin et al. (1995) and Rieker et al. (1993) used the mail questionnaire technique. Although the research conducted by Rieker et al. (1993) made no mention of a cash incentive, follow-up letters, or telephone reminders, a 70% response rate was achieved. Litwin et al. (1995) provided a small cash incentive and telephone reminders. The prostate cancer sample in Litwin's study yielded 79% to 91% response rates, as compared to only 46% in the health maintenance comparison group.

The population for this research was over sampled to secure the appropriate number of questionnaires for analysis. It was estimated that with a 50% response rate, the 160 distributed questionnaires would yield a return of approximately 80 questionnaires for analysis.

Sample Characteristics

The target population was men who were 12 to 24 months post-radical prostatectomy. As previously mentioned, potency and continence rates would have stabilized at approximately 12 months after prostatectomy surgery (Leandri et al., 1992; Rossignol et al., 1991; Steiner et al., 1991). The ideal candidate for a radical prostatectomy has a diagnosis of localized cancer without metasteses. Approximately 67% of men have localized cancer at the time of diagnosis (Littrup et al., 1993).

Tumor Registries comply with registry operations and data standards. The following significant data were documented when the patient was first seen for each primary cancer: (a) patient's name, address, and date of birth; (b) site of primary cancer; and (c) the Surveillance, Epidemiology, and End Results (SEER) Summary Staging Guide that provides site-specific definitions for each stage category, and treatment. The purpose of this study indicates the following: (a) primary cancer site was the prostate; (b) the SEER Summary Staging Guide included either the In-situ classification (neoplasm that fulfills all microscopic criteria for malignance except invasion) or localized classification (neoplasm that appears entirely confined to the organ); (c) the TNM Classification System included either the Stage I or Stage II groups; and (d) the treatment type was the cancer-directed surgical code of C61.9 indicating prostate cancer surgery.

A nonpurposive consecutive sample of 160 community-dwelling, independent elderly men who had a prostatectomy for prostate cancer in the past 12 to 24 months was sought for inclusion in the study. By self-reports the men indicated the following: (a) that they had had a radical prostatectomy for localized prostate cancer in the past 12 to 24 months, (b) that they were community-dwelling independent men, and (c) that they were able to read and write English. Exclusion criteria were: (a) less than 12 or greater than 24 months since surgery date, (b) currently institutionalized in long-term care facility, and

(c) Tumor Registry information revealed that other prostate cancer treatments, such as radiation therapy, had been administered.

Sample Recruitment

The results of the power analysis revealed that the desired sample size was estimated to be approximately 80. In addition, the oversampling calculations estimated that 160 distributed questionnaires would yield a return of approximately 80 questionnaires returned for analysis. Therefore, a Tumor Registry, which met the study requirements of a total of about 160 radical prostatectomy procedures per year, was located.

The accessible population of men at one selected Tumor Registry who had had a radical prostatectomy for localized prostate cancer 12 to 24 months prior to initiation of the study was given an opportunity to participate in the study. These men were recruited consecutively at one selected Tumor Registry, which contained an estimated 160 radical prostatectomy procedures per year, in one metropolitan area.

Sample Description

Demographic data obtained from the participants consisted of ethnic group and time-interval since surgery. Socioeconomic variables collected were living arrangements, marital status, income, education, employment, and occupation.

1. Ethnic Group: the participant's selection of the racial group to which he belonged. Available categories included: (a) White or Caucasian, (b) Black or African American, (c) American Indian, Eskimo, or Aleut, (d) Asian or Pacific Islander, (e) Hispanic, Mexican, Cuban or Puerto Rican, and (f) Other (Bureau of the Census, 1992a).

2. Date of Surgery: the date when the radical prostatectomy was performed. The time interval was computed in months from the date of radical prostatectomy surgery until the time of survey.

3. Living arrangement: the participant's selection of their present living situation. Available categories included: (a) living with spouse or partner, (b) living with other family members, (c) living with nonfamily members, and (d) living alone (Bureau of the Census, 1992b).

4. Marital status: the participant's identification of their present marital situation. Available categories included: (a) never married, (b) married, (c) separated, (d) divorced, (e) widowed, and (f) partnered (Bureau of the Census, 1992b)

5. Income: the amount in dollars the participant reported earning in the most recent year (scale of 1 to 5, with 1 ≤ $20,000 and 5 ≥ $50,001).

6. Education: the highest level of education obtained as reported by the participant. Available categories included: (a) less than high school diploma, (b) high school graduate or GED, (c) trade school or some college, (d) college degree, and (e) advanced degree.

7. Employment: the participant's selection of the employment group to which he belonged. Available categories included: (a) work full-time for pay, (b) work part-time for pay, (c) volunteer every week, (d) unemployed due to age, (e) unemployed due to disability, (f) laid off, (g) fired, (h) unable to find work, and (i) retired (Bureau of Census, 1992a).

8. Occupation: the participant's selection of the occupation group to which he belonged. The Health and Retirement Study occupational groups were used, and they included: (a) manager or professional; (b) sales or clerical; (c) service (cleaning or food preparation); (d) protection, health, personal service, or farming; (e) mechanics or construction; (f) self-employed; and (g) armed forces (Angel & Angel, 1996).

Instruments

Standardized instruments were combined to form a single questionnaire containing 90 items, which took approximately 1 hour to complete. The standard instruments were: (a) Prostate Cancer Index (Litwin et al., 1995), (b) the Rosenberg Self-Esteem Scale (Rosenberg, 1965), (c) Anger Expression-In Subscale from the State-Trait Anger Expression Inventory (Spielberger, 1996), (d) Personal Resource Questionnaire Part II or PRQ-85 Part 2 (Weinert, 1987; Weinert & Brandt, 1987), (e) the Center for Epidemiologic Studies Depression 10-Item (CESD-10) Scale (Andresen, Carter, Malmgren, & Patrick, 1994), (f) Multidimensional Health Locus of Control Internal Locus of Control Subscale (ILCS) (Wallston, Wallston, & DeVillis, 1978), and (g) Modified Flanagan Quality of Life Scale (QOLS) (Burckhardt, Woods, Schultz, & Ziebarth, 1989). Table 1 presents a summary of the following items related to scale characteristics: (a) number of items, (b) validity evaluation, and (c) Cronbach's alpha coefficients.

Table 1

Summary of Scales

Scale	Number of items	Validity	Reliability
Prostate Cancer Index	15	Face validity, factor analysis	alpha coefficients = .87 to .93 test-retest = .92 to .93, ,66 to .70
Rosenberg Self-Esteem Scale	10	Multi-trait, multi-method study; convergent validity	alpha coefficients = .74 to .87 test-retest = .85
Anger Expression-In subscale	8	Discriminant validity	alpha coefficients = .84
PRQ-85 Part 2	25	Content, construct, and predictive validity	alpha coefficients = .79 to .88 test-retest = .72
CESD-10	10	Convergent, discriminant, and predictive validity	alpha coefficients = .85 test-retest = .71
Internal Locus of Control Subscale	6	Convergent and discriminant validity	equivalent forms = .71 to .86
QOLS	16	Content, convergent, and discriminant validity	alpha coefficients = .82 to .92 test-retest = .76 to .84

Independent Variables

Twelve independent variables have been posited to predict the variance in the dependent variable of quality of life. The relationships among these independent variables were based on the theoretical and empirical data previously cited.

This model contains one exogenous variable: age. Age was assessed by asking the respondent for the month and year of their birth. To calculate the age, the year of birth was subtracted from the month and year of the survey.

Sexual and Urinary Function and Appraisal

Sexual and urinary function and appraisal were assessed with selected subscales from the UCLA Prostate Cancer Index (Litwin et al., 1995). Sexual function was assessed by eight items, sexual appraisal by one item. Urinary function was assessed by five items, urinary appraisal by one item. Higher scale scores represented a high level of function and indicated that the function was not a problem.

As previously mentioned, the sexual and urinary questionnaire was developed with three focus groups comprised of 36 prostate cancer patients and their partners. Face validity was evaluated with 16 patients and their partners, as well as eight experts. The sexual and urinary function internal consistency reliability was .93 and .87, respectively. The sexual and urinary function test-retest reliability at a 4-week interval was .92 and .93, respectively. The sexual and urinary bother test-retest reliability at a 4-week interval was .70 and .66, respectively.

Self-esteem

Self-esteem was defined as a product of an implicit evaluation of self-approval or self-disapproval made by the person concerning personal judgment of general self-worth (Joubert, 1990). This variable was measured with the 10-item Rosenberg Self-Esteem Scale (RSES) (Rosenberg, 1965). The scale was originally developed to measure attitudes in adolescence, but has been used in other populations such as the chronically ill and geriatric populations (Conn et al., 1991; Guillory, 1996, Lewis, 1982; Ward, 1977). The RSES consists of a 10-item, four-point Likert-like scale ranging from strongly agree to strongly disagree. Scale scores range from 10 to 40, with a lower scale score indicating lower self-esteem.

Rosenberg (1965) did not conduct a formal psychometric assessment of the scale. However, he did note that adolescents who scored low were more likely to have high scores on a measure of depressive affect, display more psychosomatic symptoms, and be viewed as holding a lower social status as rated by their peers.

In a multi-trait multi-method study (Silbert & Tippett, 1965), the convergent validity values or the correlations between different measures of self-esteem and the RSES ranged from .56 to .83. The correlation between the RSES with a different concept (stability of self-image) measured by the same method was .53 and with different concepts measured by different methods ranged from .21 to .40. The test-retest reliability was .85 over a 2-week interval (Silbert & Tippett, 1965). The internal consistency reliability was computed for several groups. These groups were the elderly widowed, late-stage cancer patients, and COPD patients ($\propto$ = .74, .87, and .77, respectively) (Anderson, 1995; Lewis, 1982; Ward, 1977).

Anger Suppression

Anger suppression was assessed by the Anger Expression-In Subscale of the 24-item Anger Expression (AX) Scale (Spielberger, 1996). The Anger Expression-In measures generally suppressed anger, the Anger Expression-Out measures outwardly expressed anger negatively, and Anger Expression-Control measures the ability to express anger in more constructive and controlled ways. Each of the three subscales has eight items with Likert-like scales of Almost Never (1) to Almost Always (4).

The internal consistency reliability of the Anger Expression-In Subscale was .84. Discriminant validity of the Anger Expression Scale reflected that the Anger Expression-In and Anger Expression-Out Subscales had different patterns of correlations with anger, personality, and physiologic variables (Spielberger, 1996).

Perceived Social Support

The PRQ-85 Part 2 was used to measure perceived social support (Weinert, 1987; Weinert & Brandt, 1987). The PRQ-85 consisted of two parts. Part 1 measures the network structure and describes the situational support. Part 2 measures the level of perceived support. The two parts can be used together or separately. The PRQ-85 has 25 items with a seven-point Likert-like scale from strongly agree (7) to strongly disagree (1). Higher scores indicate higher perceived social support. The items assess the following: (a) provision for attachment/intimacy, (b) social integration, (c) opportunity for nurturing behavior, (d) reassurance of worth as an individual and in role accomplishments, and (e) the ability of informational, emotional, and material assistance.

Content, construct, and predictive validity were established in a sample of 149 adults (Brandt & Weinert, 1981). The validity coefficients were between .30 and .44, and Cronbach's alpha was .89 (Brandt & Weinert, 1981). The construct validity in a later study of 100 adults (Weinert & Brandt, 1987) indicated that the shared variance between perceived social support and related mental health or personality characteristics was minimal. In this same sample, the internal consistency using the Cronbach's alpha of the whole scale was .93; subscale reliability coefficients ranged from .79 to .88; and the test-retest reliability coefficient at a 4- to 6-week period was .72 (Weinert & Brandt, 1987). Further evidence of the internal consistency reliability ($\propto \geq .89$) of the PRQ-85 has been provided with COPD patients (Anderson, 1995; Lee, Graydon, & Ross, 1991).

Depression

Depression was measured by the CESD-10 Scale which has 10 items. The range of scores was from 0 to 30, with high scores indicating the presence and persistence of depressive symptoms (Andresen et al., 1994). The CESD-10 was derived from the CES-D which contains 20 items (Radloff, 1977). The CES-D has been used in many different populations including numerous age, racial, ethnic, and language groups (Guarnaccia, Angel, & Worobey, 1989; Liang, VanTran, Krause, &

Markides, 1989; Roberts, 1980; Roberts & Vernon, 1983; Roberts, Vernon, & Rhoades, 1989; Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977).

The relationship between the CESD-10 and other measures of emotion and physical discomfort (Positive Affect Scale, Pain Scale, Stress Scale) have been evaluated. There was a positive correlation with poorer health status ($\underline{r}$ = .37) and a strong negative correlation with positive affect ($\underline{r}$ = -.63). The CESD-10 was found to have good predictive accuracy when compared to the 20-item CES-D (κ = .97) (Radloff, 1977). The correlation between the CESD-10 measured by different methods ranged from .21 to .40. Test-retest reliability was .71 over 1- to 4-week intervals (Andresen et al., 1994).

Health Locus of Control

One subscale of the Multidimensional Health Locus of Control (MHLC) Scale was employed to measure this variable (Wallston et al., 1978). Based on the conceptualization of the generalized expectancy of internal control in relation to health behaviors (Wallston et al., 1976), the six-item subscale of Internal Health Locus of Control (IHLC) from the MHLC, which measures internality, was used for this study. The scores range from 6 to 36 and are measured with a six-point Likert-like scale ranging from strongly disagree (1) to strongly agree (6) (Wallston et al., 1978).

IHLC discriminant and convergent validity have been demonstrated. The subscale and another internal locus of control scale were correlated 0.56. However, social desirability and two other external subscales of the MHLCS had low correlations (.04, .12, and -.29, respectively). Equivalent forms of each scale were constructed, yielding Form A, Form B, and Form A&B. The reliability of these equivalent forms of the subscale were assessed as being .77, .71, and .86, respectively (Wallston et al., 1978).

Dependent Variable: Modified Quality of Life Scale

One instrument, the QOLS (Burckhardt et al., 1989), was used to measure the overall quality of life. As previously mentioned, 3,000 persons from regional samples and diverse groups contributed to more than 6,500 critical incidents about American life components (Flanagan, 1978). The QOLS consisted of the five domains of: (a) physical and material well-being; (b) relations with other; (c) social, community, and civic activities; (d) personal development and fulfillment; and (e) recreation (Flanagan, 1982). Burckhardt et al. (1989) modified the QOLS by adding independence as a domain and including a 7-point Delighted-Terrible Scale. The 7-point rating method was viewed as more sensitive and less negatively skewed; the seven available responses were <u>delighted</u> (7), <u>pleased</u>, <u>mostly satisfied</u>, <u>mixed</u>, <u>mostly dissatisfied</u>, <u>unhappy</u>, and <u>terrible</u> (1). It was the opinion of Burckhardt and her colleagues that this 7-point rating method allowed for a broader range of affective response than the 5-point scale. With the addition of the independence domain, the modified QOLS had a total of 16 items and ranged from 16 to 112, with a higher score indicating a higher perceived quality of life. Since the study of reliability and validity involving four chronic illness groups, the QOLS has been used for cardiac arrest and COPD patients (Anderson, 1995; Underhill, 1992).

Convergent and discriminant construct validity were determined by comparing the QOLS to four other instruments (Burckhardt et al., 1989). The test-retest reliability coefficients ranged from .76 to .84 for the two 3-week intervals, and the Cronbach's alpha for internal consistency reliability ranged from .82 to .92 (Burckhardt et al., 1989).

Because other significant health problems or major life events may be important to the quality of life after a radical prostatectomy, two additional questions were asked of the participants: (a) Other than your prostate cancer, have other events occurred during this last year that have been especially upsetting or difficult for you?, and (b) On the lines, please rate how much these events have affected life? The rating was done on a visual analogue scale (VAS) with anchors from a great deal to not at all.

VASs are responsive and valid in measuring subjective perceptions and emotional responses (Guyatt, Townsend, Berman, & Keller, 1987; Jaeschke, Singer, & Guyatt, 1990; Wewers & Lowe, 1990). A simple VAS can be constructed by: (a) drawing a 100 mm vertical line, (b) drawing two ½-inch long horizontal lines adjacent to the ends of the vertical line, and (c) placing words above the top horizontal line and below the bottom horizontal line to anchor each end of the VAS. Although there are many different versions of VASs, research findings indicate a vertical orientation has been useful in the measurement of these subjective feelings (Cline, Herman, Shaw, & Morton, 1992).

Procedure

Ten men were asked to participate in a pilot study to test the constructed instrument for use with the selected sample. The purpose for pretesting the instrument was to determine whether the questions and directions were understandable to the participants. The pilot participants were selected in the same manner and from the same population as the participants for the larger study. The original plan was to conduct only one pilot study unless extensive instrument revisions were required.

Six of the 10 men asked to participate responded. The results revealed a typographical error in the Likert-like scale on two of the questionnaire pages. These errors did not affect the overall content of the questionnaire. The two pages were revised, and all six of the pilot participants completed the revised pages. Because the nature of questionnaire revisions did not change the content, the pilot data were included in the overall results of the study.

Specific procedures were followed for each phase of the survey (see Appendix E). The questionnaire packet consisted of: (a) a cover letter (see Appendix F), (b) a Participant Information Sheet (see Appendix C), (c) the questionnaire (see Appendix G), and (d) a postcard requesting a copy of the survey results (see Appendix H). A self-addressed, stamped envelope for returning the questionnaire was sent to each participant by the Tumor Registry. A mailing list that cross-referenced the names and addresses with the questionnaire identification number was kept by the Tumor Registry. To provide an optimum response rate, subsequent mailings were sent to the men who did not respond to the first mailing. The following procedures were used to prompt return of the questionnaire in a timely manner: (a) a postcard follow-up was sent 1 week after the initial mailing (see Appendix I), (b) a second follow-up letter with a replacement questionnaire was mailed three weeks after the initial mailing (see Appendix J), and (c) a final mailing with a replacement questionnaire was mailed seven weeks after the initial mailing (see Appendix K) (Dillman, 1978). A letter of thanks was sent to subjects upon receipt of the questionnaire (see Appendix L). A copy of the survey results was sent by the Tumor Registry to each participant who requested it via the postcard (see Appendix H).

Psychometric Performance of the Instruments

Internal consistency reliabilites (Cronbach's alpha) were computed for all of the scales. Only cases that contained all items for the scale being calculated were utilized for these computations. Therefore, the number of cases used to calculate the Cronbach's alpha are specified for each scale, and the results are displayed in Table 2. The minimum criteria for internal consistency suggested by Nunnally (1978) is .70. All scales met this minimum criteria.

Table 2

Internal Consistency of Instruments

Instrument	N of cases used to calculate	Missing cases	Cronbach's alpha
Sexual Function Subscale of Prostate Cancer Index	86	124, 141	.90
Urinary Function Subscale of Prostate Cancer Index	85	36, 59, 61	.87
Rosenberg Self-Esteem Scale	88	--	.88
Anger Expression-In Subscale	88	--	.81
PRQ-85 Part 2	85	42, 98, 124	.94
CESD-10	88	--	.81
Internal Locus of Control Subscale	88	--	.83
Modified Flanagan Quality of Life Scale	84	42, 112, 127, 136	.93

Data Analysis

Data Entry and Verification

Data were entered into SPSS, version 7.5, by data entry personnel. Data were verified by the researcher and one other data entry person.

Model Assumptions

Path analysis requires that specific theoretical and statistical assumptions be met: (a) the model must be correctly specified; (b) the specifications not only require the inclusion of relevant variables, but also specify a linear, additive, and one-way or unidirectional causal model; (c) the variables are measured on reliable interval scales; and (d) each residual should not be correlated with the variables that precede it in the model (Pedhazur, 1982). The assumptions regarding model specifications and interval level of data were previously addressed.

Model Construction

The total covariance, direct, indirect, total and noncausal effects between the independent variables and the dependent variable were used to construct the model. Hierarchical multiple regression with the 10 independent variables was used to test the hypotheses. Variables entered at each path analysis step are shown in Table 3. The data analysis identified the functional forms of all variables and important interactions among the variables. The following were documented: (a) number and names of independent variables at each stage of regression; (b) R^2, adjusted R^2, R^2 change at each stage; (c) unstandardized (B) and standardized regression coefficients

Table 3

Variables Entered at Each Path Analysis Step

Step	Dependent variable	Independent variables
		Direct effects of preceding variables with each endogenous variable in the model
1	Sexual Function	Age
2	Urinary Function	Age
3	Sexual Appraisal	Age, Sexual Function, Urinary Function
4	Urinary Appraisal	Age, Sexual Function, Urinary Function
5	Self-esteem	Age, Sexual Function, Urinary Function, Sexual Bother, Urinary Bother
6	Anger Suppression	Age, Sexual Function, Urinary Function, Sexual Bother, Urinary Bother
7	Social Support	Age, Sexual Function, Urinary Function, Sexual Bother, Urinary Bother
8	Depression	Age, Sexual Function, Urinary Function, Sexual Bother, Urinary Bother
9	Health Locus of Control	Age, Sexual Function, Urinary Function, Sexual Bother, Urinary Bother

(Continued)

Table 3 (continued)

Step	Dependent variable	Independent variables
Direct effects of preceding variables with each endogenous variable in the model		
10	Quality of Life	Age
11	Quality of Life	Age, Sexual Function, Urinary Function
12	Quality of Life	Age, Sexual Function, Urinary Function, Sexual Bother, Urinary Bother
Direct effects of all preceding variables on quality of life, plus total effect for last five variables entered in analysis		
13	Quality of Life	Age, Sexual Function, Urinary Function, Sexual Bother, Urinary Bother, Esteem, Anger, Social Support, Depression, Health Locus of Control

*Underline indicates total effects of variables on quality of life (β) at each stage, and (d) the appropriate inferential statistic (see Table 4). The significance level for the standardized regression coefficients (β) was set at .05 (two-tailed).

Assessment of multicollinearity. A Pearson's r correlation matrix with zero-order correlations among all the independent variables and the dependent variable was constructed to describe the relationships between variables. Even though independent variables may be correlated, a good fit can still be obtained. Because redundant variables can weaken an analysis, multicollinearity can cause logical and statistical problems. Theoretical problems may occur at correlations greater than .70; statistical problems may occur at even higher correlation (≥ .90) levels (Tabachnick & Fidell, 1996). A formal method that can be used to detect the presence of multicollinearity in the model is the variance inflation factor (VIF). A VIF value of greater than 10 indicates multicollinearity may be unduly influencing the least squares estimates. If a VIF value of greater than 10 was detected, dropping an independent variable from the model was considered to lessen the effects of the multicollinearity (Neter, Kutner, Nachtsheim, & Wasserman, 1996).

Model diagnostics. The statistical assumptions of normality, linearity, homoscedasticity, and uncorrelated residuals of multiple regression and path analysis were also examined. The assumptions regarding the residuals were tested by reviewing how the residuals correlate with the preceding independent variables (Pedhazur, 1982). A normal probability plot of the residuals, which plots each residual

Table 4

Hierarchical Multiple Regression Steps

Step	Variable	B	β	Significant change	R^2	Adjusted R^2	F equation	Significant F
1	Age							
2	Sexual, & Urinary Function							
3	Sexual, & Urinary Appraisal							
4	Self-esteem							
5	Anger Suppression							
6	Perceived Social Support							
7	Depression							
8	Health Locus of Control							

against its expected values under normality, assessed the skewness, kurtosis, outliers and the normality of the error distribution (Neter et al., 1996). A plot of the residuals against the fitted values was used to assess the appropriateness of the multiple regression function and the constancy of the variance of error terms (Pedhazur & Schmelkin, 1991). Partial regression plots were used to examine the relationship between independent variables given the other variables in the model and the strength of relationships with the dependent variable, as well as to uncover outliers with a strong influence. An outlier is defined as a variable with a standard deviation greater than 3 from the mean. A scatter plot matrix of all the variables assessed the nature and strength of the relationship between the variables, as well as identified data gaps and outliers. The Mahalanobis, which measures the distance of cases from average values of the independent variables, was computed to identify influential outlier cases (Tabachnick & Fidel, 1996).

Remedial measures. Depending on the distribution of the variables, a transformation; such as logarithm, square root, quadratic, exponential, negative exponential, or reciprocal; was performed to see if the outlier(s) remained after transformation (Neter et al., 1996). If the outlier(s) remained after transformation, they were replaced by the next highest or next lowest observation (Kirk, 1995).

These diagnostics and remedial measures for multiple regression assisted in the model development and evaluation. In the optimum model, the adjusted R^2 was at a maximum value (Knapp, 1994; Neter et al., 1996).

CHAPTER IV

RESULTS

This chapter will first present a discussion about the characteristics of the sample, followed by a description of the associations among the variables. Finally, the path analyses and the research hypotheses are discussed.

Sample

The sample was obtained from one selected Tumor Registry in a single metropolitan area. Those who met the inclusion criteria for the nonpurposive consecutive sample were community-dwelling, independent elderly men who had had a prostatectomy for prostate cancer in the past 12 to 24 months. Of the 145 who were initially identified as potential participants, 13 did not meet the community-dwelling criteria, and 2 participants had received other prostate cancer treatments. Ninety-seven of the 132 men who met the eligibility criteria for inclusion in the study demonstrated their willingness to participate by returning a completed questionnaire, thus yielding a 73% response rate. However, analysis was completed on 88 of these subjects after deleting three subjects of Nonwhite origin, and those with missing data.

Missing Data

Each questionnaire was reviewed and assessed for missing data. The criteria used to assess the missing data was based on recommendations by Cohen and Cohen (1983) who asserted that the scope of a problem associated with missing data is much more significant when a respondent has a larger percentage of missing data, such as

40%, than when missing a smaller percentage, such as 1%. To retain as many respondents as possible, a conservative cutoff of 20% missing data was established. Thus, a respondent was eliminated if 20% of the demographic variables, the independent variable, or the dependent variable was missing.

Thirty-two of the 97 cases were found to have missing data. A total of 6 cases (6%) were eliminated: (a) 2 cases were eliminated (128, 138) due to the absence of more than 20% of data on the independent variables of sexual function and perceived social support, (b) 1 case was eliminated (99) due to the absence of more than 20% of data on the dependent variable, and (c) 3 cases (94, 109, 141) were eliminated due to the absence of more than 20% of the demographic data. Based on Cohen and Cohen's (1983) view that 5% to 10% of the respondents with missing data can be dropped without serious objections being raised about the introduction of bias, the deletion of these cases was deemed to be reasonable.

After elimination of the six cases with more than 20% of the data missing, 91 cases remained in the data set. Of the remaining 91, 65 had no missing data, and 26 had at least one missing data item (see Table 5). The cases with missing data were identified in order to compare their responses with respondents without missing data (Cohen & Cohen, 1983; Tabachnick & Fidell, 1996). An independent groups t test was conducted to identify any patterns among the cases with the missing data. For this analysis, the group, consisting of respondents who had no missing data, and the group with missing data, were compared on the 11 independent and dependent model

Table 5

A Profile of Cases with Missing Data

Variable	Non- missing (n = 91)	Missing (n = 91)	Non-missing (n = 88)	Missing (n = 88)	Substitution of mean (n = 88)
Race	91	0	88	0	
Living arrangement	90	1 (156)	87	1 (156)	
Marital status	91	0	88	0	
Household income	85	6 (50,70,76,80,82,95)	82	6 (50,70,76, 80,82,95)	
Current employment	91	0	88	0	
Work type (industry)	89	2 (44,97)	86	2 (44,97)	
Educational degree	90	1 (108)	88	0	
Years of school	76	15 (5,42,44,50,52, 59,61,70,79,82,88, 91,97, 124, 148)	73	15 (5,42,44,50,52,59, 61,70,79,82,88,91,97, 124,148)	

* Numbers in parentheses are the identification numbers of the cases

Table continued

Table 5 (continued)

Variable	Non- missing (n = 91)	Missing (n = 91)	Non-missing (n = 88)	Missing (n = 88)	Substitution of mean (n = 88)
Sexual function	89	2 (124,143)	86	2 (124,143)	2 (124,143)
Urinary function	88	3 (36,59,61)	85	3 (36,59,61)	3 (36,59,61)
Social support	88	3 (42,98,124)	85	3 (42,98,124)	3 (42,98,124)
Quality of life	87	4 (42,112,127,136)	84	4 (42,112,127,136)	4 (42,112,127,136)

* Numbers in parentheses are the identification numbers of the cases

variables. A statistically significant difference for these variables may reflect a potential bias in the cases with the nonmissing data (Tabachnick & Fidell, 1996). No statistically significant difference was found between the group with missing data and the group without missing data.

Contending with the missing values during computation was another issue that needed to be addressed. It was deemed feasible to substitute the mean item value for the independent and dependent variables with missing data on one or more item, thus allowing the maximum number of cases to be included in the analysis. This substitution was completed for 10 cases for the variables of sexual function, urinary function, perceived social support, and quality of life (see Table 5 for case identification numbers).

Nonresponse Bias

Nonresponse bias can also be a concern in survey research. It exists as a result of a systematic nonresponse related to personal characteristics of those who did not respond (Polit, 1996). In an attempt to determine whether a biased subset volunteered to participate in the study, the respondents were compared with the nonrespondents. The researcher did not have access to the demographic information on both the respondents and nonrespondents. However, the Tumor Registry agreed to compare responders and nonresponders for the sample of 132 men who met the eligibility criteria for inclusion in the study. The available demographic variables were: ethnic origin, age, and time interval since surgery.

A Chi-square was used to compare respondents to nonrespondents on the ethnic origin groups. A t test was used to compare the mean age of respondents (M = 64) to nonrespondents (M = 61) and time interval since surgery for respondents (M = 16.7 months) to nonrespondents (M = 17.6 months). The Tumor Registry reported no differences among the two groups on the variables of ethnic origin, age, and time interval since surgery ($p < .05$). In addition to these findings, the response rate in this study was 73%, which was fairly high, almost negating the threat of a response bias.

Sample Characteristics

Descriptive statistics were calculated to examine the characteristics of the sample. After substitution of the mean, 91 cases were included in the analysis.

The mean time interval since the radical prostatectomy was 17.1 months (SD = 4.53, Mdn = 17 months, mode = 11 months). However, the distribution of the quartile values of 13 at the 25th percentile, 17 at the 50th percentile, and 21 at the 75 percentile represented a normal distribution throughout the range of 11 to 25 months for the entire sample. To further examine the impact of the time-interval since surgery, two groups (less time group = 11 to 18 months, more time group = 19 to 25 months) were constructed. Fifty-two participants were included in the less time group, 36 in the more time group. An independent groups t test comparing the 11 independent and dependent model variables was conducted to identify any patterns for the less time group when compared to the more time group. No significant differences were found between the means of the two groups.

Demographic Data

Eighty-eight of the participants were of White ethnic origin, two were Asian or Pacific Islander and one respondent was Hispanic. Because of the wide discrepancy between the number of Whites and Nonwhites represented in the sample and as a consequence the inability to generalize to this latter population, the decision was made to drop the three Nonwhite respondents. This decision was based on the rationale that the loss of three cases, which represented only 3% of the sample, did not seriously affect the sample size. According to power analysis, the 88 participants who remained represented an adequate sample size. Although the results would only represent the White population, they would permit a clearer interpretation for generalization to this population.

A majority of the 88 participants were married (84%) and living with spouse or partner (86%) (see Table 6). The remaining 16% indicated that they were divorced (8%), widowed (5%), single (2%), or separated (1%). A minority lived alone (11%), with other family members (2%), or with nonfamily members (1%).

Marital status was categorized into two groups, nonmarried and married. A t test was conducted to compare the means of these two groups (nonmarried = 14; married = 74) on the other independent and dependent model variables. Significant differences were found between the two groups on social support and quality of life.

Table 6

A Profile of Sample by Marital Status, Living Arrangements, and Income

Variable	Frequency	Percentage
Marital status		
Nonmarried		
Single	2	2
Separated	1	1
Widowed	4	5
Divorced	7	8
Married	84	84
Living arrangements		
Living with others		
With spouse or partner	75	86
With family	2	2
With nonfamily	1	1
Living alone	10	11
Income		
< $20,000	9	11
$20,001-30,000	14	17
$30,001-40,000	7	10
$40,001-50,000	17	21
> $50,001	34	41

The mean social support score was lower for the nonmarried group (M = 122) than the married group (M = 141), t(86) = -3.19, $p < .05$. The quality of life mean was lower for the nonmarried group (M = 76) than the married group (M = 87), t(86) = -2.74, $p < .05$.

Six of the 88 participants (7%) chose not to submit information regarding income. Of those who did include their income status, 62% had an annual household income of more than \$40,000 (see Table 6). The income status of the remaining participants was almost evenly disbursed into the three remaining categories of less than \$20,000 (11%), \$20,001 to \$30,000 (17%), and \$30,001 to \$40,000 (10%).

Employment status of the sample fell into one of two major categories, either retired (54%) or working (41%) full- or part-time (see Table 7). The information obtained from the participants indicated that over one-third (34%) of the participants were currently or had been employed as mechanics or in the construction industry. About 26% were currently or had been employed in managerial or professional occupations, and 22% were employed in sales or clerical occupations.

The relationships among the variables of education, occupation, and income were examined. A majority of those who had graduated with a bachelors (25%) or masters (11%) degree and had a higher income (greater than \$40,000) were employed in managerial or professional occupations (63%). The range of school years completed was from 8 to 23 years. The mean, median, and mode were all in very close proximity (M = 15, Mdn = 14, and mode = 14), indicating normal distribution.

Table 7

A Profile of Sample by Employment, Occupation, and Educational Degree

Variable	Frequency	Percentage
Employment		
Retired	47	54
Full-time	29	33
Part-time	7	8
Unemployed/disabled	2	2
Volunteer	1	1
Laid Off	1	1
Unable to find work	1	1
Occupation		
Mechanics/construction	29	34
Manager/professional	22	26
Sales/clerical	19	22
Protection, health, farming	9	10
Service (cleaning, food prep)	4	5
Self-employed	3	3
Educational Degree		
No degree	4	5
GED	8	8
HS	32	36
Vocational	4	5
AD	5	5
BA/BS	22	25
MA/MS	11	11
Doctoral	4	5

Associations Among the Model Variables

Descriptive statistics consisted of the range, median, mode, mean, and standard deviation for each variable. Histograms with the normal curve plotted, scatter plots of all independent variables with the dependent variable, and normal probability plots were examined for skewness, kurtosis, and the presence of outliers. Univariate outliers were cases that have extreme values on one variable (Tabachnick & Fidell, 1996).

Age

The mean age of the sample was 65, with a range from 43 to 77 (see Table 8). The median and mode were close to the mean (mdn = 66, mode = 68). The structured literature review conducted by Wasson et al. (1993) indicated that the typical radical prostatectomy patient had a median age of 63.

Disease Variables

The disease variables included in the model were sexual and urinary function and appraisal. These variables were assessed with selected subscales from the UCLA Prostate Cancer Index (Litwin et al., 1995). Higher sexual and urinary function scores indicated better sexual or urinary function. Higher appraisal scores indicated that sexual or urinary function was not perceived as a problem; lower appraisal scores indicated that function was perceived as a significant problem. A comparison group of 273 men without prostate cancer used by Litwin et al. (1995) had the following

Table 8

Descriptive Statistics for Model Variables (n = 88)

Variable	Normal values*	Mean	Median	Mode	Range	SD
Age	63	64.67	66	68	43-77	7.13
Sexual function	47	22.66	13.5	0	0-84	23.89
Urinary function	90	72.25	75	100	0-100	25.13
Sexual appraisal	48	35.51	25	0	0-100	36.70
Urinary appraisal	83	78.41	75	100	0-100	26.85
Self-esteem	29	33.57	34	40	19-40	4.89
Anger suppression	14-17	13.80	13	13	8-25	3.75
Social support	135-143	138.25	142	146	55-172	21.27
Depression	4.4-4.8	6.02	5	0	0-26	5.05
Health locus of control	24-25	24.76	25	23	9-36	5.94
Quality of life	82-85	84.90	87	90	50-112	13.65

*Normal value sources are cited in the text.

means for the disease variables: sexual function, 47; urinary function; sexual appraisal, 48; and urinary appraisal, 83.

The sexual function scores were in the lower bounds of the scale range (0 to 100), with a median of 14 and a mean of 23. The mode was 0 (n = 16), with 16 participants indicating that they had little or no sexual function. On the other hand, the mean urinary function scores (M = 72) were found in the upper end of the scale range (0 to 100). The median was 75 and the mode was 100 (n = 20), with 20 participants indicating they had total control of urinary function. However, the majority of the participants (77%) indicated that they had some urinary function difficulties.

The patterns of sexual and urinary function were reflected in the sexual and urinary appraisal. The median and mean for sexual appraisal showed distribution patterns similar to that of sexual function (M = 36, Mdn = 25). The mode was 0 on the 0 to 100 range, with 36 participants indicating a low level of sexual appraisal and that sexual function was a significant problem. On the other hand, urinary appraisal scores were on the upper end of the 0 to 100 scale, with a median of 75 and a mean of 78. The mode was 100, with 41 participants (47%) indicating a high level of urinary appraisal and that urinary function was not a problem. On the other hand, 53% of the sample indicated that urinary function was a problem.

Psychosocial Variables

Self-esteem was assessed using the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Higher scores on this scale indicated higher levels of self-esteem. The self-esteem scores for the present study covered a broad range, extending from 19 to 40 on a scale of 10 to 40. The median and mean were both 34 (SD = 5), with a mode of 40. The higher scores indicated higher levels of self-esteem in this sample.

Anderson (1995), who studied COPD patients, and Ward (1977), who studied elderly persons of at least 60 years of age, had similar RSES scores (RSES = 29). However, two other studies of chronically ill, community-dwelling persons reported lower RSES scores. These samples consisted of late-stage cancer (RSES = 18) patients (Lewis, 1982) and post-MI (RSES = 19) patients (Conn et al., 1991). While the late cancer sample may have differed emotionally and physically from the present sample with localized cancer, the reasons for the lower scores for the post-MI sample were more difficult to predict. The post-MI sample did, however, have findings (age was associated with less social support and higher depression) that were not identified in this study's results.

Anger suppression was assessed by the Anger Expression-In Subscale (Spielberger, 1996). Those with high anger suppression scores frequently experienced intense angry feelings, but tended to suppress these feelings rather than express them either physically or in verbal behavior. During scale development, the mean anger suppression score for men with a high school diploma was 17; for men with college degrees, the score was 14 (Spielberger, 1996). Anger scores were distributed over a range from 8 to 25, with a possible scale range from 8 to 36. Both the median and mode were 13, with a mean of 14 (SD = 4). Although the mean anger suppression scores of this sample were close to previous observations, 13 men scored 18 or higher on the scale. The results indicated that some of the participants may frequently experience intense angry feelings, but tend to suppress rather than express those feelings.

Perceived social support was measured with the PRQ-85 Part 2 (Weinert, 1987; Weinert & Brandt, 1987). The mean scores for the PRQ-85 Part 2 in the literature among other populations ranged from 135 to 143 (Anderson, 1995; Conn et al., 1991; Lee et al., 1991). The scale had a range from 25 to 175, with participant scores covering an extensive range from 55 to 172. The median (142) and mode (146) were in close proximity to each other, with a mean of 135 (SD = 21). These high scores indicated relatively high levels of perceived support. One case (119) was identified as a univariate extreme value from the histogram with the normal curve plotted and the scatter plot of social support with quality of life. This case was more than three standard deviations below the mean.

The Center for Epidemiologic Studies Depression (CESD-10) Scale (Andresen et al., 1994; Radloff & Teri, 1986) was used to assess depression. A score of 10 or higher on the CESD-10 suggested possible depressive symptoms. Andresen et al. (1994) found mean scores in two different age groups for men: 4.4 mean in the 65 to 74 years group and 4.8 in the group comprised of men older than 75. The depression scores in the present study sample ranged from 0 to 26, representing almost the full range of the scale (0 to 30). Although those with higher scores on this scale may have greater degrees of depressed mood, the majority of the scores were distributed in the 5 to 6 range (M = 6.02, SD = 5.05, Mdn = 5). The mode was 0 for 11 cases (13%) indicating the respondents had no depressive symptoms. Nineteen cases were found to have scores of 10 or greater, possibly suggesting higher levels of depressive symptoms. Two cases (119, 140) were identified as univariate extreme values from the histogram with the normal curve plotted and the scatter plot of depression with quality of life. Both scores were more than three standard deviations above the mean. There was also positive skewness in the distribution as evidenced by excessive bulging at the lower left-hand corner of the scatter plot of depression with quality of life.

Health locus of control was measured with the Internal Locus of Control Subscale (ILCS) from the Multidimensional Health Locus of Control Scale (Wallston et al., 1978). The mean scores recorded during the scale development were 25 (Wallston et al., 1978) and 24 with arthritic patients (Burckhardt, 1985). In the present study, the health locus of control scores fell over a broad range, from 9 to 36 out of a possible range from 6 to 36. The median and mode were 25 and 23, respectively, with a mean of 25 (SD = 6). The higher scores indicated that these men had relatively high levels of perceived control and power over their own health.

Dependent Variable

The Modified Flanagan Quality of Life Scale (QOLS) (Burckhardt et al., 1989) was used to assess quality of life. Mean scores were recorded in cardiac arrest and COPD patients ranging from 82 to 85 (Anderson, 1995; Underhill, 1992). The quality of life scores for this sample ranged from 50 to 112, with distribution over the upper end of the 16 to 112 range of the scale. The mean (SD = 14), median, and mode were all in close approximations to each other (M = 85, Mdn = 87, mode = 90). The high scores indicated that the majority of the sample has high satisfaction with quality of life.

Two additional questions were asked regarding other significant health problems or major life events during the prior year. Those questions were directed at events that may have been especially upsetting or difficult, thereby affecting the quality of life after a radical prostatectomy. Forty-three percent of the participants (38 out of 88) indicated they had incurred a significant life event in the past year. The ratings, using a visual analogue scale (VAS) with anchors of a great deal and not at all, ranged from 7 to 100. The mean (M = 67, SD = 28.50) and median (Mdn = 76) were in close proximity. The mode was 100, with 5 men indicating that the significant life event had impacted their life a great deal. Although the nature of this event was not ascertained, it could have impacted on the variables included in this study.

A few concerns were identified in the review of the descriptive statistics, histograms, scatter plots, and normal probability plots. The problems identified were: (a) one case (119) identified as a univariate extreme value in the social support variable; (b) two cases (119, 140) identified as univariate extreme values in the depression variable; and (c) a moderate amount of positive skewness in the distribution of the depression variable. Further evidence of influential outlier cases was sought in the regression analysis.

Zero-Order Correlations

Zero-order correlations were performed to examine the relationships among all the variables in the model. These correlations are presented in Table 9. Of the 10 independent variables, 6 had a significant zero-order correlation with the dependent variable, quality of life. These six variables were: urinary appraisal ($r = .221$, $p < .05$),

Table 9

Zero-Order Correlation of Model Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Age	1.00	-.392**	-.035	-.210*	-.077	-.094	-.121	.019	- .066	-.030	.120
2. Sexual Function		1.00	.234*	.436**	.240*	.037	.101	.140	-.181*	.156	-.006
3. Urinary Function			1.00	.363**	.852**	.182*	-.056	-.027	-.101	.209*	.114
4. Sexual Appraisal				1.00	.372**	.083	-.108	.057	-.172	.087	.070
5. Urinary Appraisal					1.00	.254**	-.153	.042	-.160	.286**	.221*
6. Self-esteem						1.00	-.271**	.627**	-.547**	.076	.669**
7. Anger Suppression							1.00	-.341**	.492**	-.075	- .410**
8. Social Support								1.00	-.611**	.061	.765**
9. Depression									1.00	-.176	-.583**
10. Health Locus of Control										1.00	.214*
11. Quality of Life											1.00

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

self-esteem (r = .669, p <.01), anger (r = -.410, p <.01), social support (r = .765, p <.01), depression (r = -.583, p <.01), and health locus of control (r = .214, p <.05). A scatter plot matrix of all the variables was used to assess the nature and strength of the relationships between the variables, as well as identify outliers and data gaps.

Correlations among the independent variables were reviewed. Correlations greater than .70 could cause theoretical problems, while correlations greater than .90 could cause statistical problems (Tabachnick & Fidell, 1996). One set of variables, self-esteem and social support, was found to be moderately correlated (r = .627). Two additional variables, urinary function and urinary appraisal, were found to be highly correlated (r = .852), indicating a potential multicollinearity problem at least at the theoretical level. These findings were similar to those of Litwin et al. (1995) that indicated urinary function items and urinary appraisal were found to have correlations ranging from .58 to .82 in prostate cancer, observation, and comparison patients. This issue was further evaluated using a more formal method, the variance inflation factor (VIF), during the regression analysis.

Regression Analysis Diagnostics

Path analysis was the approach used to test pathways that were based on theoretical knowledge, and it employed multiple regression to isolate the effects on the dependent variable made by the set of independent variables (Polit, 1996). Regression analysis diagnostics were used to detect potential problems in multiple regression. The regression analysis diagnostics focused on multicollinearity, normality, linearity, and homoscedasticity.

A VIF value of greater than 10 would indicate that multicollinearity may be an undue influence on the least squares estimates (Neter et al., 1996). The largest VIF value (4.227) was that of the urinary appraisal variable. The decision to retain the urinary function and urinary appraisal variables in the model was based on two issues: (a) both variables were considered valuable, theoretically, to the indirect and direct pathways of the model, and (b) the VIF values were well below the suggested cutoff of 10.

For review, two cases (119, 140) were identified as univariate extreme values. Multivariate outliers would be evident because of an unusual combination of scores that produced an unusual pattern of scores in these cases. Univariate outliers may or may not be multivariate outliers (Tabachnick & Fidell, 1996). The following were reviewed to assess the normality, linearity, and homoscedasticity of the distributions:

1. A normal probability plot of the residuals, which was used to assess the skewness, kurtosis, outliers and the normality of the error distribution (Neter et al., 1996), was found to be normal.

2. Partial regression plots were used to examine the relationship between independent variables, given the other variables in the model and the strength of relationships with the dependent variable, and to uncover outliers with a strong influence. One case (95) was near, but not beyond the three standard deviation demarcation.

3. A plot of the residuals against the fitted values was utilized to assess the appropriateness of the multiple regression function and the constancy of the variance of error terms (Pedhazur & Schmelkin, 1991). One case (95) was found to be at 3.5 standard deviations.

4. The Mahalanobis distance was computed to identify cases which were influential outliers (Tabachnick & Fidel, 1996), and to measure the distance of cases from average values of the independent variables. The distribution for the Mahalanobis distance equals a $\underline{X}^2$ with degrees of freedom equal to the number of the independent variables (Tabachnick & Fidell, 1996). Although no Mahalanobis distance value was greater than this table value ($\underline{X}^2(10) = 29.588$), two cases (48, 119) were close in value (22).

Path Analysis Results

Path analysis decomposes the correlations among the model variables into different effects (see Table 10). Polit (1996) specified these effects as the direct effects, indirect effects, total effects, and noncausal effects. Direct effects illustrate a direct path between an independent and a dependent variable. The indirect effects were the effect of another mediating variable on a dependent variable. The two effects--direct and indirect--are summed to produce the total effects of the predictor. Noncausal effects were composed of two components, the unanalyzed and the spurious. The unanalyzed component involves correlations among correlated exogenous variables. The spurious effects occur with a third variable, another exogenous variable that was not the dependent variable.

Variables were entered in regression equations at each path analysis step (see Table 3). Path analysis solved for a set of equations. Each dependent variable was regressed on the independent variables to produce path coefficients. The significant and nonsignificant path coefficients are depicted in Figure 3. The standardized regression

Table 10

Decomposition of Covariance for All Independent Variables With Quality of Life

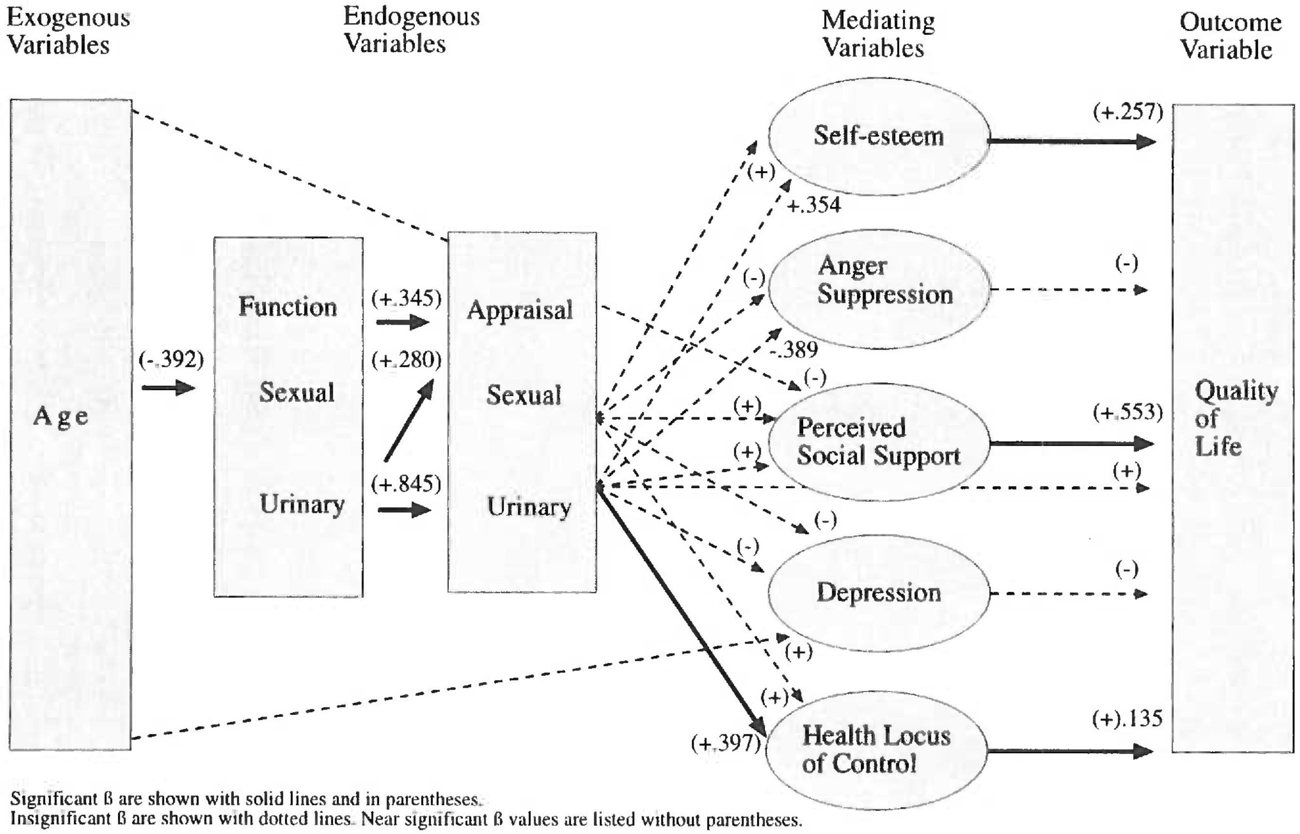
	Total covariance[a] (A)	Direct effects[b] (B)	Indirect effects (C) © = D - B)	Total effects (D = B + C)	Non-causal effects (E = A - D)
Age	.120	.099	.021	.120	0
Sexual function	-.006	-.105	.124	.019	- .025
Urinary function	.114	- .073	.187	.114	0
Sexual appraisal	.070	.024	.012	.036	.034
Urinary appraisal	.221	.162	.308	.470*	- .249
Self-esteem	.669	.257*	---	.257*	.415
Anger suppression	- .410	-.081	---	-.081	.490
Social support	.765	.553*	---	.553*	.211
Depression	-.583	-.031	---	-.031	- .471
Health locus of control	.214	.135*	---	.135*	.081

[a] Zero-order correlation between independent variable and dependent variable (quality of life).

[b] Standardized regression coefficient (β) from step 13 in regression analyses.

* Indicates p < .05.

Figure 3. Path Analysis for Quality of Life of Men with Prostate Cancer After Prostatectomy



Significant ß are shown with solid lines and in parentheses.
Insignificant ß are shown with dotted lines. Near significant ß values are listed without parentheses.

coefficients (β) represented the path coefficients, reflecting the relationship between the dependent variable and the independent variables associated with the regression equation. Standardized regression coefficients were chosen because the variable effects are standardized in the model and comparable in value. The unstandardized (B) coefficients were also reported to allow for comparisons of the study findings to other populations (Pedhazur, 1982; Polit, 1996).

The direct effects values of the standardized regression coefficients (β) for the mediating variables in the thirteenth regression equation were equal to the total effects for the mediating variables. Because there were no other variables between the mediating variables and the dependent variables, the direct effects (β) were equal to the total effects (β) for the mediating variables.

The total effect of the independent variable on the dependent variable, quality of life, was the standardized regression coefficient from the first equation that the independent variable was used in from Steps 10 through 13. Indirect effects were calculated by subtracting the direct effects from the total effects. Noncausal effects were calculated by subtracting total effects from the zero-order correlations (see Table 11).

Causal Hypotheses as Related to Path Analysis Results

The path analysis used to study the patterns of causation among the set of variables indicated that the model explained 72% of the total variance in quality of life after radical prostatectomy (multiple $\underline{r} = .847$, $\underline{R}^2 = .717$, adjusted $\underline{R}^2 = .680$).

Table 11

Regression Coefficients and Signficance Levels in Relation to Hypothesis for Variables Entered at Each Path Analysis Step

Step	Dependent variable (DV)	Independent variable (IV)	R [a]	R^2 [b]	Adjusted R^2 [c]	F of equation (sig) [d]	B (SE) [e]	β [f]	t of β (sig) [g]
1	Sexual function	Age	.392	.154	.144	15.647 (.000)	- 1.315 (.332)	-.392	- 3.956 (.000)
2	Urinary function	Age	.035	.001	-.010	.103 (.749)	- .122 (.380)	- .035	-.321 (.749)
3	Sexual appraisal	Age	.515	.265	.239	10.108 (.000)	- .333 (.525)	- .065	- .635 (.527)
		Sexual function					.530 (.161)	.345	3.292 (.001)
		Urinary function					.408 (.141)	.280	2.900 .005

[a] Multiple correlation coefficient which indicates the magnitude of the relationship between DV and multiple IV, taken together.

[b] Squared multiple correlation coefficient which indicates the proportion of variance in the DV explained by the IVs.

[c] Squared multiple correlation coefficient adjusted for sample size and number of IVs.

[d] F ratio in the ANOVA table (test of the overall model).

[e] Unstandardized regression weight (standard error).

[f] Standardized regression coefficient which indicates the relative weight of a standardized IV in the regression equation.

[g] t test for each regression coefficient.

Table continued

Table 11 (continued)

Step	Dependent variable (DV)	Independent variable (IV)	R [a]	R^2 [b]	Adjusted R^2 [c]	F of equation (sig) [d]	B (SE) [e]	β [f]	t of β (sig) [g]
4	Urinary Appraisal	• Age	.854	.729	.719	75.360 (.000)	-.138 (.233)	- .037	- .593 (.555)
		• Sexual Function					.031 (.071)	.027	.432 (.667)
		• Urinary Function					.902 (.063)	.845	14.427 (.000)
5	Self-esteem	• Age	.277	.077	.020	1.363 (.247)	- .065 (.080)	-.094	-.813 (.418)
		• Sexual Function					- .012 (.026)	-.057	-.455 (.650)
		• Urinary Function					- .021 (.040)	-.108	-.526 (.600)
		• Sexual Appraisal					- .001 (.017)	-.004	-.032 (.974)
		• Urinary Appraisal					.064 (.037)	.354	1.727 (.088)

[a] Multiple correlation coefficient which indicates the magnitude of the relationship between DV and multiple IV, taken together.

[b] Squared multiple correlation coefficient which indicates the proportion of variance in the DV explained by the IVs.

[c] Squared multiple correlation coefficient adjusted for sample size and number of IVs.

[d] F ratio in the ANOVA table (test of the overall model).

[e] Unstandardized regression weight (standard error).

[f] Standardized regression coefficient which indicates the relative weight of a standardized IV in the regression equation.

[g] t test for each regression coefficient.

Table continued

Table 11 (continued)

Step	Dependent variable (DV)	Independent variable (IV)	R [a]	R^2 [b]	Adjusted R^2 [c]	F of equation (sig) [d]	B (SE) [e]	β [f]	t of β (sig) [g]
6	Anger Suppression	• Age	.298	.089	.033	1.602 (.169)	- .060 (.061)	-.115	-.996 (.322)
		• Sexual Function					.023 (.020)	.150	1.193 (.236)
		• Urinary Function					.044 (.030)	.293	1.443 (.153)
		• Sexual Appraisal					- .016 (.013)	-.159	-1.285 (.202)
		• Urinary Appraisal					- .054 (.028)	-.389	-1.910 (.060)
7	Social Support	• Age	.211	.045	- .014	.765 (.578)	.301 (.352)	.101	.854 (.395)
		• Sexual Function					.163 (.114)	.183	1.425 (.158)
		• Urinary Function					-.221 .176	-.261	-1.256 (.213)
		• Sexual Appraisal					.005 (.073)	.009	.075 (.941)
		• Urinary Appraisal					.178 (.165)	.225	1.079 (.284)

[a] Multiple correlation coefficient which indicates the magnitude of the relationship between DV and multiple IV, taken together.

[b] Squared multiple correlation coefficient which indicates the proportion of variance in the DV explained by the IVs.

[c] Squared multiple correlation coefficient adjusted for sample size and number of IVs.

[d] F ratio in the ANOVA table (test of the overall model).

[e] Unstandardized regression weight (standard error).

[f] Standardized regression coefficient which indicates the relative weight of a standardized IV in the regression equation.

[g] t test for each regression coefficient.

Table continued

Table 11 (continued)

Step	Dependent variable (DV)	Independent variable (IV)	R [a]	R^2 [b]	Adjusted R^2 [c]	F of equation (sig) [d]	B (SE) [e]	β [f]	t of β (sig) [g]
8	Depression	• Age	.290	.084	- .028	1.504 (.198)	- .123 (.082)	-.174	-1.502 (.137)
		• Sexual Function					- .040 (.027)	-.189	-1.502 (.137)
		• Urinary Function					.037 (.041)	.186	.914 (.363)
		• Sexual Appraisal					- .014 (.017)	-.101	-.817 (.416)
		• Urinary Appraisal					-. 047 (.038)	-.249	-1.219 (.226)
9	Health Locus of Control	• Age	.316	.100	.045	1.813 (.119)	.029 (.095)	.035	.304 (.762)
		• Sexual Function					.033 (.031)	.134	1.074 (.286)
		• Urinary Function					- .033 (.048)	-.138	-.681 (.498)
		• Sexual Appraisal					- .010 (.020)	-.062	-.503 (.616)
		• Urinary Appraisal					.087 (.045)	.397	1.963 (.053)

[a] Multiple correlation coefficient which indicates the magnitude of the relationship between DV and multiple IV, taken together.

[b] Squared multiple correlation coefficient which indicates the proportion of variance in the DV explained by the IVs.

[c] Squared multiple correlation coefficient adjusted for sample size and number of IVs.

[d] F ratio in the ANOVA table (test of the overall model).

[e] Unstandardized regression weight (standard error).

[f] Standardized regression coefficient which indicates the relative weight of a standardized IV in the regression equation.

[g] t test for each regression coefficient.

Table continued

Table 11 (continued)

Step	Dependent variable (DV)	Independent variable (IV)	R [a]	R^2 [b]	Adjusted R^2 [c]	F of equation (sig) [d]	B (SE) [e]	β [f]	t of β (sig) [g]
10	Quality of Life	Age	.120	.014	.003	1.247 (.267)	.229 (.205)	.120	1.117 (.267)
11	Quality of Life	• Age	.169	.029	- .006	.822 (.485)	.250 (.224)	.131	1.116 (.268)
		• Sexual Function					.011 (.069)	.019	.154 (.878)
		• Urinary Function					.062 (.060)	.114	1.029 (.306)
12	Quality of Life	• Age	.302	.091	.036	1.641 (.158)	.288 (.221)	.150	1.306 (.195)
		• Sexual Function					- .004 (.072)	-.007	-.055 (.956)
		• Urinary Function					- 1.59 (.110)	-.293	-1.444 (.153)
		• Sexual Appraisal					.013 (.046)	.036	.294 (.770)
		• Urinary Appraisal					.239 (.103)	.470	2.313 (.023)

[a] Multiple correlation coefficient which indicates the magnitude of the relationship between DV and multiple IV, taken together.

[b] Squared multiple correlation coefficient which indicates the proportion of variance in the DV explained by the IVs.

[c] Squared multiple correlation coefficient adjusted for sample size and number of IVs.

[d] F ratio in the ANOVA table (test of the overall model).

[e] Unstandardized regression weight (standard error).

[f] Standardized regression coefficient which indicates the relative weight of a standardized IV in the regression equation.

[g] t test for each regression coefficient.

Table continued

Table 11 (continued)

Step	Dependent variable (DV)	Independent variable (IV)	R [a]	R^2 [b]	Adjusted R^2 [c]	F of equation (sig) [d]	B (SE) [e]	β [f]	t of β (sig) [g]
13	Quality of Life	• Age	.847	.717	.680	19.476 (.000)	.191 (.133)	.099	1.435 (.155)
		• Sexual Function					- .060 (.045)	-.105	-1.346 (.182)
		• Urinary Function					- .040 (.065)	-.073	-.611 (.543)
		• Sexual Appraisal					.009 (.027)	.024	.339 (.736)
		• Urinary Appraisal					.082 (.063)	.162	1.310 (.194)
		• Self-esteem					.716 (.245)	.257	2.918 (.005)
		• Anger Suppression					-.295 (.268)	-.081	-1.097 (.276)
		• Social Support					.355 (.057)	.553	6.196 (.000)
		• Depression					-.084 (.245)	-.031	-.343 (.732)
		• Health Locus of Control					.311 (.149)	.135	2.095 (.039)

[a] Multiple correlation coefficient which indicates the magnitude of the relationship between DV and multiple IV, taken together.

[b] Squared multiple correlation coefficient which indicates the proportion of variance in the DV explained by the IVs.

[c] Squared multiple correlation coefficient adjusted for sample size and number of IVs.

[d] F ratio in the ANOVA table (test of the overall model).

[e] Unstandardized regression weight (standard error).

[f] Standardized regression coefficient which indicates the relative weight of a standardized IV in the regression equation.

[g] t test for each regression coefficient.

Direct effects

Direct effects represent a direct path between an independent and a dependent variable (Polit, 1996). Age was predicted to have a relationship with perceived social support and depression, but no evidence of these hypothesized relationships was found. Age was, however, found to have direct effects on sexual function ($\beta = -.392$, $p < .000$). This relationship was not hypothesized in the model. Results of the causal hypotheses are displayed in Table 12 and Table 13.

The endogenous variables were found to be constructive variables in the model. As hypothesized, sexual function was found to be a predictor of sexual appraisal ($\beta = .345$, $p = .001$), and urinary function was a predictor of urinary appraisal ($\beta = .845$, $p < .000$). An additional finding was that urinary function was a predictor of sexual appraisal ($\beta = .280$, $p = .005$), but this relationship was not hypothesized in the model.

The model had hypothesized that a decrease in sexual appraisal would produce a decrease in self-esteem, perceived social support, and health locus of control, as well as an increase in anger suppression and depression. However, none of the hypotheses regarding sexual appraisal were supported.

Urinary appraisal, on the other hand, was found to be a significant contributor in the model. Urinary appraisal was a predictor of health locus of control ($\beta = .397$, $p = .053$) and a near significant predictor of self-esteem and anger suppression ($\beta = .354$, $p = .088$; $\beta = -.389$, $p = .060$, respectively). Although it had been hypothesized that a decrease in urinary appraisal would produce a decrease in perceived social support and an increase in depression, these findings were not supported. Urinary appraisal had been

Table 12

Summary of Hypotheses from Path Analyses

Hypothesis No.	Causal Hypotheses	Supported
1	An increase in age will lead to a decrease in perceived social support.	No
2	An increase in age will lead to more depression.	No
3	A decrease in sexual function will lead to lower sexual appraisal.	Yes
4	A decrease in urinary function will lead to lower urinary appraisal.	Yes
5	A decrease in sexual appraisal will lead to a decrease in self-esteem.	No
6	A decrease in sexual appraisal will lead to more anger suppression.	No
7	A decrease in sexual appraisal will lead to a decrease in perceived social support.	No
8	A decrease in sexual appraisal will lead to more depression.	No
9	A decrease in sexual appraisal will lead to a decrease in health locus of control.	No
10	A decrease in urinary appraisal will lead to a decrease in self-esteem.	No
11	A decrease in urinary appraisal will lead to more anger suppression.	No (.088)
12	A decrease in urinary appraisal will lead to a decrease in perceived social support.	No (.060)
13	A decrease in urinary appraisal will lead to more depression.	No
14	A decrease in urinary appraisal will lead to a decrease in health locus of control.	Yes
15	A decrease in urinary appraisal will lead to a decrease in quality of life.	No
16	An increase in self-esteem will lead to an increase in quality of life.	Yes
17	An increase in anger suppression will lead to a decrease in quality of life.	No
18	An increase in perceived social support will lead to an increase in quality of life.	Yes
19	An increase in depression will lead to a decrease in quality of life.	No
20	An increase in health locus of control will lead to an increase in quality of life.	Yes

* Number in hypotheses represent the near significant standardized regression coefficients (β)

Table 13

Summary of Null Hypotheses from Path Analyses

Null Hypothesis No.	Causal Hypotheses	Supported
1	An increase in age will not lead to a change in the sexual function.	No
2	An increase in age will not lead to a change in the urinary function.	Yes
3	An increase in age will not lead to a change in the sexual appraisal.	Yes
4	An increase in age will not lead to a change in the urinary appraisal.	Yes
5	An increase in age will not lead to a change in self-esteem.	Yes
6	An increase in age will not lead to a change in anger suppression.	Yes
7	An increase in age will not lead to a change in health locus of control.	Yes
8	An increase in age will not lead to a change in quality of life.	Yes
9	A decrease in sexual function will not lead to a change in urinary appraisal.	Yes
10	A decrease in sexual function will not lead to a change in self-esteem.	Yes
11	A decrease in sexual function will not lead to a change in anger suppression.	Yes
12	A decrease in sexual function will not lead to a change in perceived social support.	Yes
13	A decrease in sexual function will not lead to a change in depression.	Yes
14	A decrease in sexual function will not lead to a change in health locus of control.	Yes
15	A decrease in sexual function will not lead to a change in quality of life.	Yes
16	A decrease in urinary function will not lead to a change in sexual appraisal.	No
17	A decrease in urinary function will not lead to a change in self-esteem.	Yes
18	A decrease in urinary function will not lead to a change in anger suppression.	Yes
19	A decrease in urinary function will not lead to a change in perceived social support.	Yes
20	A decrease in urinary function will not lead to a change in depression.	Yes
21	A decrease in urinary function will not lead to a change in health locus of control.	Yes
22	A decrease in sexual appraisal will not lead to a change in quality of life.	Yes

hypothesized to have significant direct effects on quality of life, but this was also not supported in the model.

Three of the five mediating variables--self-esteem (β = .257, p = .005), perceived social support (β = .553, p < .000), and health locus of control (β = .135, p = .039)--were found to have direct effects on quality of life. Contrary to the study hypotheses, anger suppression and depression had no direct effects on quality of life (β = -.081, p = .276; β = -.031, p = .732).

Indirect effects

Indirect effects were the effects of another mediating variable on a dependent variable (Polit, 1996). Contrary to predictions, age had no indirect effect through mediating variables on quality of life. Several indirect paths were found between the endogenous variables of urinary function and appraisal and quality of life. These paths, via the urinary appraisal variable, were traced through the variable of health locus of control.

Total effects

The two effects--direct (illustrating a direct path between the independent and dependent variables) and indirect (the effects of another mediating variable on a dependent variable)--were summed to produce the total effects of the predictor (Polit, 1996). While the direct effect of urinary appraisal on quality of life was not statistically significant, the total effect of this variable on quality of life was significant (β = .470, p = .023). Urinary appraisal had notable indirect effects through health locus of control. Because the direct effects were equal to the total effects for the psychosocial mediating variables, the three mediating variables of self-esteem, perceived social support, and health locus of control that were found to have significant direct effects also had significant total effects on quality of life.

Post Hoc Exploration

A comparison of the concerns most prominent between the younger and the older portions of the sample was of interest. As previously delineated in the path analysis results, age was found to have direct effects on sexual function. Therefore, two groups (younger = 43 to 65 years of age and older = 66 to 77 years of age) were created to further explore the differences between the two groups on the other variables in the model. A t test was conducted to compare the means of the two groups (younger = 42; older = 46) on the other independent and dependent model variables. Significant differences were only found between the two groups on the sexual function scores. Sexual function scores were higher for the younger group mean ($M = 29$) than the older group mean ($M = 17$), $t(86) = 2.61$, $p < .05$.

Two groups were constructed for the sexual and urinary function variables to further differentiate those with low and those with high sexual and urinary function. The low function group consisted of men with scores from 0 to 50; the scores for the high function group were from 51 to 100.

A t test was conducted to compare the means of these two groups for sexual function (low sexual function = 74, high sexual function = 14) and two groups for urinary function (low urinary function = 17, high urinary function = 71) on the other independent and dependent model variables. For the sexual function groups, significant differences were found between the two groups on age and sexual appraisal. Those with lower sexual function were older with a mean age of 66, while those with higher sexual function were younger with a mean age of 59, t(86) = 3.643, p <.000. In addition, the lower sexual function group had significantly lower sexual appraisal scores (M = 30) than the higher sexual function group (M = 64), t(86) = -3.387, p =.001.

Those with lower urinary function had significantly lower sexual appraisal scores (M = 16) than the higher urinary function group (M = 40), t(86) = -2.490, p =.015. As expected, lower urinary function had significantly lower urinary appraisal scores (M = 38) than the higher sexual function group (M = 88), t(86) = -6.771, p < .000. Additionally, the self-esteem mean was lower for the lower urinary function group (M = 31) than for the higher urinary function group (M = 34), t(86) = -2.787, p = .007.

CHAPTER V

DISCUSSION AND CONCLUSIONS

The sample and study results, which are accompanied by an examination of previous research findings, are discussed in this chapter, followed by an overview of model findings, and a review of the variables supported in the model. Limitations of the study are also addressed. Finally, the implications for practice, as well as recommendations for future research, are presented.

Discussion of Study Results

The purpose of the study was to examine physical, psychological, and social factors affecting the quality of life for men after radical prostatectomy treatment for prostate cancer. The data were gathered via mailed surveys using a single questionnaire, constructed of 90 items from previously developed and standardized instruments.

Relationships Among the Model Variables

The literature review provided a lucid argument that radical prostatectomy treatment can affect the quality of life for prostate cancer patients. Sexual and urinary function pertained to the quantitative function from the participant's perspective, while sexual and urinary appraisal were associated with the qualitative judgment of whether sexual or urinary function was a problem from the participant's perspective (Litwin et al., 1995). It was hypothesized that prostatectomy treatment affected the sexual and urinary function, leading to changes in the person’s sexual and urinary appraisal. Subsequently, this appraisal then influenced psychological responses. Although the results of the study supported this hypothesis for urinary appraisal, some of the other relationships were not supported. The significant findings of the model indicated that the three mediating variables of self-esteem, perceived social support, and health locus of control were significant predictors of quality of life.

Prior to this study, researchers limited their research to a single domain (e.g., health) in the conceptualization of quality of life. The present research applied the broad conceptualization of quality of life as defined by Young and Longman (1983) "the degree of satisfaction with the perceived present life circumstances"--and operationalized by Flanagan’s (1978) five common domains: (a) physical and material well-being; (b) relations with others; (c) social, community, and civic activities; (d) personal development and fulfillment; and (e) recreation.

In doing so, this research incorporated the broad definition of quality of life in a model that included hypothesized exogenous, endogenous, and mediating variables in the quality of life after radical prostatectomy treatment for localized prostate cancer. A literature review identified the hypothesized relationships as presented in Figure 2 and Appendix B. The hypotheses predicted that six independent variables--urinary appraisal, self-esteem, anger suppression, perceived social support, depression, and health locus of control--would have direct effects on the dependent variable, quality of life--and that three variables--self-esteem, perceived social support, and health locus of control--had significant direct effects on quality of life.

Significant total effects of urinary appraisal on quality of life were also found. This model provided support for the role of the endogenous and mediating variables in quality of life for the participants. Overall, the theoretical model explained 72% of the total variance in quality of life after radical prostatectomy.

Variables Supported in the Model

Perceived Social Support

The conceptualization for perceived social support for this study was provided by Cohen and Willis (1985) and defined as the person's perception of the adequacy of available support and the degree to which these resources are responsive to the demands elicited by recognized life stressors. This social support may be positive when it is perceived as adequate and negative when perceived as inadequate.

Perceived social support was not correlated with any exogenous or endogenous variables. Rather, it was correlated significantly with the other mediating variables: positively correlated with self-esteem and negatively correlated with anger and depression. These findings corroborate previous research that documented the association between social support and self-esteem in cancer patients (Tempelaar, Dehaes, & DeRuiter, 1989), social support and anger in post-MI patients (Baker et al., 1994), and depression in COPD patients (Anderson, 1995).

Mean perceived social support scores of this sample, as measured by the PRQ-85 Part 2, were comparable to other populations. Anderson (1995) and Lee et al. (1991) found similar PRQ Part 2 scores. Similar PRQ Part 2 scores were obtained by Anderson

(1995), with a convenience sample of 126 community-dwelling COPD patients and Lee et al., with a sample composed of 30 oxygen-dependent, community-dwelling patients with COPD. The high scores reported by Anderson and Lee et al. may indicate, that despite their health problems, these individuals were able to maintain relatively high levels of perceived support.

The perceived social support variable explained most of the variance in quality of life in this study. These findings substantiate previous research that has found perceived social support to be a significant predictor of quality of life in community-dwelling residents. Evidence of this positive view of social support was supported in this research, and was similar to other diverse studies (Levitt et al., 1987; Snow & Crapo, 1982) and primary health problems, such as bone marrow transplant, post-MI, arthritis, and COPD patients (Anderson, 1995; Baker et al., 1994; Burckhardt, 1985; Snow & Crapo, 1982; Wingate, 1995).

A significant difference in perceived social support was found among the men in this sample~~,~~ based on marital status. The scores for perceived social support, as measured with the PRQ 85 Part 2, and quality of life were much lower for those who were nonmarried than for those who were married. Population-based research indicates that marital support and, subsequently, social support, was a positive factor in treatment response for cancer patients (Goodwin, Hunt, Key & Samet, 1987). Brandt and Weinert (1981) also suggested that higher PRQ 85 Part 2 scores may function as a predictor in forecasting marital adjustment and family functioning. Thus, marital support may influence perceived social support and subsequently influence quality of life after radical prostatectomy treatment.

Little research exists regarding men with prostate cancer and their social support systems. Kornblith et al. (1994) proposed that prostate cancer treatments negatively altered the social support systems of the marital dyad. However, the marital dyad changes demonstrated that it was the spouse, rather than the the men, who encountered increased distress after prost. The present research extended these previous observations and identified that a higher level of perceived social support in men was a strong predictor of quality of life after prostatectomy for prostate cancer.

Self-esteem

Global self-esteem, which refers to feelings about general self-worth, was used in the conceptualization for this variable. Katz, Rodin, and Devins (1995) delved into the concept of self-esteem and found that it may include such diverse dimensions as body image, social self-esteem, achieving self-esteem, and identification self-esteem. These extensions of global self-esteem could serve as an appropriate framework to view the associations between self-esteem and the psychosocial variables of anger suppression, perceived social support, and depression in future research.

The self-esteem scores revealed two interesting phenomena in this study. First, the findings corroborated the earlier observation of Heyman and Rosner (1996) that the side effects of prostate cancer treatments, such as incontinence, may negatively affect self-worth (Heyman & Rosner, 1996). Second, the mean for self-esteem was lower for the lower urinary function group than the higher urinary function group.

Self-esteem was significantly associated with other variables in the study model as well. It was moderately correlated with the disease variables of urinary function and appraisal. Urinary appraisal was associated with, although only a near significant predictor of, self-esteem. Heyman and Rosner (1996) hypothesized that the side effects of prostate cancer treatments, such as impotence and incontinence, may cause self-worth losses. Since self-esteem has not been specifically studied or pursued in a quantitative fashion in the post-prostatectomy population, this study supported the preceding qualitative research.

Self-esteem had a significant univariate association, as well a significant multivariate relationship, with quality of life in the causal model. This was consistent with previous research that also found self-esteem to be a strong predictor of quality of life in the general population (Campbell, 1981; Diener, 1984; Diener & Diener, 1995; Hong & Giannakopoulos, 1994; Wingate, 1995) and in those with chronic illnesses, such as arthritis and COPD (Anderson, 1995; Burckhardt, 1985).

Other studies have found self-esteem to be the strongest predictor of life quality (Anderson, 1995; Burckhardt, 1985). In this study, however, perceived social support was the strongest predictor, while self-esteem was second. Nevertheless, rating one significant predictor, such as social support, as more important than another significant predictor, such as self-esteem, may not be appropriate at this time. This study did not use the same steps as the two previous studies. The strength of the relationships in the model may be an artifact of the regression analysis steps. Replication of this model, using the same regression analysis steps, with additional samples would provide a better understanding of the strength of the relationships.

Thus, although diminished self-esteem has been linked with stressful life events, such as medical illnesses (Moos & Schaefer, 1986), the men in this study were able to maintain their feelings of self-worth and pride in themselves, and were, in general, satisfied with their lives despite physical and emotional changes caused by diagnosis and treatment of cancer. Perhaps, the high levels of perceived social support played an important role in assisting patients in dealing with the insults to their psyche and coping with their cancer.

Health Locus of Control

The health locus of control scores of this sample were comparable to those of other populations (Wallston et al, 1978; Burckhardt, 1985). Prior research has found locus of control to predict life satisfaction in the general population (Hong & Giannakopoulos, 1994), as well as for elderly persons (Hickson et al., 1988; Levitt et al., 1987). Two studies conducted with osteoarthritis and arthritis patients also found that internal control over health was a predictor of quality of life (Burckhardt, 1985) and that life satisfaction was related to internal locus of control (Laborde & Powers, 1985). However, two studies with late-stage cancer patients and post-MI women determined that health locus of control was not a predictor of quality of life in these populations (Lewis, 1982; Wingate, 1995).

The hypothesis that an increase in health locus of control will produce an increase in quality of life was supported in this study. A related issue discussed by Heyman and Rosner (1996) was that early and late phase coping strategies concerned seeking information to gain mastery of situations. Unlike other mediating variables in the model, health locus of control was significantly correlated with only three other variables: urinary function, urinary appraisal, and quality of life. Perhaps, its relationship with the dependent variable combined with the lack of shared variance with other psychosocial variables enabled health locus of control to act as a significant predictor of quality of life in the model.

Endogenous Variables

It was noteworthy that both sexual and urinary function had direct effects on sexual appraisal. The contribution of urinary function to sexual appraisal may be related to the inclusion of the item that referred to "urine leakage interfering with your sexual activity" within the urinary function scale. There was evidence that this assumption may be true. Of all the urinary function items, this item had the largest correlation with sexual appraisal. Further evaluation of the disease variable scales is warranted, because the factor structure may be different from the structure presumed during instrument development.

The literature provided evidence that radical prostatectomy treatments negatively affect sexual and urinary function in some men (Catalona & Bigg, 1990; Leandri et al., 1992; Rossignol et al., 1991; Wasson et al., 1993). Although Litwin et al. (1995) explored how changes in sexual and urinary function affect the appraisal of function, the sample was comprised of men who were up to 30 years post-prostatectomy. However, past research has not delineated how these sexual and urinary function changes affect the appraisal of function during the 12 to 24 months post-prostatectomy for prostate cancer. A consistent pattern between the function variables and their respective appraisal was seen in the correlations and regression analyses in this study. This study reinforced the findings of past research that sexual and urinary function were adversely affected by prostate surgery and that functional changes ultimately aroused feelings of increased symptom severity about these problems (Braslis et al., 1995; Herr, 1994; Litwin et al., 1995; Pedersen et al., 1993).

Litwin et al. (1995) used the UCLA Prostate Cancer Index subscales to compare the post-prostatectomy group with radiation treatment, observation-only prostate cancer, and community comparison groups. The present study extended Litwin's (1995) research, comparing the three treatment groups by using the same subscales to assess sexual and urinary function to predict the appraisal in a sample 12 to 24 month after prostatectomy. Furthermore, these variables, and urinary appraisal in particular, were instrumental in providing significant total effects in the prediction of quality of life.

This study's findings also found that the disease variables--sexual function and appraisal, and urinary function and appraisal--exhibited significant correlations with certain psychosocial variables, namely, anger suppression, self-esteem, and health locus of control. Urinary function had significant direct effects on urinary appraisal. Subsequently, urinary appraisal had significant direct effects on health locus of control, as well as near significant direct effects on self-esteem and anger.

While urinary appraisal was not a significant predictor of anger suppression, this relationship may still be clinically relevant. These findings corroborated prior research indicating that anger was associated with treatment side effects, specifically incontinence, after prostatectomies (Braslis et al., 1995; Lim et al., 1995). In qualitative interviews with post-treatment prostate cancer patients, early post-treatment phase issues included feelings of anger; early post-treatment phase coping strategies involved feelings of anger when expectations were not met (Heyman & Rosner, 1996). The near significance of urinary appraisal in predicting anger suppression, in light of the previous findings, leads to the conclusion that further investigation of anger suppression, as well as other anger states and traits, is needed.

Urinary appraisal was also found to be as a near significant predictor of self-esteem and a significant predictor of health locus of control. These results were consistent with previous qualitative prostate cancer research conducted by Heyman and Rosner (1996) indicating that the side effects of prostate cancer treatments may arouse self-worth losses. Additionally, they observed that the side effects of prostate cancer treatments may provoke a loss related to a sense of control (Heyman & Rosner, 1996).

This research extended the health-related quality of life research of Braslis et al. (1995), Fowler et al. (1995), Herr (1994), Pedersen et al. (1993) that found negative changes in urinary and sexual function and increased symptom severity in feelings about sex and sexual problems occurred after prostatectomy surgery. This research examined the relationship of the sexual and urinary symptoms with the mediating psychosocial variables, utilizing a broad definition of quality of life as the dependent variable. Although urinary appraisal was strongly correlated with quality of life, its causal effect was small relative to the indirect causal effect it had on quality of life through health locus of control. Urinary appraisal, not sexual appraisal, was the primary disease variable predictor in this model.

One plausible interpretation for this finding is associated with how often men are bothered by impotence and/or incontinence. Smith (1981) described the decade-by-decade decline of sexual activity of men, and noted that by the sixth decade--which would include most of the sample for this study--only about 50% had intercourse on a weekly basis. Perhaps, some men were not as bothered by the loss of sexual function because of previous losses, as suggested by Fowler et al. (1995). Men may be more distressed by the daily bother from incontinence than by the weekly bother from inadequate sexual function, possibly explaining why urinary appraisal was such a strong predictor, as compared with sexual appraisal. Perhaps baseline assessments of previous sexual and urinary function prior to treatment would provide health care professionals with a better understanding of this phenomenon.

In the case of prostate cancer treatments, such as radical prostatectomy, health care professionals, then, should not use quantification of an individual's symptoms to perceive their quality of life, but rather the patient's view of risks and benefits. Howe (1994) asked the simple question, "Where does all this leave the patient who has just been diagnosed with prostate cancer?" (p. 1702) and then answered it: "Nevertheless, a majority of patients will choose surgery or radiation in the hope of achieving a cure despite the risk of significant side effects" (Howe, 1994, p. 1702). After full disclosure, only the individual can judge or make a lucid appraisal of how much a loss of sexual and/or urinary function would bother them. Findings in this study indicate that the function; and the appraisal of that function may have negative effects on the mediating psychosocial variables and, subsequently, on quality of life after a radical prostatectomy.

Age and Sexual Function

A significant correlation was found in the present study between sexual function and age. Subsequently, a relationship that had not been hypothesized, that age had direct effects on sexual function, was also observed in the regression analysis. Further exploration of age revealed there were sexual function differences between the younger (43 to 65 years of age) and the older (66 to 77 years of age) groups. Although psychogenic factors may affect sexual function, this finding supports other research noting that the aging process affects sexual function (Quinlan et al., 1991; Smith, 1981; Wagner & Green, 1981). Interviews with 47 middle-aged married couples reported a great majority of men (87%) had decreased sexual activity over the 5 years preceding the study, with 56% of the men indicating that the change was due to the aging process (Walfisch, Maoz, & Antonovsky, 1984).

Variables Not Supported in the Model

Three variables--age, anger suppression, and depression--were not supported in the model. Path analysis, employing multiple regression to isolate the effects on the dependent variable made by a set of independent variables, was the approach used to test pathways that were based on theoretical knowledge (Polit, 1996). Regression analysis diagnostics--which examined the path analysis and multiple regression assumptions regarding multicollinearity, normality, linearity, and homoscedasticity--were used to detect potential problems in multiple regression. According to the diagnostics, all of the assumptions were met for the variables in the model. Even though age, anger suppression, and depression were not supported in the model, the statistical procedures used in testing the model hypotheses were appropriate.

Age

As hypothesized, the univariate and multivariate findings did not indicate that age was related to quality of life. One study found that older persons were more satisfied with human relations, material needs, and religiosity than younger persons in a broad, population-based study that surveyed 13 nations in four age groups. These findings were ascribed to life-span developmental processes in these nations (Butt, & Beiser, 1987). However, the findings that age was not a predictor of quality of life was a more typical finding (Hong and Giannakopoulos, 1994; Linn & Linn, 1981; Snow & Crapo, 1982).

Past research, such as Burckhardt's (1985) study of chronically ill persons with arthritis, has indicated that age may impact quality of life indirectly through perceived support. Other findings suggest that increased age was not only associated with less social support and higher depression, but was also a predictor of having poor social support (Conn et al., 1991; Goodwin et al., 1991). In the present study, no significant correlations were found between age and perceived social support or depression. The model hypothesis, that an increase in age would lead to a decrease in perceived social support and to higher depression scores, was not supported. Therefore, the findings of this study did not support previous research findings.

The divergence between these and previous findings may lie in the different populations. Important differences exist between this sample and previous samples: (a) this sample had higher Rosenberg Self-Esteem Scale scores than the 1- and 2-year post-MI sample (Conn et al., 1991); (b) the newly diagnosed cancer patients were older than this sample (Goodwin et al., 1991); and (c) this sample had higher socioeconomic status than the newly diagnosed cancer patients (Goodwin et al., 1991). Consequently, notable discrepancies, which cannot be precisely determined, between this and previous research samples may account for the disparity in the findings.

Anger Suppression

Conceptually, the expression of anger, which includes anger suppression, must be distinguished from the state of anger, which measures the intensity of anger, and trait anger, which assesses the disposition to anger experience. Furthermore, a multifaceted concept of anger occurs when the anger is turned in toward the self, which may ultimately result in feelings of depression. The results of anger suppression lead to experiences of anger as an emotional state or state anger (Spielberger, 1996).

The anger suppression scores in this study were similar to those for men with college degrees (Spielberger, 1996). Part of the sample, however, had elevated anger suppression scores, suggesting that a few men in this study may have experienced intense angry feelings but tended to suppress these feelings rather than express them either physically or verbally.

For this population, previous research regarding anger was limited. Heyman and Rosner (1996) provided preliminary findings, in their qualitative interviews with post-treatment prostate cancer patients, which indicated that early post-prostatectomy phase issues included feelings of anger; early post-prostatectomy phase coping strategies involved feelings of anger when expectations were not met (Heyman & Rosner, 1996). This study provided a better understanding of the univariate and multivariate contributions of anger suppression in this post-treatment prostate cancer population.

The findings of this study extended the qualitative research, which identified the presence of anger during the post-prostatectomy convalescence. In this model, there were indications that urinary appraisal had a meaningful connection with other variables, specifically with anger suppression. These multivariate findings support the quantitative findings of Braslis et al. (1995) and Lim et al. (1995), who studied the univariate associations and found that treatment side effects, specifically incontinence, have been associated with anger in prostate cancer. The association between anger suppression and the other mediating variables of self-esteem, social support, and depression was a new and significant finding in this population.

The findings revealed that urinary appraisal had near significant direct multivariate effects on anger suppression in the regression analysis. A significant univariate correlation between anger suppression and quality of life was also found. However, the relationship between anger suppression and quality of life was weakened to a nonsignificant total effect in the model. In other words, when the other variables in the model were controlled, the relationship was reduced. The hypothesis that an increase in anger suppression will produce a decrease in quality of life was, therefore, not supported.

Concepts related to anger suppression have been included in a few quality of life studies in the past with results that different from those acquired in this study. Low anger arousal was found to be related to high well-being, and trait anger was negatively predictive of life satisfaction (Biaggio, 1980; Hong & Giannakopoulos, 1994). In this sample, however, anger suppression was not predictive of quality of life. Nevertheless, the detection of the significant univariate correlation between anger suppression and quality of life was an important finding with implications in health care. Although all health care workers cannot be responsible for psychoanalysis, an awareness of a potential anger problem would be imperative.

Depression

In contrast to the conclusions reached in past research that depression was an important predictor of quality of life, as provided by research in the general population (Hong & Giannakopoulos, 1994), COPD patients (Anderson, 1995), post-coronary artery bypass surgery patients, older male cancer patients, and testicular cancer patients (Godding et al., 1995; Kaasa et al., 1991; Strauss et al., 1992), the findings of this study did not find depression to be a predictor of quality of life. The fact that only a small portion of this sample possessed a propensity toward greater degrees of depressed mood when compared with an older well group, might offer a plausible explanation for the difference. Strauss et al. (1992) found this to be the case in a study of pre- and post-coronary artery bypass surgery. They concluded that a sub-population considered a risk group, which varied in health-related anxiety and depression, differed in many respects from the other patients, even preoperatively. A risk group, such as the one found by Strauss et al. (1992), may have existed in this population, but the size may have been too small, in relation to the overall sample, to detect in the multivariate analysis.

Therefore, depression had no direct effects on quality of life in this study. Like anger, the relationship between depression and quality of life was weakened to a nonsignificant total effect in the model. When the other variables in the model were controlled, the relationship was reduced to a nonsignificant level. Thus, the hypothesis that an increase in depression will produce a decrease in quality of life was not supported.

Limitations of the Study

Major design limitations of this study will be discussed as they relate to the threats to internal and external validity. The limitations of this study will also be reviewed, followed by suggestions of alternatives in future investigations.

Internal Validity

Maturation is a process of changes that occur in subjects due to the passage of time (Pedhazur & Schmelkin, 1991). This study was a cross-sectional design that sampled a single group of post-prostatectomy men at one point in time. It was possible that subjects, at different time intervals since surgery, responded in a different manner. This issue was examined twice in the analysis phase of the study. First, the Tumor Registry assessed the differences between respondents and nonrespondents on the time interval since surgery variable and found no differences. Then, the researcher used an independent groups' t test in an attempt to identify differences between the less time versus the more time groups. Again, no significant differences were found.

External Validity

In this study, the case for external validity was based on an argument that the sample was representative of the population. From a purist's position, the findings of a study can only be generalized to the population from which the sample was randomly selected. Therefore, the best way to insure generalizability is to draw the sample at random from the population. A convenience sample was used to obtain an adequate sample size within the time constraints of this cross-sectional study design. Although the sample was nonrandom, the response set did not differ on the variables of race, age, and time interval since surgery from those that did not respond. Nevertheless, in spite of less than optimal sample selection procedures, the method did provide a sample that was representative of the Tumor Registry from which it originated. In addition, the demographic variables indicated the sample was also representative of the community base as characterized by the demographic variables, such as living arrangements and occupation.

While the age of the sample was representative of the population according to the structured literature review conducted by Wasson et al. (1993), this sample was found to have high income and educational levels. Some consideration should be given to the notion that the sample may have originated from an area of higher than average socioeconomic status. The socioeconomic status may also have been affected by other issues as well. Only recently has there been approval of PSA screening for Medicare recipients (DHHS, 1997). The literature indicated that accessibility, cost, and health were factors that might affect participation in prostate cancer screening (Zimmerman, 1997). Men who seek treatment for localized prostate cancer may belong, in general, to a higher socioeconomic group. The most basic premise for this claim is that to belong to a health care system, one must be employed in a position that pays more than a minimum wage with health care benefits or have a level of income that allows the person to be a self-payor for the insurance. Either situation lends itself to a higher socioeconomic level. Other populations who may have access to health care but who are representative of other socioeconomic situations, such as men associated with Veterans Affairs, should be studied as well.

Generalization of the findings to different ethnic groups is a concern. Although the inclusion of the all-White sample provided a more clear interpretation of the results for generalization to the White population, the results are only representative of this specific population. Replication to address differences associated with nonWhite populations would be important.

In this study, neither sexual function nor sexual appraisal were determined to be significant predictors of quality of life. Fowler et al. (1995) observed that patients who had some sexual function before surgery were bothered by diminished sexual function, but those who had little or no sexual function before treatment reported no problems. It is possible that a significant proportion of this sample had already incurred a significant deterioration in sexual function prior treatment; therefore when the post-treatment measurements were performed, these men noted no problems in sexual function because they had already adapted to the loss. Future research efforts could be enhanced through the control of these factors by using a longitudinal study design, with pre- and post-prostatectomy measurement of phenomenons such as sexual function.

Implications for Practice and Research

Implications for Practice

This research used causal modeling via path analytic processes to determine if the data conformed sufficiently to support patterns of causation. However, these findings must be interpreted with caution because the correlation or covariance of variables in this nonexperimental study does not explain causality (Polit, 1996; Polit & Hungler, 1995).

Perceived Social Support

Within many health care institutions, patients feel lost in a jungle of health care management. In this study perceived social support was an important factor associated with quality of life. Nurses can serve as facilitators to identify pertinent issues to address with patients and family members. Social support has been recognized as an important factor in quality of life for those with cancer (Guillory, 1996). Some psychosocial interventions with cancer patients have been found to be beneficial (Andersen, 1992; Trijsburg, van Knippenberg, & Rijpma, 1992).

Informal and formal support has been found to vary between different groups (Guidry, Aday, Zhang, & Winn, 1997; Krause, 1990; Noelker & Bass, 1989). Nurses should not assume a man who has had a prostatectomy would be interested in participating in a formal support group. Rather, nurses should consider offering patients different approaches, both formal and informal, that would enhance their social support.

While some approaches can be individualized and featured in direct patient care activities, others could utilize more organized group activities. Informal support--such as family, friends, and relatives--plays an important role in coping with cancer and provides emotional assistance and extended relationship networks (Guidry et al. 1997). Support groups that provide group interaction and counseling sessions that provide information about cancer and positive health strategies have been found to reduce the psychosocial difficulties of those with cancer (Cain, Kohorn, Quinlan, Latimer, & Schwartz, 1986; Gellert, Maxwell, & Siegel, 1993; Jacobs, Ross, Walker, & Stockdale, 1983; Lieberman, 1988; Telch, & Telch, 1986).

Self-esteem

Self-esteem was another factor found to be a predictor of quality of life after radical prostatectomy. Variations in self-esteem have been attributed to other cancer treatments (Reiker, 1996; Roach, Chinn, Holland, & Clark, 1996; Schain, Worden, & Weisman, 1977). In this sample, the changes in self-esteem were significantly correlated with urinary appraisal and, to a lesser effect, with urinary function.

Helping these men to manage the treatment side effects is in the realm of nursing practice. The common nursing treatments consist of behavioral therapy with perineal exercises, pelvic muscle electrical stimulation, as well as biofeedback which has been found to be an effective, minimally invasive method. In addition, medical treatments such as medications, collagen injections, and artificial sphincter implantation may be used (Burgio, Stutzman, & Engel, 1989; Goode, 1998; Jackson, Emerson, Johnston, Wilson, & Morales, 1996; Meaglia, Joseph, Chang, & Schmidt, 1990).

Health Locus of Control

Apart from its relationship with self-esteem, urinary appraisal was also found to have direct effects on health locus of control. In turn, health locus of control was found to have direct effects on quality of life. The quality of life of cancer patients may be influenced by how much control they feel they maintain over situations that arise when dealing with cancer and the effects of its treatment.

A brief, group program teaching coping skills has been found to be effective in this area. Past research in the qualitative realm has suggested that linking these men with resources, such as libraries and computers to provide information and communication links, was also helpful. In other phases of the adjustment, practical information from other men who have lived through the experience of dealing with treatment side effects, such as incontinence or impotence, can be helpful in increasing health locus of control (Cunningham, Lockwood, & Cunningham, 1991; Weinberg, Schmale, Uken, & Wessel, 1996).

Health locus of control was found to be one of the three important predictors of quality of life after radical prostatectomy treatment for prostate cancer. Wallston et al. (1976) found that health-related information seeking was a joint function of a person's locus of control beliefs and the value placed on health. This locus of control was found to be a significant factor in psychological adjustment in long-term cancer survivor coping strategies. Halstead et al. (1995) found that control over life dimensions, which includes control over illness, was a significant factor in psychological adjustment. Halstead et al. believed their data suggested that interventions designed to increase patients' perceptions of control would likely have a positive impact on the qualitative aspect of treatment. One method whereby nursing could influence the patients' perception of control would be through aiding the patient's information-seeking during the informed consent process. Ethical principles support the proactive role of nursing in the consent process. Initially, the important consideration for informed consent was that the health care team members would disclose an adequate amount of information on which the patient could make an informed decision. However, more emphasis is now placed on autonomy, the patient's understanding and consent. The obligation for veracity furthers this process to include that a valid consent depends on truthful communication, insures obligations of fidelity, promise-keeping, and relationships of trust for fruitful interaction and cooperation (Beauchamp & Childress, 1994). Therefore, it is the responsibility of nursing to follow these ethical principles to insure that patients have adequate information on which to base an informed decision in the consent process. In this sample, about half the men considered their sexual and urinary function to be somewhat of a problem after radical prostatectomy. Men need to consider the odds seriously prior to the treatment, weighing the odds of the years added to their life span with the known detrimental side effects of the treatment. The Man-to-Man program from the American Cancer Society sponsors individual counseling programs to help those with prostate cancer in this decision-making process (American Cancer Society, 1998).

Implications for Research

African-American men have a prostate cancer incidence rate nearly twice that of the general population (Littrup et al., 1993). Since the incidence of prostate cancer is particularly high in that population, research for the African-American population should receive a high priority.

Both sexual and urinary function were found to have direct effects on sexual appraisal. It has been posited that the contribution of urinary function to sexual appraisal may be related to the inclusion of the item, "Urine leakage interfering with your sexual activity" within the urinary function scale. This item does have specific relevance to sexual activity, but the direct effects of urinary function to sexual appraisal was conceptually troubling in the model. The domains of urinary function and sexual appraisal are in need of further evaluation to explore the possibility that this item represents a subscale of urinary function.

No longitudinal research has been conducted on the adaptation process of men who have been diagnosed with prostate cancer who receive the radical prostatectomy treatment. Fowler et al. (1995) indicated that pre-prostatectomy sexual function may affect the post-prostatectomy sexual appraisal of these men. Tangential to controlling for sexual function prior to the prostatectomy treatment was the possibility that there may be other differences that exist in the populations that have gone undetected. Strauss et al. (1992) found that a high risk sub-population differed in many respects from the other patients preoperatively. In addition, the impact of aging, in conjunction with the physical and emotional changes caused by diagnosis and treatment of cancer, may affect the adjustment of these post-prostatectomy men (Shell & Smith, 1994). Therefore, a longitudinal study with pre- and post-prostatectomy measurements would be the next logical research to be conducted.

Conclusions

Three major contributions to research were provided by this study. First, all the variables were incorporated in a causal model to predict quality of life after radical prostatectomy. Next, a number of psychosocial variables, including self-esteem, social support, and health locus of control, were measured in a quantitative manner to provide input as mediating variables in the causal model. Finally, a broad conceptual definition of quality of life, not health-related quality of life, was used.

Nursing as a human science is concerned with the experiences of patients. Research is conducted in order to improve the experiences of patients through advances in nursing science. The purpose of this research was to examine physical, psychological, and social factors that affect the quality of life of men 12 to 24 months after radical prostatectomy treatment for prostate cancer. A model was developed to help members of the health care team understand men's experiences after radical prostatectomy and to develop treatments in the future that will enhance the life quality of these men. By conducting this research, it was found that perceived social support, self-esteem, and health locus of control had direct effects, augmented by the indirect effects of urinary appraisal through health locus of control, on the quality of life after radical prostatectomy.

The findings of this research can be brought into nursing practice with ease. Nursing can assist at the beginning of this process during the prostate cancer screening. Basic information to help men gain a better understanding of their body functions would be appropriate at the screening level. Meticulous patient assessments, provision of relevant information, consideration for alternative resources, attention to patient education opportunities, and appropriate referrals to other agencies are all important in the nursing care of men with prostate cancer.

Specifically, perceived social support was found to be an important predictor of quality of life in this sample. The enhancement of perceived social support, using a variety of approaches, is within the scope of nursing practice. Both informal and formal social support systems should be considered (Krause, 1990). One example of formal social support is support groups. Support groups may perform a number of different roles such as provide information, enhance behavioral or cognitive coping, or furnish focused interventions. Prostate cancer support groups are available in many communities and have been found to be effective (Cain et al., 1986; Grassman, 1993). Research indicates that these groups may be effective, providing men with a better understanding of their illness, giving them reassurance, helping to relieve anxiety, and providing a positive outlook (Gregoire, Kalogeropoulos, & Corcos, 1997). Informal social support, such as family, friends, and relatives, is also an important factor (Guidry et al., 1997). Acknowledgment and inclusion of these significant persons are an important influence on the patient's ability to cope with prostate cancer.

The sense of self and the impact of cancer on intimate relationships is a concern in men with prostate cancer. Lowered self-esteem in cancer patients may be due to body alterations, disruption of personal relationships, or depression (Katz et al, 1995). Research has indicated that therapeutic interventions can improve self-esteem in cancer patients (Linn, Linn, & Harris, 1982). Effective counseling should focus on understanding prostate cancer and four psychosocial domains: (a) the context of mens' lives, (b) the assault on the sense of self, (c) the impact on intimate relationships, and (d) treatment options and subsequent psychosocial effects (Reiker, 1996).

Nurses can serve as interventionists to enable men to either maintain or regain control. Mastery of health information can be enhanced by providing timely information to these men. To further their control over the situation, the following characteristics are desirable in nurses providing care for these men: (a) being an approachable health care team member, (b) encouraging their participation in health decisions, (c) allowing them opportunities to discuss risk taking and deferred gratification, and (d) yielding to them the sense of responsibility for behavioral outcomes (Arakelian, 1980).

Urinary appraisal had significant total effects on quality of life in this study. It is within the realm of nursing to provide behavioral therapy with perineal exercises, pelvic muscle electrical stimulation, as well as biofeedback. In a recent study, Engberg and McDowell (1998) found that the most common treatment for post-prostatectomy incontinence was pelvic floor muscle exercises. Men who did the exercises felt that these exercises were effective in incontinence reduction.

The American Cancer Society (1998) provides a cadre of information for public consumption, such as: “The PSA Blood Test & Prostate Cancer,” “After Diagnosis: Prostate Cancer,” “Informed Decisions: The Complete Book of Cancer Diagnosis, Treatment, and Recovery,” “Prostate Cancer: Education & Support Program,” “Sexuality & Cancer: For the Man Who Has Cancer, and His Partner,” and “Managing Incontinence after Treatment for Prostate Cancer.” Integrating American Cancer Society support program approaches can assist nursing to help men deal with pertinent issues before, during and after diagnosis and treatment for prostate cancer.

Nursing pursues the quest for a balance between a long life and a quality of life. The knowledge obtained from this research regarding the life quality of men with prostate cancer can assist clinicians to become more responsive to issues during the informed consent process, to identify pertinent issues for teaching patients and family members, and to provide applicable information to professionals involved in support groups that serve to help men deal with prostate cancer and its treatment after effects.

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APPENDIX A

Factors Affecting Quality of Life Outcomes in Men with Prostate Cancer

Table A-1

Study	Sample size	Age	Clinical/Pathological Stage	Prostate Treatment	S/P Time Interval
Braslis et al. (1994)	Two groups: (a) one month prior to surgery = 28, or (b) twelve months or longer after surgery = 51	Range 44 to 74, mean 61 years old	Pre-operative stages 23 T1c, 10 T2a, 44 T2b, and 2 T3. Mean pre-op Gleason score 5.4, range 3-9	Radical prostatectomy (RP), with nerve-sparing in 13 of 79 subjects	Two groups: (a) one month prior to surgery, or (b) twelve months or longer after surgery
Fowler et al. (1995)	1072 Medicare patients (national sample)	> 65 years old, 47% > 70 years	Not reported	RP	2-4 years after surgery
Gburek et al. (1992)	n = 88; (a) 38 with RP treatment, (b) 27 with radiotherapy (RT), & (c) 23 with both RP and RT	Not reported	Not reported	3 treatment groups: (a) RP, (b) RT, & (c) RP & RT	Men completing treatments during the past 5 years
Herr (1994)	50 with moderate to severe urinary incontinence from 650 in ongoing psycho-educational support group for prostate cancer patients & spouses.	Mean age 68 years	Not reported	RP	18 = 1 to 3 years, 15 = 3 to 5 years, 17 = > 5 years post-operative

(Table continues)

Table A-1 (Continues)

Study	Sample size	Age	Clinical/Pathological Stage	Prostate Treatment	S/P Time Interval
Heyman & Rosner (1996)	20 volunteer couples from a support group & urologist's referrals	Range 54 to 80, mean 66 years old.	Not reported	RP (10), RT (6), endocrine therapy (6), watchful waiting (2)	Not reported
Kornblith et al. (1994)	172 patients 83 spouses	About 50 to 80 years	Of no treatment men, 17 of 18 had Stage C or D cancer	Of 159 reporting treatments: 52% hormonal, 31% RP, 20% RT, 14% orchiectomy	Not reported
Krongrad et al. (1997)	BPH or prostate cancer consecutive patients at VA; 100 at 1-month and 100 patients at 6-month who completed questionnaires	Both BPH and prostate cancer mean of 68 years of age	Not reported in sampling methods	BPH and prostate cancer were combined because, "general QOL scores of men with BPH and prostate cancer are statistically indistinguishable (p. 534)	Models were generated for 1-month and 6-month repeated measures
Lim et al. (1995)	135 (69%) responders = 89 (65%) RP & 46 (77%) RT; 46 (77%) nonresponders	Mean age 65 years, range 41-78	Mean pretreatment: Gleason score 6.8, range 3-9; PSA 16, range 2-120; Stage T1c = 29%, T2a = 13%, T2b = 55%, & T3 = 2%	RP & RT	< 3 months = 7%, 3-6 months = 13%, 6-12 months = 20%, 12-18 months = 31%, > 18 months = 28%

(Table continues)

Table A-1 (Continues)

Study	Sample size	Age	Clinical/Pathological Stage	Prostate Treatment	S/P Time Interval
Litwin et al. (1995)	528 men, RP = 98, RT = 56), & observation alone = 60, metastatic disease were excluded	Mean age RP = 69.7, RT = 76.2, observation, 72.5 = comparison	Not reported	RP, RT, observation with a comparison group	5-6 years after treatment
Pedersen et al. (1993)	182; 131 were assessed on 272 occasions	Mean age 64.4, range 49-73	Localized cancer with no lymph node involvement	RP	35 completed after RP, 64 at 3 months, 70 at 6 months, 64 at 12 months, & 39 at 18 months
Rieker et al. (1993)	207 men	Not reported	Early stage prostate cancer	RP & RT	12 months post-diagnosis
Rossetti & Terrone (1996)	161 patients with radical prostatectomies during a 15 ½ year period (January 1980 to June 1995)	Mean 73 (49 -88 range)	80% without metastases at initial diagnosis - majority were initially symptomatic (89%) with most having urinary symptoms (96%)	All had RP - but 9% with bone metastases and hormonal treatment the most common treatment (61%) for modesties	Follow-up done June `995 to June 1996 to focus on early and late complications, as well as compliance and the attitudes before and after surgery

Table A-2

Study	Instrument(s)	Bowel Function Findings	Sexual Function Findings	Urinary Function Findings	General Quality of Life Findings
Braslis et al. (1994)	Functional Living Index: Cancer (FLIC); POMS; Bladder, bowel, and sexual function inventory	Little bowel dysfunction	S/P decreased sexual function	S/P decreased continence function; little voiding dysfunction; incontinence associated with increased confusion, depression, & anger; inversely correlated with perceived physical & psychological well-being.	Hardship scores increased following RP, tension scores improved
Fowler et al. (1995)	Subjective ratings of sexual & urinary function from no problem to big problem; 2 general measures of QOL, Mental Health Index & General Health Index	Not measured	Had diminished sexual function, but not a statistically significant effect on general QOL; those with no sexual function before surgery reported no concern with function after	Dripping urine, especially wearing pads, had more significant effect on patients than loss of sexual function; those with incontinence diminished QOL	Incontinence had significant adverse effects on measures of QOL (scoring lower on both GHI & MHI); sexual function not significant

(Table continues)

Table A-2 (Continues)

Study	Instrument(s)	Bowel Function Findings	Sexual Function Findings	Urinary Function Findings	General Quality of Life Findings
Gburek et al. (1992)	Devised QOL questionnaire containing questions about urinary control, bowel function, sexual function, and treatment satisfaction	Bowels problems rated worse in RT compared to RP & combined treatments	Sexual problems rated comparably in RP, combined treatment, and RT	Urinary problems in RP & combined treatments compared to RT; > RP & combined treatments used > incontinent pads daily than RT	General QOL not measured
Herr (1994)	Self-administered questionnaire to assess degree of incontinence, ADL global impact, & satisfaction regarding surgery	Not measured	Not measured	Incontinence episodes several times / week in 25%, 1 time / day in 31%, and 44% constant dribbling	26% reported limitations in the usual physical activity and more than half reported moderate to severe emotional distress
Heyman & Rosner (1996)	Interviewed separately by same-sex interviewers	No specific findings	Impotence linked to loss of manhood, change in intimacy relationship	Urinary incontinence influenced routine daily living	Reaction to treatment side effects was loss related to self-worth and sense of control

(Table continues)

Table A-2 (Continues)

Study	Instrument(s)	Bowel Function Findings	Sexual Function Findings	Urinary Function Findings	General Quality of Life Findings
Kornblith et al. (1994)	EORTC Prostate Cancer Quality of Life Questionnaire + prostate module, Intrusion of Event Scale subscale, Marital Communication Problems Scale	Not measured	78% < erection ability, < sexual enjoyment & interest (58%), men had worse sexual problems than spouses, but spouses > psychological distress & intrusion	25% difficulty control urination, 38% frequency	38% tired, 31% need rest,(74%) , & , 29% worry, 29% sleep trouble, pain; lack of energy & urinary frequency significantly correlated with QOL measures; RP & RT > negative than no treatment
Krongard et al. (1997)	Outcome of general QOL based on Rand Mental Health Index (good measure of psychological distress); self-report questionnaire based upon inputs as recommended by focus groups (p. 535).	Not measured	Sex life was found not to be a significant predictor QOL	Distress from urinary problems was found not to be a significant predictor of QOL	All models (1- and 6-month) supported predictors of social support, ADLs, and coping (6-month model had one significant disease-specific variable (localized prostate cancer) as 1-month model. The 1-month model had 4 and 6-month had 14 significant predictors of QOL.

(Table continues)

Table A-2 (Continues)

Study	Instrument(s)	Bowel Function Findings	Sexual Function Findings	Urinary Function Findings	General Quality of Life Findings
Lim et al. (1995)	FLIC; POMS; Symptom Inventory to evaluate bladder, bowel, and sexual function	RT group worse bowel function	RP worse sexual function than RT; sexual function associated with vigor, but negatively associated with incontinence & depression; RT sexual function negatively associated with voiding difficulties	RP worse incontinence, RP incontinence associated tension, fatigue, depression, & negatively associated with vigor & social well-being; RT incontinence correlated with tension, anger, fatigue & negatively associated with vigor & social well-being; 3% RP incontinent big problem, 13% RT = big problem	Problems with bowel, sexual & urinary function associated with depression, tension, fatigue; no significant differences found in overall quality of life measurements between 2 groups

(Table continues)

Table A-2 (Continues)

Study	Instrument(s)	Bowel Function Findings	Sexual Function Findings	Urinary Function Findings	General Quality of Life Findings
Litwin et al. (1995)	RAND SF 36-Item Health Survey, Cancer Rehabilitation Evaluation System-Short Form (CARES-SF); Functional Assessment of Cancer Therapy- General form (FACT-G); Sexual urinary, and bowel. function & bother	Bowel RT worse bother than other groups	Sexual function & bother = cancer was worse than comparison	Urinary (a) RP function worse than other groups, (b) RT comparable to observation & comparison groups	Differences between cancer and non-cancer in sexual, urinary, and bowel function and bother but not in general QOL measures; RP & RT had significantly worse sexual, urinary, and bowel function than men without cancer; nerve-sparing RP did not differ from those who had undergone standard RP
Pedersen et al. (1993)	Self-administered questionnaire developed at York University (Gudex & Kind, QUALY Toolkit, Discussion Paper 38) modified to test perception of side-effects after RP	Not measured	Potency: at 3, 6, 12, and 18 months ½ had distress over erectile impotence that did not change with time. Those taking the questionnaire before RP were suffering no distress, but suffered increasing distress during first year	Voiding disorders worse distress at 3 months, but at 18 months most not distressed	Anxiety only slightly greater after RP, with no distress from anxiety during the first year; 3. 4. Overall judgement: Some suffered severe overall distress, with a median value higher than for single factors. Over time, overall distress shows slight decease

(Table continues)

Table A-2 (Continues)

Study	Instrument(s)	Bowel Function Findings	Sexual Function Findings	Urinary Function Findings	General Quality of Life Findings
Rieker et al. (1993)	SF-36	RT versus RP: > bowel symptoms	RP versus RT: RP greater sexual dissatisfaction; RP (age adjust) associated with > sexual dissatisfaction	RP versus RT: more often indicated current use of pads	Cancer survivors experience better quality of life than a noncancer community sample; RP patients younger & < comorbidity than RT. RP versus RT: better physical functioning scores, better general health perceptions. RT versus RP: more activity limitations due to urinary symptoms. RP (age adjust) better general health perceptions
Rossetti & Terrone (1996)	30-item focused on early and late complications, as well as compliance and attitudes before and after surgery to measure impact on QOL	Not measured	Rated sexual activity as being less important than warranty of cure	96% of the symptomatic patients complained of urinary symptoms; urinary incontinence at 6 months post-RP was 4.3% (7/61)	Majority were symptomatic (89%), 90% satisfied and would repeat surgery; and Karnofsky performance status at diagnosis was good

APPENDIX B

Causal Hypotheses

Causal Hypotheses

Hypothesis 1 An increase in age will lead to a decrease in perceived social support.

Hypothesis 2 An increase in age will lead to more depression.

Hypothesis 3 A decrease in sexual function will lead to lower sexual appraisal.

Hypothesis 4 A decrease in urinary function will lead to lower urinary appraisal.

Hypothesis 5 A decrease in sexual appraisal will lead to a decrease in self-esteem.

Hypothesis 6 A decrease in sexual appraisal will lead to more anger suppression.

Hypothesis 7 A decrease in sexual appraisal will lead to a decrease in perceived social support.

Hypothesis 8 A decrease in sexual appraisal will lead to more depression.

Hypothesis 9 A decrease in sexual appraisal will lead to a decrease in health locus of control.

Hypothesis 10 A decrease in urinary appraisal will lead to a decrease in self-esteem.

Hypothesis 11 A decrease in urinary appraisal will lead to more anger suppression.

Hypothesis 12 A decrease in urinary appraisal will lead to a decrease in perceived social support.

Hypothesis 13 A decrease in urinary appraisal will lead to more depression.

Hypothesis 14 A decrease in urinary appraisal will lead to a decrease in health locus of control.

Hypothesis 15 A decrease in urinary appraisal will lead to a decrease in quality of life.

Hypothesis 16 An increase in self-esteem will lead to an increase in quality of life.

Hypothesis 17 An increase in anger suppression will lead to a decrease in quality of life.

Causal Hypotheses (continued)

Hypothesis 18 An increase in perceived social support will lead to an increase in quality of life.

Hypothesis 19 An increase in depression will lead to a decrease in quality of life.

Hypothesis 20 An increase in health locus of control will lead to an increase in quality of life.

Null Hypothesis 1 A increase in age will not lead to a change in the sexual function.

Null Hypothesis 2 A increase in age will not lead to a change in the urinary function.

Null Hypothesis 3 A change in age will not lead to a change in the sexual appraisal.

Null Hypothesis 4 A change in age will not lead to a change in the urinary appraisal.

Null Hypothesis 5 An increase in age will not lead to a change in self-esteem.

Null Hypothesis 6 An increase in age will not lead to a change in anger suppression.

Null Hypothesis 7 An increase in age will not lead to a change in health locus of control.

Null Hypothesis 8 An increase in age will not lead to a change in quality of life.

Null Hypothesis 9 An decrease in sexual function will not lead to a change in urinary appraisal.

Null Hypothesis 10 A decrease in sexual function will not lead to a change in self-esteem.

Null Hypothesis 11 A decrease in sexual function will not lead to a change in anger suppression.

Null Hypothesis 12 A decrease in sexual function will not lead to a change in perceived social support.

Null Hypothesis 13 A decrease in sexual function will not lead to a change in depression.

Null Hypothesis 14 A decrease in sexual function will not lead to a change in health locus of control.

Causal Hypotheses (continued)

Null Hypothesis 15 A decrease in sexual function will not lead to a change in quality of life.

Null Hypothesis 16 A decrease in urinary function will not lead to a change in sexual appraisal.

Null Hypothesis 17 A decrease in urinary function will not lead to a change in self-esteem.

Null Hypothesis 18 A decrease in urinary function will not lead to a change in anger suppression.

Null Hypothesis 19 A decrease in urinary function will not lead to a change in perceived social support.

Null Hypothesis 20 A decrease in urinary function will not lead to a change in depression.

Null Hypothesis 21 A decrease in urinary function will not lead to a change in health locus of control.

Null Hypothesis 22 A decrease in sexual appraisal will not lead to a change in quality of life.

APPENDIX C

Participant Subject Information Sheet

Oregon Health Sciences University
Participant Information Sheet

TITLE:
Quality of Life of Men after a Radical Prostatectomy

PRINCIPLE INVESTIGATOR:
LouAnn M. Rondorf-Klym, MSN, RN, Doctoral Nursing Student
School of Nursing, Oregon Health Sciences University, Telephone: (503) 494-7840

WHAT IS THIS STUDY ABOUT:

You were asked to participate in this research study because you have had prostatectomy surgery within the last 12 to 24 months. The questionnaire is being sent to you by the Tumor Registry at the Center for Health Outcomes in the Providence Health System. The purpose of this study is to examine physical, psychological, and social factors that affect the quality of life of men 12 to 24 months after radical prostatectomy treatment for prostate cancer.

THE IMPORTANCE OF YOUR PARTICIPATION:

I believe that health care workers need to better understand your daily life experiences following the radical prostatectomy surgery. Although a great deal is known about how a radical prostatectomy affects your potency or urinary function, not as much information is known about how these issues affect your overall quality of life. The information from your completed questionnaire may assist health care workers such as nurses and doctors in caring for future patients to better understand the effects of the radical prostatectomy treatment.

WHAT YOUR PARTICIPATION MEANS:

You are requested to complete a questionnaire about your physical, psychological, social, and economic status. A questionnaire has been created to assess the relationships among sexual and urinary function and bother (how much of a problem it is to you); self-esteem; anger expression; perceived social support; depression; health locus of control (how much you feel you control your health decisions); and your quality of life. The time it takes to complete the questionnaire is estimated to be less than one hour.

RISKS AND BENEFITS OF THIS STUDY:

You may experience some emotional discomfort when answering the study questions. Should you find any question uncomfortable or upsetting to you, you do not have to answer. You will receive no direct benefit from participating in the study. However, by participating, you may contribute information that will benefit other patients in the future. If you feel you may benefit from talking to other men who have had treatment for prostate cancer, a support group may be available in your community. You can find out more about prostate cancer support groups by contacting either your health care provider or the Providence Health System Resource Line at (503) 215-6595.

NO COST TO YOU:

There is no cost to you for your participation; nor will you be paid for participating in this study. A self-addressed, stamped envelope is enclosed for you to return the completed questionnaire to the Tumor Registry. The Oregon Health Sciences University, as a public institution, is subject to the Oregon Tort Claims Act. If you suffer any injury from this research project, compensation would be available to you only if you establish that the injury occurred through the fault of the University, its officers, or employees. If you have further questions, please call the Medical Services Director at (503) 494-8014.

CONFIDENTIALITY:

The questionnaire will be identified by a code number for use by the Tumor Registry. Neither your name nor identity will be known by the investigator or used for publication or publicity purpose. If you want to receive a summary of the study results from the Tumor Registry, a postcard is enclosed to return with the questionnaire.

WHAT YOUR CONSENT MEANS:

The return of your completed questionnaire indicates that you have read this letter and voluntarily agreed to participate in this study. You may refuse to participate without affecting your relationship with the Providence Health System. If you do not want to participate, simply throw the Questionnaire away. However, in the near future you will be contacted to give you the chance to reconsider.

APPENDIX D

Power Analysis Calculations

Power Analysis Calculations

The power analysis was based on previous research (Anderson, 1995; Burckhardt, 1985; Wingate, 1995). The lower 90% CI of 30% total variance in quality of life explained by these variables was approximated using data from these studies. These studies indicated that from three to five variables were significant in each model. Based on past research, the seven significant variables in the proposed model will be sexual bother, urinary bother, self-esteem, perceived social support, depression, and health locus of control.

The power analysis was performed using the software program Statistical Power Analysis: A computer program (Borenstein & Cohen, 1988). The formula for effect size for multiple regression is denoted f-squared as the proportion of variance explained by the set of independent variables divided by the proportion of variance attributed to error. This was the $f^2 = R^2_{Y\cdot A,B} - R^2_{Y\cdot A} \div 1 - R^2_{Y\cdot A,B}$ formula. (Cohen, 1988). The values of .02 (small), .15 (moderate), and .35 (large) effects in the social sciences were recorded. The selection of multiple regression with three sets of two independent variables was selected to estimate power. The determination for power was the $\lambda = f^2 (u + v + 1)$ formula (Cohen, 1988, p. 414).

Table C-1

Summary of Power Analysis Results (alpha .05) from Statistical Power Analysis software

Set	Type	Increment Variables in Set	Increment R^2	Increment Power	Cumulative Variables	Cumulative R^2	Cumulative Power
1	Covariates	2	.07	.63	2	.07	.63
2	Primary	2	.07	.63	4	.14	.83
3	Subsequent	2	.06	.56	6	.20	.92

Assuming a moderate effect size, power .92, and alpha .05, the desired sample size was estimated to be approximately 80.

Appendix E

Outline of Procedures for Each Phase of the Survey

Outline of Procedures for Each Phase of the Survey

1. The Tumor Registry searched the register for patients who had a surgical code of C61.9, indicating a radical prostatectomy procedure for localized prostate cancer had been done.
2. To narrow the search further, the Tumor Registry confined the dates for the procedure to those done in the past 12 to 24 months prior to the date of the search.
3. Any patients who had registry records, which indicated other prostate cancer treatments such as radiation therapy, were eliminated from the search.
4. Only patients who continued to reside in the community, as judged by their mailing address, were included in the study.
5. The Tumor Registry assigned identification numbers to the participants. A mailing list was created and maintained by the Tumor Registry. The mailing list cross referenced the identification number with name and address of the participant.
6. A copy of the identification numbers created by the Tumor Registry, without patient names or addresses, was given to the researcher.
7. The researcher prepared all information packets sent to the participants. Each questionnaire, envelope, and return envelope was coded with an identification number.

Outline of Procedures for Each Phase of the Survey (continued)

8. After preparation of the materials by the researcher, the Tumor Registry applied the mailing labels according to the cross-referenced mailing list.
9. Initially, all participants were sent a cover letter (see Appendix E) and a questionnaire packet. A packet consisted of: (a) a Participant Information Sheet (see Appendix C), (b) the questionnaire (see Appendix F), (c) a self-addressed stamped envelope for a questionnaire return was sent to each participant by the Tumor Registry, and (d) a postcard requesting a copy of the survey results (see Appendix G).
10. A follow-up postcard was sent one week after the initial mailing to all participants (see Appendix H).
11. For the participants who did not return their initial packet, a second follow-up letter with a replacement questionnaire packet was sent three weeks after the initial mailing (see Appendix I) was sent.
12. Seven weeks after the initial mailing, a final mailing with a replacement questionnaire at seven weeks after the initial mailing (see Appendix J) was sent.
13. It was the responsibility of the researcher to update the list of the identification numbers without the names. When the questionnaire was received, the ID was checked off on the list by the researcher as having been received.

Outline of Procedures for Each Phase of the Survey (continued)

14. After each mailing, the researcher provided the Tumor Registry with an updated list of the participants who had returned the questionnaire.
15. Following the updated list, a letter of thanks was sent to subjects upon receipt of the questionnaire (see Appendix K) by the Tumor Registry.
16. Separate from the questionnaire, the participant had the opportunity to request a copy of the survey results by returning a postcard to the Tumor Registry (see Appendix G). The researcher provided a copy of the survey results to the Tumor Registry. Using the postcards returned by the participants, the Tumor Registry distributed the abstract of the study results to the participants who requested study results.

APPENDIX F

Cover Letter to Participants

OREGON HEALTH
SCIENCES UNIVERSITY
3181 S.W. Sam Jackson Park Road, SN-ORD, Portland, Oregon 97201-3098
(503) 494-3856, Fax (503) 494-4350

School of Nursing
Office of Research Development and Utilization

Dear Sir:

My name is LouAnn M. Rondorf-Klym and I am a doctoral nursing student at Oregon Health Sciences University. I am conducting a study of quality of life in men with prostate cancer who have been treated with a radical prostatectomy.

The questionnaire for my study is being distributed by the Tumor Registry at the Center for Health Outcomes in the Providence Health System. The enclosed Subject Information Sheet explains the study's purposes, the importance of your participation, and issues related to confidentiality, risks, and benefits. By having the Tumor Registry distribute the study questionnaire, all information you might give will be completely anonymous. Neither your name nor identity will be known by the investigator. Only grouped results will be reported and you cannot be identified individually.

The time it takes to complete the questionnaire is estimated to be less than one hour. The questionnaire will include items about physical, psychological, social, and economic status. Examples of the items include, "Over the past 4 weeks, how often have you leaked urine?"; "During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?"; "During the past 4 weeks, how much of the time has your physical, health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?"; and "What is your approximate annual combined household income?".

If you choose to participate in the study, please complete the enclosed Study Questionnaire. A self-addressed stamped envelope to return your completed questionnaire to the Tumor Registry is enclosed for your convenience. If you do not wish to participate, simply throw the Questionnaire away. However, in the near future you will be contacted to give you the chance to reconsider.

Thank you for considering participation in the study. The information from your completed questionnaire may assist nurses and doctors to better understand the effects of the radical prostatectomy treatment and provide better care in the future.

Sincerely,

[redacted]

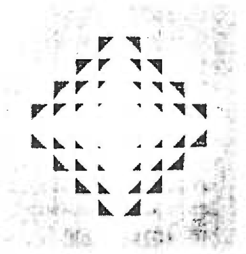
LouAnn M. Rondorf-Klym, MSN, RN
Doctoral Student, School of Nursing
Oregon Health Sciences University, Portland, OR

Enclosures

APPENDIX G

Quality of Life After a Radical Prostatectomy Questionnaire

The Quality of Life
After Radical Prostatectomy



DO NOT WRITE YOUR NAME ANYWHERE ON THIS SURVEY

URINARY FUNCTION

This section is about your urinary habits. Please consider ONLY THE LAST 4 WEEKS.

Q1. How big a problem, if any, has each of the following been for you?

(**CIRCLE** one number on each line)

	NO PROBLEM	VERY SMALL PROBLEM	SMALL PROBLEM	MODERATE PROBLEM	BIG PROBLEM
a. Dripping urine or wetting your pants	0	1	2	3	4
b. Urine leakage interfering with your sexual activity	0	1	2	3	4

Q2. Over the past 4 weeks, how often have you leaked urine?

(**CIRCLE** one number)

1 EVERY DAY
2 ABOUT ONCE A WEEK
3 LESS THAN ONCE A WEEK
4 NOT AT ALL

Q3. Which of the following best describes your urinary control during the last 4 weeks?

(**CIRCLE** one number)

1 NO CONTROL WHATSOEVER
2 FREQUENT DRIBBLING
3 OCCASIONAL DRIBBLING
4 TOTAL CONTROL

Q4. How many pads or adult diapers per day did you usually use to control leakage during the last 4 weeks?

(**CIRCLE** one number)

1 3 OR MORE PADS PER DAY
2 1-2 PADS PER DAY
3 NO PADS

Q5. Overall, how big a problem has your urinary function been for you during the last 4 weeks?

(**CIRCLE** one number)

1 NO PROBLEM
2 VERY SMALL PROBLEM
3 SMALL PROBLEM
4 MODERATE PROBLEM
5 BIG PROBLEM

Go on to the next page ⟶

SEXUAL FUNCTION

The next section is about your sexual function and sexual satisfaction. Many of the questions are very personal, but they will help me understand the important issues that you face every day. Please answer honestly about THE LAST 4 WEEKS ONLY.

Q6. How would you rate each of the following during the last 4 weeks?

(**CIRCLE** one number on each line)

	VERY POOR	POOR	FAIR	GOOD	VERY GOOD
a. Your level of sexual desire?	1	2	3	4	5
b. Your ability to have an erection?	1	2	3	4	5
c. Your ability to reach orgasm (climax)?	1	2	3	4	5

Q7. How would you describe the usual QUALITY of your erections?

(**CIRCLE** one number)

1 NONE AT ALL
2 NOT FIRM ENOUGH FOR ANY SEXUAL ACTIVITY
3 FIRM ENOUGH FOR MASTURBATION AND FOREPLAY ONLY
4 FIRM ENOUGH FOR INTERCOURSE

Q8. How would you describe the FREQUENCY of your erections?

(**CIRCLE** one number)

1 I NEVER HAD AN ERECTION WHEN I WANTED ONE
2 I HAD AN ERECTION LESS THAN HALF THE TIME I WANTED ONE
3 I HAD AN ERECTION ABOUT HALF THE TIME I WANTED ONE
4 I HAD AN ERECTION MORE THAN HALF THE TIME I WANTED ONE
5 I HAD AN ERECTION WHENEVER I WANTED ONE

Q9. How often have you awakened in the morning or night with an erection?

(**CIRCLE** one number)

1 NEVER
2 SELDOM (LESS THAN 25% OF THE TIME)
3 NOT OFTEN (LESS THAN HALF THE TIME)
4 OFTEN (MORE THAN HALF THE TIME)
5 VERY OFTEN (MORE THAN 75% OF THE TIME)

Q10. During the last 4 weeks did you have intercourse?

(**CIRCLE** one number)

1 NO
2 YES, ONCE
3 YES, MORE THAN ONCE

Go on to the next page ⟶

SEXUAL FUNCTION (continued)

Please answer honestly about THE LAST 4 WEEKS ONLY.

Q11. Overall, how would you rate your ability to function sexually during the last 4 weeks?

(**CIRCLE** one number)

1 VERY POOR
2 POOR
3 FAIR
4 GOOD
5 VERY GOOD

Q12. Overall, how big a problem has your sexual function been for you during the last 4 weeks?

(**CIRCLE** one number)

1 NO PROBLEM
2 VERY SMALL PROBLEM
3 SMALL PROBLEM
4 MODERATE PROBLEM
5 BIG PROBLEM

REACTIONS

A number of statements are listed below which people use to describe their reactions when they feel angry or furious. Read each statement and then circle the number which indicates how often you generally react or behave in the manner described when you are feeling angry or furious. Remember that there are no right or wrong answers.

(**CIRCLE** one number on each line)

When Angry or Furious...	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
Q13. I keep things in	1	2	3	4
Q14. I pout or sulk	1	2	3	4
Q15. I withdraw from people	1	2	3	4
Q16. I boil inside, but I don't show it	1	2	3	4
Q17. I tend to harbor grudges that I don't tell anyone about	1	2	3	4
Q18. I am secretly quite critical of others	1	2	3	4
Q19. I am angrier than I am willing to admit	1	2	3	4
Q20. I am irritated a great deal more than people are aware of	1	2	3	4

Go on to the next page →

FEELINGS ABOUT YOUR SELF

Below is a list of ways you might have felt about yourself recently. Circle the appropriate number that applies to you.

(**CIRCLE** one number on each line)

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
Q21. I feel that I am a person of worth, at least on an equal basis with others.	1	2	3	4
Q22. I feel that I have a number of good qualities.	1	2	3	4
Q23. All in all, I am inclined to feel that I am a failure.	1	2	3	4
Q24. I am able to do things as well as most other people.	1	2	3	4
Q25. I feel I do not have much to be proud of.	1	2	3	4
Q26. I take a positive attitude toward myself.	1	2	3	4
Q27. On the whole, I am satisfied with myself.	1	2	3	4
Q28. I wish I could have more respect for myself.	1	2	3	4
Q29. I certainly feel useless at times.	1	2	3	4
Q30. At times I think I am no good at all.	1	2	3	4

Go on to the next page →

LIFE SATISFACTION

These 16 items relate to your satisfaction with life. Please circle the one number that best describes your satisfaction for each item using this scale:

DELIGHTED	PLEASED	MOSTLY SATISFIED	MIXED	MOSTLY DISSATISFIED	UNHAPPY	TERRIBLE
7	6	5	4	3	2	1

(**CIRCLE** one number on each line)

Q31.	Material comforts: home, food, financial security	7	6	5	4	3	2	1
Q32.	Health: being physically fit and vigorous	7	6	5	4	3	2	1
Q33.	Relationships with parents, siblings, and other relatives: communicating, visiting, helping	7	6	5	4	3	2	1
Q34.	Having and rearing children	7	6	5	4	3	2	1
Q35.	Close relations with spouse or significant other	7	6	5	4	3	2	1
Q36.	Close friends	7	6	5	4	3	2	1
Q37.	Helping and encouraging others, volunteering	7	6	5	4	3	2	1
Q38.	Participating in organizations and public affairs	7	6	5	4	3	2	1
Q39.	Learning: attending school, improving knowledge	7	6	5	4	3	2	1
Q40.	Understanding yourself: knowing what life is about	7	6	5	4	3	2	1
Q41.	Work: job or home	7	6	5	4	3	2	1
Q42.	Expressing yourself creatively..........	7	6	5	4	3	2	1
Q43.	Socializing: meeting other people, doing things	7	6	5	4	3	2	1

Go on to the next page →

LIFE SATISFACTION

These items relate to your satisfaction with life. Please circle the one number that best describes your satisfaction for each item using this scale:

DELIGHTED	PLEASED	MOSTLY SATISFIED	MIXED	MOSTLY DISSATISFIED	UNHAPPY	TERRIBLE
7	6	5	4	3	2	1

(**CIRCLE** one number on each line)

Q44. Reading, music, or watching entertainment	7	6	5	4	3	2	1
Q45. Participating in active recreation	7	6	5	4	3	2	1
Q46. Independence, being able to do things for yourself	7	6	5	4	3	2	1

HEALTH MANAGEMENT

Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6).
CIRCLE THE NUMBER THAT REPRESENTS THE EXTENT TO
WHICH YOU DISAGREE OR AGREE WITH EACH STATEMENT.

STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
1	2	3	4	5	6

(**CIRCLE** one number on each line)

Q47. If I get sick, it is my own behavior which determines how soon I get well again.	1	2	3	4	5	6
Q48. I am in control of my own health.	1	2	3	4	5	6
Q49. When I get sick I am to blame.	1	2	3	4	5	6
Q50. The main thing that affects my health is what I myself do.	1	2	3	4	5	6
Q51. If I take care of myself, I can avoid illness.	1	2	3	4	5	6
Q52. If I take the right actions, I can stay healthy.	1	2	3	4	5	6

Go on to the next page ⟶

EMOTIONAL RESPONSES

Below is a list of the ways you might have felt or behaved recently. Please tell me how often you have felt this way during the past week.

RARELY OR NONE OF THE TIME (LESS THAN 1 DAY)	SOME OR A LITTLE OF THE TIME(1-2 DAYS)	OCCASIONALLY OR A MODERATE AMOUNT OF THE TIME (3-4 DAYS)	MOST OR ALL OF THE TIME (5-7 DAYS)
1	2	3	4

During the past week: (**CIRCLE** one number on each line)

Q53. I was bothered by things that usually don't bother me.	1	2	3	4
Q54. I had trouble keeping my mind on what I was doing.	1	2	3	4
Q55 I felt depressed.	1	2	3	4
Q56. I felt that everything I did was an effort.	1	2	3	4
Q57. I felt hopeful about the future.	1	2	3	4
Q58. I felt fearful.	1	2	3	4
Q59. My sleep was restless.	1	2	3	4
Q60. I was happy.	1	2	3	4
Q61. I felt lonely.	1	2	3	4
Q62. I could not "get going".	1	2	3	4

Go on to the next page →

SUPPORT

Below are some statements with which some people agree and others disagree. There is no right or wrong answer.

STRONGLY DISAGREE 1	DISAGREE 2	SOMEWHAT DISAGREE 3	NEUTRAL 4	SOMEWHAT AGREE 5	AGREE 6	STRONGLY AGREE 7

(**CIRCLE** one number on each line)

Q63. There is someone I feel close to who makes me feel secure	1	2	3	4	5	6	7
Q64. I belong to a group in which I feel important	1	2	3	4	5	6	7
Q65. People let me know that I do well at my work (job, homemaking)	1	2	3	4	5	6	7
Q66. I can't count on my relatives and friends to help me with problems	1	2	3	4	5	6	7
Q67. I have enough contact with the person who makes me feel special	1	2	3	4	5	6	7
Q68. I spend time with others who have the same interests that I do	1	2	3	4	5	6	7
Q69. There is little opportunity in my life to be giving and caring to another person	1	2	3	4	5	6	7
Q70. Others let me know that they enjoy working with me (job, committees, projects)	1	2	3	4	5	6	7
Q71. There are people who are available if I needed help over an extended period of time	1	2	3	4	5	6	7
Q72. There is no one to talk to about how I am feeling	1	2	3	4	5	6	7
Q73. Among my group of friends we do favors for each other	1	2	3	4	5	6	7
Q74. I have the opportunity to encourage others to develop their interests and skills	1	2	3	4	5	6	7

Go on to the next page ⟶

SUPPORT

Below are some statements with which some people agree and others disagree. There is no right or wrong answer.

STRONGLY DISAGREE	DISAGREE	SOMEWHAT DISAGREE	NEUTRAL	SOMEWHAT AGREE	AGREE	STRONGLY AGREE
1	2	3	4	5	6	7

(**CIRCLE** one number on each line)

Q75. My family lets me know that I am important for keeping the family running	1	2	3	4	5	6	7
Q76. I have relatives or friends that will help me out even if I can't pay them back	1	2	3	4	5	6	7
Q77. When I am upset there is someone I can be with who lets me be myself	1	2	3	4	5	6	7
Q78. I feel no one has the same problems as I	1	2	3	4	5	6	7
Q79.I enjoy doing little "extra" things that make another person's life more pleasant	1	2	3	4	5	6	7
Q80. I know that others appreciate me as a person	1	2	3	4	5	6	7
Q81. There is someone who loves and cares about me	1	2	3	4	5	6	7
Q82. I have people to share social events and fun activities with	1	2	3	4	5	6	7
Q83. I am responsible for helping provide for another person's needs	1	2	3	4	5	6	7
Q84. If I need advice there is someone who would assist me to work out a plan for dealing with the situation	1	2	3	4	5	6	7
Q85. I have a sense of being needed by another person	1	2	3	4	5	6	7
Q86. People think that I'm not as good a friend as I should be	1	2	3	4	5	6	7
Q87. If I got sick, there is someone to give me advice about caring for myself	1	2	3	4	5	6	7

Go on to the next page →

HEALTH

This survey asks for your views about your health. This information will help me understand how you feel and how well you are able to do your usual activities. Answer every question by selecting the appropriate answer. If you are unsure about how to answer the question, please give the best answer you can.

	EXCELLENT	VERY GOOD	GOOD	FAIR	POOR
Q88. In general, would you say your health is:	1	2	3	4	5

The following items are about activities you might do during a typical day. Does your health limit you in these activities? If so, how much?

	YES, LIMITED A LOT	YES, LIMITED A LITTLE	NO, NOT LIMITED AT ALL
Q89. **Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
Q90. Climbing **several** flights of stairs	1	2	3

During the **past 4 weeks**, have you had any of the following problems with your work or regular daily activities **as a result of your physical health**?

	YES	NO
Q91. **Accomplished less** than you would like to?	1	2
Q92. Were limited in the **kind** of work or other activities?	1	2

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)?

	YES	NO
Q93. Accomplished less than you would like?	1	2
Q94. Didn't do work or other activities as carefully as usual?	1	2

Q95. During the **past 4 weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?

(**CIRCLE** one number)

1 Not at all
2 A little bit
3 Moderately
4 Quite a bit
5 Extremely

Go on to the next page →

HEALTH

Please answer every question about your health by selecting the appropriate answer. If you are unsure about how to answer the question, please give the best answer you can.

These questions are about how you feel and how things have been with you during the **past 4 weeks**. For each question, please give the one answer that comes closest to the way you were feeling. How much of the time during the **past 4 weeks**...

Q96. Have you felt calm and peaceful?

1 All of the time
2 Most of the time
3 A good bit of the time (**CIRCLE** one number)
4 Some of the time
5 A little of the time
6 None of the time

Q97. Did you have a lot of energy?

1 All of the time
2 Most of the time
3 A good bit of the time (**CIRCLE** one number)
4 Some of the time
5 A little of the time
6 None of the time

Q98. Have you felt downhearted and blue?

1 All of the time
2 Most of the time
3 A good bit of the time (**CIRCLE** one number)
4 Some of the time
5 A little of the time
6 None of the time

Q99. During the **past 4 weeks**, how much of the time has your **physical health** or **emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)?

1 All of the time
2 Most of the time
3 A good bit of the time (**CIRCLE** one number)
4 Some of the time
5 A little of the time
6 None of the time

Go on to the next page ⟶

EFFECTS OF RADICAL PROSTATECTOMY

These items relate to the effect of the radical prostatectomy on your life. Please answer honestly about THE LAST YEAR OF YOUR LIFE.

	YES	NO
Q100. Other than your prostate cancer, have other events occured during this last year that have been especially upsetting or difficult for you??	1	2

Q101 On the line below, please rate how much these events have affected your life?

A GREAT DEAL

NOT AT ALL

Go on to the next page →

DEMOGRAPHICS

Please answer every question about your household by selecting the most appropriate answer. If you are unsure about how to answer the question, please give the best answer you can.

You were selected for this survey on the basis of your having had a radical prostatectomy (surgery to remove the prostate through an incision in the abdomen).
Q102. What was the date of your radical prostatectomy?

Month ______ Day ______ Year ______

Q103. In what year were you born? ________________

Q104. How do you describe yourself?

1 White or Caucasian
2 Black or African-American
3 Hispanic, Mexican, Cuban, or Puerto Rican
4 Asian or Pacific Islander
5 American Indian, Eskimo, or Aleutian
6 Other: Specify________________

(CIRCLE one number)

Q105. Which of the following best describes your current living arrangement?

1 Living with spouse or partner
2 Living with other family members
3 Living with non-family members
4 Living alone

(CIRCLE one number)

Q106. What is your current marital status?

1 Single (Never married)
2 Married
3 Separated
4 Widowed
5 Divorced
6 Partnered (Not Married)

(CIRCLE one number)

Q107. What is your approximate annual combined household income?

1 $20,000 or less
2 $20,001 - 30,000
3 $30,001 - 40,000
4 $40,001 - 50,000
5 $50,001 or more

(CIRCLE one number)

Go on to the next page ⟶

DEMOGRAPHICS

Please answer every question about your household by selecting the most appropriate answer. If you are unsure about how to answer the question, please give the best answer you can.

Q108. How many years of school have you completed (include Grade School and High School as well as College or Vocational-Technical School) ____________________

Q109. What is the highest educational degree you have earned?

1 GED
2 High School Diploma
3 Associate Arts Degree (A.D.)
4 Bachelors Degree (B.A. or B.S.)
5 Masters Degree (M.A. or M.S.)
6 Doctoral Degree
7 Vocational Degree
8 No Degree

(CIRCLE one number)

Q110. In what kind of industry do/did you work (retail sales, custodial service, manufacturing, ranch/farm, etc)? ____________________

Q111. What is you current employment status?

1 I work full-time for pay
2 I work part-time for pay
3 I work as a volunteer every week
4 I am unemployed due to age
5 I am unemployed due to disability
6 I am laid off
7 I have been fired
8 I have been unable to find suitable work because of where I live
9 I am retired

(CIRCLE one number)

Thank you very much for completing this questionnaire! The new information provided by you will tell us about the factors that contribute to the quality of life after radical prostatectomy. This important information may assist nurses, doctors, and other health care workers guide and counsel other patients facing this situation in their life.

LouAnn M. Rondorf-Klym, MSN, RN
Oregon Health Sciences University
School of Nursing, Mail Code: SN-ORD
3181 S.W. Sam Jackson Park Road
Portland, Oregon 97201-3098
Telephone: (503) 494-7840

Thank you!

APPENDIX H

Postcard Requesting Distribution of Study Results

Dear Sir:
The purpose of this stamped postcard is to notify your Tumor Registry that you wish to request a copy of the results of the study. If you would like a copy of the study results, please put your name, address, and check the box "copy of results requested", and mail the card. I estimate that study results will be available by June, 1998. ☐ Copy of Results Requested
Sincerely,
LouAnn M. Rondorf-Klym, MSN, RN
Doctoral Student, School of Nursing
Oregon Health Sciences University, Portland, OR

Name: ______________________________

Address: ______________________________

City, State, ZIP: ______________________________

APPENDIX I

Postcard Follow-up Sent One Week After Initial Mailing

Dear Sir:

Last week the Tumor Registry at the Center for Heath Outcomes in the Providence Health System mailed a questionnaire to you. If you have already completed and returned it to them, please accept my sincere thanks. If not, please do so today. Because the questionnaire has only been sent to a small sample, it is very important that your comments are included in the results. If by some chance you did not receive the questionnaire, do not be concerned. In one week another questionnaire will be mailed to you.

Sincerely,

LouAnn M. Rondorf-Klym, MSN, RN
Doctoral Student, School of Nursing
Oregon Health Sciences University, Portland, OR

APPENDIX J

Second Follow-up Letter

Three Weeks After Initial Mailing

OREGON HEALTH
SCIENCES UNIVERSITY
3181 S.W. Sam Jackson Park Road, SN-ORD, Portland, Oregon 97201-3098
(503) 494-3856, Fax (503) 494-4350

School of Nursing
Office of Research Development and Utilization

Dear Sir:

About three weeks ago the Tumor Registry at the Center for Heath Outcomes in the Providence Health System sent you a questionnaire. As of today, the Tumor Registry has not yet received your completed questionnaire. The purpose of this study is to examine physical, psychological, and social factors that affect the quality of life of men 12 to 24 months after radical prostatectomy treatment for prostate cancer.

I am conducting this research because I believe that health care workers need to better understand your daily life experiences following radical prostatectomy surgery. Although a great deal is known about how a radical prostatectomy affects your potency or urinary function, not as much information is known about how these issues affect your overall quality of life. The information from your completed Questionnaire may assist health care workers such as nurses and doctors in caring for future patients to better understand the effects of radical prostatectomy.

In the event that your Questionnaire has been misplaced, a replacement is enclosed. Thank you for your time and consideration. Your cooperation is greatly appreciated.

Sincerely,

[redacted]

LouAnn M. Rondorf-Klym, MSN, RN
Doctoral Student, School of Nursing
Oregon Health Sciences University, Portland, OR

Enclosure

APPENDIX K

Final Follow-up Letter

Seven Weeks After Initial Mailing

OREGON HEALTH
SCIENCES UNIVERSITY
3181 S.W. Sam Jackson Park Road, SN-ORD, Portland, Oregon 97201-3098
(503) 494-3856, Fax (503) 494-4350

School of Nursing
Office of Research Development and Utilization

Dear Sir:

I am writing to you about my study regarding the quality of life after radical prostatectomy. The Tumor Registry has not yet received your completed Questionnaire.

I have received a substantial number of Questionnaires from men. But because it has only been sent to a small sample, it is very important that your results are included in the results. I want to accurately describe how men feel about these important issues. It has been the past experience of researchers that those who do not respond to Questionnaires may hold quite different opinions than those who may respond.

The purpose of this study is to examine physical, psychological, and social factors that affect the quality of life of men 12 to 24 months after radical prostatectomy treatment for prostate cancer. The health care workers need to better understand your daily life experiences following the radical prostatectomy surgery. I hope that the information that you can provide to me may help health care workers such as nurses and doctors understand how the radical prostatectomy treatment may affect your overall quality of life.

In the event that your Questionnaire has been misplaced, a replacement is enclosed. The Tumor Registry will send you a copy of the study results; simply put your name, address, and check the box "copy of results requested" on the enclosed postcard.

Your contribution to the success of this study is appreciated. Thank you for your time and consideration.

Sincerely,

[redacted]

LouAnn M. Rondorf-Klym, MSN, RN
Doctoral Student, School of Nursing
Oregon Health Sciences University, Portland, OR

APPENDIX L

Letter of Thanks to Participants

OREGON HEALTH
SCIENCES UNIVERSITY
3181 S.W. Sam Jackson Park Road, SN-ORD, Portland, Oregon 97201-3098
(503) 494-3856, Fax (503) 494-4350

School of Nursing
Office of Research Development and Utilization

Dear Sir:

I have received your completed "The Quality of Life After Radical Prostatectomy" questionnaire. Thank you for the completion of the Questionnaire. I appreciate your efforts and the time that you took to complete the Questionnaire.

The information obtained from your completed Questionnaire may assist health care workers such as nurses and doctors to better understand the effects of the radical prostatectomy treatment. By participating in this study, you may have contributed information that will benefit other patients in the future. Again, thank you for your participation.

Sincerely,

[redacted]

LouAnn M. Rondorf-Klym, MSN, RN
Doctoral Student, School of Nursing
Oregon Health Sciences University, Portland, OR

APPENDIX M

Communications with Institutional Review Board

OREGON HEALTH
SCIENCES UNIVERSITY
3181 S.W. Sam Jackson Park Road, SN-ORD, Portland, Oregon 97201-3098
(503) 494-3856, Fax (503) 494-4350

School of Nursing
Office of Research Development and Utilization

May 1, 1997

Committee on Human Research
Oregon Health Sciences University
3181 S.W. Sam Jackson Park Road, L106
Portland, OR 97201-3098

Dear Committee on Human Research:

Enclosed is the proposal, Quality of Life after a Radical Prostatectomy, that I am submitting for review by the Committee on Human Subjects. The materials included are: (a) Proposed Project Questionnaire, (b) Initial Review Questionnaire, (c) Study Proposal, and (d) the introductory letter and the Participant Information Sheet.

I am requesting both an exempt review and a waiver of the requirement for written informed consent. The study is a non-interventional survey to assess the quality of life of men 12 to 24 months after a radical prostatectomy for prostate cancer to appraise the extent to which variables contribute to the patient's quality of life.

The study meets the requirements for an exempt review in 45 CFR 46.101 (b) #2. The study questionnaire will be distributed by the Tumor Registry. Names and addresses of the subjects will not be known by the researcher. Only grouped results will be reported.

The study also meets the requirements for waiver of written consent in 45 CFR paragraph 46.117, section (c) (2) in that it involves no more than minimal risk of harm to subjects and without waiver the research could not be practicably be carried out. Participants will receive a written description of the study purpose and procedure, including a statement that they are not required to participate.

Thank you for your consideration of this study. Please let me know if there is additional information you would like in order to facilitate a prompt review.

Sincerely,

[redacted]

LouAnn M. Rondorf-Klym, MSN, RN
OHSU SON Doctoral Nursing Student

Enclosures

OREGON
HEALTH SCIENCES UNIVERSITY
3181 S.W. Sam Jackson Park Road, Portland, OR 97201-3098
Mail Code L609, Telephone (503) 494-1617, Fax (503) 494-7086

Oregon Cancer Center

MEMORANDUM

DATE: May 16, 1997

TO: Leslie Bevan, PhD
Director,
Research Support Office, L106

FROM: Elizabeth E. Brown
Clinical Research Coordinator
Oregon Cancer Center, L609 [redacted]

RE: Oregon Cancer Center, Clinical Research Review Committee, Review of Protocols

---

The Clinical Research Review Committee (CRRC) received the following protocol for review on 5/7/97. The CRRC subsequently reviewed and approved this protocol with the enclosed inclusion of women and minorities amendment on 5/16/97. This protocol has been forwarded to the OHSU IRB. If you have questions or concerns, please contact me, 494-6349. Thank you.

Hor-97056-L: Quality of Life After Radical Prostatectomy

Thank you.

cc: LouAnn M. Rondarof-Klym, MSN, RN
Joyce Colling, RN PhD
Lisa Nguyen

OREGON HEALTH SCIENCES UNIVERSITY
Research Support Office (RSO), L106 (503) 494-7887

MEMO

Date: May 30, 1997
To: *LouAnn Rondorf-Klym, MSN, SN-ORD,* c/o Joyce Colling
From: Robert D. K[redacted]itutional Review Board, L106
Subject: ***4499 EX***
The Quality Prostatectomy

Special Communication

☐ The RSO has not received a response to the request made on ___________ for revisions of the above protocol/consent form. These were due in the RSO on __________.

☐ The attached advertisement has been approved as presented. Any changes to this advertisement must be submitted to the RSO for IRB approval.

☐ The IRB reviewed the attached advertisement on ________ . The following changes will need to be made before approval is given. [1]

☐ The above study involves only discarded tissues/samples that do not include *identifiable private data/information obtained in a form associable with an individual.* Therefore, the study does not require IRB review.

☐ The above study meets the criteria for waiver of consent.

☒ This study is exempt based on criteria **category # 2** with a **waiver of documented consent.**

[1] see appended copy for suggested editing