

PSYCHOSOCIAL FACTORS AND SURVIVAL IN WOMEN WITH EARLY STAGE
ENDOMETRIAL CANCER

By

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To my family

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Abstract of Thesis Presented to the Graduate School
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Psychosocial factors have previously been linked with survival and mortality in cancer populations. Research suggests that quality of life, social support, and coping in the pre-surgical period are related to better health outcomes and survival while depression and life stress are associated with mortality across several cancer types. Little evidence is available about the influence of these factors on outcomes in gynecologic cancer populations, particularly endometrial cancer, the 4th most common cancer among women. This study examines the relationship between several psychosocial factors at the pre-surgical period and survival and all-cause mortality in women with endometrial cancer. Participants were 76 women (M age=60.28 yrs, SD age=9.39 yrs) who were diagnosed with Stages I-III endometrial cancer and subsequently underwent surgery. Of this sample, 17 women have died and the remaining 59 have reached 4-5 year survival since diagnosis. In a Cox survival analysis, controlling for tumor stage and age, known biomedical prognostic factors, an active coping style assessed by the Brief COPE ($M = 8.78$, $SD = 2.27$) was significantly associated with a lower risk of all-cause mortality, Hazard Ratio (HR)=0.77, $p=.03$.

Depression, life stress, self-distraction, emotional support, and quality of life in the preoperative period were not significantly associated with survival or all-cause mortality 4-5 years following diagnosis. The active coping finding lends support to the hypothesis that, among women with endometrial cancer, coping strategies may be predictive of survival outcomes. Future research should attempt to replicate these relationships in a larger and more representative sample.

CHAPTER 1 INTRODUCTION

Epidemiology and Treatment of Endometrial Cancer

Endometrial cancer is a type of uterine cancer that affects the endometrium, or the lining of the uterus. It is the most common gynecologic cancer, the fourth most common type of cancer affecting women, and the eighth leading cause of cancer-related death among women in the United States. As of 2008, it was estimated that approximately 573,300 women in the United States had a history of endometrial cancer (Howlader et al., 2011). The American Cancer Society estimated that in 2011, approximately 46,470 new cases of endometrial cancer would be diagnosed and approximately 8,120 women would die from endometrial cancer. The cancer-specific five-year survival rate for women diagnosed with endometrial cancer is 83.5% (Howlader et al., 2011), while the all-cause five-year survival rate for women diagnosed with earlier stages (Stages I-III), when there is only local or regional spread of disease, is approximately 68% (American Cancer Society, 2011). Although the overall five year survival rate for endometrial cancer exceeds that of ovarian cancer (the fifth leading cause of cancer-related death among women), the five-year survival rates for both cancers are virtually equivalent by stage of disease (American Cancer Society, 2011). The better overall five-year survival rate for endometrial cancer is largely due to the fact that most endometrial cancers are diagnosed at an early stage and are of endometrioid origin. Endometrioid adenocarcinomas, the so-called Type I endometrial cancers, have an overall excellent prognosis and, when found early, can be treated solely with total abdominal hysterectomy with bilateral salpingo oophorectomy (TAH-BSO), or the surgical removal of the uterus, fallopian tubes, and ovaries. Early stage endometrioid adenocarcinomas

do not generally require adjuvant therapy, such as chemotherapy or radiation.

Endometrioid adenocarcinomas are primarily diagnosed in women over the age of 50, with the risk for developing cancer increasing with age. Other risk factors for developing endometrial adenocarcinoma include obesity, diabetes, receiving estrogen treatments, never giving birth, and late menopause (American Cancer Society, 2011).

While endometrioid adenocarcinomas are by far the most common histologic subtype, other adenocarcinoma subtypes exist. Clear cell, papillary serous, and mucinous adenocarcinomas, the so-called Type II endometrial cancers, share features with ovarian adenocarcinomas. As such, they tend to be more aggressive and resistant to treatment, have poorer prognoses, and require adjuvant therapy at even early stages.

Psychosocial Factors and Clinical Outcomes in Cancer

Although the biological factors that influence disease progression and mortality in cancer have been well-studied, a growing body of research has begun to focus on biobehavioral and psychosocial factors that influence clinical outcomes in cancer populations. Antoni et al. (2006) presented a model describing biobehavioral influences on tumor physiology and the mechanisms by which these influences occur. Influenced heavily by the Transactional Model of Stress and Coping proposed by Lazarus and Folkman (1984), Antoni et al. (2006) posit that stress-related alterations in mood may influence cancer initiation, progression, treatment response, recurrence, metastasis, and survival via dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis and cell mediated immunity. Moreover, this model hypothesizes that coping strategies may moderate the effects of stress perceptions on mood, such that adaptive coping may ameliorate these effects while maladaptive coping may enhance these effects.

Stressful Life Events and Cancer Outcomes

Relationships among perceived stress, neuroendocrine/immune factors associated with tumorigenesis, and clinical outcomes in cancer have been increasingly examined in the literature. The perceived impact of stressful events is an individual's interpretation of the degree of stress he or she experiences as a result of an event, such as chronic illness, death of a family member, or a financial stressor. Lutgendorf et al. (2008) collected data on perceived stress, mood, and physiological variables in 56 women diagnosed with ovarian cancer. The findings demonstrated that women with higher levels of chronic stress showed higher expression of physiological factors that are known to lead to tumor progression in ovarian cancer. Stress is not only a factor in disease progression in gynecologic cancer, but may also contribute to cancer initiation, particularly among immunosuppressed individuals with virally-initiated cancers. Looking at the aforementioned model of stress on gynecologic cancer incidence, Pereira et al. (2003) followed 32 HIV-positive women for one year and looked at the relationship between life stress and persistent/progressive squamous intraepithelial lesions (SIL), a precursor to cervical cancer. The results indicated that higher life stress greatly increased the odds of having persistent/progressive SIL during the follow-up period. Subsequently, Antoni et al. (2008) tested a Cognitive Behavioral Stress Management intervention to help HIV-positive women effectively manage the experience of stress. Participants in the intervention reported significantly reduced impact of negative life events and were significantly less likely to have cervical intraepithelial neoplasia (CIN) over a nine-month follow-up period than those who did not participate in the intervention. This research suggests that although life stress is associated greater odds

of cervical precancer in HIV-positive women populations, interventions that teach stress management and coping strategies may buffer this relationship.

Several studies have examined stress and cancer outcomes in breast cancer, the most common cancer among women and the second leading cause of cancer-related death among women in the U.S. This research has found that the experience of a traumatic or stressful event or persistent stressor is associated with a shorter disease-free interval following treatment (Palesh et al., 2007) and increased risk of recurrence (Ramirez et al., 1989) among women with breast cancer. However, Graham et al. (2002) and Barraclough et al. (1992) followed 170 and 204 breast cancer patients, respectively, for two to five years and found no increased risk of recurrence associated with stressful life events prior to diagnosis. Although the research demonstrating a relationship between stress and clinical outcomes in cancer has been inconsistent, it suggests that stress remains an important factor to study, particularly in populations at risk for cancer incidence. Table 1-1 summarizes reported hazard and risk ratios in studies examining the relationship between psychosocial factors and clinical outcomes.

Mood and Cancer Outcomes

With regard to other psychosocial factors, the majority of research has focused on the relationship between mood, particularly depression, and cancer outcomes. Symptoms of depression include depressed mood, loss of appetite, sleep difficulty, and loss of interest in activities. Meta-analyses and review articles have shown that greater depressive symptoms predict increased mortality across several cancer populations. Pinquart and Duberstein (2010) conducted a meta-analysis of 76 studies and found that depressive symptoms were significantly associated with increased relative risk of mortality in leukemia/lymphoma, breast, lung, and brain cancer. Follow-up times ranged

from under 2 years to greater than 6 years, but there was no difference in the strength of association between depression and mortality; however, older age strengthened the relationship. Onitilo, Nietart, and Egede (2006) looked at over 10,000 patients in a population-based epidemiological database; patients with a variety of cancer diagnoses and healthy controls were followed for an average of 8 years. Findings indicated that patients with both cancer and depression had much higher odds of all-cause mortality than cancer patients without depression and individuals with just depression. The study also examined all-cause mortality by cancer site, comparing depressed to non-depressed samples. The findings were not significant but suggested a trend towards increased odds of mortality in depressed patients diagnosed with lung, breast, gastrointestinal, and skin cancers. Satin, Linden, and Phillips (2009) examined depression as a predictor of disease progression across several studies on breast cancer and melanoma. Findings revealed a nonsignificant trend for an association between greater depressive symptomatology and cancer progression. As a whole, the research on mood with regard to cancer outcomes suggests that there depression is associated with cancer survival and mortality.

Coping Strategies and Cancer Outcomes

There are several psychosocial factors that may moderate a relationship between stress/depressed mood and cancer outcomes, such as the aforementioned coping strategies, social support, and quality of life. With regard to coping, strategies frequently used by cancer patients include engaged or active coping and disengaged or avoidant coping (Priscilla et al., 2011; Costanzo, Lutgendorf, Rothrock, & Anderson, 2006; Schroevers, Kraaij, & Garnefski, 2011). To examine the relationship between coping strategies and mood, Costanzo et al.(2006) followed 64 women diagnosed with

gynecologic cancers (ovarian, endometrial, fallopian tube) who had undergone surgery approximately one year prior. They found that although frequent use of active coping was unrelated to mood, frequent use of avoidant strategies, particularly self-distraction or mental disengagement, was associated with greater anxiety and depressed mood at the one-year follow-up. Coping has also been examined in relationship to survival outcomes in cancer. Faller and Bülzebruck (2002) assessed coping strategies prior to treatment in 103 lung cancer patients and determined that a depressive coping style was linked with shorter survival while active coping was linked with longer survival over 10 years. Alternatively, Tian, Chen, and Hang (2009) found no significant association between coping and survival, but noted that avoidance and resignation trended toward an increased risk of mortality. This research supports the Transactional Model of Stress and Coping (1984), suggesting that coping strategies may moderate the relationship between the perception and impact of stress and cancer outcomes, including survival.

Social support, particularly having dependable social and emotional support, has also been linked with factors associated with disease progression and survival. In support of the model on biobehavioral factors related to tumor progression, ovarian cancer patients with high levels of social well-being (Lutgendorf et al., 2002) and social support (Lutgendorf et al., 2008) had lower levels of VEGF, a cytokine known to stimulate tumor growth. Several studies have also found that as the number of social supports (friends and family) increases, the risk of mortality in breast cancer decreases over four (Waxler-Morrison, Hislop, Mears, & Kan, 1991) and eight year follow-ups (Weihs et al., 2005). Concurrently, Ell et al. (1992) demonstrated that perceived adequacy of emotional support was a protective factor in localized breast, colorectal,

and lung cancer survival. Taken together, these data suggest that the number of social supports and perceived amount of positive emotional support may moderate the impact of cancer-related stress on biological and clinical outcomes in cancer, such as cancer progression and mortality risk.

Quality of Life and Cancer Outcomes

Finally, recent research has also begun to examine the relationship between quality of life and clinical outcomes in cancer patients, with the premise that better quality of life before diagnosis and treatment can predict survival. Global quality of life is comprised of several domains, including social, physical, and emotional well-being (Cella et al., 1993). Carey et al. (2008) found that, among 150 women diagnosed with ovarian cancer, better global quality of life prior to starting chemotherapy treatment was a significant independent predictor of both progression-free and overall survival up to two years later. However, in a systematic review of the literature across cancer types, Montazeri (2009) found inconsistent relationships between quality of life and clinical outcomes in cancer. In this review, 13 studies examining lung, breast, gastro-esophageal, and colorectal cancers established support for global quality of life as a significant predictor of survival, while 4 did not. Moreover, physical quality of life, specifically, was found to be a more consistent predictor of survival than global quality of life across 22 studies. Overall, these studies provide some support for the role of quality of life as an independent predictor of clinical outcomes in cancer.

Psychological Interventions and Cancer Outcomes

Furthermore, research suggests that implementing psychotherapeutic interventions that seek to reduce distress in cancer patients is associated with longer survival times and longer time to disease recurrence. Spiegel, Kraemer, Bloom, and

Gottheil (1989) examined the effects of a psychological intervention on women with metastatic breast cancer. Participants were either randomized to either a one-year intervention consisting of supportive therapy sessions once per week or a control group. After a 10 year follow-up, the results indicated that women in the intervention group survived on average twice as many months as those in the control group. Spiegel et al. suggested that increased social support and potentially increased compliance with treatment contributed to the longer survival times. Andersen et al. (2008) conducted a randomized clinical trial in which women undergoing treatment for breast cancer received both psychological assessment and intervention or assessment only. The intervention consisted of 26 small group sessions during which women learned strategies to reduce distress, improve mood and health related quality of life, as well as promote treatment adherence. Participants were followed for approximately 11 years after treatment and compared to the assessment only group, women who received the intervention were less likely to experience disease recurrence (HR = 0.55), disease-specific mortality (HR = 0.44), and all-cause mortality (HR = 0.51). Additionally, as mentioned previously, CBSM techniques have been shown to reduce stress perceptions and buffer the probability of having cervical precancer among immunosuppressed women infected with Human Papillomavirus (HPV), the virus that causes cervical cancer. Taken together, these studies provide some support for psychological interventions designed to reduce distress, improve mood/quality of life, and promote treatment adherence to buffer negative clinical outcomes in women with or at risk for cancer. In spite of this research, however, more research needs to be done on which

psychosocial mechanisms are associated with clinical outcomes in cancer in order to design effective psychosocial interventions.

Criticisms of the Literature

Despite the recent findings that psychosocial factors are related to clinical outcomes in cancer, current research has also become critical of the emergence of studies declaring that there is a relationship between psychosocial factors and cancer survival. Coyne et al. (2007) conducted a review of the literature on the effect of psychotherapy on cancer survival in order to explore methodological concerns and reporting of clinical trials. The authors stated that in order to make the claim that psychotherapy increases survival time, there has to be quality evidence that supports that claim. Coyne et al. (2007) reviewed 11 studies that have been used to support the claim that psychosocial interventions prolong survival and uncovered several flaws in study design and reporting of the results. Specifically, Coyne and colleagues discuss the following methodologic concerns: (a) survival was not an a priori end point for any of the studies reviewed, (b) several studies were underpowered for adequate survival analysis, (c) several studies evidenced bias in the initial sampling of participants and/or randomization, (d).statistical procedures were often inappropriately used and/or reported, (e) study designs and patient populations were very heterogeneous, and (f) studies that fail to find relationships between psychosocial factors and cancer survival are generally not submitted for publication or chosen for publication. Indeed, while small studies have demonstrated a relationship between positive psychology (fighting spirit, coping, benefit finding) and physical health, large studies and meta-analyses have produced only null results (Coyne & Tennen, 2010). Because of these methodologic concerns, Coyne and colleagues have argued that it was untenable (“bad science”) to

conclude that existing published research supports a relationship between psychosocial factors and cancer survival. In summary, future research that seeks to demonstrate a relationship between psychosocial and biobehavioral factors and survival outcomes should address these concerns in order to make valid conclusions based on appropriate study methodology.

Current Study

The relationship between psychosocial factors and survival outcomes have been studied primarily in breast, lung, head, and neck cancer populations. To date, comparatively little research has been conducted on the relationship between psychosocial factors and disease progression and survival in gynecologic adenocarcinomas. The existing research has focused on psychosocial factors, such as stress and social support, and their relationship to immune functioning associated with disease progression in ovarian cancer (Lutgendorf et al., 2002; Lutgendorf et al., 2008). Additional research has also shown that quality of life factors during treatment are prognostic factors for progression-free survival and overall survival in women with ovarian cancer (Carey et al., 2008). However, there is no known research linking psychosocial factors to outcomes in endometrial cancer, a cancer with substantial public health burden.

The purpose of the present study was to address the aforementioned criticisms and gaps in the literature by exploring the relationship between psychosocial factors and five-year survival in a study designed to assess psychosocial and immune factors in women diagnosed with endometrial cancer. Specifically, this study examined the relationship between pre-operative psychosocial factors and all-cause five-year mortality among women undergoing surgery for endometrial cancer. Although in the

literature coping and social support have been shown to moderate the relationship between stress and survival outcomes, the purpose of this study was to examine if any main effects exist in women with endometrial cancer before testing moderation, particularly since endometrial cancer has yet been unstudied in the literature. Additionally, the current study may not be adequately powered for testing moderation effects of coping and social support. Therefore, greater perceived negative impact of stressful events, depressive symptoms, and use of a self-distraction coping strategy during the pre-operative period were expected to be associated with a higher probability of all-cause mortality within five years after diagnosis. Additionally, greater quality of life, use of an active coping strategies, and emotional support during the preoperative period were expected to be associated with a lower probability of all-cause mortality within five years after diagnosis with endometrial cancer.

Table 1-1. Relationships between psychosocial factors and cancer clinical outcomes

Study	Construct	Population	HR	RR	95% CI
Barraclough et al. (1992)	Life stress	Breast	0.43		(0.23, 0.93)
Graham et al. (2002)	Life stress	Breast	1.01		(0.58, 1.74)
Ramirez et al. (1989)	Life stress	Breast		5.67	(1.57, 37.2)
Onitilo et al. (2006)	Depression	Mixed site	1.70		(1.35, 2.14)
Pinquart & Duberstein (2010)	Depression	Breast		1.18	(1.07, 1.29)
Satin et al. (2009)	Depression	Breast		1.23	(0.85, 1.77)
Faller & Bülzebruck (2002)	Active coping	Lung	0.72		(0.54, 0.98)
Tian et al. (2009)	Avoidant coping	Gastro-intestinal		1.07	(0.25, 4.66)
Ell et al. (1992)	Emotional Support	Breast	0.83		NR
Waxler-Morrison et al. (1991)	Social support	Breast	0.61		NR
Weihls et al. (2005)	Social Support	Breast	0.41		(0.21, 0.80)
Carey et al. (2008)	Global QOL	Ovarian	0.92		(0.86, 0.99)

HR = Hazard Ratio, RR = Relative Risk, NR = values not reported

CHAPTER 2 METHODS

Design

The current study utilized a nonexperimental, longitudinal design. Briefly, participants provided psychosocial data immediately prior to surgery for endometrial cancer. Data on the participants' survival status were collected five years after their date of diagnosis.

Participants

Participants for the present study were 76 women drawn from a larger, parent study ($N = 134$) jointly funded by the American Cancer Society Chris DiMarco Institutional Grant Award to the University of Florida (PI: W. Stratford May, MD, PhD; Project Leader: Deidre Pereira PhD) and the National Cancer Institute (PI: Deidre Pereira, Ph.D. R03 CA 117480). Participants were recruited and enrolled from 2004 until 2009. Inclusion criteria for the parent study were: (a) women with suspected primary endometrial cancer who were 18 or older, (b) undergoing a TAH-BSO or surgical resection, and (c) fluent in spoken English. Exclusion criteria were: (a) a diagnosis of recurrent endometrial cancer, (b) metastasis from another site, (c) undergoing pre-operative chemotherapy or radiotherapy, and (d) a current psychotic disorder or suicidal ideation. Participants from the parent study were included in the present study if they (a) had a diagnosis of primary endometrial cancer following surgery, (b) contributed at least partial psychosocial data prior to surgery, and (c) were confirmed to be deceased or alive at least 48 months following diagnosis.

Procedures

Participants for this study were recruited from the Gynecologic-Oncology Clinic at Shands at the University of Florida. Women who were potentially eligible for participation were identified during their pre-operative consultation visits with a medical team consisting of physicians, residents, and nurses. Patients who expressed interest in study participation to the medical staff met with a trained member of the research team to discuss study procedures and address subsequent questions and concerns. Following confirmation of interest in participation, the patient read and signed an Institutional Review Board (IRB) approved Informed Consent Form. Following consent and enrollment in the study, the participant underwent a brief psychiatric screening assessment. If the screening measure indicated a lack of either a psychotic disorder or suicidal ideation, the participant was then scheduled for a psychosocial interview and given questionnaires to complete prior to their next appointment. The psychosocial interview took place in a clinic room during their pre-operative visit to the Gynecologic Oncology Clinic. Upon completion of the psychosocial interview and collection of the questionnaires, participants received \$20 compensation to reimburse parking and transportation expenses. All study procedures were conducted in accordance with the rules and regulations of the University of Florida IRB.

Psychosocial Assessment

Depression

Depression was assessed using the Structured Interview guide for the Hamilton Anxiety/Depression Scales (SIGH-AD) (Williams, 1988), which assesses symptoms of depression and anxiety over the past week. This measure is a semi-structured interview based on the Hamilton Anxiety Scale and the Hamilton Depression Scale and has been

used in the past with medical populations (e.g., Cruess et al., 2000). The present study used an abbreviated version that consisted of a 15 item depression subscale and a nine item anxiety subscale, excluding items that may be associated with endometrial cancer symptomatology. For the purposes of the analysis, only the depression subscale was used in the present study. The minimum and maximum of possible scores ranges from 0 to 48 on the depression subscale.

Negative Impact of Stressful Life Events

Negative impact of stressful life events was assessed using a modified version (Pereira et al., 2010) of the Life Experiences Survey (Sarason, Johnson, & Siegel, 1978). This is a measure of life event stress occurring in the prior 6 months and the degree to which they were perceived as stressful. The LES has been tailored for use in chronically ill populations and is the most common life stress measure used in cancer outcome studies among women (Mandelblatt et al., 2004). The modified version is a 50-item questionnaire that assesses the following domains: changes in or problems with close relationships, death or illness among family and friends, work, finance, and insurance problems, illness, accidents, injury, crime and legal problems, and other life changes. The life events are rated for their perceived negative impact on a scale ranging from 0 (“not stressful”) to 4 (“extremely stressful”). The minimum and maximum of possible scores ranges from 0 to 200 on the perceived negative impact scale.

Coping

Coping strategies was assessed using the Brief COPE (Carver, 1997), which measures a variety of coping reactions. The Brief COPE is a 28-item questionnaire that has been used among cancer populations (Culver, Arena, Antoni & Carver, 2002). For the purposes of this study, it was used to assess the specific strategies that participants

utilized to cope with their suspected/confirmed cancer diagnosis. The measure contains between 11 and 14 subscales, including self-distraction, active coping, substance use, use of emotional support, acceptance, humor, planning, venting, religion, denial, behavioral disengagement, and positive reframing. Eleven of the subscales are comprised of two items each; the remaining six items address emotional support with regards to family or friends and can be used as one emotional support subscale or divided into the respective family and friends subscales. Response choices are on a scale ranging from 1 (“I haven’t been doing this at all”) to 4 (“I have been doing this a lot”). The minimum and maximum of possible scores ranges from 2 to 8 for two-item subscales and from 3 to 12 for three-item subscales.

Exploratory factor analysis was utilized to determine how the factor structure of the Brief COPE in the present sample. The resulting subscales were examined for strategies that typified adaptive and maladaptive coping reactions. One engaged, active coping scale and one disengaged, avoidant coping scale were used as psychosocial predictors in the analyses.

Quality of Life

Quality of life was assessed using the Functional Assessment of Cancer Therapy for Endometrial Cancer (FACT-En). The FACT was developed specifically for use in cancer populations for patients receiving treatment (Cella, 1993). The FACT-En is a 43-item questionnaire that assesses different domains of well-being, including physical, social, emotional, and functional well-being over the past week. Additionally, there is a subscale of items assessing physical concerns specific to endometrial cancer. Participants were asked to rate the extent to which each statement applied to them.

Response choices are on a scale ranging from 0 (“not at all”) to 4 (“very much”). The minimum and maximum of possible scores ranges from 0 to 172 for global quality of life.

Emotional Support

Emotional support was assessed using the Sources of Social Support Scale (SSSS; Carver, 2004), a measure of relational health. The SSSS is a 50-item questionnaire that has been used to measure social support in breast and prostate cancer populations, as well as endometrial cancer (Dodd, 2010). It assesses the frequency of emotional, tangible, and negative support received from spouse/partner, friends, adult women family members, other family members, and health care providers. Emotional support is assessed by a 20 item subscale. Response choices are on a scale ranging from 1 (“not at all”) to 5 (“a lot”). The minimum and maximum of possible scores ranges from 0 to 100 for the emotional support subscale.

Demographics

Participant demographic characteristics were assessed using a modified version of the MacArthur Sociodemographic Questionnaire (MSQ; Adler, Epel, Castellazzo, & Ickovics, 2000). Demographic variables from the MSQ used in subsequent analyses include items on race, ethnicity, level of education, occupation, and household income. The MSQ contains a measure of subjective socioeconomic status, in which participants indicate their perceived standing in terms of education, occupation, and income relative to society in the United States on a graphic ten-step ladder. For objective socioeconomic status, a composite variable comprised of education (years of education), household income, and occupation was created. The occupation variable was developed by categorizing professions into blue collar or service, clerical or self-employment, professional or managerial, and other (e.g., home-maker). Then, the

composite variable was created by standardizing each variable and taking their mean (Adler et al., 2000).

Longitudinal Survival Assessment

Follow-up procedures were completed five years after participants' diagnosis and subsequent surgery for endometrial cancer. In order to be eligible for the follow-up, participants had to complete some or all of the psychosocial assessment procedures at the pre-operative time point. Participant survival status was determined using outcome data obtained from the Oncology Data Center at Shands at the University of Florida. The cancer registry managed by the Oncology Data Center functions as a necessary component for Shands at UF to maintain its accreditation as a hospital cancer program by the American College of Surgeons. The information collected is available to medical staff, residents, medical students, and administrators for research and statistical analysis of the cancer experience at Shands (University of Florida Shands Cancer Center, 2010). The Oncology Data Center collects health data on all cancer patients diagnosed and/or treated at Shands at UF, including up to date information on the last date of contact, evidence of disease (e.g. progression or recurrence), and patient status (alive or deceased). Patient status information is collected and recorded following any patient contact with Shands at UF. For participants who did not have contact with Shands at UF through five years following their diagnosis, the Social Security Death Index (SSDI) was referenced to determine participant status. As cause of death could not accurately be determined from the Oncology Data Center or SSDI databases, all deaths were attributed to all-cause mortality.

Statistical Analyses

An *a priori* power analysis was conducted using PASS 11 statistical software (Hintze, 2011) based on values of effect size and event rates from the literature (American Cancer Society, 2011; Pinquart & Duberstein, 2010; Ontilio, et al., 2006; Satin, et al., 2009) to determine the number of participants needed to achieve adequate power for the survival analysis. This power analysis determined that for $B = .15$, P (event rate) = .32, $\alpha = .05$, a total of 78 participants would be needed to obtain power at .80. Given that 76 participants from the parent study (a) were ultimately diagnosed with endometrial cancer, (b) contributed at least partial psychosocial data, and (b) were confirmed to have expired or to be alive within 48 to 60 months following diagnoses, it was determined that the study was adequately powered, and statistical procedures were commenced.

Chi-square and t-tests were then conducted to determine whether the 76 participants from the parent study included in the current study significantly differed from those excluded from the current study on the following variables: demographic and biological variables, including age, perceived and objective socioeconomic status; tumor stage; tumor histology; Charlson Comorbidity Index scores; body mass index (BMI); and distance from residence to UF/Shands. Tumor stage was categorized as Stages I-II (local disease) or Stage III (regional disease) and tumor histology was categorized as endometrioid type or all other types (e.g. papillary serous, mucinous, etc.). The Charlson Comorbidity Index calculates the frequency of health comorbidities or the number of comorbid diseases, including cancer, diabetes, cardiovascular, pulmonary disease, etc. More severe disease, such as cancer and complicated diabetes, was given more weight than less severe disease.

Following this, the psychosocial data for the 76 included participants were examined for incomplete data. Chi-square and t-tests were conducted to determine whether the participants who had incomplete data differed from those with complete data on the aforementioned demographic and biological variables. Given that there were incomplete data, multiple imputation was used to predict plausible values for all missing data. Multiple imputation of incomplete data prevents list-wise deletion during the use of parametric statistics, which prevents the reduction in sample size and power and improves validity of inferences. A basic model illustrating the relationship among the psychosocial variables, relevant control variables, and survival outcome was created using the AMOS Version 19.0 statistical software (Arbuckle, 2010). The multiple imputation procedure uses all the covariates thought to be associated with the outcome variable, together with the interrelationships between variables to predict values for the missing data. Based on the relationships specified in the model and the existing values in the data, the program imputes numbers for the missing values, allowing for stochastic error. The imputation is performed ten times, resulting in ten complete datasets. Analyses were conducted on all ten datasets, and the results were averaged. Independent samples t-tests were conducted to determine whether the imputed values were significantly different from participant provided data.

Then, descriptive statistics were calculated on all variables of interest. The distributions of the psychosocial variables were examined for normality and were transformed, as needed, in order to allow for the use of parametric statistics.

In order to identify biobehavioral factors that may confound a significant relationship between psychosocial variables and survival outcome, several

demographic and health related variables were examined as potential control variables using Cox regression. These factors included age of participant at diagnosis, tumor type, tumor stage, BMI, and Charlson Comorbidity Index scores. Biobehavioral variables related to survival at $p < .10$ were retained as control variables in subsequent analyses.

Cox regression was performed to determine if psychosocial factors were significantly associated with probability of mortality five years post-diagnosis. The relationship between mortality and each psychosocial variable was tested separately using Cox regression adjusting for relevant biobehavioral variables. Additionally, Cox regression was performed on the completed cases, excluding the cases with missing data, in order to compare the results with the results based on multiple imputation.

CHAPTER 3 RESULTS

Sample Characteristics

A total of 134 women met the eligibility requirements for participation in the parent study and were subsequently enrolled. Fifty-eight women of these 134 women were excluded from the present study: 9 had a diagnosis of benign gynecologic disease; 22 were enrolled at their Gynecologic Oncology consultation visit but declined to participate further in study procedures at their pre-surgical visit, and therefore, had no psychosocial data; and 27 had not yet reached the 48 – 60 month required timepoint since their diagnosis with endometrial cancer. The remaining 76 women were ultimately diagnosed with endometrial cancer, contributed at least some psychosocial data, and were confirmed to have died or to be alive at 48 to 60 months post diagnosis (Figure 3-1). These 76 women were compared to the 27 women who had not yet reached 48 – 60 months post diagnosis to establish whether any significant differences existed between the two groups. Results revealed that the 27 women excluded were significantly older at diagnosis than the 76 women included, $t(101) = -2.00, p < .05$. No other significant differences emerged between these two groups on demographic or biological variables (Tables 3-1, 3-2). Given that the 22 women who declined participation did not complete any study measures, most comparative analyses could not be completed to determine whether they differed from the study sample of 76 women. However, a comparison of the number of miles between participants' residences and Shands at UF demonstrated that the current sample of 76 women lived significantly farther away from Shands at UF than the sample of 22 women who declined participation, $t(96) = 2.00, p < .05$. However, qualitative data on reasons for declining participation at the presurgical visit

indicated that most cited stress and being overwhelmed with the diagnosis and impending surgery as reasons for being unable to continue participation.

The 76 included participants ranged in age from 36 – 84 ($M = 60.3$ years, $SD = 9.4$ years). The majority of participants identified as Caucasian (90.8%) and a small subset identified as African-American (7.9%) or Hispanic/Latino (10.5%). Tumor stage was classified into two groups, Stages I-II and Stage III. The majority of the participants were diagnosed with Stages I-II endometrial cancer (85.5%) and the remainder with Stage III. Of the 76 participants, 59 (77.6%) survived 48 – 60 months post-diagnosis, while 17 (22.4%) were deceased within 5 years of diagnosis.

Associations among Control Variables and Patient Status

Tumor stage, specifically comparing Stage III disease to Stages I and II, and age at diagnosis were significantly associated with patient status, or the probability of mortality within 5 years post-diagnosis. Presence of regional disease was associated with a greater risk of mortality, $HR = 3.26$ (95% CI 1.15, 9.31), $p = .03$, as was older age at diagnosis, $HR = 1.05$ (95% CI .99, 1.10), $p = .07$. Thus, presence of regional disease and age were controlled for in the subsequent survival analyses. Tumor type, BMI, and Charlson Comorbidity Index scores were not significantly associated with patient status (Table 3-3).

Exploratory Factor Analysis – Brief COPE

Exploratory factor analyses were conducted to examine the factor structure of the Brief COPE within the current sample. Analyses were conducted on the 28 items using principal axis factoring with an oblique rotation (promax). An initial analysis was conducted to obtain eigenvalues for each component in the data. Nine factors had eigenvalues over Kaiser's criterion of 1.0 and in combination explained 65.7% of the

variance. One factor had an eigenvalue just below 1.0 (.977) and in combination with the other nine factors, explained 67.7% of the variance. Given that the ten-factor solution produced a more interpretable factor structure, the ten factors were retained in the final analysis.

The final analysis resulted in a ten-factor solution, with each factor composed of one to four items. Two factors were selected to represent an engaged, active coping strategy and a disengaged, avoidant coping strategy. Four items loaded onto a factor labeled “active coping:” “taking action” (.691), “coming up with a strategy or plan” (.623), “doing something about the situation” (.597), and “accepting reality” (.509). Guided by the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984), the first three items were deemed to represent active, problem-focused coping strategies, while “accepting reality” was deemed to represent a passive, emotion-focused coping strategy distinct from active coping. Thus, “accepting reality” was not included as an item within the active coping subscale. The disengaged, avoidant coping factor was composed of the following items: “turning to work” (.510) and “doing other activities to avoid thinking about it” (.674)., These items were deemed to represent mentally avoidant coping strategies, specifically, methods of self-distraction.

Multiple Imputation

The number of missing data for the psychosocial variables is summarized in Table 3-4. A comparison of the participants with and without missing data demonstrated no significant differences in age, socioeconomic status, distance from residence to Shands at UF, tumor stage, tumor type, BMI, or Charlson Comorbidity Index scores (Tables 3-5, 3-6). Given that there were no discernible factors that may have contributed to the cause of missingness, the data were determined to be missing at

random, thus allowing for the use of multiple imputation. The multiple imputation procedure used the following variables in the model: the observed variables include the psychosocial predictors of depression (continuous), negative impact of stress events (continuous), self-distraction (continuous), active coping (continuous), quality of life (continuous), emotional support (continuous), and the two control variables tumor stage (categorical) and age (continuous). The outcome variable was patient status, a categorical variable coded as alive or deceased. A comparison of the imputed data and the complete data demonstrated no significant differences in the means and standard deviations of each psychosocial variable (Table 3-7). Therefore, the imputed data were determined to be of the same distribution as the complete data.

Following multiple imputation, two psychosocial variables were found to be non-normally distributed. These included depression (Skewness = 1.159, SE = .089; Kurtosis = 2.413, SE = .177) and negative impact of stress events (Skewness = 2.185, SE = .089; Kurtosis = 5.765, SE = .177). As a result, the Blom transformation (Blom, 1958) was used to normalize the data in order to use parametric statistics. Following the transformation, the depression (Skewness = .032, SE = .089; Kurtosis = -.280, SE = .177) and negative impact of stressful life events (Skewness = .079, SE = .089; Kurtosis = -.353, SE = .177) variables were normally distributed. Additionally, the Blom transformation results in a range of scores between -2.40 and 2.40 with a mean of zero; since there are no negative scores on the SIGH-D or LES, a constant of three was added to create a positive distribution. Table 3-8 reports the means and standard deviations of the predictor variables.

Associations among Psychosocial Factors and Survival

Cox regression analyses revealed that, as expected, presence of regional disease and older age at diagnosis were consistently significant or nearly significant predictors of survival in all equations (Table 3-9). However, in contrast with hypotheses, after controlling for age and presence of regional disease, there was no significant association between five-year all-cause mortality and any of the following predictors: (a) negative impact of stressful life events, (b) depression, (c) use of self-distraction coping, (d) emotional support, or (e) global quality of life. However, consistent with the hypotheses, active coping was found to be significantly associated with a lower probability of all-cause mortality within five years since diagnosis, $HR = .77$ (95% CI 0.60 - 0.97), $p = .029$ (Table 3-8). The direction of this relationship was such that more frequent use of active coping prior to surgery was associated with a greater probability of survival within 5 years since diagnosis. Figure 3-2 demonstrates the Cox regression survival curve for active coping. For the purposes of demonstration, a categorical active coping variables was created using tertiles to show the relationship between high ($n=27$), moderate ($n=18$), and low ($n=31$) use of active coping prior to surgery and cumulative survival.

The complete case analysis resulted in no significant associations between the psychosocial predictors and the probability of all-cause mortality, controlling for presence of regional disease and age at diagnosis (Table 3-10). The pattern of relationships was generally the same, with active coping trending towards a significant association with a lower probability of mortality. However, presence of regional disease and age were inconsistently significant predictors of mortality, and the strength of the relationship was generally weaker than the results based on multiple imputation.

Table 3-1. Comparison of continuous demographic and biological variables

Variable name	Included Participants (N=76)		Excluded Participants (N=27)		<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Age	60.28	9.39	64.19	6.39	-2.00	101	0.048*	-0.40
Perceived SES	5.53	1.90	5.58	1.93	-0.12	94	0.90	-0.03
Composite SES	0.07	0.81	-0.09	0.90	0.69	78	0.49	0.16
Charlson Comorbidity Index Score	2.64	0.92	2.65	0.85	-0.07	99	0.95	-0.01
Body Mass Index (BMI)	37.17	11.30	33.00	8.99	1.68	99	0.10	0.34
Number of miles between residence and UF/Shands	61.45	54.83	44.63	29.50	1.99	85	0.05	0.43

Table 3-2. Comparison of categorical demographic and biological variables

Variable name	Included Participants		Excluded Participants		$\chi^2(1)$	<i>p</i>
	<i>n</i>	%	<i>n</i>	%		
Race					0.12	0.74
Caucasian	69	90.8	23	88.5		
Other	7	9.2	3	11.5		
Tumor stage					0.99	0.32
Stages I-II	65	85.5	25	92.6		
Stage III	11	14.5	2	7.4		
Tumor type					2.77	0.10
Endometrioid type	67	88.2	20	74.1		
Other	9	11.8	7	25.9		

Table 3-3. Biological variables and probability of all-cause mortality

Variable name	HR	95% CI	<i>p</i>
Age	1.05	(0.99, 1.10)	0.07*
Tumor type	1.94	(0.55, 6.83)	0.30
Presence of regional disease	3.26	(1.15, 9.31)	0.03*
Charlson Comorbidity Index Score	1.24	(0.79, 1.94)	0.36
Body mass index (BMI)	0.98	(0.94, 1.03)	0.37

Table 3-4. Presence of missing data by psychosocial variable

Psychosocial Variable	N missing	% missing
Depression (SIGH-D)	2	2.6
Negative Impact of Stressful Events (LES)	6	7.9
Self-distraction (Brief COPE)	12	15.8
Active coping (Brief COPE)	12	15.8
Quality of Life (FACT-En)	12	15.8
Emotional Support (SSSS)	9	11.8

Table 3-5. Comparison of continuous demographic and biological variables (complete vs. missing data)

Variable name	Complete data		Missing data		<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Age	59.64	8.99	62.05	10.46	-0.98	74	0.33	-0.23
Perceived SES	5.60	1.92	5.29	1.86	0.58	70	0.57	0.14
Composite SES	0.06	0.82	0.09	0.78	-0.12	61	0.91	-0.03
Charlson Comorbidity Index Score	2.55	0.89	2.89	0.99	-1.40	73	0.17	-0.33
Number of miles between residence and UF/Shands	60.41	52.56	64.35	62.13	-0.27	74	0.79	-0.06

Table 3-6. Comparison of categorical biological variables (complete vs. missing data)

Variable name	Complete data		Missing data		$\chi^2(1)$	<i>p</i>
	<i>n</i>	%	<i>n</i>	%		
Tumor stage					0.63	0.43
Stages I-II	49	87.5	16	80.0		
Stage III	7	12.5	4	20.0		
Tumor type					1.58	0.21
Endometrioid type	51	91.1	16	80.0		
Other	5	8.9	4	20.0		

Table 3-7. Comparison of psychosocial variables

Construct	Complete data		Imputed data		<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Depression (SIGH-D)	7.54	5.40	10.01	3.25	-0.64	74	0.52	-0.15
Negative Impact of Stressful Events (LES)	9.87	11.80	8.20	10.43	0.34	74	0.74	0.08
Self-distraction (Brief COPE)	5.06	1.71	5.37	1.89	-0.56	74	0.58	-0.13
Active coping (Brief COPE)	8.86	2.20	8.33	2.61	0.74	74	0.46	0.17
QOL (FACT-En)	131.79	25.04	123.17	1.89	1.10	74	0.27	0.26
Emotional support (SSSS)	66.06	20.44	64.62	18.99	0.20	74	0.84	0.05

Table 3-8. Descriptive statistics of psychosocial variables

Variable name	<i>M</i>	<i>SD</i>	Median	Range
Depression	3.00	0.97	2.90	0.6-5.4
Negative Impact of Stressful Life Events	3.01	0.96	3.00	0.6-5.4
Self Distraction	5.11	1.73	5.00	2-8
Active Coping	8.78	2.27	9.00	3-12
Global QOL	130.43	24.76	134.02	46.5-168.9
Emotional Support	65.89	20.29	69.00	0-100

Table 3-9. Psychosocial factors and probability of all-cause mortality

Variable name	HR	95% CI	<i>p</i>
Depression	0.85	(0.51, 1.42)	0.53
Negative Impact of Stressful Life Events	0.67	(0.34, 1.31)	0.24
Self Distraction	0.93	(0.69, 1.26)	0.65
Active Coping	0.77	(0.60, 0.97)	0.03*
Global QOL	0.99	(0.97, 1.01)	0.25
Emotional Support	0.97	(0.95, 1.00)	0.07

Note: values adjusted for biomedical control variables; average Presence of Regional Disease HR=3.92, significant at $p < .05$; average Age HR=1.05, trending toward significance

Table 3-10. Psychosocial factors and probability of all-cause mortality (restricted to complete data)

Variable name	HR	95% CI	<i>p</i>
Depression	0.97	(0.87, 1.07)	0.51
Negative Impact of Stressful Life Events	0.98	(0.90, 1.05)	0.52
Self Distraction	0.90	(0.65, 1.25)	0.53
Active Coping	0.78	(0.60, 1.01)	0.06
Global QOL	0.99	(0.96, 1.01)	0.28
Emotional Support	0.97	(0.95, 1.01)	0.10

Note: values adjusted for biomedical control variables; average Presence of Regional Disease HR=3.26, not significant at $p < .05$; average Age HR=1.05

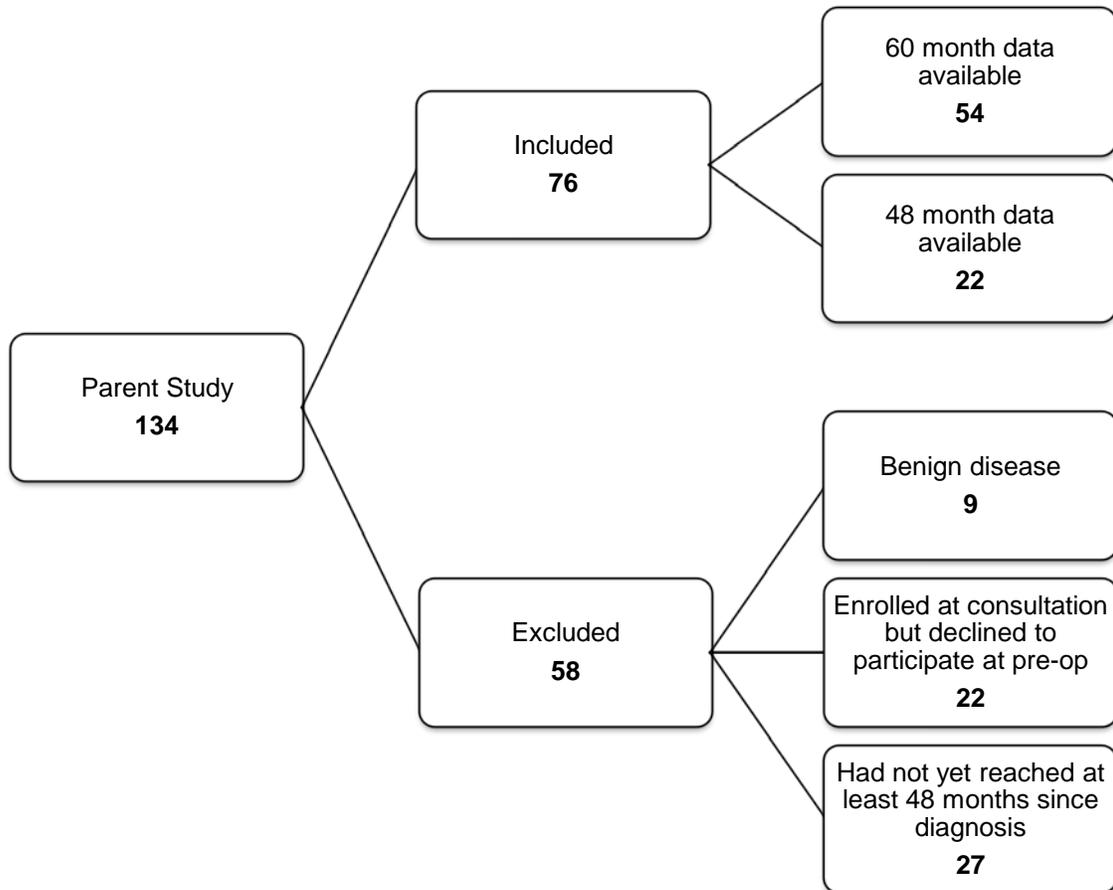


Figure 3-1. Number of included and excluded participants

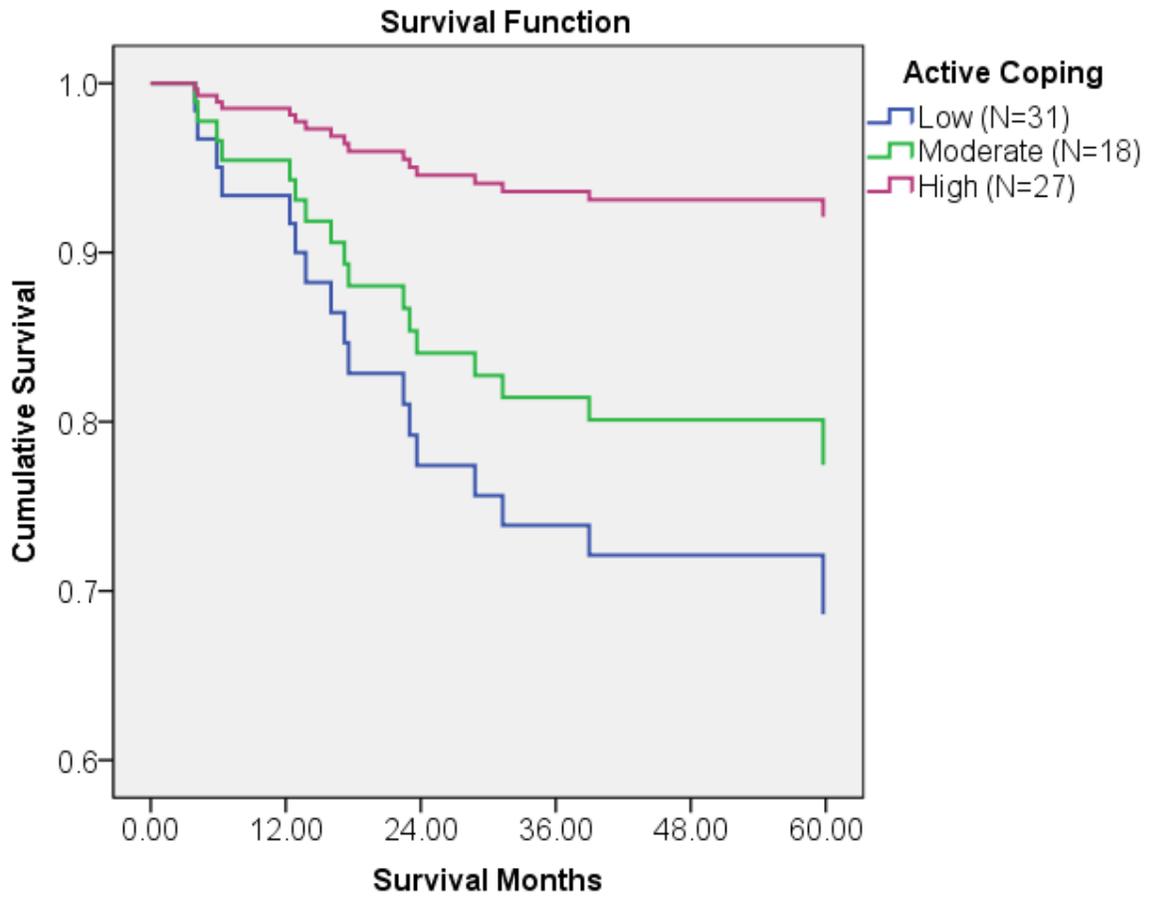


Figure 3-2. Cox regression survival curve for active coping

CHAPTER 4 DISCUSSION

Primary Aim

The current study suggests that, contrary to the model of biobehavioral influences on tumor growth and cancer outcomes (Antoni et al., 2006), negative impact of stressful life events and depression are not significantly associated with all-cause mortality in women diagnosed with endometrial cancer. However, the study indicates that active coping is significantly associated with a lower probability of all-cause mortality within five years of diagnosis with endometrial cancer. In other words, women who endorsed more frequent use of active coping were more likely to survive longer than women who with less frequent use of active coping. This finding is consistent with previous research that indicates the use of engaged coping strategies, such as active coping, is associated with longer survival in cancer populations (Faller & Bülzebruck, 2002).

Given the correlational nature of the relationship between active coping and all-cause mortality, no causal relationship can be inferred by the current study. However, certain factors related to active coping may be the mechanism by which it is related to survival/mortality. As defined by this study, active coping involves taking action following a diagnosis with endometrial cancer, coming up with a strategy or plan in light of the diagnosis, and actively reacting to the cancer diagnosis. Consistent with the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984), frequent use of active coping may imply that women are more actively engaged in the treatment process, and may demonstrate better stress management skills and adherence to treatment. Consequently, better adherence may be associated with quicker and less

complicated recovery and possibly a lower probability of disease recurrence or progression. Additionally, active coping could potentially moderate the relationship between stress and neuroendocrine regulation, thereby affecting immune system functioning and biological responses to cancer (Antoni et al., 2006). This supports previous research that psychosocial factors can potentially affect immune function in gynecologic cancer (Lutgendorf et al., 2002; Lutgendorf et al., 2008).

The clinical implications of this finding suggest that it may be important to assess coping strategies in women undergoing cancer surgery and design/implement effective coping interventions for those that may only infrequently use active coping strategies. Although the results of the present study do not suggest a survival advantage may be obtained via targeting and intervening upon depressive symptoms, emotional support, and global quality of life prior to surgery, other published research (Andersen et al., 2008; Spiegel et al., 1989) suggests that these factors may be related to survival. Therefore, the design/testing of pre-surgical psychological intervention that broadly targets mood, coping, and quality of life may be a logical next step.

In this study, the remaining psychosocial factors were not significantly associated with all-cause mortality in women with early-stage endometrial cancer. However, it is notable that emotional support was approaching significance, indicating that greater emotional support at the time of diagnosis might be associated with a lower probability of all-cause mortality. This supports previous research that has found a significant relationship between social and emotional support and survival within cancer populations (Ell et al., 1992; Waxler-Morrison et al., 1991; Weihs et al., 2005) It is possible that while these factors were not related to all-cause mortality, they could be

significant predictors of cancer-specific mortality. Unfortunately, given the limitations of the data recorded by the Oncology Data Center at Shands at UF, the current study could not separate cancer-specific and all-cause mortality.

Additionally, the current study assessed only pre-surgical psychosocial functioning and its relationship with survival outcomes; the negative impact of stressful life events, depression, emotional support and quality of life captured at baseline at baseline does reflect how these factors change post-surgically and throughout the treatment and recovery process. These factors may fluctuate over time, particularly over a 48 to 60 month period, and psychosocial functioning prior to surgery may be unrelated to survival outcomes. Similar to the findings in Carey et al. (2008) regarding quality of life and survival, psychosocial factors assessed after surgery over the intervening years may be more important with regard to predicting survival in gynecologic cancers.

Although active coping was the only psychosocial factor significantly associated with all-cause mortality, the biomedical covariates, specifically presence of regional disease and age at diagnosis, were consistently significant predictors of all-cause mortality. Participants who were diagnosed with Stage III disease and those who were older at the time of diagnosis were more likely to be deceased within five years than those with Stages I-II disease and younger participants. These findings are consistent with the inherent prognostic nature of the biomedical factors. This suggests that the current study had adequate external validity, such that factors that are expected to be related to mortality in medical settings, like older age and regional disease, were related to all-cause mortality in the study. Of note, these findings were obtained only in the results based on multiple imputation. The survival analyses performed on the data

restricted to complete cases demonstrated an inconsistent relationship between the biomedical covariates and all-cause mortality. Given this pattern of results, the results based on multiple imputation are considered to represent more accurately the relationships between biomedical factors and all-cause mortality in the endometrial cancer population. Consequently, the relationships found between the psychosocial factors and all-cause mortality in the multiple imputation dataset are also considered to be more generalizable to the endometrial cancer population than the dataset restricted to complete cases. This conclusion is additionally supported by the nature of multiple imputation, which seeks to preserve sample size, increase power, and create a more realistic dataset that is generalizable to the population.

Finally, generalizability in the current study is also supported by the survival rates in the sample population. Looking at all-cause mortality, the approximate five-year survival rate for participants in the study was 77.6%, a number that compares favorably to the published national statistics of 68% (all-cause) and 83.5% (cancer-specific). This suggests that the survival rate found in the current study is consistent with the survival rate found in local/regional endometrial cancer, further supporting the validity of the findings in this study.

Study Limitations and Future Directions

The current study has several notable limitations. First of all, these findings are not generalizable to women diagnosed following surgery with Stage IV disease. Additionally, given that the majority of the current study's sample was non-Hispanic Caucasian, these findings are also not generalizable to other racial groups or Latinas. Previous research suggests that racial or ethnic minority groups endorse different types of coping strategies in response to diagnosis and treatment for breast cancer (Culver et

al., 2002). Thus, the current finding that active coping is associated with longer survival in a mostly Caucasian sample might not extend to African-American or Hispanic populations. Future research should seek to replicate and expand upon these findings within more inclusive and representative samples.

Another important consideration of this study is that it was only a subset of the parent study population. Of the parent study, 27 participants have not reached the follow-up time point, or five years since their diagnosis with endometrial cancer, thus, they were not included in the current study. This sample was found to be significantly older than the current study sample. Given that age was a biomedical covariate in the analyses, once these participants reach the appropriate time point and are included in the analyses, the results may demonstrate that the pattern of significance has changed.

Additionally, it must be noted that of the parent study, 22 participants who were recruited subsequently declined to participate in study procedures. These participants did not complete any psychosocial data at the preoperative time point, thus they were excluded from the current study. Although these participants were found to live closer to UF/Shands than the current study sample, the majority who declined participation cited stress and being overwhelmed with the diagnosis and impending surgery as reasons for being unable to fully participate. Given these reasons, it is possible that this subset of participants were in significantly more distress than the sample included in the current study. Additionally, the exclusion of a more distressed sample could explain why several of the psychosocial factors, particularly depressive symptoms, negative impact of stressful events, and self-distraction as a coping strategy were not found to be significantly associated with a higher probability of all-cause mortality.

Although a significant relationship was found between active coping and survival, the nature of the analysis suggests only a correlational relationship, not causation. There are likely other factors that mediate the relationship between coping and survival in the cancer population. As presented in the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984), coping itself moderates the relationship between perceptions of stress and mood, which according to Antoni et al. (2006), can subsequently impact biological factors and responses to cancer. Therefore, it is possible that there is an interaction between perceived negative impact of stressful life events and active coping, instead of a main effect of active coping on survival. Future research is needed on these relationships in gynecologic cancers. This study also highlights the importance of further research into psychosocial and biological factors related to active coping that might be predictive of longer survival. Most important is the need to further explore and evaluate the relationship between psychosocial factors and clinical outcomes in gynecologic cancers. Research has suggested that psychosocial factors are not only associated with survival outcomes, but also time to disease progression and/or disease recurrence (Carey et al., 2008; Palesh et al., 2007). Expanding on the research between psychosocial factors and clinical outcomes may lead to the development of interventions that could impact disease factors and health related quality of life in women diagnosed with endometrial and other gynecologic cancers.

APPENDIX A
STRUCTURED INTERVIEW GUIDE FOR THE HAMILTON DEPRESSION AND
ANXIETY SCALES

**Structured Interview Guide for the Hamilton Depression and Anxiety Scales
(SIGH-AD)**

Overview: I'd like to ask you some questions about the past week. How have you been feeling since last (DAY OF WEEK)? IF OUTPATIENT: Have you been working? IF NOT: Why not?

What's your mood been like this past week?

DEPRESSED MOOD (sadness, hopeless, helpless, worthless):

Have you been feeling down or depressed? IF YES: Have you been feeling worse in the morning?

0 = absent
1 = indicated only on questioning
2 = spontaneously reported verbally
3 = communicated non-verbally, i.e. facial expression, posture, voice, tendency to weep
4 = VIRTUALLY ONLY these feeling states reported in spontaneous verbal and non-verbal communication

Sad? Hopeless?

In the last week, how often have you felt (OWN EQUIVALENT)? Every day? All day?

1 =POSS/DEF ORG

Have you been crying at all?

3 = NOT ORG

IF SCORED 1-4 ABOVE, ASK:
How long have you been feeling this way?

How have you been spending your time this past week (when not at work)?

Have you felt interested in doing (THOSE THINGS), or do you feel you have to push yourself to do them?

Have you stopped doing anything you used to do?

Is there anything you look forward to?

(AT FOLLOW-UP: Has your interest been back to normal?)

In the last week, have you had trouble concentrating or trouble remembering things? (How much?)

How has your appetite been this past week? (What about compared to your usual appetite?)

Have you had to force yourself to eat?

Have other people had to urge you to eat?

WORK AND ACTIVITIES:

- 0 = No difficulty
 - 1 = thoughts and feeling of incapacity, fatigue, or weakness related to activities, work or hobbies
 - 2 = loss of interest in activity, hobbies, or work-by direct report of the patient or indirect in listlessness, indecision and vacillation (feels he has to push self to work or activities)
 - 3 = decrease in actual time spent in activities or decrease in productivity. In hosp., pt. spends less than 3 hrs/day in activities (hospital job or hobbies) exclusive of ward chores
 - 4 = stopped working bec. Of present illness. In hospital, no activities except ward chores, or fails to perform ward chores unassisted
-

1 = POSS/DEF ORG

3 = NOT ORG

INTELLECTUAL (difficulty in concentrating, poor memory)

- 0 = not present
- 1 = mild
- 2 = moderate
- 3 = severe
- 4 = very severe

SOMATIC SYMPTOMS GASTROINTESTINAL:

- 0 = none
 - 1 = loss of appetite but eating without encouragement
 - 2 = difficulty eating without urging
-

1 = POSS/DEF ORG

3 = NOT ORG

How have you been sleeping over the last week?

Have you had any trouble falling asleep at the beginning of the night? (Right after you go to bed, how long has it been taking you to fall asleep?)

How many nights this week have you had trouble falling asleep?

During the past week, have you been waking up in the middle of the night? IF YES: Do you get out of bed? What do you do? (Only go to the bathroom?)

When you get back in bed, are you able to fall right back asleep?

Have you felt your sleeping has been restless or disturbed some nights?

What time have you been waking up in the morning for the last time, this past week?

IF EARLY, Is that with an alarm clock, or do you just wake up yourself? What time do you usually wake up (that is, before you got depressed)?

INSOMNIA EARLY:

0 = no difficulty falling asleep
1 = complains of occasional difficulty falling asleep-i.e., more than ½ hour
2 = complains of nightly difficulty falling asleep

1 = POSS/DEF ORG

3 = NOT ORG

INSOMNIA MIDDLE:

0 = no difficulty
1 = complains of being restless and disturbed during the night
2 = waking during the night-any getting out of bed (except to void)

1 = POSS/DEF ORG

3 = NOT ORG

INSOMNIA LATE:

0 = no difficulty
1 = waking in early hours of morning but goes back to sleep
2 = unable to fall asleep again if gets out of bed

1 = POSS/DEF ORG

3 = NOT ORG

In the last week, have you had broken sleep, dreams, or nightmares?

Have you felt tired when you wake up? (How bad has that been?)

How has your energy been this past week?

Have you been tired all the time?

This week, have you had any backaches, headaches, or muscle aches?

This week, have you felt any heaviness in your limbs, back or head?

In the past week, have you lost interest in things, or no longer enjoyed your hobbies? Have you felt worse in the morning?

INSOMNIA (difficulty in falling asleep, broken sleep, unsatisfying sleep and fatigue on waking, dreams, nightmares, night terrors):

- 0 = not present
- 1 = mild
- 2 = moderate
- 3 = severe

SOMATIC SYMPTOMS
GENERAL:

- 0 = none
- 1 = heaviness in limbs, back or head. Backaches, headache, muscle aches. Loss of energy and fatigability.
- 2 = any clear-cut symptoms

1 = POSS/DEF ORG

3 = NOT ORG

DEPRESSED MOOD (loss of interest, lack of pleasure in hobbies, depression, early waking, diurnal swing):

- 0 = not present
- 1 = mild
- 2 = moderate
- 3 = severe
- 4 = very severe

Have you been especially critical of yourself this past week, feeling you've done things wrong, or let others down?
IF YES: What have your thoughts been?

Have you been feeling guilty about anything that you've done or not done?

Have you thought that you've brought (THIS DEPRESSION) on yourself in some way?

Do you feel you're being punished by being sick?

This past week, have you had any thoughts that life is not worth living, or that you'd be better off dead? What about having thoughts of hurting or even killing yourself?

IF YES: What have you thought about? Have you actually done anything to hurt yourself?

In the last week, how much have you been worrying (not just about everyday concerns)?

How much have you been worrying about the worst that can happen, or been afraid of what's going to happen?

Have you been feeling especially irritable this past week?

FEELINGS OF GUILT:

- 0 = absent
- 1 = self-reproach, feels he has let people down
- 2 = ideas of guilt or rumination over past errors or sinful deeds
- 3 = present illness is a punishment. Delusions of guilt
- 4 = hears accusatory or denunciatory voices and/or experiences threatening visual hallucinations

SUICIDE:

- 0 = absent
- 1 = feels life is not worth living
- 2 = wishes he were dead or any thoughts of possible death to self
- 3 = suicidal ideas or gesture
- 4 = attempts at suicide

ANXIOUS MOOD (worries, anticipation of the worst, fearful anticipation, irritability)

- 0 = not present
- 1 = mild
- 2 = moderate
- 3 = severe
- 4 = very severe

Have you been feeling especially tense this past week?

Have you been worrying a lot about little unimportant things, things you wouldn't ordinarily worry about? IF YES: Like what, for example?

In the past week, how much have you had any of these things: being startled easily, crying easily, trembling, feeling restless because of nervousness, not being able to relax?

This past week, have you been afraid of the dark, of strangers, of being left alone, of animals, of traffic, or of crowds? IF YES: How afraid?

In this past week, have you had any of these physical symptoms (READ LIST PAUSING AFTER EACH SX REPLY)?

How much have these things been bothering you this past week? (How bad have they gotten? How much of the time, or how often, have you had them?)
NOTE: DON'T RATE IF CLEARLY DUE TO MEDICATION (E.G., DRY MOUTH AND IMIPRAMINE)

ANXIETY PSYCHIC:

- 0 = no difficulty
- 1 = subjective tension and irritability
- 2 = worrying about minor matters
- 3 = apprehensive attitude apparent in face or speech
- 4 = fears expressed without questioning

TENSION (feelings of tension, fatigability, startle response, moved to tears easily, trembling, feelings of restlessness, inability to relax):

- 0 = not present
- 1 = mild
- 2 = moderate
- 3 = severe
- 4 = very severe

FEARS (of dark, of strangers, of being left alone, of animals, of traffic or crowds?):

- 0 = not present
- 1 = mild
- 2 = moderate
- 3 = severe

ANXIETY SOMATIC (physiologic concomitants of anxiety such as C-V – heart palpitations, headaches
RES – hyperventilating, sighing)

- 0 = absent
- 1 = mild
- 2 = moderate
- 3 = severe
- 4 = very severe

In the last week, how much have your thoughts been focused on your physical health or how your body is working (compared to your normal thinking)?

Do you complain much about how you feel physically?

Have you found yourself asking for help with things you could really do yourself?
IF YES: like what for example? How often has that happened?

RATING BASED ON OBSERVATION

RATING BASED ON OBSERVATION DURING INTERVIEW

HYPOCHONDRIASIS:

- 0 = not present
- 1 = self-absorption (bodily)
- 2 = preoccupation with health
- 3 = frequent complaints, requests for help, etc.
- 4 = hypochondriacal delusions

INSIGHT:

- 0 = acknowledges being depressed and ill OR not currently depressed
- 1 = acknowledges illness but attributes cause to bad food, climate, overwork, virus, need for rest, etc
- 2 = denies being ill at all

AGITATION:

- 0 = none
- 1 = fidgetiness
- 2 = playing with bands, hair, etc.
- 3 = moving about, can't sit still
- 4 = hand-wringing nail biting, hair pulling , biting of lips

Evidence of anxiety during the interview, such as fidgeting, restlessness or pacing, tremor of hands, furrowed brow, strained face, sighing or rapid respiration, facial pallor, swallowing, etc.

**RATING BASED ON OBSERVATION
DURING INTERVIEW**

BEHAVIOR AT INTERVIEW
(fidgeting, restlessness or pacing tremor of hands, furrowed brow, strained face, sighing or rapid respiration, facial pallor, swallowing, etc.):

- 0 = not present
- 1 = mild
- 2 = moderate
- 3 = severe
- 4 = very severe

RETARDATION (slowness of thought and speech, impaired ability to concentrate, decreased motor activity):

- 0 = normal speech and thought
- 1 = slight retardation at interview
- 2 = obvious retardation at interview
- 3 = interview difficult
- 4 = complete stupor

-
- 1 = POSS/DEF ORG
 - 3 = NOT ORG

APPENDIX B
LIFE EXPERIENCES SURVEY

LIFE EXPERIENCES SURVEY (LES)

IN THE PAST SIX MONTHS SINCE: _____ (calculate date from today)

Listed below are a number of events that sometimes bring about change in the people's lives. Please circle "1" for "yes" if you have experienced this event in the **PAST 6 MONTHS** and "2" for "no". **For events experienced in the past 6 months**, indicate how stressful the event was for you when it occurred.

	Event happened to you in the past 6 months?		IF YES: How stressful was the event or difficulty <u>when it occurred?</u>				
	YES	NO	Extremely Stressful	Very Stressful	Moderately Stressful	A Little Stressful	Not Stressful
<u>RELATIONSHIPS</u>							
1. You got married, engaged or made a formal commitment to a partner, including a ceremony	1	2	1	2	3	4	5
2. You got separated, divorced, or had a break-up with a partner (mate, girlfriend or boyfriend) due to conflict (must have been in the committed relationship at least 6 months)	1	2	1	2	3	4	5
3. You had an increase in serious arguments with a partner (mate, girlfriend or boyfriend) <i>without separation or divorce</i> (must have been in the committed relationship at least 6 months)	1	2	1	2	3	4	5
4. You had a major change in closeness to a family member (estrangement from family, serious argument(s) with family members)	1	2	1	2	3	4	5
<u>DEATH OR ILLNESS AMONG FAMILY AND CLOSE FRIENDS</u>							
5. Death of <u>close</u> family member below:							
a. husband/wife/partner	1	2	1	2	3	4	5
b. child	1	2	1	2	3	4	5
c. mother	1	2	1	2	3	4	5
d. father	1	2	1	2	3	4	5
e. brother	1	2	1	2	3	4	5
f. sister	1	2	1	2	3	4	5
g. grandparent	1	2	1	2	3	4	5
h. other relative that you are very close to (specify) _____	1	2	1	2	3	4	5

Event happened
to **you** in the past
6 months?

IF YES:

How stressful was the event or difficulty when it occurred?

	YES	NO	Extremely Stressful	Very Stressful	Moderately Stressful	A Little Stressful	Not Stressful
6. Death of very close friend (do not include casual friends).	1	2	1	2	3	4	5
7. Death of pet	1	2	1	2	3	4	5
8. Serious illness or injury of close family member listed below (do not include those who have died):							
a. husband/wife/partner	1	2	1	2	3	4	5
b. child	1	2	1	2	3	4	5
c. mother	1	2	1	2	3	4	5
d. father	1	2	1	2	3	4	5
e. brother	1	2	1	2	3	4	5
f. sister	1	2	1	2	3	4	5
g. grandparent	1	2	1	2	3	4	5
h. other relative that you are very close to (specify) _____	1	2	1	2	3	4	5
9. Serious illness or injury of very close friend (do not include casual friends or those who have died).	1	2	1	2	3	4	5
<u>WORK PROBLEMS/FINANCES/INSURANCE</u>							
10. Trouble with your employer (in danger of losing your job, being suspended or demoted, experiencing discrimination, other major problems with your job)	1	2	1	2	3	4	5
11. Loss of your job (fired, laid off, quit due to health status or other reason, retired)	1	2	1	2	3	4	5
12. Trouble finding employment (you must be seriously looking AND out of work for at least 2 months)	1	2	1	2	3	4	5
13. You worked long hours (60 or more hours/week) for at least 1 month	1	2	1	2	3	4	5
14. Your spouse/partner had trouble with his employer, lost his job, had trouble finding employment or worked long hours for at least 1 month.	1	2	1	2	3	4	5

Event happened to
you in the past 6
months?

IF YES:

How stressful was the event or difficulty when it occurred?

	YES	NO	Extremely Stressful	Very Stressful	Moderately Stressful	A Little Stressful	Not Stressful
15. You had a major worsening of your financial status (large drop in personal or family income) or you had major chronic financial problems (e.g., months behind in bills, bill collectors, foreclosure on mortgage or loan, repossession of car, had to sell possessions, not enough money for basic necessities, such as clothing, housing, food, or health care)	1	2	1	2	3	4	5
16. You experienced difficulties with or a loss of your health insurance.	1	2	1	2	3	4	5
17. You went on federal assistance or disability.	1	2	1	2	3	4	5

**ILLNESS/ACCIDENTS/
INJURY/SAFETY**

18. You had a major illness, chronic health problem or injury (<i>not including illness related to cancer</i>)	1	2	1	2	3	4	5
19. You had a major illness, chronic health problem or injury related to cancer	1	2	1	2	3	4	5
20. You were in a motor vehicle accident (with some injury or financial loss, NOT fender bender)	1	2	1	2	3	4	5
21. You were hospitalized overnight for illness or injury <i>not related to cancer</i>	1	2	1	2	3	4	5
22. You were hospitalized overnight for illness or injury related to cancer	1	2	1	2	3	4	5
23. You were physically attacked or assaulted or had your life threatened	1	2	1	2	3	4	5
24. You were sexually abused or assaulted	1	2	1	2	3	4	5
25. Problems feeling safe in your neighborhood	1	2	1	2	3	4	5

Event happened to
you in the past 6
months?

IF YES:

How stressful was the event or difficulty when it occurred?

	YES	NO	Extremely Stressful	Very Stressful	Moderately Stressful	A Little Stressful	Not Stressful
<u>CRIME OR LEGAL PROBLEMS</u>							
26. You were arrested for a serious crime (e.g., driving under the influence of alcohol or drugs, robbery, drugs, crime involving more than just a fine)	1	2	1	2	3	4	5
27. You were convicted of a crime and went to jail or comparable institution _____ (# days)	1	2	1	2	3	4	5
28. Mate or close relative was arrested for a serious crime (with likely jail sentence) or mate or close relative went to jail for at least one-month	1	2	1	2	3	4	5
29. You were robbed or your home was burglarized	1	2	1	2	3	4	5
<u>OTHER LIFE CHANGES</u>							
30. You experienced trouble with your in-laws	1	2	1	2	3	4	5
31. Your child/grandchild moved into your home	1	2	1	2	3	4	5
32. Your child/grandchild moved away from your home (e.g., leaving to go to school, custody given to ex-mate)	1	2	1	2	3	4	5
33. You moved residence during the past six months	1	2	1	2	3	4	5
34. Other (specify below)							
a. _____	1	2	1	2	3	4	5
b. _____	1	2	1	2	3	4	5
c. _____	1	2	1	2	3	4	5

APPENDIX C
BRIEF COPE

BRIEF COPE

*INSTRUCTIONS: The next items ask about specific ways that people try to deal with hard situations. We're interested in how many of these reactions you've had in trying to deal with cancer. Obviously, different people deal with things in different ways, but we're interested here in how you've tried to deal with it. Each item says something about a particular way of coping. We want to know to what extent you've been doing what the item says. How **much** or how **frequently**. **Don't** answer on the basis of whether it seems to be **working** or not—just whether or not you're doing it. Make your answers as true FOR YOU as you can. Use the following response choices:*

- 1 = I haven't been doing this at all
- 2 = I've been doing this a little bit
- 3 = I've been doing this a medium amount
- 4 = I've been doing this a lot

	Not at all	A little bit	A medium amount	A lot
1. I've been turning to work or other activities to take my mind off things.	1	2	3	4
2. I've been concentrating my efforts on doing something about the situation I'm in.	1	2	3	4
3. I've been saying to myself "this isn't real."	1	2	3	4
4. I've been using alcohol or other drugs to make myself feel better.	1	2	3	4
5. I've been getting emotional support from my husband/partner.	1	2	3	4
6. I've been getting emotional support from my friends.	1	2	3	4
7. I've been giving up trying to deal with it.	1	2	3	4
8. I've been taking action to try to make the situation better.	1	2	3	4
9. I've been refusing to believe that it's really happened.	1	2	3	4
10. I've been saying things to let my unpleasant feelings escape.	1	2	3	4
11. I've been using alcohol, medications, or other drugs to help me get through it.	1	2	3	4
12. I've been spending time, or talking with, my spouse/partner to make me feel better.	1	2	3	4

13. I've been spending time, or talking with, my friends to make me feel better.	1	2	3	4
14. I've been trying to see it in a different light, to make it seem more positive.	1	2	3	4
15. I've been trying to come up with a strategy, or plan, about what to do.	1	2	3	4
16. I've been getting comfort and understanding from my husband/partner.	1	2	3	4
17. I've been getting comfort and understanding from my friends.	1	2	3	4
18. I've been giving up the attempt to cope.	1	2	3	4
19. I've been looking for something good in what's happening.	1	2	3	4
20. I've been making jokes about it.	1	2	3	4
21. I've been doing something to think about it less—like going to movies, watching TV, reading, daydreaming, sleeping, or shopping	1	2	3	4
22. I've been accepting the reality of the fact that this as happened.	1	2	3	4
23. I've been expressing my negative feelings.	1	2	3	4
24. I've been trying to find comfort in my religion or spiritual beliefs.	1	2	3	4
25. I've been learning to live with it.	1	2	3	4
26. I've been thinking hard about what steps to take.	1	2	3	4
27. I've been praying or meditating.	1	2	3	4
28. I've been making fun of the situation.	1	2	3	4

APPENDIX D
FUNCTIONAL ASSESSMENT OF CANCER THERAPY FOR ENDOMETRIAL
CANCER

FACT-En

INSTRUCTIONS: I am going to read you a list of statements that people with cancer have said are important. Please use the following response options to indicate how true each statement has been for you during the past 7 days: Not at all, A little bit, Somewhat, Quite a bit, Very much.

Physical Well-being

	Not at all	A little bit	Somewhat	Quite a bit	Very much
1. I have a lack of energy.	1	2	3	4	5
2. I have nausea.	1	2	3	4	5
3. Because of my physical condition, I have trouble meeting the needs of my family.	1	2	3	4	5
4. I have pain	1	2	3	4	5
5. I am bothered by side effects of treatment.	1	2	3	4	5
6. In general, I feel sick.	1	2	3	4	5
7. I am forced to spend time in bed.	1	2	3	4	5

Social/Family Well-being

	Not at all	A little bit	Somewhat	Quite a bit	Very much
1. I feel close to my friends.	1	2	3	4	5
2. I get emotional support from my family.	1	2	3	4	5
3. I get support from my friends and neighbors.	1	2	3	4	5
4. My family has accepted my illness.	1	2	3	4	5
5. I am satisfied with family communication about my illness.	1	2	3	4	5
6. I feel close to my partner (or the person who is my main support)	1	2	3	4	5

Regardless of your current level of sexual activity, please, answer the following question. If you prefer not to answer it, please check this box and go to the next section.

7. I am satisfied with my sex life.	1	2	3	4	5
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Emotional Well-being

	Not at all	A little bit	Some-what	Quite a bit	Very much
1. I feel sad.	1	2	3	4	5
2. I am satisfied with how I am coping with my illness.	1	2	3	4	5
3. I am losing hope in the fight against my illness.	1	2	3	4	5
4. I feel nervous.	1	2	3	4	5
5. I worry about dying.	1	2	3	4	5
6. I worry that my condition will get worse.	1	2	3	4	5

Functional Well-being

	Not at all	A little bit	Some-what	Quite a bit	Very much
1. I am able to work (include work at home).	1	2	3	4	5
2. My work (include work at home) is fulfilling.	1	2	3	4	5
3. I am able to enjoy life.	1	2	3	4	5
4. I have accepted my illness.	1	2	3	4	5
5. I am sleeping well.	1	2	3	4	5
6. I am enjoying the things I usually do for fun.	1	2	3	4	5
7. I am content with the quality of my life right now.	1	2	3	4	5

Additional Concerns

	Not at all	A little bit	Some-what	Quite a bit	Very much
1. I have swelling in my stomach area	1	2	3	4	5
2. I have cramps in my stomach area	1	2	3	4	5
3. I have discomfort or pain in my stomach area	1	2	3	4	5
4. I have vaginal bleeding or spotting.	1	2	3	4	5
5. I have vaginal discharge.	1	2	3	4	5
6. I am unhappy about a change in my appearance.	1	2	3	4	5
7. I have hot flashes.	1	2	3	4	5
8. I have cold sweats	1	2	3	4	5
9. I have night sweats	1	2	3	4	5
10. I feel fatigued	1	2	3	4	5

	Not at all	A little bit	Some-what	Quite a bit	Very much
11. I have pain or discomfort with intercourse	1	2	3	4	5
12. I have trouble digesting food	1	2	3	4	5
13. I have been short of breath	1	2	3	4	5
14. I am bothered by constipation	1	2	3	4	5
15. I urinate more frequently than usual	1	2	3	4	5
16. I have discomfort or pain in my pelvic area	1	2	3	4	5

APPENDIX E
SOURCES OF SOCIAL SUPPORT SCALE

SSSS

The next sets of items concern the kinds of help and support you get from various people *regarding your illness*. The items ask about several *different* sets of people, but apply the same questions to each. Choose a number from the following scale for all of the items:

1 **2** **3** **4** **5** **OR** **0 = Does not apply**
Not at all **A little** **Moderate amount** **Pretty large amount** **A lot**

A. The first items concern your **husband/partner**. [*If you do not have a husband/partner, enter "0" for these items and go to section B, number 11*].

- _____ 1. How much does your husband/partner give you **advice or information** about your cancer (whether you want it or not)?
- _____ 2. How much does your husband/partner give you **assistance** with things related to your cancer (for example, helping you with daily chores, driving you places, dealing with bills and paperwork)?
- _____ 3. How much does your husband/partner give you **reassurance, encouragement, and emotional support** (affection) concerning your cancer?
- _____ 4. How much does your husband/partner **listen to and try to understand** your worries about your cancer?
- _____ 5. How much can you **relax and be yourself** around your husband/partner?
- _____ 6. How much can you **open up to** your husband/partner if you need to talk about your worries about your cancer?
- _____ 7. How often does your husband/partner **argue** with you relating to your cancer?
- _____ 8. How often does your husband/partner **criticize** you relating to your cancer?
- _____ 9. How often does your husband/partner **let you down** when you are counting on him?
- _____ 10. How often does your husband/partner **withdraw from discussions** about your illness or try to **change the topic** away from your illness?

B. The next items concern your **friends**. Continue to use the same response choices you used above.

- _____ 11. How much do your friends give you **advice or information** about your cancer (whether you want it or not)?
- _____ 12. How much do your friends give you **assistance** with things related to your cancer (for example, helping you with daily chores, driving you places, dealing with bills and paperwork)?
- _____ 13. How much do your friends give you **reassurance, encouragement, and emotional support** (affection) concerning your cancer?
- _____ 14. How much do your friends **listen to and try to understand** your worries about your cancer?
- _____ 15. How much can you **relax and be yourself** around your friends?
- _____ 16. How much can you **open up to** your friends if you need to talk about your worries about your cancer?

Continue to use these response choices:

1 2 3 4 5 OR 0 = Does not apply
Not at all A little Moderate amount Pretty large amount A lot

- _____ 17. How often do your friends **argue** with you relating to your cancer?
_____ 18. How often do your friends **criticize** you relating to your cancer?
_____ 19. How often do your friends **let you down** when you are counting on them?
_____ 20. How often do your friends **withdraw from discussions** about your illness or try to **change the topic** away from your illness?

C. The next items concern **adult women in your family** (sisters, mother, aunts or adult daughters). [*If you do not have adult women in your family, enter "0" for these items and go to section C, item 21*]. Please continue to use the same response choices you used above.

- _____ 21. How much do these women give you **advice or information** about your cancer (whether you want it or not)?
_____ 22. How much do these women give you **assistance** with things related to your cancer (for example, helping you with daily chores, driving you places, dealing with bills and paperwork)?
_____ 23. How much do these women give you **reassurance, encouragement, and emotional support** (affection) concerning your cancer?
_____ 24. How much do these women **listen to and try to understand** your worries about your cancer?
_____ 25. How much can you **relax and be yourself** around these women?
_____ 26. How much can you **open up to** these women if you need to talk about your worries about your cancer?
_____ 27. How often do these women **argue** with you relating to your cancer?
_____ 28. How often do these women **criticize** you relating to your cancer?
_____ 29. How often do these women **let you down** when you are counting on them?
_____ 30. How often do these women **withdraw from discussions** about your illness or try to **change the topic** away from your illness?

D. The next items concern **other family members**. [*If you do not have other family besides those mentioned above, enter "0" for these items and go to section D, item 31*]. Continue to use the same response choices you used above.

- _____ 31. How much do these people give you **advice or information** about your cancer (whether you want it or not)?
_____ 32. How much do these people give you **assistance** with things related to your cancer (for example, helping you with daily chores, driving you places, dealing with bills and paperwork)?
_____ 33. How much do these people give you **reassurance, encouragement, and emotional support** (affection) concerning your cancer?

Continue to use these response choices:

1 2 3 4 5 OR 0 = Does not apply
Not at all A little Moderate amount Pretty large amount A lot

- ____ 34. How much do these people **listen to and try to understand** your worries about your cancer?
- ____ 35. How much can you **relax and be yourself** around these people?
- ____ 36. How much can you **open up to** these people if you need to talk about your worries about your cancer?
- ____ 37. How often do these people **argue** with you relating to your cancer?
- ____ 38. How often do these people **criticize** you relating to your cancer?
- ____ 39. How often do these people **let you down** when you are counting on them?
- ____ 40. How often do these people **withdraw from discussions** about your illness or try to **change the topic** away from your illness?

E. The next items concern your **health care providers**. Continue to use the same response choices you used above.

- ____ 41. How much do your health care providers give you **advice or information** about your cancer (whether you want it or not)?
- ____ 42. How much do your health care providers give you **assistance** with things related to your cancer (for example, helping you with daily chores, driving you places, dealing with bills and paperwork)?
- ____ 43. How much do your health care providers give you **reassurance, encouragement, and emotional support** (affection) concerning your cancer?
- ____ 44. How much do your health care providers **listen to and try to understand** your worries about your cancer?
- ____ 45. How much can you **relax and be yourself** around your health care providers?
- ____ 46. How much can you **open up to** your health care providers if you need to talk about your worries about your cancer?
- ____ 47. How often do your health care providers **argue** with you relating to your cancer?
- ____ 48. How often do your health care providers **criticize** you relating to your cancer?
- ____ 49. How often do your health care providers **let you down** when you are counting on them?
- ____ 50. How often do your health care providers **withdraw from discussions** about your illness or try to **change the topic** away from your illness?

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BIOGRAPHICAL SKETCH

Laura Telepak attended Miami University and graduated in 2010 with a Bachelor of Arts in psychology and Italian studies. She completed an undergraduate honors thesis that employed qualitative analysis to describe the experience of therapists who have their own history of psychological distress and how it impacts their work as clinicians.

Laura is currently attending graduate school at the University of Florida in the Department of Clinical and Health Psychology. She began her graduate studies in 2010 and was awarded an Alumni Fellowship. Laura obtained her Master of Science in 2012 and is currently working on her doctorate. She is a member of Deidre Pereira's research lab where she conducts research in psycho-oncology, psychoneuroimmunology, and women's health.