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Abstract

More than 10 million cancer survivors are now living in the United States. Using the QOL-CS, a measure of quality of life of cancer survivors, the current study considered quality of life differences in 115 cancer survivors based upon three cancer types (breast, prostate, and colon cancers) and number of types of cancer treatments received. It was hypothesized that differences in HRQOL would be found between the cancer type and number of treatment types received. Results were mixed. MANOVA analysis revealed statistically significant differences based upon cancer type. Breast cancer survivors had significantly higher scores than prostate cancer survivors on social well-being, and prostate cancer survivors demonstrated significantly higher scores on psychological well-being than breast cancer survivors. No differences in HRQOL were found between the two groups based upon the number of treatment types received. Limitations of the study are reviewed and implications for future research and counseling are considered.

*Keywords*: cancer, health-related quality of life, psychosocial oncology
Chapter I

Introduction

Cancer is the second leading cause of death in the United States, accounting for one in four deaths each year (American Cancer Society, 2008; National Center for Health Statistics, 2009). Advances in both early detection and treatment have significantly improved the 5-year survival rate for many different types of cancer over the past few decades (American Cancer Society, 2008). Currently, there are more than 10 million individuals in the United States who have completed treatment or are currently living with cancer (National Cancer Institute, 2009). Approximately 14% of these individuals are survivors who were diagnosed more than 20 years ago (National Cancer Institute, 2009). The term “cancer survivor” refers to any individual who has received a diagnosis of cancer and is still living, no matter when the diagnosis was given, if the individual has active disease, or if the individual is currently undergoing treatment (Morgan, 2009). The Institute of Medicine recognizes survivorship “from the time of diagnosis through the balance of his or her life” (Institute of Medicine, 2005, p. 2). A long-term cancer survivor is an individual living at least five years beyond diagnosis of their disease, regardless of their current disease-status (Deimling, Bowman, Sterns, Wagner, & Kahana, 2006; Zebrack, Yi, Peterson, & Ganz, 2008). Thus, long-term cancer survivors may be undergoing active treatment, have active disease, or be disease-free. As noted by
Deimling, Bowman, and Wagner (2007), survivors of five or more years are likely to identify themselves “as cancer survivors and/or as ex-patients rather than as victims or patients” (p. 764). However, even when the immediate danger of active cancer growth has passed, survivors must cope with a number of potential chronic and/or late effects (American Cancer Society, 2009; Bloom, Petersen, & Kang, 2007; Phipps, Braitman, Stites, & Leighton, 2008) and negative life circumstances (Foley, et al., 2006; National Cancer Institute, 2009).

Having survived the immediate threat of active cancer, survivors may later find themselves faced with additional post-cancer life stressors (Bloom, et al., 2007; Foley, et al., 2006; National Cancer Institute, 2009; Phipps, et al., 2008). For instance, survivors may face employment and insurance discrimination (Henderson, 1997), difficulties in relationships (Henderson, 1997), financial difficulties (Golden-Kreutz & Andersen, 2004), and a number of negative psychosocial outcomes, such as depression (Bloom, et al., 2007), anxiety (Deimling, et al., 2006), and fear of recurrence (Deimling, et al., 2006; Henderson, 1997).

A number of negative physical ailments may also develop as a result of cancer diagnosis and treatment even months and years post-treatment (Bloom, et al., 2007; Foley, et al., 2006; Henderson, 1997; National Cancer Institute, 2009). Among these possible treatment-related late effects and long-term side effects are second malignancies, sleep disturbances, infertility, cardiorespiratory problems, sexual impairment, chronic fatigue, lymphedema, gastrointestinal difficulties, premature menopause, chronic pain, skeletal problems, numbness, and neurocognitive problems (Bloom, et al.; Foley, et al.,
Thus, it is important to consider how a cancer diagnosis may affect quality of life (QOL) both in the short-term and long-term.

Background

The concept of “quality of life” (QOL) has gained considerable attention in the past seven decades, beginning with a concentration on urban life (Thorndike, 1939). This term includes a wide variety of definitions, ranging from the social-political, economic, and environmental to the social and health sciences (Kaplan & Bush, 1982; Schrim, 2008). Whether addressing global QOL or health-related QOL, its measurement can be either subjective or objective (Schirm, 2008; Wan, Counte, & Cella, 1997). In 1993, the World Health Organization defined quality of life as “individuals’ perceptions of their position in life in the context of the culture and value system in which they live and in relation to their goals, standards, and concerns” (as cited in Baune & Aljeesh, 2006, para. 1) with six domains: physical, social, independence, psychological, environmental, and spiritual well-being. Numerous other definitions exist and are used in a variety of environmental contexts.

Quality of life has been defined as “a sense of personal satisfaction with life that is more than just pleasure or happiness and yet something less than meaning or fulfillment” (Coulter, 1990, p. 61). More specifically, health-related quality of life refers to one’s expectations of health, one’s ability to fulfill expected roles, mental well-being, and social well-being as it relates to physical health (Padilla, 2003). Ferrell, Hassey-Dow, and Grant (1995) suggested a theoretical quality of life framework for long-term cancer survivors consisting of physical, social, psychological, and spiritual well-being, while Cella, et al. (1993) suggested a theoretical framework which concentrated upon physical,
psychological, emotional, and social well-being. Health-related quality of life (HRQOL) was described by Fayers and Machin (2007) as a “loose definition” (p. 4). They suggested that the term can refer to “general health, physical functioning, physical symptoms and toxicity, emotional functioning, cognitive functioning, role functioning, social well-being and functioning, sexual functioning, and existential issues” (Fayers & Machin, 2007, p. 4).

Theoretical Framework

Betty Ferrell (1993) formulated a holistic quality of life model for breast cancer patients, involving four distinct domains: psychological, physical, social, and spiritual. Each domain included areas which were likely to be affected by the diagnosis and treatment of breast cancer (Ferrell, 1993). For instance, the model suggested that psychological well-being might be affected through body image issues, distress, completion of treatment, depression, anxiety, normalcy, and fear of recurrence (Ferrell, 1993). Within the Ferrell (1993) model, post-diagnosis physical well-being included limited mobility, symptoms of advanced disease, the side effects due to combining different therapies, and symptoms associated with having had surgery. The Ferrell (1993) model suggested that social domains might be affected by feelings of isolation, changes in roles, sexuality, changes in relationships, financial issues, issues with employment and insurance, and issues related to family life functioning. Within the model, the spiritual domain was described as the meaning associated with the illness, increased/highlighted awareness of death and mortality, and degree of religious faith (Ferrell, 1993). After a year of pilot testing and literature reviews, this model then became the basis for the later development of the QOL-CS measurement which is used in the current study. While
cancer certainly influences HRQOL in cancer patients, the effect of cancer treatment upon HRQOL should also be an important consideration (Cella, Hahn, & Dineen, 2002). Thus, the effect of the number of cancer treatments the cancer survivors received should also be considered.

_Cancer and Counseling Psychology_

In discussing the changes that occur following a cancer diagnosis, it is also necessary to discuss how individuals might cope with receiving the diagnosis and the long-term changes associated with the diagnosis; this may include receiving counseling (Strada & Sourkes, 2010). The Society of Counseling Psychology (2010) defines counseling psychology as:

- a psychological specialty facilitates personal and interpersonal functioning across the life span with a focus on emotional, social, vocational, educational, health-related, developmental, and organizational concerns. Through the integration of theory, research, and practice, and with a sensitivity to multicultural issues, this specialty encompasses a broad range of practices that help people improve their well-being, alleviate distress and maladjustment, resolve crises, and increase their ability to live more highly functioning lives. Counseling psychology is unique in its attention both to normal developmental issues and to problems associated with physical, emotional, and mental disorders.

In addition, within the American Psychological Association Division 17 of Counseling Psychology, a section of Counseling Health Psychology exists. According to their website this group (2010):
is dedicated to the science and practice of counseling psychology in health related contexts either through research with medical, rehabilitation, or related populations, direct service to individuals across their lifespan (e.g., prevention, adjustment to and recuperation from illness, healthy lifestyle changes, psychological concomitants of medical illnesses), teaching and training of graduate students or the education of other health care professionals, or involvement with health policy.

Counselors work in a variety of health-care related settings, including “general hospitals, psychiatric facilities, Veterans’ Administration facilities, rehabilitation centers, and substance abuse treatment programs” (Browers, 2005, p. 371). Within the hospital setting, counselors “focus on crisis work, preventative counseling, remediation, or supportive counseling with patients” (Browers, 2005, p. 371). Counselors in these settings may work on behavior change, change in mental schemas, and emotions linked to medical conditions (Browers, 2005). Thus, the link between the value of counseling for those coping with and adjusting to illness (including cancer) has been recognized (Strada & Sourkes, 2010). For instance, Strada and Sourkes (2010) have suggested that psychological intervention for oncology patients is a continuum of care which includes psychoeducation, counseling, and psychotherapy. Cancer patients and caregivers have received increased clinical and research psychological attention over the last several years (Carver, et al., 2006; Feuerstein, 2007; Gotay & Muraoka, 1998).

Statement of Problem

As the number of cancer survivors continues to rise, the HRQOL of long-term survivors has gained increased research (Carver, et al., 2006; Feuerstein, 2007; Gotay &
Muraoka, 1998) and clinical attention (Institute of Medicine, 2006; Institute of Medicine, 2008; Strada & Sourkes, 2010). However, much is still unknown about cancer’s effect on the HRQOL of long-term survivorship. Small sample sizes and limited cancer types in previous research studies may impact the generalizability of the research findings (Bansal, et al., 2004; Costanzo, Lutgendorf, Rothrock, & Anderson, 2006; Dacal, Sereika, & Greenspan, 2006; Foley, et al., 2006; Friedman, et al., 2006; Hurria, et al., 2006; Luoma & Hakamies-Blomqvist, 2004; McCaul, et al., 1999; Phipps, et al., 2008; Rietman, et al., 2004; van de Wiel, Geerts, & Hoekstra-Weebers, 2008). Recognizing the growing interest in long-term cancer survivorship, the current study fills a gap in the research literature by examining the HRQOL of long-term adult cancer survivors of four diverse cancer types and the effect of number of treatment types.

**Purpose**

The current study adds to the growing body of research in long-term cancer adult survivorship as the four cancer diagnoses, their associated differences in treatment, and potential differences in HRQOL have not been compared in previous studies using the QOL-CS measure. Furthermore, as prior study has suggested, breast cancer survivors may have higher psychological well-being scores than other cancer types (Brintzenhofe-Szoc, Levin, Li, Kissane, & Zabora, 2009). Perhaps due to awareness of low survival rates, patients diagnosed with either colorectal or lung cancer may be more likely to have lower psychological HRQOL than breast or prostate cancer patients. In addition, it may be that the surgeries such as a lung removal or colorectal resection as part of treatment for lung and colorectal cancer may negatively impact physical HRQOL in these patients as opposed to the surgeries commonly used as part of treatment for breast or prostate cancer.
In addition, the associated treatments with a colorectal or lung cancer diagnosis may impact social well-being through changes in sexuality and increased isolation (Bloom, et al., 2007; Phipps, et al., 2008). Stage at cancer diagnosis may also influence HRQOL, with higher stage related to lower HRQOL (Rosenfeld, Roth, Gandhi, & Penson, 2004; Steginga, Lynch, Hawkes, Dunn & Aitken, 2009; Vacek, et al., 2003). The current study considers that the number of treatment types may also negatively influence HRQOL (Greimel, Winter, Kapp, & Haas, 2009; Joseph, 2006). The idea behind this hypothesis involved anticipation that if one or two treatment types were unsuccessful then three or four would be needed, and these additional treatments may lead to lowered quality of life. For instance, prostate cancer survivors have reported that sexual dysfunction is more common with surgery (one type of treatment) as treatment protocol rather than watchful waiting (no treatment) (Joseph, 2006). Thus, in the current study, cancer diagnosis and number of treatments are acknowledged as having the potential for lowering HRQOL in the four different cancer types considered. The current study evaluates HRQOL factors as related to cancer type and number of treatments.

**Hypotheses**

The present study hypothesizes that:

- There will be differences in HRQOL, as measured by the QOL-CS, between long-term survivors of colorectal, lung, breast, and prostate cancer.

- There will be differences in HRQOL, as measured by the QOL-CS, associated with the number of treatments undergone by adult-onset, long
term cancer survivors (0-4 treatments: surgery, chemotherapy, radiation, and/or hormone therapy).

Definition of Terms

Cancer

A malignant growth or tumor caused by uncontrollable or abnormal cell division (American Cancer Society, 2008; National Cancer Institute, 2009).

Health-related quality of life

Health-related quality of life refers to one’s expectations of health, one’s ability to fulfill expected roles, mental well-being, and social well-being as it relates to one’s physical health (Padilla, 2003). For the purposes of this study, quality of life is a multi-dimensional construct measured by QOL-CS subscale measures (Cella, et al., 2002; Ferrell, et. al, 1995; Padilla, 2003; Schirm, 2008; Wan, et al., 1997).

Late effects

Late effects are side effects from cancer diagnosis or cancer treatment that develop months or years after the completion of treatment (Bloom, et al., 2007; Foley, et al., 2006; Henderson, 1997; National Cancer Institute, 2009).

Long-term cancer survivors

For the purpose of this study, a long-term cancer survivor is defined as an individual who was diagnosed with malignant disease at least five years prior to the beginning of this study (Deimling, et al., 2006; Zebrack, et al., 2008). For the purpose of this study, long-term survivorship will be measured by a self-report question on the demographic questionnaire that asks the question: “when were you first diagnosed with cancer?”
Long-term side effects

Long-term side effects include side effects that develop during cancer treatment and continue after treatment has ended (Denlinger & Barsevick, 2009).

Metastasis

Metastasis refers to the spread of cancer from one body part to another (American Cancer Society, 2008; National Cancer Institute, 2009).

Recurrence

A recurrence involves a reappearance of cancer cells in the same site or in another location of the body after a period of disease remission (American Cancer Society, 2008; National Cancer Institute, 2009).

Limitations

One limitation of the current study is that it includes utilization of a data set which is based upon self-report rather than review of medical records. For instance, many of the participants could not recall or reported that they were not informed of their disease stage. Accuracy for the information provided via self-report was not verified. A lack of ethnic diversity in the participant population is yet another limitation. A further limitation is that the study population was focused on a single site (Ball Memorial Hospital) in a small-town in the Midwestern United States (Muncie, Indiana) which restricts generalizability.

Assumptions

A number of assumptions are involved in the current study. First of all, it is assumed that the work conducted by Ferrell (1993) and Ferrell, Hassey-Dow, and Grant (1995) in the development of the theoretical framework involved is applicable to the
current study. Secondly, it is assumed that the participants involved in the prior study (Jenkins, 2010) responded truthfully to the questions measured in the surveys. Finally, it is assumed that the QOL-CS survey is appropriate for use with the study population as the measure was developed with a large population of long-term, mixed (various types of cancer) cancer survivors.

Summary

Even years after diagnosis, long-term cancer survivors may continue to endure the effects of their cancer diagnosis and the treatments they received in order to battle their disease. Long-term survivors may experience long-term side effects and/or late effects related to their diagnosis and treatment. Thus, a cancer history may continue to affect an individual’s HRQOL in the following areas: physical, psychological, social and spiritual well-being. Although the individuals studied all have the common experience of having had a cancer diagnosis, long-term survivors of breast, prostate, colon, and lung cancer may have diverse experiences related to the types and number of treatments faced during their cancer journey. These differences may influence HRQOL in a variety of areas of well-being. The current study considers the relationships between cancer type, number of treatments, and HRQOL through utilization of the QOL-CS overall and subscale measurements. The results of the current study may assist oncologists, nurses, psycho-oncologists, social workers, and others in their work with long-term cancer survivors.
Chapter II

Literature Review

Introduction

The purpose of the current study is to investigate the relationships between cancer type, number of treatments, and health-related quality of life in long-term prostate, breast, colon, and lung cancer survivors treated at Ball Memorial Hospital in Muncie, Indiana. An extensive literature review was performed to investigate the findings of past research. Topics researched include health-related quality of life, cancer type, treatment effects, late effects, long-term side effects, age, stage, time since diagnosis, long-term survivorship, social support, benefit-finding, and various cancer-related variables.

Health-related Quality of Life

Health-related quality of life is a multi-dimensional construct defined as “a subjective assessment of physical, functional, emotional, and social well-being relative to one’s current and future expectations” (Wan, et al., 1999, p. 308). In a study comparing long-term breast cancer survivors with age-matched healthy controls on HRQOL measures of physical, social, spiritual, and emotional well-being, Helgeson and Tomich (2005) found that there were no differences between the two groups on several of the HRQOL indicators of the SF-36 measure. However, the survivor group members were more likely to report “more difficulties with physical functioning, more physical symptoms, and more faith than did controls” (Helgeson & Tomich, 2005, p. 307). The
long-term breast cancer survivors in the study had been diagnosed with Stage I, II, or III disease between 1993 and 1996, while the female controls were part of an age-matched neighborhood control group (Helgeson & Tomich, 2005). Some of the participants of the study had received educational and social support intervention in an earlier research study soon after the participants had been diagnosed (Helgeson & Tomich, 2005). It was found that the individuals who had received the education intervention in the earlier study fared better on physical functioning than those who did not (Helgeson & Tomich, 2005). In the Helgeson and Tomich (2005) study, the researchers also considered differences between breast cancer survivors who had remained disease-free and those who had had a recurrence. The researchers found that having had a recurrence negatively affected HRQOL, especially with regards to physical well-being (Helgeson & Tomich, 2005). The health-related quality of life of long-term cancer survivors may be impacted by type of cancer, as well as stage of cancer, time since diagnosis, comorbidity, treatment type, and the toxicity of treatment (Cimprich, Ronis, & Martinez-Ramos, 2002; Deimling, et al., 2006; Vacek, et al., 2003; Zebrack, et al., 2008). These changes in HRQOL can be far-reaching and quite different, dependent upon a number of variables. Due to consideration of these findings, the current study concerns quality of life differences based upon type of cancer and the number of associated cancer treatments.

Late Effects and Long-term Side Effects

Health-related quality of life may be influenced by both cancer type and the associated treatment even years after diagnosis through late effects and long-term side effects (Bloom, et al., 2007; Phipps, et al., 2008). For example, Phipps, et al. (2008) found that long-term survivors of colon cancer, who underwent colorectal surgery and
were disease-free for at least five years, still reported remaining bowel problems, low energy, and low sexual function despite their disease status. Pain, numbness, swelling, and stiffness of the arm have frequently been reported by women following treatment for breast cancer (Bloom, et al., 2007). In addition, long-term survivors of prostate cancer frequently must cope with urinary, sexual, and bowel dysfunction (Bloom, et al., 2007). Treatment-related late effects may arise months or years after treatment has been completed (Bloom, et al., 2007). These late effects may also differ from the side effects of treatment experienced closer to an individual’s diagnosis and throughout the individual’s active treatment (Bloom, et al., 2007). Thus, the cancer treatments (such as chemotherapy, radiation, surgery, hormone therapy, and bone marrow transplant) that have extended the lives of cancer patients may later negatively affect the HRQOL of cancer survivors through late effects and long-term side effects.

**HRQOL and Cancer-related Variables**

The relationship between treatment type and HRQOL has been studied extensively (Bloom, et al., 2007; Carver, et al., 2006; Deimling, et al., 2006; Greimel, Winter, Kapp, & Haas, 2009; Joseph, 2006; Norum and Wist, 1996; Rusiewicz, 2008). In their literature review of 53 publications, Bloom, et al. (2007) found that type of treatment impacted quality of life in long-term cancer survivors regardless of the cancer type. However, these researchers also found that breast cancer survivors reported improving HRQOL with increased time since diagnosis, whereas prostate cancer survivors reported decreased HRQOL over time (Bloom, et al., 2007). Through their study of 236 survivors of hematopoietic stem cell transplant (HSCT), Rusiewicz, et al. (2008) suggested that the high rates of distress reported by survivors may be linked to the...
difficulty of undergoing the intensive HSCT treatment. In the Rusiewicz, et al. (2008) study, the length of time since transplant ranged from 0.6 years to 11.5 years with an average of 3.4 years since transplant. These researchers found no distress differences between cancer type and thus, a link between distress and the adverse effects of HSCT treatment was suggested (Rusiewicz, et al., 2008). In addition, as found in a sample of 163 long-term breast cancer survivors, fears of disease recurrence have been associated with having undergone chemotherapy as part of an individual’s treatment regimen as opposed to another form of treatment (Carver, et al., 2006). In their study of 321 older adult long-term survivors of prostate, breast, or colorectal cancer, Deimling, et al. (2006) found that participants who suffered from treatment-related symptoms were more likely to report continued worries about a cancer recurrence or having a second cancer. Sexual dysfunction, a possible side effect of prostate cancer, has been found to be more problematic with individuals who have undergone surgery rather than the watchful waiting method (Joseph, 2006). In their study of 42 Hodgkin’s disease patients, Norum and Wist (1996) found the survivors to generally have high levels of functioning and infrequent difficulty with symptoms. However, these researchers found that patients who had undergone mantle field irradiation had lowered HRQOL which was related to development of shortness of breath (Norum & Wist, 1996). These researchers utilized the EORTC QLQ-C30, a 30-item survey which considers social, role, cognitive, physical, emotional, and total HRQOL, to develop the link between treatment, the associated symptom of shortness of breath, and HRQOL (Norum & Wist, 1996). Similarly, cervical cancer survivors treated with radiation and surgery had lower HRQOL compared to survivors who had been treated with either surgery alone or surgery and chemotherapy.
(Greimel et al., 2009). One hundred twenty-three survivors of mixed stages and types of cervical cancer who had been diagnosed between 3 and 14 years prior were evaluated using the EORTC QLQ-C30 (Greimel et al, 2009). Thus, treatment type has the potential to influence health-related quality of life.

Cancer type and time since diagnosis have also been studied to better understand potential relationships with HRQOL (Carver, et al., 2006; Cimprich, et al., 2002; Hannah, et al., 1992; Sarna, et al., 2004). In their study of testicular cancer and Hodgkin’s disease survivors and their spouses, Hannah, et al. (1992) found that both groups of survivors reported that cancer had had a negative impact on sexual frequency and body image. This study included 34 couples coping with testicular cancer and 24 couples coping with Hodgkin’s disease and considered changes in sexual functioning and marital relationship functioning between the two groups (Hannah, et al., 1992). Significant numbers of long-term non-small cell lung cancer survivors have been found to have continuing respiratory issues, including dyspnea (shortness of breath), cough, wheezing, and phlegm following treatment (Sarna, et al., 2004). Using the QOL-CS questionnaire, Cimprich, et al. (2002) demonstrated variations in reported HRQOL based on length of time since diagnosis in a sample of 105 long-term survivors, with those further from diagnosis expressing better social and psychological health and higher overall HRQOL scores. Thus, the impact of cancer diagnosis and treatment, as well as a number of other areas, on the factors of physical, psychological, emotional, spiritual, and social well-being should be an important concern for oncologists, psychologists, family members, social workers, and nurses in their continued interaction with cancer survivors in order to improve the quality of life of these individuals.
Age has also been considered as a factor in HRQOL (Carver, et al., 2006; Cimprich, et al., 2002; Friedman, et al., 2006). Cimprich, et al., (2002) found age at diagnosis to be linked to HRQOL. Specifically, these researchers discovered that those individuals who were older at diagnosis demonstrated higher scores in social well-being than younger survivors (Cimprich, et al., 2002). In addition, these researchers related findings that middle-aged survivors scored higher than older survivors in physical functioning (Cimprich, et al., 2002). In their study of long-term, early-stage breast cancer survivors, Carver, et al. (2006) found that age at diagnosis was predictive of HRQOL on several factors. For instance, these researchers discovered that women who were younger were more likely to have higher levels of concern over their appearance, financial troubles, and pain than women who were older (Carver, et al., 2006). Similarly, Friedman, et al. (2006) found age to be linked with emotional well-being; that is, younger women had lower emotional well-being than older women. Therefore, the impact of age on HRQOL has been consistently demonstrated through various research studies.

Stage at diagnosis, type of treatment, and treatment-related effects may also impact HRQOL (Carver, Smith, Petronis, & Antoni, 2006; Fairclough, Fetting, Cella, Wonson, & Moinpour, 1999; Rosenfeld, Roth, Gandhi, & Penson, 2004; Steginga, et al., 2009; Vacek, et al., 2003). In their research with young breast cancer survivors, Vacek, et al. (2003) found that late-stage disease and more aggressive treatments (e.g., chemotherapy) negatively impacted HRQOL of the younger women, in comparison to older women who were less likely to have advanced disease or to have received chemotherapy. This same study demonstrated that HRQOL in cancer survivors is negatively impacted by comorbid physical ailments, such as cardiovascular disease and
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arthritis (Vacek, et al., 2003). Considering the toxicity of two different breast cancer
treatment regimens, Fairclough, et al. (1999) found the more toxic of the regimens to
lower quality of life of 163 recently-diagnosed survivors. Looking at a variety of
characteristics to predict health-related outcomes in long-term breast cancer patients,
Carver, Smith, Petronis, and Antoni (2006) found body image concerns and financial
hardship to be associated with both having had chemotherapy and having more advanced
stage disease. In their work with 341 prostate cancer survivors, Rosenfeld, et al. (2004)
found higher stage cancer to be linked with lower quality of life, especially in the
physical well-being domain of measurement. This factor remained statistically significant
after the researchers controlled for a number of other factors including age and co-morbid
illness (Rosenfeld, et al., 2004). Steginga, et al. (2009) revealed similar findings in
colorectal patients; higher stage cancer was correlated with lower levels of physical and
functional adjustment. These researchers studied a sample of 1,822 colorectal patients
who were assessed at 6 months and 24 months after diagnosis and thus did not study
long-term cancer survivors (Steginga, et al, 2009). However, Phipps, et al. (2008) have
found that bowel issues may continue in long-term survivors of colon cancer. Therefore,
several studies suggest the importance in considering the influence of not only a history
of cancer in general, but also cancer type, stage, treatment type, and a number of
treatment-related factors on a variety of HRQOL domains of long-term survivors.

Social Support

In addition, social support has also been well-studied with regard to quality of life
(Carver, et al., 2005; Carver, et al., 2006; Devine, Parker, Fouladi, and Cohen, 2003;
Friedman, et al., 2006; Gustavsson-Lilius, Julkunen, & Hietanen, 2007; Lewis, et al.,
Studies have revealed contradictory findings with regard to the correlation between social support levels and quality of life. In their study of social support and intrusive thoughts in cancer patients, Devine, et al., (2003) found that more social support, less avoidance, and fewer intrusive thoughts predicted better adjustment when measured one month after completing an experimental vaccination treatment. These researchers utilized a sample of 24 metastatic melanoma and 29 metastatic renal cell cancer patients enrolled in a clinical trial, staged at either Stage III or Stage IV, and who had previously undergone surgery as part of their treatment (Devine, et al., 2003). Similarly, Lewis, et al. (2001) found that women who perceived themselves as having a low level of social support and who reported high levels of intrusive thoughts were likely to have lower levels of mental well-being, while those individuals with higher perceived social support had higher levels of mental well-being. The 64 participants in the Lewis, et al. (2001) study were on average 6.7 years post-diagnosis (with a range from one to fifteen years) and their HRQOL was assessed through three measures: Impact of Events Survey (IES), Interpersonal Support Evaluation List (ISEL), and Medical Outcomes Study-Short Form (MOS-SF). Studying Australian colorectal cancer patients, Steginga, et al. (2009) found that issues with fecal control and having less social support was correlated with lower social well-being levels on the FACT-Colorectal measure. Considering quality of life in breast cancer patients who had had a mastectomy, Meyerowitz (1983) unexpectedly found that patients who received moderate social support levels demonstrated less distress than individuals with either low or high levels of social support. In their research of long-term cervical cancer survivors, Clemmens, Knafl,
Lev, and McCorkle (2008) found that study participants “spoke of either family or friends providing the social support that helped them to cope and get through the difficult times” (p. 900). However, in their study of cancer patients in the Netherlands, Ranchor, Sanderman, Steptoe, Wardle, Miedema, and Ormel (2002) reported that individuals with higher levels of pre-morbid social support was in fact linked to higher levels of cancer-related distress and adjustment one year post diagnosis. Conversely, Evans, Thompson, Browne, Barr, and Barton (1993) found that social support and psychological well-being were not linked in patients diagnosed with leukemia in remission. Thus, the effects of level of social support on quality of life remain unclear as a variety of research has resulted in conflicting findings. Such is the case for another aspect of an individual’s social system: marital status.

Marital status has frequently been considered as related to social support and HRQOL (Carver, et al., 2005; Carver, et al., 2006). Marital status has been linked to lower levels of depression, social disruption, and mood disturbance in long-term breast cancer survivors (Carver, et al. 2005). Carver, et al. (2005) studied 163 early-stage breast cancer patients who were between five and thirteen years post surgical treatment while considering how optimistic personality traits predict long-term psychosocial adjustment. Continuing their study of long-term breast cancer survivors, Carver, et al. (2006) found that “being partnered predicted lower emotional disruption, social avoidance, fatigue, and distress both about recurrence and about the family’s future at follow-up” (p. 753). This study considered information from 163 long-term cancer survivors who had been diagnosed at Stage 0, I, or II and the predictive value of various demographic, health, and psychosocial variables (Carver, et al., 2006). In a study of short-term cancer patients in
Finland who had been diagnosed eight months prior to the study, low levels of hopelessness and high levels of optimism were linked with both higher levels of partner support and higher HRQOL measurements in women (Gustavsson-Lilius, et al., 2007). In this study, only lower levels of hopelessness and higher HRQOL were linked in men (Gustavsson-Lilius, et al., 2007). The Gustavsson-Lilius, et al. (2007) study included 155 dyads of which one partner was eight months post-diagnosis. In a population of 351 patients of mixed cancer type, Parker, et al. (2003) found that cancer survivors who were married or living with their partners reported fewer depressive symptoms than non-married survivors. However, other researchers have had different findings. For instance, Friedman, et al. (2006) considered trait optimism, social support, and HRQOL in 81 recently-diagnosed women with active breast cancer or in treatment and found no relationship between marital status and psychological well-being. Therefore, while the findings on marital status and its relationship to HRQOL have been varied, this is indeed an area which has been extensively studied. As with general social support, marital status and its relationship to HRQOL has been extensively studied and has led to many contradictory results.

Effects on HRQOL

Research on the emotional and psychological effects of cancer has demonstrated both positive and negative effects on long-term survivors. In their research with long-term survivors of mixed cancers, Foley and colleagues (2006) found that many cancer survivors consider their cancer to have had either little or no impact, or a positive impact, on their lives. However, those individuals who reported continuing pain, lower levels of social support, and/or had sustained physical deformities as a result of their cancer had
lower HRQOL and feelings of resentment towards their cancer diagnosis and experience as opposed to individuals who did not report such lasting effects (Foley, et al., 2006). Similarly, in a breast cancer survivor study, lower quality of life was reported in cancer survivors who perceived the experience to have continued harmful effects (Tomich & Helgeson, 2002). In their study of older adult long-term survivors, Deimling, et al. (2006) found links between continued concern over cancer recurrence or new cancer to depression and anxiety in older adults. Comparing breast cancer survivors and healthy controls, Tomich and Helgeson (2002) found that breast cancer survivors were more likely to describe the world as “less controllable” and “more random,” although the two groups showed no differences when considering the perceived amount of control over their daily lives (p. 154). When comparing survivors of numerous cancer types on anxiety and depressive symptoms, Brintzenhofe-Szoc and colleagues (2009) found higher rates of depressive and anxiety symptoms in head and neck, stomach, pancreatic, and lung cancer patients, with lower rates in breast cancer patients, demonstrating that cancer type may influence the experience of anxiety and depression related to cancer. Through a qualitative study of 19 long-term cervical cancer survivors, Clemmens, Knafl, Lev, and McCorkle (2008) identified three patterns related to their survivorship: moving on, ongoing struggles, and a renewed appreciation for life. In this study, the researchers also found that “two-thirds of women…reported good QOL despite worries or complications for cervical cancer” (Clemmens, Knafl, Lev, & McCorkle, 2008, p. 901). Carver and colleagues (2005) found that the results of measured optimism and psychological well-being found soon after surgery were predictive of later results of the same measures 5 to 13 years later. In their research of long-term breast cancer survivors, Bower, et al. (2005)
found that feelings of vulnerability associated with a cancer diagnosis were linked to difficulties with adjustment and negative affect. However, this study also found positive meaning attribution, shifts in priorities, and outlook to occur alongside these feelings of vulnerability (Bower, et al., 2005). Thus, results have been mixed in how the cancer experience has been felt based on a number of factors. Additional studies are needed to tease out the link between cancer type, stage, age, ethnicity, socioeconomic status, education, social support, marital status, number of treatments, and types of treatments, among other factors. Several studies in the last few years have focused upon aspects of cancer-related benefit-finding.

**Benefit-finding**

Recently, the concept of benefit-finding within and beyond a diagnosis of cancer has become a subject of interest (Carver & Antoni, 2004; Carver, Smith, Petronis, & Antoni, 2006; Tomich & Helgeson, 2002). Benefit-finding refers to an individual’s ability to find a positive life change due to a cancer diagnosis (Carver & Antoni, 2004; Carver, et al., 2006; Tomich & Helgeson, 2002). Benefit-finding has been linked to less distress, lower depression, and higher levels of positive emotion in long-term breast cancer survivors (Carver & Antoni, 2004). A curvilinear association between psychosocial adjustment and benefit-finding was found in long-term breast cancer survivors in that individuals of groups with either high or low levels of benefit-finding had higher levels of psychosocial functioning than did groups with intermediate benefit-finding levels (Lechner, Carver, Antoni, Weaver & Phillips, 2006). Considering social support to be a possible factor in benefit-finding, Kinsinger, et al. (2006) found that that increased levels of perceived social support were linked to higher levels of benefit.
finding in prostate cancer survivors. In their study of long-term breast cancer survivors, Carver, et al. (2006) found an inverse relationship between benefit-finding and level of education. In their cross-sectional study of the health-related quality of life of long-term breast cancer survivors, Tomich and Helgeson (2002) found that there was relatively little difference in the quality of life of breast cancer survivors and healthy controls; however, when asked about major life stressors, the survivors reported higher levels of benefit-finding than did the healthy women. Considering a potential link between social well-being variables and benefit-finding in breast cancer survivors, Weiss (2004) found that the quality of spousal support was correlated with benefit-finding or posttraumatic growth (PTG). Thus, despite the potential for tremendous negative effects from cancer and the associated treatments, many cancer survivors are able to find benefit from their experience.

_Psychosocial Support and Counseling_

Due to the potentially long-lasting effects and life-threatening nature of a cancer diagnosis, cancer survivors may demonstrate a variety of psychological responses to the changes experienced which may include distress, depression, and anxiety (Mitchell, 2010; Strada & Sourkes, 2010). Disturbances may occur due to changes in a variety of physical, psychological, social, and spiritual realms (Bloom, et al., 2007; Deimling, et al., 2006; Hannah, et al., 1992; Helgeson & Tomich, 2005; Phipps, et al., 2008; Rusiewicz, et al., 2008; Sperry, 2010). Counseling has been demonstrated to be beneficial for cancer patients to help alleviate psychological symptoms (Hersch, Juraskova, Price, & Mullan, 2009; Rehse & Pukrop, 2003) and improve quality of life (Chow, Tsao, & Harth, 2004; Dale, Adair, & Humphris, 2010). Counseling has been found to be effective with cancer
patients suffering from pain (Breitbart, Park, & Katz, 2010; Keefe, Somers, & Abernethy, 2010), nausea and vomiting through Behavioral treatment (Ramchandran & Von Roenn, 2010), fatigue (Breitbart & Alici, 2010; Escalante & Manzullo, 2009), and insomnia (Yue & Dimsdale, 2010). Salander (2010) found that Swedish oncology patients were likely to begin a therapeutic relationship due to “coping with anxiety and worries caused by the disease; dealing with relational problems in life outside the disease; dealing with relational problems actualized by the disease; living with a malignant disease-despair in a new life situation; and finally dealing with a particular problem” (p. 248). Based upon work with breast cancer patients, Schain (1976) recommends that counselors’ “strategies should include (a) presurgical intervention aimed at helping women reach informed decisions about type of treatment and surgery they want, and (b) continuing support to deal with such patient concerns as fear of dying, employment problems, and sexual attitudes” (p. 45). Thus, counseling can be a very helpful option for those coping with a cancer diagnosis and the short-term and long-term effects of the diagnosis.

Effects of Cancer

Overall, long-term survivors appear to report relatively few negative effects (Bloom, et al., 2007; Foley, et al., 2006). However, many of these studies feature breast cancer survivors, neglecting survivors of other cancer types and perhaps missing the negative impact felt by those with these cancer diagnoses (Bloom, et al., 2007). Thus, it is important to consider the many factors which may impact HRQOL, including cancer diagnosis (Carver, et al., 2006; Cimprich, et al., 2002; Hannah, et al., 1992; Sarna, et al., 2004). The current study considers that it may well be that being diagnosed with a cancer such as lung or colorectal cancer, which has a worse prognosis than breast or prostate
cancer, may have a greater effect on both physical and psychological HRQOL. If found in the current study, differences in HRQOL may perhaps be found due to the treatment effects through number of treatment types as well as the psychological effects of knowledge of lower survival rates. For instance, Wan, et al. (1999) found that lung cancer patients had lower levels of Functional Well-being as measured by the FACT-G than the other cancer types measured. Comparing survivors of lung, prostate, and colon cancer who were at varying lengths of time since diagnosis, Schag and colleagues (1994) found that lung cancer had more psychological distress than individuals with either of the other diagnoses. Considering the quality of life of cancer patients with either good, medium, or poor prognoses, Ringdal, Ringdal, Kvinnsland, and Gotestam (1994) found a relationship between prognosis and psychological functioning. Thus, in the current study, four different cancer types are studied: two with relatively high survival rates (breast and prostate cancer, 89.1% and 99.7%, respectively) and two with lower survival rates (colorectal and lung cancer, 65.2% and 15.6%, respectively) (Horner, et al., 2008). A brief overview of breast, prostate, colorectal, and lung cancers and popular cancer treatments follows to compare and contrast the four cancers of interest in the current study. The differences in survival rates between the cancers may be especially important when comparing HRQOL psychological and physical subscales and cancer diagnosis. In addition, treatment protocols may also impact the HRQOL psychological, social, and physical subscales and will be considered in the current study.

Cancer Treatments

Cancer treatments may include a number of different side effects based upon their very nature as well as the toxicity of the treatment (American Cancer Society, 2009;
National Cancer Institute, 2009). For instance, chemotherapy side effects may include anemia, nausea, vomiting, infection, neuropathy, trouble with bleeding and bruising, pain, fatigue, alopecia, changes in memory, appetite changes, diarrhea, constipation, mouth sores, changes in taste, changes in urination, sexual issues, problems with fertility, fluid retention, and changes in skin and nails (National Cancer Institute, 2009). Long-term side effects of chemotherapy may include organ damage to the kidneys, lungs, heart, or reproductive system, while late effects may include second malignancies (American Cancer Society, 2009).

Three main types of radiation therapy exist: external beam, systemic, and internal radiation therapies (National Cancer Institute, 2009). The side effects of radiation therapy may include fatigue, alopecia, diarrhea, changes in urination, sexual issues, problems with fertility, mouth or throat pain and changes, nausea and vomiting, and changes in skin (National Cancer Institute, 2009). Late effects of radiation therapy include lymphedema, infertility, second cancers, joint problems, dry mouth, increased number of cavities, problems with thinking, mental processing, and memory, and jaw bone loss (National Cancer Institute, 2009). Long-term side effects of radiation include second cancers and cellular damage in the area radiated which may lead to a variety of conditions including lymphedema, scarring, and issues with normal body functions (American Cancer Society, 2009).

Hormone therapy side effects vary by type of therapy and the gender of the patient (National Cancer Institute, 2009). Side effects may include hot flashes, nausea, increased weight, and changes in fertility (National Cancer Institute, 2009). Males may experience impotence, breast growth, or lowered sexual desire or absent libido (National
Cancer Institute, 2009). Females may experience vaginal dryness, irregular menstruation, or a lack of menstruation (National Cancer Institute, 2009).

The type and severity of surgical side effects are dependent upon the location and size of the tumor (National Cancer Institute, 2009). Side effects of surgery may include pain and infection (National Cancer Institute, 2009). However, long-term surgery side effects may include scarring, wounds, limb amputation, and long-term changes due to the removal of the cancer-associated body parts (American Cancer Society, 2009). Such side effects are likely to impact HRQOL both during and following treatment for cancer.

Breast Cancer

Consideration of the distinct characteristics of breast cancer and the related treatments may be important when comparing breast cancer survivors to survivors of other cancers. Breast cancer, forming as malignant tumor in the breast tissue, is the second most common cancer in women in the United States (American Cancer Society, 2009). Breast cancer has genetic, environmental, and behavioral risk factors (Taylor, 2009), which include older age, family history, having dense breast tissue, early onset of menstruation, late onset menopause, excessive use of alcohol, long-term use of birth control pills, never having given birth or having first child after age 30, race, hormone therapy, being overweight, radiation exposure, a previous breast cancer diagnosis, precancerous breast changes, and a genetic predisposition (American Cancer Society, 2009; National Cancer Institute, 2009). Although far more commonly diagnosed in women, breast cancer may also be diagnosed in men (American Cancer Society, 2009). Currently, there are more than 2.5 million individuals with a history of breast cancer in the United States (Horner, et al., 2008).
The National Cancer Institute estimates that more than 190,000 people will be diagnosed with breast cancer and that more than 40,000 people will die from breast cancer in 2009 (Horner, et al., 2008). The five-year survival rate for individuals diagnosed with breast cancer is now 89.1% (Horner, et al., 2008). Breast cancer is staged with the following levels: 0, I, IIA, IIB, IIIA, IIIB, and IV (American Cancer Society, 2009). Breast cancer, when treated in early stages has a high 5-year survival rate, ranging from a 100% 5-year survival rate for stages 0 and I disease to a 20% 5-year survival rate for stage IV disease (American Cancer Society, 2009).

Treatment for breast cancer includes surgery, chemotherapy, radiation therapy, and hormone therapy (American Cancer Society, 2009). Chemotherapy treatment for advanced breast cancer may entail usage of a variety of cytotoxic chemotherapy drugs, including Taxanes, Fluoropyrimidines, Vinca alkaloids, Anthracyclines, Alkylating agents, Antimetabolites, Platinum, Gemcitabine, and Mitomycin C (National Cancer Institute, 2009). A number of these drugs may be used in combinational regimens in breast cancer treatment (National Cancer Institute, 2009). Long-term side effects may include neuropathy, permanent organ damage, second cancers, infertility, and sexual side effects due to chemotherapy, scarring due to surgery, second cancers due to radiation, and lymphedema (American Cancer Society, 2009).

Prostate Cancer

When comparing multiple cancers, the distinctive characteristics of prostate cancer should be taken into account. Prostate cancer forms in the prostate of men and most commonly develops from prostate gland cells (American Cancer Society, 2009). It is the second most common cancer for men in the United States. Risk factors for prostate
cancer include family history, obesity, genetic predisposition, nationality, race, age, diet, and changes in the prostate (American Cancer Society, 2009; National Cancer Institute, 2009). African-American men have both higher rates of diagnosis and mortality (American Cancer Society, 2008).

Currently, more than 2.1 million men in the United States have a history of prostate cancer (Horner, et al., 2008). The 2009 estimate from the National Cancer Institute for prostate cancer is that more than 190,000 men will be diagnosed with prostate cancer and that more than 27,000 men will die from the disease (Horner, et al., 2008). The five-year survival rate for individuals diagnosed with prostate cancer is now 99.7% (Horner, et al., 2008). Prostate cancer is staged from levels I to IV (National Cancer Institute, 2009). Survival rates for the disease vary significantly based upon whether or not the disease has metastasized; localized and regionalized disease have a 100% 5-year survival rate, while distant disease has a 31% 5-year survival rate (American Cancer Society, 2009).

Treatment for prostate cancer includes watchful waiting, radiation therapy, surgery, chemotherapy, cryosurgery and hormone therapy (American Cancer Society, 2009; National Cancer Institute, 2009). Long-term treatment side effects include sterility, change in the length of the penis, lymphedema, and impotence due to surgery, and bladder and bowel problems and impotence due to radiation (American Cancer Society, 2009). Long-term prostate cancer survivors also may report sexual, urinary, and bowel dysfunction (Bloom, Petersen, & Kang, 2007).
Colorectal Cancer

An individual receiving a diagnosis of colorectal cancer may encounter very different treatment than individuals with another cancer diagnosis. Colorectal cancer forms in the tissue in either the colon or rectum, two distinct parts of the large intestine (American Cancer Society, 2009). Risk factors for colorectal cancer include age, genetics, family history, diet, having had colorectal polyps, previous diagnosis of colorectal cancer, cigarette smoking, and having been diagnosed with Crohn’s disease (National Cancer Institute, 2009).

Currently, there are more than 1.1 million individuals with a history of colorectal cancer in the United States (Horner, et al., 2008). The National Cancer Institute estimates that more than 146,000 people will be diagnosed with colorectal cancer and that more than 49,000 people will die from colorectal cancer in 2009 (Horner, et al., 2008). The five-year survival rate for individuals diagnosed with colorectal cancer is now 65.2% (Horner, et al., 2008). Colorectal cancer is staged from levels I to IV (American Cancer Society, 2009). Five-year survival rates for colorectal cancer range from 93% for stage I disease to 8% for stage IV disease (American Cancer Society, 2009). In recent years, the prevalence of colorectal cancer has decreased (American Cancer Society, 2008).

Treatment for colorectal cancer includes chemotherapy, radiation therapy, surgery, and/or monoclonal antibodies (National Cancer Institute, 2009). The most common treatment includes surgery (American Cancer Society, 2008). Surgery choices most frequently include a segmental resection or colectomy (American Cancer Society, 2009). A colostomy or ileostomy may be necessary in some cases (American Cancer Society, 2009). If the cancer diagnosis includes metastases, chemotherapy and radiation
may be necessary (American Cancer Society, 2008). Common chemotherapy regimens include oxaliplatin, 5-FU (5-fluorouracil), and leucovorin (American Cancer Society, 2008). Targeted monoclonal antibodies used in the treatment of colon cancer include bevacizumab, panitumumab, and cetuximab (American Cancer Society, 2008). Long-term colon cancer side effects may include changes in organ functions due to surgery, second cancers due to chemotherapy or radiation, bowel issues due to radiation, and sexual comfort issues related to having had a colostomy (American Cancer Society, 2009). Long-term survivors of colon cancer who had undergone surgery as part of their treatment may report low energy, decreased sexual function, and bowel problems (Phipps, et al., 2008).

**Lung Cancer**

A number of distinctive characteristics differentiate lung cancer from other cancer types. Lung cancer forms in the tissue of the lung, often in the lining of air passages (American Cancer Society, 2009). It is the most common form of cancer death for both men and women (American Cancer Society, 2009). However, the mortality rates have been decreasing in recent years (American Cancer Society, 2008). There are two common types: small cell and non-small cell cancer (American Cancer Society, 2009). Small cell lung cancer accounts for 13% of lung cancer diagnoses, while non-small cell makes up 87% of lung cancer diagnoses (American Cancer Society, 2008). Risk factors include tobacco consumption, age, asbestos, air pollution, family history, prior history of lung cancer, and exposure to radon (National Cancer Institute, 2009). In addition, exposure to radiation, tuberculosis, secondhand smoke, and other environmental factors may lead to development of lung cancer (American Cancer Society, 2008).
There are more than 364,000 individuals in the United States with a history of lung cancer (National Cancer Institute, 2009). It is estimated that more than 219,000 people will be diagnosed with lung cancer and that more than 159,000 individuals will die from lung cancer in 2009 (Horner, et al., 2008). The five-year survival rate for individuals with lung cancer is 15.6% (Horner, et al., 2008). The two most common types are staged differently (National Cancer Institute, 2009). Small cell lung cancer is staged as either “limited” or “extensive” for treatment purposes and staged I through IV for more complete analysis (American Cancer Society, 2009; National Cancer Institute, 2009). Small cell lung cancer survival ranges from 31% for Stage I to 2% for Stage IV disease (American Cancer Society, 2009). Non-small cell lung cancer is staged as occult or stages 0, IA, IB, IIA, IIB, IIIA, IIIB, or IV (National Cancer Institute, 2009). Non-small cell lung cancer survival ranges from 56% for Stage I to 2% for Stage IV (American Cancer Society, 2009).

Treatment for lung cancer includes chemotherapy, radiation therapy, targeted therapy, or surgery (National Cancer Institute, 2009). Long-term side effects of lung cancer treatment include difficulty breathing and damage to the lungs due to chest radiation, second cancers due to radiation and chemotherapy, and scarring due to surgery. Long-term lung cancer patients may also continue to have a variety of respiratory difficulties (Sarna, et al., 2004).

Summary

Numerous studies have considered the effects of cancer type, treatment type and toxicity, stage of cancer, time since diagnosis, and comorbidity (Cimprich, et al., 2002; Deimling, et al., 2006; Vacek, et al., 2003; Zebrack, et al., 2008). Physical,
psychological, social, and spiritual aspects of life can be greatly affected by a cancer diagnosis, cancer-related variables, and treatment variables (Bloom, et al., 2007; Carver, et al., 2006; Deimling, et al., 2006; Greimel, Winter, Kapp, & Haas, 2009; Helgeson & Tomich, 2005; Joseph, 2006; Norum & Wist, 1996; Phipps, et al., 2008; Rusiewicz, 2008). Long-lasting physical issues and body image issues have been studied in a variety of cancer types (Carver, et al., 2006; Cimprich, et al., 2002; Hannah, et al., 1992; Sarna, et al., 2004). The role of social support has also been considered in numerous studies (Carver, et al., 2005; Carver, et al., 2006; Devine, Parker, Fouladi, & Cohen, 2003; Friedman, et al., 2006; Gustavsson-Lilius, Julkunen, & Hietanen, 2007; Lewis, et al., 2001; Meyerowitz, 1983; Parker, Baile, de Moor, & Cohen, 2003; Steginga, et al., 2009). Depression and anxiety symptoms following a cancer diagnosis have also been studied extensively (Bloom, et al., 2007; Deimling, et al., 2006). Furthermore, although less often studied, spirituality, religious coping, and benefit-finding in long-term cancer survivors are receiving increased research interest (Carver & Antoni, 2004; Carver, Smith, Petronis, & Antoni, 2006; Kinsinger, et al., 2006; Lechner, et al., 2006; Tomich & Helgeson, 2002; Weiss, 2004; Zavala, Maliski, Kwan, Fink, & Litwin, 2009).

The current study will add to the growing body of knowledge of long-term cancer survivors. It will also look at two notably less-studied populations, individuals with lung and colon cancers, in addition to analyzing information about the more frequently studied breast and prostate cancer populations. In the present study, it is hypothesized that there will be differences in HRQOL of long-term cancer survivors based upon cancer type. Furthermore, it is hypothesized that there will be differences in HRQOL of long-term cancer survivors based upon number of treatment types. The current study utilizes the
QOL-CS survey which was developed with a long-term cancer survivor population and considers four subscales of well-being: psychological, physical, spiritual, and social (Ferrell, Hassey-Dow, & Grant, 1995).
Chapter III
Methodology

Introduction

The current research study includes a secondary analysis of data collected from a sample of 265 long-term cancer survivors of mixed cancer types (Jenkins, 2010). Sixty-three individuals did not meet the inclusion criteria for the current study and were excluded. The responses from 196 breast, prostate, colon, or lung cancer survivors (nearly 74%) was utilized in the current study following approval for secondary analysis from the institutional review boards of Ball State University and Ball Memorial Hospital. Among other self-report questionnaires, the prior study collected data using both a demographic questionnaire and the QOL-CS. Information accessed through these two measurements was used in the current study.

Participants

Selection criteria for this study were a) a diagnosis of breast, prostate, lung, and colon cancer at least five years prior to start of data collection, b) received treatment at Ball Memorial Hospital Cancer Center, and c) at least 25 years of age. Any individuals who were a) currently receiving treatment, b) less than 25 years of age and/or c) non-English speaking were excluded from participation. The data from a total of 196 participants were considered in the present study. Of the 196 total participants, 138 of these were breast cancer survivors, 28 were prostate cancer survivors, 22 were colorectal
cancer survivors, and 8 were lung cancer survivors. Fifty-two individuals reported having one type of treatment, 68 respondents reported having two different types of treatment, 60 participants reported having three types of cancer treatment, and 16 individuals reported having four types of treatment. The average age of the respondents was 64.94 years. One hundred twenty-nine (65.6%) of the participants were married. One hundred and sixty individuals responded to the demographic question about stage of cancer. 8 individuals were diagnosed with Stage 0 cancer (5%), 43 were diagnosed with Stage I cancer (26.88%), 26 were diagnosed with Stage II disease (16.25%), 11 were diagnosed with Stage III cancer (6.88%), and 8 were diagnosed with Stage IV disease (5%). In addition, 5 participants reported “no stage” (3.13%) and 59 individuals reported that they “didn’t know/remember” (36.88%).

Table 1 shows the sample sizes by cancer type and number of treatment types. This information was then used to make decisions about which groups were utilized in statistical analyses. Tables 2 through 5 display the weighted means and standard deviations for each of the QOL-CS Subscales by cancer type and number of treatment types.
Table 1

*Sample Size by Cancer Type and Number of Treatment Type Categories*

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Number of Treatment Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td></td>
<td>26</td>
<td>45</td>
<td>51</td>
<td>16</td>
<td>138</td>
</tr>
<tr>
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<tr>
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<td>9</td>
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<td>0</td>
<td>22</td>
</tr>
<tr>
<td>Lung</td>
<td></td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
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<td></td>
<td>52</td>
<td>68</td>
<td>60</td>
<td>16</td>
<td>196</td>
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</table>

Table 2

*Physical Well-being Means and Standard Deviations by Cancer Type and Number of Treatment Types Received*

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Number of Treatment Types</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
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</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.94</td>
<td>1.64</td>
</tr>
<tr>
<td>Prostate</td>
<td>1</td>
<td>8.22</td>
<td>1.52</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8.16</td>
<td>1.98</td>
</tr>
<tr>
<td>Cancer Type</td>
<td>Number of Treatment Types</td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------</td>
<td>------</td>
<td>----------</td>
</tr>
<tr>
<td>Breast</td>
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</tr>
<tr>
<td></td>
<td>2</td>
<td>6.76</td>
<td>1.65</td>
</tr>
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</table>

Table 3

*Psychological Well-being Means and Standard Deviations by Cancer Type and Number of Treatment Types Received*
<table>
<thead>
<tr>
<th></th>
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<th>Total</th>
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Running head: QUALITY OF LIFE DIFFERENCES
Table 4

Social Well-being Means and Standard Deviations by Cancer Type and Number of Treatment Types Received

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<tr>
<th>Cancer Type</th>
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<th>Std. Dev.</th>
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<td>8.44</td>
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<td>Number of Treatment Types</td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------</td>
<td>------</td>
<td>-----------</td>
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</table>

Table 5

*Spiritual Well-being Means and Standard Deviations by Cancer Type and Number of Treatment Types Received*
Procedure

Approval by the institutional review boards of Ball State University and Ball Memorial Hospital (Jenkins, 2010) was first obtained. As per the Jenkins (2010) study, data collection followed the Tailored Design Methodology (Dillman, 2007). This included a pre-notice letter, an initial packet of questionnaires with a one dollar incentive included, a thank you and reminder postcard, and a replacement packet two to four weeks following the mailing of the initial packet, sent via the U.S. Postal Service (Jenkins, 2010). Participants were identified through the Ball Memorial Hospital Tumor Registry by the tumor registrar based upon the selection criteria described above. A total of 774 individuals met the selection criteria (Jenkins, 2010). Oncologists at Ball Memorial Hospital then reviewed the patient list and gave approval for sending an initial contact letter to potential participants (Jenkins, 2010). The initial mailing was sent to 766 potential participants (Jenkins, 2010). Twenty individuals withdrew from the study at this

<table>
<thead>
<tr>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>7.11</td>
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</table>

<table>
<thead>
<tr>
<th>Procedure</th>
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<tbody>
<tr>
<td>Approval by the institutional review boards of Ball State University and Ball Memorial Hospital (Jenkins, 2010) was first obtained. As per the Jenkins (2010) study, data collection followed the Tailored Design Methodology (Dillman, 2007). This included a pre-notice letter, an initial packet of questionnaires with a one dollar incentive included, a thank you and reminder postcard, and a replacement packet two to four weeks following the mailing of the initial packet, sent via the U.S. Postal Service (Jenkins, 2010). Participants were identified through the Ball Memorial Hospital Tumor Registry by the tumor registrar based upon the selection criteria described above. A total of 774 individuals met the selection criteria (Jenkins, 2010). Oncologists at Ball Memorial Hospital then reviewed the patient list and gave approval for sending an initial contact letter to potential participants (Jenkins, 2010). The initial mailing was sent to 766 potential participants (Jenkins, 2010). Twenty individuals withdrew from the study at this</td>
</tr>
</tbody>
</table>
point and 59 letters were returned due to inaccurate addresses (Jenkins, 2010). A total of 687 packets were mailed and 12 participants withdrew (Jenkins, 2010). Four hundred and sixty-six replacements were then mailed several weeks later (Jenkins, 2010). A final contact via a scripted telephone call concluded contact with participants (Jenkins, 2010). The first packet mailing resulted in the return of 233 completed packets, while the second mailing resulted in 32 completed packets being returned for a total of 265 respondents in the previous study (Jenkins, 2010). Twelve completed packets with incomplete HIIPA or informed consent forms were also returned; data from these participants was not utilized (Jenkins, 2010). Data collection and entry took place over the course of four months with the researcher of the current study tasked with data collection and data entry management.

Of these respondents, the data from 196 breast, prostate, colon, and lung long-term cancer survivors was analyzed in current study for secondary analysis following approval from the institutional review boards of Ball State University and Ball Memorial Hospital. As no further contact with participants was needed, both institutional review boards granted the study exempt status. The data collection process is outlined in Figure 1.
Figure 1

*Data Collection Flow Diagram*

- **Enrollment**
  - Assessed for eligibility (n=265)
  - Excluded (n=63)
    - Not meeting inclusion criteria (n=63)
    - Excluded due to cancer type (not breast, prostate, lung, or colorectal cancer)

- **Completion**
  - Completed survey materials (n=196)
  - Did not complete survey materials (n=6)

- **Analysis**
  - Breast Cancer (n = 138)
  - Prostate Cancer (n= 28)
  - Colorectal Cancer (n= 22)
  - Lung Cancer (n= 8)
  - 1 Treatment Type (n= 52)
  - 2 Treatment Types (n= 68)
  - 3 Treatment Types (n= 60)
  - 4 Treatment Types (n= 16)
Instruments

General Information Questionnaire. In order to gain more complete data about the individual participants of the study, a general information questionnaire was included. This instrument was developed specifically for the current and prior study. Of the 22 total items, 11 items were relevant to this study on the general questionnaire including age, sex, cancer type, cancer stage, marital status, date of diagnosis, and types of treatments received. These demographic items were utilized during statistical analyses.

Quality of Life-Cancer Survivors (QOL-CS). The Quality of Life-Cancer Survivors (QOL-CS) instrument was utilized in this study as a measure of long-term health-related quality of life (HRQOL) (Ferrell, et al., 1995; Jenkins, 2010). The QOL-CS, developed at the City of Hope National Medical Center, is a 41 item self-administered survey covering 4 different domains (physical, psychological, social, and spiritual well-being) based upon the cancer survivor-adapted model of quality of life (Ferrell, et al., 1995). Eighteen items measure psychological well-being, 8 items appraise physical well-being, 8 items determine social well-being, and 7 items assess spiritual well-being (Ferrell, et al., 1995; Zebrack & Chesler, 2001). Each item has an 11 point scale from 0 (representing worst outcome) to 10 (representing best outcome) (Ferrell, et al., 1995). Twenty-six items use reverse anchors to guard against a response set bias (Ferrell, et al., 1995). The mean for all 41 items is taken in order to report a total score, and an average score for each subscale can also be reported if so desired (Ferrell, et al., 1995). Individual items had test-retest reliability ranging from 0.62-0.85 (Ferrell, et al., 1995). Utilization of Cronbach’s alpha coefficient yielded an overall internal consistency score of .93 (Ferrell, et al., 1995). A range of internal consistency scores were found in
the subscales: .89 (Psychological), .81 (Social), .77 (Physical), and .71 (Spiritual) (Ferrell, et al., 1995). Overall test-retest reliability for this measure was .89 with subscale measurements of .88 (physical), .88 (psychological), .81 (social), and .90 (spiritual) (Ferrell, et al., 1995).

Physical well-being in QOL is measured based on items addressing overall physical health, fatigue, appetite changes, aches or pain, sleep changes, constipation, nausea, and menstrual/fertility changes (Ferrell, et al., 1995). The test-retest reliability of the Physical subscale was .88 (Ferrell, et al., 1995). Psychological well-being is measured through items assessing quality of life, happiness, feeling in control, satisfaction with life, concentration and memory, feelings of usefulness, depression, coping, appearance changes, self-concept, future test fears, second cancer fear, recurrence fear, metastasis fear, distress since time of treatment, and anxiety (Ferrell, et al., 1995). Test-retest reliability for the Psychological well-being subscale was .88 (Ferrell, et al., 1995). Social well-being items focused on family distress, financial burden, feelings of isolation, home activities, employment, impact on sexuality, personal relationships, and sufficient social support (Ferrell, et al., 1995). The social subscale test-retest validity was .81, while the spiritual subscale test-retest validity was .90 (Ferrell, et al., 1995). Spiritual well-being items focused on feelings of uncertainty about the future, feeling hopefulness, changes in religious activities, changes in spiritual activities, changes in spirituality, positive life changes, and sense of purpose (Ferrell, et al., 1995).

The QOL-CS was validated using a population of 686 long-term, mixed cancer survivors (Ferrell, et al., 1995) and has been used in a variety of studies which assessed HRQOL in a range of cancer survivor populations (Ahles, et al., 2005; Christopher &
Morrow, 2004; Cimprich, et al., 2002; Phipps, Braitman, Stites, & Leighton, 2008; Zebrack & Chesler, 2001). The research (Ferrell, et al., 1995) included mailing surveys of a demographic questionnaire, FACT-G, and QOL-CS to 1200 long-term cancer survivors who were members of the National Coalition for Cancer Survivorship (Ferrell, et al., 1995). The data from the 686 survey respondents were then utilized for the reliability and validity data (Ferrell, et al., 1995). The authors used five different measures of validity, including content, predictive, concurrent, construct, and discriminate (Ferrell, et al., 1995). Content validity was based upon the practical experience of the researchers, literature review, initial pilot study, interviews with five long-term cancer survivors, and a final pilot study (Ferrell, et al., 1995). Content validity was first established with a panel of oncology nurses and QOL experts (Ferrell, et al., 1995). A step-wise multiple regression was used to establish predictive validity of overall HRQOL (Ferrell, et al., 1995). Seventeen variables accounted for 91% of the variance in overall HRQOL with the highest amount of variance associated with the items of appearance, fatigue, aches and pains, uncertainty, future, satisfaction, and control (Ferrell, et al., 1995). Ferrell, et al. (1995) found strong correlations between the subscales of the QOL-CS and FACT-G. The QOL-CS Psychological and FACT-G Emotional subscales were shown to have a relationship of .65, while the QOL-CS Social and FACT-G Social subscales had a correlation of .44 (Ferrell, et al., 1995). The QOL-CS Physical and FACT-G Physical subscales were demonstrated to have a correlation of .74, while the overall correlation between the two measures was .78 (Ferrell, et al., 1995). Pearson’s correlations were also performed on individual items with moderate to strong correlations being found among the QOL-CS items (Ferrell, et al., 1995). Using a
principal components factor analysis for construct validity, the subscales of the QOL-CS were polished and further construct validity was established by assessing the measurement’s ability to discriminate based upon demographic variables in contrasting cancer survivor groups (Ferrell, et al., 1995).

Preliminary Analyses and Design

This study involves a cross-sectional, non-experimental descriptive field research with a factorial design. Originally, it had been planned that analyses would include a 4 x 4 between-subjects MANOVA (breast cancer x prostate cancer x colorectal cancer x lung cancer by 1 type of treatment x 2 types of treatment x 3 types of treatment x 4 types of treatment). However, response rates were low and led to small sample sizes of prostate and colorectal cancer survivors who had had 3 and 4 types of treatments and from lung cancer survivors in all 4 categories of treatment types. Coladarci, Cobb, Minium, and Clarke (2008) state that:

Because smaller samples lead to a larger standard error and less power, there is a greater chance of committing a Type II error as sample size is decreased. With insufficient sample size, then, the investigator may conclude “no effect” when, in fact, there is one (p. 408).

Thus, the analysis was adjusted to a 2 x 3 between-subjects MANOVA (breast cancer x prostate cancer x colorectal cancer by 1 or 2 types of treatment).

Research including descriptive field design often has high external validity due to the participant population being based in the main population of interest, while possessing low internal validity as the study variables are not able to be manipulated (Heppner, Wampold, & Kivlighan, 2008). A preliminary analysis of the data was
conducted in order to understand the relationship among the measured variables. Descriptive statistics, such as means, medians, correlations, and standard deviations were considered as part of the preliminary analyses. Other statistics involved a one-way, between-subjects Multivariate Analysis of Variance (MANOVA), as the present study incorporates multiple dependent variables (QOL-CS overall and four subscale scores) in addition to multi-level independent variables (3 cancer types and 2 number of treatment type categories). Use of a MANOVA tested for the vectors of the means involved in the results. Cancer type was measured on three categorical (nominal) levels (breast, prostate, and colorectal cancer). Number of treatment types was treated as a continuous variable based upon the specified number of treatment types (one vs. two types of treatment categories: combinations of surgery, chemotherapy, radiation, and/or hormone therapy treatment). Measurement of potential differences in the HRQOL of adult-onset, long-term cancer survivors as a result of both cancer type and the number of treatment types was measured by QOL-CS overall and subscale scores. Analysis of the QOL-CS scale measurements demonstrated whether or not differences existed based upon cancer type and number of treatment types. The researcher also assessed that the data has a normal distribution and checked for outliers. Pillai’s Trace was used as a multivariate test statistic. A significant multivariate effect was followed by Univariate Analyses of Variance to determine significant differences. Predictive Analytic Software (version 18) by SPSS, Inc., Chicago, IL was utilized for statistical analyses.
Chapter IV

Results

Introduction

Prior to analysis, the data were scanned for data entry accuracy, missing response values, and outliers. Listwise deletion was used in cases of missing data. Statistical analyses included Multivariate Analysis of Variance (MANOVA) and Univariate Analysis of Variance (ANOVA). Between-subjects MANOVA and ANOVA analyses involved consideration of the responses from 115 participants. Scores for total number of treatment types ranged from 0-4, with no respondents reporting that they had received five treatment types. Only one participant reported having no treatments and this individual was dropped from the analyses. In addition, only eight individuals with lung cancer responded and these individuals were dropped from the analyses due to the low response rate. In addition, due to small sample sizes of participants with prostate and colon cancer who had had three or four treatments, it was decided that analyses would be scaled back to a 2 x 3 between subjects MANOVA. Few prostate and colon cancer survivors who had had three types of treatment responded and no prostate and colon cancer survivors who had had four types of treatment responded. The sixteen individuals who responded that they had had four types of treatment were all breast cancer survivors and thus, it was decided that inclusion of the higher numbers of treatment types would
confound the results. Thus, individuals having received three or four treatments were also dropped from analyses.

*Between-Subjects Analysis*

Descriptive statistics of the 115 include age, gender, marital status, first diagnosis status, and ethnicity. Females made up 70.4% of the population considered in the analyses, while males made up 27.8% of the population, with 2 individuals who did not respond to the gender item on the questionnaire. Nearly sixty-two percent of the population reported being married, while thirty-eight percent was not married. The majority of respondents were Caucasian (94.8%), while 5 were African-American (4.3%) and 1 individual responded as “Other” (0.9%). For 109 of the individuals, this was their first diagnosis (94.8%), while 5 survivors (4.3%) had had a prior diagnosis and one individual (0.9%) did not respond. Stage of cancer varied from Stage 0 (4.3%) to no stage (2.6%). However, 35 (30.4%) individuals did not remember their stage of cancer. Table 6 shows demographic information for the sample population.

Table 6

*Demographic Information for Breast, Prostate, and Colorectal Survivors*

<table>
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<th>Demographic category</th>
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<th>Percentage (%)</th>
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</tr>
<tr>
<td>Female</td>
<td>81</td>
<td>70.4</td>
</tr>
<tr>
<td>Male</td>
<td>32</td>
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</tr>
<tr>
<td><strong>Marital Status</strong></td>
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<td></td>
</tr>
<tr>
<td>Married</td>
<td>71</td>
<td>61.7</td>
</tr>
</tbody>
</table>


The 115 individuals ranged in age from 47 years to 94 years, with 4 individuals who did not respond to the age item on the questionnaire. Age as it relates to cancer type was significant \( (p = .002) \). Breast cancer survivors with a mean age of 67.59 years were significantly younger than prostate cancer survivors \( (p = .009) \) with a mean age of 74.32 years. Breast cancer survivors were also significantly younger than the colorectal cancer
survivor group \((p = .002)\) with a mean age of 76.78 years. Table 7 shows the mean ages for each group.

Table 7

*Age by Cancer Type (Breast, Prostate Colorectal)*

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>Mean age (in years)</th>
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<td>67.59</td>
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<td>74.32</td>
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<tr>
<td>Colorectal</td>
<td>76.48</td>
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</table>

Table 8 demonstrates the group sizes by cancer type and number of treatment types which were utilized in analyses following the decision to remove the lung cancer group and the groups of individuals who had had three or four treatment types. Tables 9 through 12 displays the means and standard deviations for each of the QOL-CS Subscales by cancer type and number of treatment types.

Table 8

*Sample Sizes by Cancer Type and Number of Treatment Types used in Analyses*

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Number of Treatment Types</th>
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</thead>
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<td>Prostate</td>
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<td>26</td>
</tr>
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<td>9</td>
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<td>1 Type</td>
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<tr>
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<td>Total</td>
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<tr>
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<td>1.74</td>
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<td>2 Types</td>
<td>8.16</td>
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<td></td>
<td>Total</td>
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<td>1.68</td>
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</tbody>
</table>
Table 10

*Psychological Well-being Means and Standard Deviations by Cancer Type (Breast, Prostate & Colorectal) and Number of Types of Treatment (1 or 2) Received*

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Number of Treatment Types</th>
<th>Mean</th>
<th>St. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>1 Type</td>
<td>7.16</td>
<td>1.65</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>6.76</td>
<td>1.65</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6.90</td>
<td>1.65</td>
</tr>
<tr>
<td>Prostate</td>
<td>1 Type</td>
<td>7.63</td>
<td>1.45</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>8.02</td>
<td>1.11</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.78</td>
<td>1.32</td>
</tr>
<tr>
<td>Colorectal</td>
<td>1 Type</td>
<td>6.65</td>
<td>2.39</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>7.75</td>
<td>1.73</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.20</td>
<td>2.10</td>
</tr>
<tr>
<td>Total</td>
<td>1 Type</td>
<td>7.22</td>
<td>1.74</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>7.10</td>
<td>1.65</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.15</td>
<td>1.69</td>
</tr>
</tbody>
</table>
Table 11

*Social Well-being Means and Standard Deviations by Cancer Type (Breast, Prostate & Colorectal) and Number of Types of Treatment (1 or 2) Received*

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Number of Treatment Types</th>
<th>Mean</th>
<th>St. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast</td>
<td>1 Type</td>
<td>8.41</td>
<td>1.31</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>8.26</td>
<td>1.63</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>8.32</td>
<td>1.51</td>
</tr>
<tr>
<td>Prostate</td>
<td>1 Type</td>
<td>7.83</td>
<td>1.49</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>7.43</td>
<td>1.29</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.68</td>
<td>1.40</td>
</tr>
<tr>
<td>Colorectal</td>
<td>1 Type</td>
<td>7.56</td>
<td>1.55</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>8.64</td>
<td>1.18</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>8.10</td>
<td>1.45</td>
</tr>
<tr>
<td>Total</td>
<td>1 Type</td>
<td>8.08</td>
<td>1.42</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>8.18</td>
<td>1.55</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>8.14</td>
<td>1.49</td>
</tr>
</tbody>
</table>
Table 12

*Spiritual Well-being Means and Standard Deviations by Cancer Type (Breast, Prostate & Colorectal) and Number of Types of Treatment (1 or 2) Received*

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Number of Treatment Types</th>
<th>Mean</th>
<th>St. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>1 Type</td>
<td>7.55</td>
<td>1.96</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>6.96</td>
<td>2.07</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.18</td>
<td>2.03</td>
</tr>
<tr>
<td>Prostate</td>
<td>1 Type</td>
<td>6.79</td>
<td>1.87</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>6.03</td>
<td>1.67</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6.50</td>
<td>1.80</td>
</tr>
<tr>
<td>Colorectal</td>
<td>1 Type</td>
<td>6.95</td>
<td>2.23</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>6.59</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6.77</td>
<td>2.06</td>
</tr>
<tr>
<td>Total</td>
<td>1 Type</td>
<td>7.21</td>
<td>1.97</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>6.76</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6.96</td>
<td>1.99</td>
</tr>
</tbody>
</table>

*Multivariate Analysis of Variance for Quality of Life*

In testing Hypothesis 1, MANOVA revealed an overall significant difference for Cancer Type, $F(8, 214) = 3.50, p = .001$. However, in testing Hypothesis 2, number of treatment types and any potential interaction effects between cancer type and number of treatment types, were not found to be significant, as shown in Table 13. Box’s Test of
Equality of Covariance Matrices, which is a test of assumption of equal co-variance, was considered. However, this was found to not be significant \( (p = .301) \), and thus was not violated during MANOVA analyses. During pairwise comparisons, a statistically significant difference was found on the psychological well-being subscale between prostate and breast cancer survivors. Prostate cancer survivors were found to have higher psychological well-being than breast cancer survivors \( (p = .029) \), with a mean difference of .867. Breast cancer survivors had a mean score of 6.96 while prostate cancer survivors reported a mean score of 7.82 for psychological well-being as shown in Table 16. On the social well-being subscale, breast cancer survivors were found to have significantly higher HRQOL scores \( (p = .046) \) than prostate cancer, with a mean difference of .706. Breast cancer survivors reported a mean score of 8.34 while prostate cancer survivors had a mean score of 6.41 on social well-being as shown in Table 17. Levene’s Test of Equality of Error Variances was also utilized during MANOVA and ANOVA analyses, which is a test of assumption for covariance and variance in MANOVA and ANOVA analyses. The results of Levene’s Test of Equality of Error Variances for physical well-being \( (p=.847) \), psychological well-being \( (p=.676) \), social well-being \( (p=.833) \), and spiritual well-being \( (p=.801) \) were not significant.

Table 13

*Multivariate Test* \(^a\) *Results*

<table>
<thead>
<tr>
<th>Effect</th>
<th>Pillai’s Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer Types</td>
<td>.231</td>
<td>3.50</td>
<td>8.00</td>
<td>214.00</td>
<td>.001</td>
</tr>
<tr>
<td>Number of</td>
<td>.064</td>
<td>1.81</td>
<td>4.00</td>
<td>106.00</td>
<td>.133</td>
</tr>
</tbody>
</table>
Considering between-subjects effects, no significant differences emerged as revealed in Table 14.

**Table 14**

*Test of Between-Subjects Effects*

<table>
<thead>
<tr>
<th>Source</th>
<th>Dependent Variable</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cancer Type</strong></td>
<td>Physical Well-being</td>
<td>2.65</td>
<td>2</td>
<td>1.33</td>
<td>.47</td>
<td>.625</td>
</tr>
<tr>
<td></td>
<td>Psychological Well-being</td>
<td>13.46</td>
<td>2</td>
<td>6.73</td>
<td>2.44</td>
<td>.092</td>
</tr>
<tr>
<td></td>
<td>Social Well-being</td>
<td>8.96</td>
<td>2</td>
<td>4.48</td>
<td>2.05</td>
<td>.134</td>
</tr>
<tr>
<td></td>
<td>Spiritual Well-being</td>
<td>13.75</td>
<td>2</td>
<td>6.88</td>
<td>1.73</td>
<td>.182</td>
</tr>
<tr>
<td><strong>Number of Treatment Types</strong></td>
<td>Physical Well-being</td>
<td>8.93</td>
<td>1</td>
<td>8.93</td>
<td>3.18</td>
<td>.077</td>
</tr>
<tr>
<td></td>
<td>Psychological Well-being</td>
<td>2.66</td>
<td>1</td>
<td>2.66</td>
<td>.97</td>
<td>.328</td>
</tr>
<tr>
<td></td>
<td>Social Well-being</td>
<td>.61</td>
<td>1</td>
<td>.61</td>
<td>.28</td>
<td>.598</td>
</tr>
<tr>
<td></td>
<td>Spiritual Well-being</td>
<td>6.66</td>
<td>1</td>
<td>6.66</td>
<td>1.68</td>
<td>.198</td>
</tr>
</tbody>
</table>
Tables 15 through 18 include the QOL subscale means based upon cancer type due to Hypothesis 1 which stated: there will be differences in HRQOL, as measured by the QOL-CS, between long-term survivors of colorectal, breast, and prostate cancer.

Table 15

**Means of Physical QOL Based Upon Cancer Type**

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Mean</th>
<th>St. Error</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>7.81</td>
<td>.21</td>
<td>7.40</td>
</tr>
<tr>
<td>Prostate</td>
<td>8.19</td>
<td>.34</td>
<td>7.52</td>
</tr>
</tbody>
</table>
Table 16

*Means of Psychological QOL Based Upon Cancer Type*

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Mean</th>
<th>St. Error</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>6.96</td>
<td>.21</td>
<td>6.55</td>
<td>7.36</td>
<td></td>
</tr>
<tr>
<td>Prostate</td>
<td>7.82</td>
<td>.34</td>
<td>7.16</td>
<td>8.49</td>
<td></td>
</tr>
<tr>
<td>Colorectal</td>
<td>7.20</td>
<td>.39</td>
<td>6.43</td>
<td>7.98</td>
<td></td>
</tr>
</tbody>
</table>

Table 17

*Means of Social QOL Based Upon Cancer Type*

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Mean</th>
<th>St. Error</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>8.34</td>
<td>.18</td>
<td>7.97</td>
<td>8.70</td>
<td></td>
</tr>
<tr>
<td>Prostate</td>
<td>7.63</td>
<td>.30</td>
<td>7.04</td>
<td>8.22</td>
<td></td>
</tr>
<tr>
<td>Colorectal</td>
<td>8.10</td>
<td>.35</td>
<td>7.41</td>
<td>8.79</td>
<td></td>
</tr>
</tbody>
</table>
Table 18

*Means of Spiritual QOL Based Upon Cancer Type*

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Mean</th>
<th>St. Error</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>Breast</td>
<td>7.25</td>
<td>.25</td>
<td>6.77</td>
</tr>
<tr>
<td>Prostate</td>
<td>6.41</td>
<td>.40</td>
<td>5.61</td>
</tr>
<tr>
<td>Colorectal</td>
<td>6.77</td>
<td>.47</td>
<td>5.84</td>
</tr>
</tbody>
</table>

Table 19 displays the means of the QOL subscales based upon the number of treatment types experienced by the respondents. These analyses were conducted based upon Hypothesis 2 which stated: there will be differences in HRQOL, as measured by the QOL-CS, associated with the number of treatments undergone by adult-onset, long term cancer survivors (0-4 treatments: surgery, chemotherapy, radiation, and/or hormone therapy).

Table 19

*Means of the QOL Subscales based upon Number of Treatment Types*

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Number of Treatment Types</th>
<th>Mean</th>
<th>St. Error</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>Physical Well-being</td>
<td>1 Type</td>
<td>7.64</td>
<td>.26</td>
<td>7.13</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>8.31</td>
<td>.27</td>
<td>7.77</td>
</tr>
<tr>
<td>Psychological</td>
<td>1 Type</td>
<td>7.15</td>
<td>.26</td>
<td>6.64</td>
</tr>
</tbody>
</table>
Univariate Analysis of Variance

As the MANOVA for Cancer Type was statistically significant, ANOVA analyses followed. Table 20 shows the descriptive statistics based upon overall HRQOL. This table shows means and standard deviations by cancer type and number of treatment types. Levene’s Test of Equality of Error Variances was also utilized during ANOVA analyses which is a test of assumption for covariance and variance. Levene’s Test was not significant ($p = .89$) and thus was not violated during the analysis. Between-subject analyses revealed no significant differences as demonstrated in Table 21.

Table 20

*Means for Overall QOL Based on Cancer Type and Number of Treatments*

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Number of Treatment Types</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>1 Type</td>
<td>7.67</td>
<td>1.17</td>
</tr>
<tr>
<td></td>
<td>2 Types</td>
<td>7.51</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.57</td>
<td>1.22</td>
</tr>
</tbody>
</table>
Table 21

*Between-Subjects Effects*

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer Type</td>
<td>.174</td>
<td>2</td>
<td>.087</td>
<td>.06</td>
<td>.947</td>
</tr>
<tr>
<td>Number of Treatment Types</td>
<td>.497</td>
<td>1</td>
<td>.497</td>
<td>.312</td>
<td>.578</td>
</tr>
<tr>
<td>Interaction</td>
<td>3.98</td>
<td>2</td>
<td>1.99</td>
<td>1.25</td>
<td>.291</td>
</tr>
<tr>
<td>Error</td>
<td>173.64</td>
<td>109</td>
<td>1.59</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

This study involved two hypotheses involving HRQOL as measured by the QOL-CS. Namely, these hypotheses stated: 1) that there would be differences in HRQOL
between long-term survivors of colorectal, breast, and prostate cancer and 2) that there would be differences in HRQOL associated with the number of treatments undergone by adult-onset, long term cancer survivors (0-4 treatments: surgery, chemotherapy, radiation, and/or hormone therapy). MANOVA revealed overall significant differences based upon cancer type. Number of treatment types was not found to be significant. In pairwise comparisons, prostate cancer survivors were found to have significantly higher psychological well-being scores than breast cancer survivors. Also, in pairwise comparisons, breast cancer survivors were found to have significantly higher social well-being scores than prostate cancer survivors. Univariate ANOVA analysis on overall HRQOL found no significant differences.
Chapter V
Discussion

Introduction

The current study investigated the relationships between cancer type, number of treatments, and health-related quality of life (HRQOL) in 115 long-term cancer survivors. Cancer type and time since diagnosis have been studied extensively to better understand the relationship between these factors and HRQOL (Carver, et al., 2006; Cimprich, et al., 2002; Hannah, et al., 1992; Sarna, et al., 2004). In addition, many prior studies have considered the link between treatment type and HRQOL (Bloom, et al., 2007; Carver, et al., 2006; Deimling, et al., 2006; Greimel, Winter, Kapp, & Haas, 2009; Joseph, 2006; Norum and Wist, 1996; Rusiewicz, 2008).

Cancer type and the treatments received can affect quality of life not only at the time an individual is undergoing treatment but also months and years after diagnosis through various long-term side effects and late effects (Bloom, et al., 2007; Phipps, et al., 2008). Treatments including chemotherapy, radiation, surgery, hormone therapy, bone marrow transplant, and other systemic treatments can lead to changes in health-related quality of life (Bloom, et al., 2007; Carver, et al., 2006; Deimling, et al., 2006; Greimel, Winter, Kapp, & Haas, 2009; Joseph, 2006; Norum and Wist, 1996; Rusiewicz, 2008). In the current study, two hypotheses were investigated to explore HRQOL in long-term
cancer survivors. Results were mixed. Some aspects of the hypotheses were supported and others were not.

*Cancer Type*

In the first hypothesis, differences in HRQOL between long-term survivors of colorectal, breast, and prostate cancer were hypothesized. Cancer type was demonstrated to be a significant factor in HRQOL scores. In pairwise comparisons, breast cancer survivors had significantly higher scores on social well-being than prostate cancer survivors. Also during pairwise comparisons, prostate cancer survivors demonstrated significantly higher scores on psychological well-being than breast cancer survivors.

*Overall HRQOL*

The first hypothesis suggests that there would be differences in the HRQOL of the cancer type groups. The researcher anticipated that there may be differences between cancer type due to differences in treatment and prognosis. Based upon prior research which found that lung cancer survivors have lower psychological and/or functional well-being than other cancer survivors (Schag, et al., 1994; Wan, et al., 1999), the researcher anticipated that lung cancer survivors might have lower psychological, functional, and physical well-being than the survivors of other cancer types, especially due to the low long-term survival rates of lung cancer (Ringdal, Ringdal, Kvinnsland, and Gotestam, 1994). However, due to low response rates and the resulting small sample size of lung cancer survivors, the analyses did not include lung cancer survivors.

*Physical HRQOL*

Based upon the first hypothesis of differences in HRQOL based upon diagnosis, it was thought that there might be differences in physical HRQOL based upon cancer type.
No statistically significant differences were found between the cancer type groups on the physical HRQOL measure; thus, the first hypothesis was not supported. In addition, though it was not stated explicitly as part of the hypotheses, the researcher anticipated that colorectal survivors might have lower physical HRQOL based upon long-term side effects of the common surgical treatments for that cancer type. The first hypothesis was not supported when findings revealed that there were no significant physical differences in the cancer types. Rosenfeld, et al. (2004) and Steginga, et al. (2009) found higher cancer stage to be linked to lower physical well-being in prostate and colorectal cancer survivors. However, in the current study few higher-staged survivors responded. It could be that differences do exist based upon cancer type and stage but that these differences were not tapped by the current study.

**Psychological HRQOL**

Similarly, the first hypothesis stated that there would be differences in HRQOL based upon diagnosis, and thus that psychological differences might be found based upon cancer type. Though it was not stated explicitly as part of the hypotheses, the researcher anticipated that breast and prostate cancer survivors might have better psychological HRQOL than colorectal cancer survivors who have lower long-term survival rates. Again, this was found to not be the case; no statistically significant differences were found based upon cancer type. This is different from the findings of Brintzenhofe-Szoc and colleagues (2009) who found that breast cancer survivors had lower levels of anxiety and depression than survivors of other cancer types. However, during pairwise comparisons, it was found that prostate cancer survivors had better psychological well-being than breast cancer survivors. This may be due to the better long-term survival rate.
for prostate cancer, as Ringdal, et al. (1994) had previously suggested a link between prognosis and psychological functioning.

**Social HRQOL**

On social well-being, the first hypothesis was also not supported; no differences in HRQOL were found based upon diagnosis. However, during pairwise comparisons, breast cancer survivors reported significantly higher scores than prostate survivors.

**Spiritual HRQOL**

The first hypothesis was also not supported by findings in spiritual HRQOL; differences in HRQOL were not found based upon diagnosis. Helgeson and Tomich (2005) found that breast cancer survivors reported more faith than the individuals in the healthy control group, however, in the current study, breast cancer survivors did not report spiritual well-being that differed from the other cancer survivors in the sample. No differences were found in pairwise comparisons of spiritual well-being.

**Number of Treatment Types**

In the second hypothesis, differences in HRQOL associated with the number of treatments undergone by adult-onset, long-term cancer survivors were hypothesized. In findings of the second hypothesis, no statistically significant differences were found. Few other studies found during the literature review considered number of treatments and their potential effect on HRQOL. Initially, the current study had hoped to consider differences between individuals who had received one, two, three, or four different types of treatment (i.e. surgery, chemotherapy, radiation, and hormone therapies). However, a low response rates from individuals who had undergone three or four treatments was received and thus, the analyses which included higher numbers of treatment type was not completed. It
could be that significant differences may have been found had the response rate for these groups been higher. However, no differences between one and two types of treatment were found.

*Overall HRQOL*

The second hypothesis suggested that there would be differences in HRQOL of the number of treatment types groups. However, this was not supported by the results of overall HQQOL. Any overall HRQOL differences were not statistically significant. It was also thought that due to the differences in treatment protocols that cancer type might affect both number of treatment types and HRQOL. This was also not supported by the findings. No differences between groups who had had one and two types of treatment were found.

*Physical HRQOL*

The second hypothesis asserted that there would be differences in HRQOL based upon number of treatment types, perhaps demonstrating differences in physical HRQOL. The researcher anticipated that increased number of treatment types would lower physical functioning. In other words, having to have three or four treatment types versus one or two would negatively impact physical HRQOL for individuals with any of the four cancer types. However, this was not supported by the findings in the current study as these analyses were not completed. No differences between one and two types of treatment were found.

*Psychological HRQOL*

The second hypothesis stated that HRQOL differences would be found based upon number of treatment types which might have been demonstrated in differences in
psychological HRQOL. The researcher anticipated that having higher number of
treatment types might be linked to lower HRQOL; however, this was with the idea of
considering individuals who had had between one and four types of treatment. Again, this
could not be tested. However, no statistically significant differences were found based
upon one or two number of treatment types. It was thought that having more treatment
types might increase the number of long-term side effects or late effects. Deimling, et al.
(2006) found that individuals who continued to have symptoms from their treatment were
more likely to have concerns about a recurrence or secondary cancer diagnosis.
Deimling, et al. (2006) also found that these continued fears may be linked to depression
and anxiety symptoms in older adults. However, in the current study, no differences were
found based upon having one or two types of treatment, and therefore the hypothesis was
not supported.

*Social HRQOL*

The second hypothesis was also not supported by findings related to social
HRQOL based upon one or two types of treatment. Again, perhaps if the response rate
for individuals who had had higher numbers of types of treatment had been higher,
significant differences would have been found; however, this could not be assessed in the
current study.

*Spiritual HRQOL*

In addition, the second hypothesis was not supported by findings related to
spiritual HRQOL. Differences based upon number of treatment types did not exist
between the two levels of the number of treatment types group. Although certainly
different in several ways than the current study, researchers concentrating on low-income
men who had been diagnosed with metastatic prostate cancer found a link between higher levels of spirituality and better HRQOL and psychosocial well-being (Zavala, et al., 2009). In their study, a high percentage of the men studied were members of a minority (Zavala, et al., 2009). However, number of treatment types was not considered in the Zavala (2009) study and stage of cancer was not considered in the current study.

**Strengths and Limitations**

The current study has a number of strengths and weaknesses which should be noted. One of the strengths is its addition to the body of literature regarding long-term cancer survivorship and quality of life factors. In addition, few prior studies have considered long-term survivors with mixed cancers. Although long-term cancer survivorship has gained increased attention, many studies have focused upon breast cancer patients rather than including other cancer types. The current study considers breast, prostate, and colorectal cancer survivors. In addition, few studies considered the relationship of the number of cancer treatment types and HRQOL. A further strength of the present study is that it may aid a variety of health professionals in understanding the needs of long-term cancer survivors and quality of life issues.

Another strength of the current study is the inclusion of two cancer types which are typically gender-specific: prostate cancer and breast cancer (which has a very low percentage of men diagnosed). In the current study, only female breast cancer survivors responded, and of course, only male prostate cancer survivors responded. The juxtaposition of these two cancer types also allows for studying gender differences in cancer types which both have relatively high long-term survival rates. Comparisons of differences in the HRQOL of prostate and breast cancer patients has been studied.
previously (Bloom, et al. (2007; Ullrich, Rothrock, Lutgendorf, Jochimsen, & Williams, 2008). During a matched study of prostate and breast cancer patients who were nearly four years post-surgery, Ullrich, Rothrock, Lutgendorf, Jochimsen, and Williams (2008) found that prostate and breast cancer survivors had a low frequency in discussion of their cancer diagnosis with individuals in their lives “with a mean of 1.24 on a scale where 1 indicates ‘no discussion’” (p. 396). However, the types of discussions these patients did have varied based on cancer type (Ullrich, Rothrock, Lutgendorf, Jochimsen, & Williams, 2008). The prostate cancer survivors more frequently discussed sexual issues, while breast cancer survivors were more likely to discuss the possibility of future treatments and changes in physical health (Ullrich, Rothrock, Lutgendorf, Jochimsen, & Williams, 2008). Bloom, et al. (2007) found that breast cancer survivors reported improved HRQOL with increased time while prostate cancer survivors reported decreased HRQOL over time.

In the present study, significant differences between the HRQOL of prostate and breast cancer survivors were found. Prostate cancer survivors were found to have higher psychological well-being scores than breast cancer survivors, while breast cancer survivors were found to have higher social well-being scores than prostate cancer survivors. Differences in psychological well-being may be due to the wide-spread knowledge that prostate cancer has a high 5-year survival rate. Although both diseases have fairly similar rates of diagnosis, fewer individuals die of prostate cancer (Horner, et al., 2008) and prostate cancer is considered to be a less aggressive type of cancer than breast cancer and frequent “treatment” for prostate cancer includes “watchful waiting” (American Cancer Society, 2009; National Cancer Institute, 2009). In addition, in the
current study, the breast cancer survivors were significantly younger than the prostate cancer group (with mean ages of 67.58 and 74.32, respectively) which may in part help explain the psychological well-being difference found.

Age has been well-studied as a factor in cancer-related quality of life and may be an important factor in explaining the psychological well-being HRQOL differences found in the current study between prostate and breast cancer survivors. In their study of breast cancer patients, Carver, et al. (2006) found that younger women had lower well-being on a variety of factors when compared to their older counterparts. Similarly, Mehnert, Berg, Henrich, and Herschbach (2009) found that younger breast cancer survivors were more likely to have fear of cancer progression than older survivors. In studies involving ovarian cancer, Arden-Close, Gidron, and Moss-Morris (2008) found that younger women were more likely to have anxiety and depression than older women. In their study of long-term cancer survivors of mixed cancer types, Zebrack, Yi, Petersen, and Ganz (2008) found older individuals to have “better overall QOL and mental health” (p. 891). Thus, perhaps some of the psychological well-being differences in the current study may also be explained by the age difference of nearly seven years between the prostate and breast cancer groups as older individuals may find a diagnosis less disruptive than the younger survivors.

Pairwise comparisons in the current study also demonstrated that the breast cancer group had higher social HRQOL than the prostate cancer group. It is also well known that perceived availability is an important component of social support. Perhaps because of the huge public support and recognition of breast cancer (Race for the Cure, Susan G. Komen Breast Cancer Foundation, National Breast Cancer Foundation, the general
public’s awareness of the meaning of the pink ribbon, etc.), breast cancer survivors feel
greater levels of social support. In addition, men are less likely to utilize cancer support
groups (Ginossar, 2008; Lieberman, 2008). In their study of 289 cancer patients in
support groups, Lieberman, Golant, and Altman (2004) found that seventy percent of
participants were female. Thus, women are more likely to gain additional social support
from support groups. Men with prostate cancer are more likely to utilize support groups
when they have weak social support (Voerman, et al., 2007). In prior study, Bloom, et al.
(2007) found that long-term survivors of prostate cancer frequently must cope with
urinary, sexual, and bowel dysfunction, all of which may affect social well-being. Related
to how social well-being may be affected in men with cancer, Helgeson and Lepore
(1997) considered:

how two male gender-related traits, agency (focus on self) and unmitigated
agency (focus on self to the exclusion of others), were related to physical and
emotional functioning in 162 48–84 yr olds treated for prostate cancer. As
predicted, unmitigated agency was associated with worse functioning and more
cancer-related difficulties. By contrast, agency was associated with better
functioning and fewer cancer-related difficulties. It was examined whether
difficulties expressing emotions explained these relations. Unmitigated agency
was associated with difficulty expressing emotions, and agency was associated
with the ability to express emotions. Results show that emotional expressiveness
mediated the relations of unmitigated agency and agency to adjustment to prostate
cancer (p. 251).
Weber, et al. (2007) found peer support to be beneficial for men who had undergone a radical prostatectomy. These researchers found the men who participated in peer-to-peer support had increased self-efficacy and QOL (Weber, et al., 2007). Additional research is needed to understand possible HRQOL differences between gender-specific cancer types.

As with all research, the current study also includes a number of limitations. One limitation of the present study is the use of self-reported data which was not verified through medical record review. Many of the individuals reported that they either did not remember the stage of their disease or reported that they had never been informed of their disease stage. In addition, some individuals failed to fully complete certain demographic information. Furthermore, the previous study from which this data was drawn included a demographic questionnaire and four separate surveys which were time-consuming and may have led to attrition. Additionally, the religious coping focus of the prior study may have deterred some individuals (perhaps those who are not religious or spiritual) from responding, leading to further attrition. The prior study included a response rate of 34.6% but due to focus on specific cancer populations and the lack of response from the groups of interest, the current study included 43.4% of the total respondents from the original study. Ganz, Land, Antonio and colleagues (2009) discussed the challenge of recruiting long-term cancer survivors for quality of life research. These researchers received completed interviews from 29% of the population they attempted to sample (Ganz, et al., 2009). Ganz, et al. (2009) cited a number of difficulties in recruiting long-term cancer survivors for research including lack of updated contact information, lack of participant interest, and lack of commitment from the cancer-treatment institutions. Ideally, not only would the response rate have been better from individuals representing the prostate,
colocecal, and lung cancer types and higher levels of number of treatment types, but also participants would have completed the questionnaires more fully. It was unfortunate to not have received responses from more than eight lung cancer survivors, as this group had to be dropped from analysis due to the low response rate. The same is true for the prostate and colorectal groups as the low response rate from individuals who had had three or four types of treatment led to the need to drop individuals with larger numbers of types of treatment. Furthermore, it is possible of course that because individuals were at least five years removed from their diagnosis they couldn’t easily remember specifics about their disease and treatment course. In addition, generalizability is limited due to utilization of a population from a single site. A further limitation in the current study includes having few individuals from ethnically diverse groups, which is consistent with other research conducted.

Another limitation of the current study is the disproportionate number of breast cancer survivors who responded compared to survivors of other cancer types. It was hoped that larger numbers of prostate, colorectal, and lung cancer survivors would respond to the study; however, only a small number of respondents met this criteria. This could be due to a number of factors, including gender, continued health problems, such as low energy, which may have kept them from completing the four surveys and demographic questionnaire, and/or mortality. The response rate could be skewed by the fact that lung and colorectal cancer survivors have a lower long-term survival rate than breast and prostate cancer survivors.
Counseling Implications

The current study adds to the growing long-term cancer survivor research base and includes implications for counseling. The current study confirms the idea that there may be differences in HRQOL based upon cancer type. Psycho-oncology counselors should discuss with their clients how HRQOL has been affected by their cancer diagnosis in the physical, psychological, social, and spiritual realms. Counselors working with cancer patients should be aware that there may be dramatic differences in HRQOL based upon a number of variables (including cancer type and cancer treatments). For instance, counselors working with prostate cancer survivors may discuss current levels of social support and support groups such as Man-to-Man (Smith, Crane, Byers, & Nelson-Marten, 2002). In addition, counselors working with colorectal and prostate cancer survivors may discuss sexual functioning to discern whether or not this might affect their social well-being as prior study has demonstrated that these cancer diagnoses and the associated treatments may lead to decreased sexual function (Bloom, et al., 2007; Phipps, et al., 2008), a factor assessed on the QOL-CS social well-being subscale (Ferrell, et al., 1995). Likewise, also addressed by the QOL-CS social well-being (Ferrell, et al., 1995) individuals with prostate and colorectal cancer may feel more isolated than breast cancer patients who as previously mentioned have enormous public support and recognition. The findings in the current study can help remind counselors to address differences between cancer groups.

Summary

With increasing numbers of long-term cancer survivors in the United States, long-term survivorship issues have received and will continue to receive research attention.
Much of the information that has become the foundation for cancer survivorship information has been based upon studies which focus upon a limited number of cancer types, most typically breast cancer. The current study focused upon the relationship between HRQOL and cancer type and number of treatment types in long-term survivors of breast, prostate, colon, or lung cancer. It was hypothesized that there would be differences in HRQOL based upon cancer type and also differences based upon the number of treatment types individuals had undergone. Significant differences did exist based upon cancer type, but no differences were found based upon number of treatment types and the interaction. However, the statistical analyses were hindered by the low response rates of individuals who had had three or four types of treatment and lung cancer. Future research may include matched groups to further consider differences among the cancer types and different treatment regimens. Additional research is needed to address the relationship between number of treatment types, number of overall treatments, type of treatment and HRQOL. In addition, the relationship between ethnicity and HRQOL should continue to be considered in future research, especially as their relationship relates to health disparities. Such research could then be used to assist cancer survivors and their medical teams in decision-making as well as help to guide psychoeducation for cancer patients so that they can be informed of and prepared for long-term side effects and late effects which may later affect their health-related quality of life. That the effects of receiving a diagnosis of cancer and treatment for the diagnosis may continue in the long-term cancer survivor is now well-recognized (American Cancer Society, 2009; Bloom, et al., 2007; Phipps, et al., 2008). The current study supports the
idea that differences based upon cancer type are related to the health-related quality of life in long-term cancer survivors.
References


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Appendix A: General Information Questionnaire

1. What is today’s date? _______________________________

2. What is your date of birth? ____ ____ ____
   month day year

3. How old are you today? ____ years

4. What is your sex? (1)____ male (0)_____ female

5. What is your marital status?
   ____ (0) single, never married
   ____ (1) married
   ____ (2) divorced
   ____ (3) widowed
   ____ (4) separated
   ____ (5) Other: ___________

6. What is your race/ethnicity?
   ____ (0) Caucasian/White
   ____ (1) African American/Black
   ____ (2) Latino/Latina/Hispanic
   ____ (3) Asian American
   ____ (4) Other, please specify: ______________

7. Do you consider yourself a Christian? (1) ___ Yes  (0) ____ No

8. If so, what denomination: ________________________

9. How long have you been a Christian? _______

10. How many times a week do you attend religious activities? _______

11. How many times a month do you attend religious activities? _______

12. Did your involvement in religious activities change after you were diagnosed with cancer?
   ___ (0) No ___ (1) Yes

   **DIAGNOSIS AND TYPE OF CANCER**

13. When were you first diagnosed with cancer? If uncertain, give approximate date.
   ____/____/____
   Month Day Year

14. With which type of cancer were you diagnosed (e.g., breast, prostate, lung)?
   ____________________
   (Write type of cancer here)
15. Has a doctor ever told you the stage of your cancer? (1) ___ Yes (0) ____ No

16. If so, what was the stage?
   _____ stage 0
   _____ stage I
   _____ stage II
   _____ stage III
   _____ stage IV
   _____ no stage
   _____ Don’t know/remember

17. Was this your first diagnosis of any type of cancer (other than skin cancers)?
   _____ (1)Yes  _____ (0) No
   • If no, when were you previously diagnosed?
     ____/____/____
     Month  Day  Year
   • If no, with what type of cancer were you previously diagnosed?
     _______________________
     (Write type of cancer here)

CANCER TREATMENTS

18. Are you currently receiving treatment for you cancer? _____ (1) Yes _____ (0) No

19. If yes, what type of treatment(s) are you currently receiving (check all apply)

   _____ (1) surgery
   _____ (2) chemotherapy
   _____ (3) radiation therapy
   _____ (4) hormonal therapy
   _____ (5) other: ___________
     (specify type)

20. If no, what type of treatment(s) have you ever received? (check all that apply)

   _____ (1) surgery
   _____ (2) chemotherapy
   _____ (3) radiation therapy
   _____ (4) hormonal therapy
   _____ (5) other: ___________
     (specify type)
21. Has your doctor ever told you that you are “cancer free”? ___ (1) Yes  ___ (0) No

22. What is the current status of your disease? ___ (0) Remission ___ (1) Recurrence ___(2) Don’t Know

THANK YOU VERY MUCH. PLEASE CONTINUE TO COMPLETE THE NEXT QUESTIONNAIRE.
Appendix B: Quality of Life-Cancer Survivor

Directions: We are interested in knowing how your experience of having cancer affects your Quality of Life. Please answer all of the following questions based on your life at this time.

Please circle the number of 0-10 that best describes your experiences:

*Physical Well being*

To what extent are the following a problem for you:

1. Fatigue
   
   no problem  0 1 2 3 4 5 6 7 8 9 10  severe problem

2. Appetite
   
   no problem  0 1 2 3 4 5 6 7 8 9 10  severe problem

3. Aches or pain
   
   no problem  0 1 2 3 4 5 6 7 8 9 10  severe problem

4. Sleep changes
   
   no problem  0 1 2 3 4 5 6 7 8 9 10  severe problem

5. Constipation
   
   no problem  0 1 2 3 4 5 6 7 8 9 10  severe problem

6. Nausea
   
   no problem  0 1 2 3 4 5 6 7 8 9 10  severe problem

7. Menstrual changes or fertility
   
   no problem  0 1 2 3 4 5 6 7 8 9 10  severe problem
8. Rate your overall physical health

**extremely poor** 0 1 2 3 4 5 6 7 8 9 10  **excellent**

*Psychological Well being*

9. How difficult is it for you to **cope** today as a result of your disease and treatment?

**not at all difficult** 0 1 2 3 4 5 6 7 8 9 10  **very difficult**

10. How good is your quality of life?

**extremely poor** 0 1 2 3 4 5 6 7 8 9 10  **excellent**

11. How much **happiness** do you feel?

**not at all** 0 1 2 3 4 5 6 7 8 9 10  **a great deal**

12. Do you feel like you are **in control** of things in your life?

**not at all** 0 1 2 3 4 5 6 7 8 9 10  **completely**

13. How satisfying is your life?

**not at all** 0 1 2 3 4 5 6 7 8 9 10  **completely**

14. How is your present ability to **concentrate or to remember** things?

**extremely poor** 0 1 2 3 4 5 6 7 8 9 10  **excellent**

15. How useful do you feel?

**not at all** 0 1 2 3 4 5 6 7 8 9 10  **extremely**

16. Has your illness or treatment caused changes in your **appearance**?

**not at all** 0 1 2 3 4 5 6 7 8 9 10  **extremely**
17. Has your illness or treatment caused changes in your self concept (the way you see yourself)?

not at all 0 1 2 3 4 5 6 7 8 9 10 extremely

How distressing were the following aspects of your illness and treatment?

18. Initial diagnosis

not at all distressing 0 1 2 3 4 5 6 7 8 9 10 very distressing

19. Cancer treatment (i.e. chemotherapy, radiation, or surgery)

not at all distressing 0 1 2 3 4 5 6 7 8 9 10 very distressing

20. Time since my treatment was completed

not at all distressing 0 1 2 3 4 5 6 7 8 9 10 very distressing

21. How much anxiety do you have?

none at all 0 1 2 3 4 5 6 7 8 9 10 a great deal

22. How much depression do you have?

none at all 0 1 2 3 4 5 6 7 8 9 10 a great deal

To what extent are you fearful of:

23. Future diagnostic tests

no fear 0 1 2 3 4 5 6 7 8 9 10 extreme fear

24. A second cancer?

no fear 0 1 2 3 4 5 6 7 8 9 10 extreme fear
25. **Recurrence** of your cancer?

no fear   0 1 2 3 4 5 6 7 8 9 10  extreme fear

26. **Spreading (metastasis)** of your cancer?

no fear   0 1 2 3 4 5 6 7 8 9 10  extreme fear

**Social Concerns**

27. How distressing has illness been for your **family**?

not at all   0 1 2 3 4 5 6 7 8 9 10  a great deal

28. Is the amount of **support** you receive from others sufficient to meet your needs?

not at all   0 1 2 3 4 5 6 7 8 9 10  a great deal

29. Is your continuing health care interfering with your **personal relationships**?

not at all   0 1 2 3 4 5 6 7 8 9 10  a great deal

30. Is your **sexuality** impacted by your illness?

not at all   0 1 2 3 4 5 6 7 8 9 10  a great deal

31. To what degree has your illness and treatment interfered with your **employment**?

no problem   0 1 2 3 4 5 6 7 8 9 10  severe problem

32. To what degree has your illness and treatment interfered with your **activities at home**?

no problem   0 1 2 3 4 5 6 7 8 9 10  severe problem

33. How much **isolation** do you feel is caused by your illness or treatment?

none   0 1 2 3 4 5 6 7 8 9 10  a great deal
34. How much **financial burden** have you incurred as a result of your illness and treatment?

   none   0 1 2 3 4 5 6 7 8 9 10  a great deal

**Spiritual Well Being**

35. How important to you is your participation in **religious activities** such as praying, going to church?

   not at all important   0 1 2 3 4 5 6 7 8 9 10  very important

36. How important to you are other **spiritual activities** such as meditation?

   not at all important   0 1 2 3 4 5 6 7 8 9 10  very important

37. How much has your **spiritual life** changed as a result of cancer diagnosis?

   less important   0 1 2 3 4 5 6 7 8 9 10  more important

38. How much **uncertainty** do you feel about your future?

   not at all uncertain   0 1 2 3 4 5 6 7 8 9 10  very uncertain

39. To what extent has your illness made **positive changes** in your life?

   not at all   0 1 2 3 4 5 6 7 8 9 10  a great deal

40. Do you sense a purpose/mission for your life or a reason for being alive?

   not at all   0 1 2 3 4 5 6 7 8 9 10  a great deal

41. How hopeful do you feel?

   not at all hopeful   0 1 2 3 4 5 6 7 8 9 10  very hopeful