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Predictors of Psychosocial Adjustment During the Post-Radiation Treatment Transition

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Abstract

The aim of this study was to examine the role of cognitive appraisal in predicting psychosocial adjustment during the post-radiation treatment transition. A predictive correlational design was used in a convenience sample of 80 patients with breast, lung, and prostate cancer who were receiving radiation therapy. Two weeks prior to completion of treatment, subjects completed instruments to measure symptom distress, uncertainty, cognitive appraisal, social support and self-efficacy for coping. The Psychosocial Adjustment to Illness Scale was administered one month after therapy. Adjustment was significantly correlated with all independent variables, age, and comorbidity. Young age and high amounts of threat appraisal, harm/loss appraisal, uncertainty, and symptom distress were significantly associated with poor adjustment. The model predicted 52% of the variability in adjustment. Cognitive appraisal was not a significant explanatory variable for adjustment when controlling for uncertainty, cancer stage, age, and symptom distress. Symptom distress was the only significant predictor of adjustment.

Keywords

cognitive appraisal; psychosocial adjustment; radiation therapy

Completion of cancer treatment is one of many transitions along the cancer trajectory and has been described as a “critical period” that is characterized by feelings of uncertainty and anxiety for both caregivers and patients (Schumacher, 1994). Patients undergoing radiation therapy are vulnerable for maladjustment during the immediate post-treatment transition, the period from the last week of active treatment to one to three months after treatment. During this time, the patient’s very intense, daily contact with the healthcare team during weeks of radiation treatment ends abruptly at the completion of treatment and may remain disrupted until the first follow-up visit four to six weeks later. Patients often are not prepared to cope with the physical, emotional, and social demands during this transition in to the post-treatment phase of cancer survivorship.

Longitudinal studies have found that quality of life (QOL) scores are low at the end of radiation therapy (Deshields, et al., 2005; Dow & Lafferty, 2000; Rose & Yates, 2001). Although some studies have reported steady improvement in QOL in the month after

radiation therapy (Deshields, et al., 2005), other studies have reported mixed findings regarding the pattern of improvement in QOL (Klee, Thranov, & Machin, 2000). However, studies consistently report that emotional health, particularly depression, remains a significant problem for a subgroup of patients in the period after radiation therapy (Deshields, et al., 2005; Klee, et al., 2000; Rose & Yates, 2001). Physical and psychosocial problems may be compounded by the reduced access to health care professionals and general lack of resources for psychosocial support during the immediate post-treatment cancer period (Arnold, 1999; Lethborg, Kissane, Burns, & Snyder, 2000).

Despite the potentially turbulent course of the post-radiation treatment transition, it is rarely described in the literature. Most studies of the immediate post-radiation therapy period have focused on depression, physical side effects, or QOL in women with breast cancer (Deshields, et al., 2005; Back, Ahern, Delaney, Graham, Steigler, & Wratten, 2005; Schreier & Williams, 2004; Graydon, 1994). Other studies have specifically evaluated psychosocial adjustment in women with breast cancer, but at longer intervals (six months) after radiation (Dow & Lafferty, 2000). There are few empirical reports describing characteristics of patients at high risk for poor psychosocial adjustment. This information is critical for the development of screening tools and psychosocial interventions. Feelings of uncertainty, hopelessness, and symptom severity significantly predicted problems in adjustment during radiation treatment in a study of 55 patients with mixed cancer diagnoses (Christman, 1990).

Psychosocial Adjustment

Psychosocial adjustment is a dynamic adaptive process, using cognitive and behavioral resources in response to stress and occurring within a social context (Brennan, 2001; Derogatis, 1986). Psychosocial adjustment during the immediate post-cancer treatment period has been described as taking place within the emotional, physical, interpersonal, and practical domains (Stanton, et al., 2005). Individuals who have completed cancer treatment are confronted with reintegrating or renegotiating social roles at many levels including marital, family, occupational, and community (Holland & Reznik, 2005). Psychosocial adjustment also includes the process of attaining emotional or psychological well-being.

In this study, psychosocial adjustment was selected as the key construct, rather than a more broad perspective such as QOL or a more narrow focus such as depression or distress. An assessment of an individual's psychosocial adjustment provides a descriptive, pragmatic, and holistic picture of how he/she is faring with the social and emotional "work" of the post-treatment transition. Also, the psychosocial domains of health, vocation, family, sexuality, interpersonal relationships, and emotions are potential targets for nursing interventions.

Cognitive Appraisal

Cognitive appraisal, which is an individual's evaluation of a situation in terms of its relevance to his/her well-being (Lazarus, 1991), may be a key factor in determining adaptive responses during the post-radiation treatment transition. It has been shown to be predictive of psychological functioning or mood in women six months after their diagnosis of breast cancer (Gallagher, Parle, & Cairns, 2002), in men with prostate cancer (Ahmad, Musil, Zauszniewski, & Resnick, 2005), and in patients with mixed diagnoses undergoing chemotherapy (Munkres, Oberst, & Hughes, 1992) and radiation therapy (Oberst, Hughes, Chang, & McCubbin, 1991). The strength of the relationship varied in these studies and conclusions are difficult to make due to the different variables, measures, and timing of the measurements. Cognitive appraisal has been shown to be influenced by numerous personal and situational antecedent factors in studies of patients undergoing treatment (Munkres, et al., 1992; Oberst, et al., 1991) and cancer survivors (Bowman, Deimling, Smerglia, Sage, & Kahana, 2003). It is likely that each new transition along the cancer trajectory has common

situational factors that combine with unique, personal factors, to form an individual's appraisal of a situation. This study explored the influence of two common experiences of patients completing cancer treatment (symptom distress and uncertainty) on cognitive appraisal during the post-radiation treatment transition.

Factors Influencing Cognitive Appraisal

Symptom distress, defined as a subjective phenomenon in which the patient attributes meaning to a symptom causing a negative emotional response (Goodell & Nail, 2005), is a personal factor that may influence appraisal by functioning as a measure of well-being for the patient or by shaping and enhancing a patient's understanding of his or her experience (Lazarus & Folkman, 1984). There are few studies of the relationship between cognitive appraisal and symptom distress, and the results are conflicting in those studies, possibly due to different operational definitions of symptom distress (Munkres, et al., 1992; Northouse, et al., 1999; Northouse, et al., 2002).

Uncertainty, conceptualized by Mishel (1988, p. 225) as the "inability to determine the meaning of illness-related events," has been found to be a significant predictor of threat and harm appraisals in long-term breast cancer survivors (Wonghongkul, Moore, Musil, Schneider, & Deimling, 2000). No studies were identified that explored the precise relationship between uncertainty and cognitive appraisal during the post-radiation treatment transition. Other studies have found that uncertainty, when coupled with harm or danger appraisal, is predictive of QOL in women with breast cancer three years post-diagnosis (Wonghongkul, Dechaprom, Phumivichuvate, & Losawatkul, 2006), women being treated for gynecologic cancer (Padilla, Mishel, & Grant, 1992), and older men who have opted to practice "watchful waiting" as a treatment option for prostate cancer (Wallace, 2003).

Given the variability in the strength of the relationship between cognitive appraisal and adjustment in previous studies, it is likely that other psychosocial variables moderate the relationship. In particular, self-efficacy and social support have been identified as influential. Self-efficacy for coping is defined as confidence in one's ability to apply a coping strategy to achieve goals (Merluzzi, Nairn, Hegde, Martinez Sanchez, & Dunn, 2001). There were no studies found of the moderating role of self-efficacy during the transition. However, self-efficacy has been shown to influence QOL and psychosocial adjustment in patients with cancer along multiple pathways, exerting direct (Champion, et al., 2007; Kreitler, Peleg, & Ehrenfeld, 2007) or indirect effects by functioning as a moderator (Carlsson, Bjorvatn, Engebretsen, Berglund, & Natvig, 2004) or mediator (Kreitler, et al., 2007; Martinez Sanchez, 1996). Consistent with O'Reilly's (1988) observation that social support is interactive, behavioral, and results in a positive effect on well-being, social support during the post-radiation treatment transition was conceptually defined as an interaction between two individuals that is perceived to be helpful by the intended recipient. It consists of emotional, instrumental, informational, and appraisal elements. Social support has been found to moderate the relationship between intrusive thoughts about cancer and quality of life in breast cancer survivors (Lewis, et al., 2001). There were no studies found of social support and its interaction with cognitive appraisal specifically during the post-radiation treatment transition.

Theoretical Framework

The conceptual framework for this study was based on Lazarus and Folkman's Transactional Model of Stress and Coping, which views the individual's cognitive appraisal of a threat as the central factor in determining how the individual responds (Lazarus & Folkman, 1984). Cognitive appraisal is a unique, dynamic and relational process that is occurring constantly between the person and environment and consists of primary and

secondary appraisal (Lazarus & Folkman, 1984). Primary appraisal refers to the individual's assessment of a situation related to one's well-being. It is categorized as irrelevant (of no consequence to the individual), benign-positive (providing some good or benefit), or stressful. Stressful appraisals of an encounter are further categorized as harm/loss (damage has already occurred to the individual), threat (the perception of potential harm), and challenge (the awareness of an opportunity for growth and mastery). Secondary appraisal is the individual's assessment of what can be done to effectively cope with a situation. Personal and environmental factors, described as "causal antecedents" in the model by Lazarus and Folkman (1984), work together to influence cognitive appraisal.

Purpose

In this study, it was posited that the patient's primary appraisal of his/her health during the post-radiation treatment transition is pivotal in determining an adaptive response and is influenced by antecedents of symptom distress, uncertainty, age, sex, race/ethnicity, education, cancer stage, and co-morbidities. It was also hypothesized that social support and self-efficacy for coping moderated the relationship between cognitive appraisal and psychosocial adjustment. The study model is shown in Figure 1.

The primary aim of this study was to examine the predictive relationship between cognitive appraisal of health and psychosocial adjustment during the immediate post-radiation treatment transition in patients with breast, lung and prostate cancer who had completed their primary treatment for their cancer. Additional aims were to (1) describe characteristics of psychosocial adjustment during the transition; (2) investigate the relationship between symptom distress, uncertainty, medical factors (cancer stage and co-morbidities), and personal factors (age, sex, race/ethnicity, and education) and cognitive appraisal; and (3) determine if social support and self-efficacy for coping moderate the relationship between cognitive appraisal and psychosocial adjustment.

Methods

Design

A predictive correlational design, with a prospective approach, was used to test the relationship between cognitive appraisal and the outcome variable, psychosocial adjustment. Potential participants, who were identified from the weekly treatment schedule in collaboration with the clinic nurse, were approached in the department approximately two weeks prior to the completion of radiation treatment. After obtaining informed written consent, a structured interview by the nurse researcher was completed to obtain demographic and medical information. The instruments measuring cognitive appraisal, uncertainty, symptom distress, social support, and self-efficacy for coping were given during a face-to-face interview in the clinic or self-administered in the clinic or at home. The second contact with the participants occurred approximately one-month after radiation treatment was complete, at which time the subjects completed the instrument measuring psychosocial adjustment either by self-administration at home or by phone interview with the nurse researcher.

Sample

Following IRB approval of the study, a convenience sample of adult patients was recruited from the radiation therapy department of a Midwestern National Cancer Institute designated Comprehensive Cancer Center. Inclusion criteria were: diagnosis of stage 0, I, II, or III breast, lung or prostate cancer; undergoing their first course of radiation therapy, given with curative (versus palliative) intent, with no further surgery or chemotherapy treatment planned for at least two months after radiation therapy; and receiving treatment as an

outpatient. Exclusion criteria included prior radiation treatment, recurrent or stage IV disease, and concurrent chemotherapy.

Measures

The Psychosocial Adjustment to Illness Scale – Self-Report version (PAIS-SR), consists of 46 items designed to measure seven domains of psychosocial adjustment: health care orientation, vocational environment, domestic environment, sexual relationships, extended family relationships, social environment, and psychological distress (Derogatis, 1986). The responses follow a four point (0 to 3) scale. The raw scores are summed for each of the seven domains and converted to a standardized *t*-score using a normative table of patients with mixed cancer diagnoses (Derogatis & Derogatis, 1990). The seven standardized *t*-scores are summed to provide a PAIS-SR total score. Higher scores reflect poorer psychosocial adjustment. The internal consistency and construct validity of the PAIS-SR was supported in a study of 502 cancer patients (Merluzzi & Sanchez, 1997). The Cronbach alpha coefficient for the entire PAIS-SR scale in this study was .94.

Primary appraisal was measured using 23 items from the Cognitive Appraisal of Health Scale (CAHS), a self-report tool aimed at assessing primary appraisal with four separate scales: threat, challenge, benign/irrelevant, and harm/loss (Kessler, 1998). Participants rate their agreement with statements using a five-point scale from 1 (strongly disagree) to 5 (strongly agree). Scores are summed for each scale; higher scores indicated agreement with the type of appraisal measured. The psychometric properties of the CAHS were tested in a sample of 201 women with breast cancer (Kessler, 1998). Internal consistency and construct validity were supported. The Cronbach alpha coefficients for this study were: threat appraisal (.72), challenge appraisal (.68), harm/loss appraisal (.86), and benign/irrelevant appraisal (.74).

The Mishel Uncertainty in Illness Scale – Community Form (MUIS-C) was used to measure uncertainty (Mishel, 1981). The MUIS-C is an abbreviated version of the original MUIS (Mishel, 1981). Items pertaining to inpatient treatment, which can be found on the original MUIS, are excluded on the MUIS-C version. The MUIS-C is a self-report measure of attitudes and perceptions of illness for non-hospitalized adults and consists of 23 items that are rated on a five point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Scores are summed; higher scores indicate greater uncertainty. Mishel (1997) reported the internal consistency for the MUIS-C in three cancer studies to be .98, .87, and .53. Validity for the MUIS-C has not been reported. However, construct and convergent validity of the original MUIS have been determined, lending some support for validity of the MUIS-C (Mishel, 1981). The Cronbach alpha coefficient was .90 in this study.

The Memorial Symptom Assessment Scale Short Form (MSAS-SF), which is a list of 32 physical and psychologic symptoms, was used to measure symptom distress (Chang, Hwang, Feuerman, Kasimis, & Thaler, 2000). The distress or bother associated with physical symptoms that occurred during the past week is rated on a five point scale ranging from 0.8 (not at all) to 4 (very much). The frequency of psychological symptoms is rated on a four point scale, ranging from 1 (rarely) to 4 (almost constantly). The total MSAS score is calculated as the average of the 32 symptom scores. Higher scores indicate greater symptom distress. Internal consistency and convergent validity of the MSAS-SF were confirmed in a sample of 299 cancer patients (Chang et al., 2000). In this study, the Cronbach alpha for the total score was .85.

Comorbidity was assessed using the Charlson Comorbidity Index (CCI), which consists of 19 medical conditions, each with an associated weighted value of 1 to 6, with a higher weight indicating a condition with greater relative risk of death (Charlson, Pompei, Ales, &

MacKenzie, 1987). Higher total scores reflect a higher degree of comorbidity and risk of death. Predictive and concurrent validity of the CCI were supported in a retrospective study of 88 patients with head and neck cancer (Singh et al., 1997). Inter-rater reliability of .74 and test-retest correlations of .86 were reported in a study of 203 cancer patients (Extermann, Overcash, Lyman, Parr, & Balducci, 1998).

Social support was measured using the Medical Outcomes Social Support Survey (MOS-SSS), which is a 19 item, self-report survey with four support subscales: emotional/informational, tangible, affectionate, and positive social interaction (Sherbourne & Stewart, 1991). Subjects rate how often each type of support is available to them using a five point scale, ranging from 1 (none of the time) to 5 (all of the time). The overall support index is calculated by averaging the 19 items; a higher score indicates more support. Internal consistency and divergent validity of the MOS-SSS subscales were verified in a sample of 2,987 adult patients with hypertension, diabetes, coronary heart disease, and/or depression (Sherbourne & Stewart, 1991). The Cronbach alpha for the total score was .95 in this study.

The Cancer Behavior Inventory Long Form (CBI-L) – Version 2.0, a 33 item instrument, was used to measure self-efficacy for coping with cancer (Merluzzi et al., 2001). Subjects rate their confidence for seven factors using a nine point scale, ranging from 1 (not at all confident) to 9 (totally confident). The seven factors are: maintenance of activity/independence, finding and understanding medical information, managing stress, coping with side effects, keeping a positive attitude, regulating emotions, and seeking support. A total score is obtained by summing the subject's ratings for the items, with a higher score representing higher self-efficacy. Internal consistency, convergent validity, and concurrent validity of the CBI-L were supported in a study of 280 cancer patients (Merluzzi et al., 2001). In this study, the Cronbach alpha was .95.

Demographic variables were measured by self-report and include: age, gender, race/ethnicity, marital status, education, employment status, income, and current living arrangement. Cancer type, stage of cancer, months since diagnosis, type of treatments received to date, concurrent treatments, any planned future treatment, and number of radiation treatments received were collected from the medical record.

Data Analysis

Data were analyzed using SPSS version 15.0. All tests of significance were two-tailed with an alpha level of .05. The total score of the PAIS-SR, the dependent variable, had close approximation to a normal distribution with slight positive skewness and normal kurtosis. No corrections were required.

The predictive relationship between cognitive appraisal and psychosocial adjustment was examined with a hierarchical multiple regression analysis. The following control variables for the regression were selected based on theory, prior research, and examination of bivariate correlations between the independent variables and psychosocial adjustment: cancer stage, age, and scores for uncertainty (Christman, 1990), and symptom distress (Budin, 1998). They were entered into the first step of the regression, followed by the four scales of primary appraisal (harm/loss, benign/irrelevant, threat, and challenge) in the second step to determine if appraisal significantly contributed to the model.

Descriptive statistics were used to analyze the sample's demographic and medical characteristics and scores for the independent and outcome variables. Independent Samples *t*-tests and bivariate correlations were used for univariate analyses. Simultaneous regressions were used to explore the relationship between symptom distress, uncertainty, medical factors, and personal factors and cognitive appraisal of health. Lastly, using the approach

outlined by Baron and Kenny (1986), the moderating effects of social support and self-efficacy on the relationship between cognitive appraisal and psychosocial adjustment were assessed for each of the four scales of the CAHS.

Results

Characteristics of participants

Eighty (63%) of the 126 patients assessed for eligibility from August 2008 to February 2009 enrolled in the study. Seven subjects did not complete the survey one month after treatment. When comparing the dropouts to those subjects who remained in the study, statistically significant differences were found for race, $\chi^2(1, N = 82) = 11.92, p < .01$; education, $\chi^2(1, N = 82) = 3.84, p = .05$; and income, $\chi^2(1, N = 82) = 5.96, p < .05$. Dropouts were more likely to be non-Caucasian, have a high school education or less, and earn \$20,000 or less per year.

Demographic and clinical characteristics are presented in Table 1. The mean age was 62.28 years ($SD = 12.92$). Breast cancer was the most common diagnosis, $n = 45$ (56.3%), followed by prostate cancer, $n = 32$ (40.0%) and lung cancer, $n = 3$ (3.8%). Fifty percent of the sample was more than 200 days since diagnosis and most (85%) of them had received treatment prior to the radiation therapy. Twelve subjects (15%) were receiving hormonal therapy during the radiation treatment and 40 (50%) indicated that they would receive hormonal therapy after completing treatment. The mean number of treatments remaining at the initial contact with the participant was 9.46 ($SD = 3.32$). The total number of daily radiation treatments received ranged from 25 to 46 ($M = 35.70, SD = 6.94$).

As shown in Table 2, at two weeks prior to completion of radiation therapy, the subjects had, on average, high scores for challenge appraisal, social support, and self-efficacy for coping. They did not exhibit high uncertainty or symptom distress. The mean number of symptoms reported was 7.66 ($SD = 4.06, Mdn = 6.50$). The most prevalent symptoms were lack of energy (63.8%), changes in skin (55%), pain (52.5%), worrying (52.5%), feeling drowsy (52.5%), and feeling sad (50%).

Characteristics of psychosocial adjustment

One month after radiation therapy, the mean total score for psychosocial adjustment for this sample was in the 50th centile of the normative cancer population ($M = 349.58, SD = 50.75, Mdn = 346.00$). In this sample, the domains with lower than average t -scores, indicating fewer problems with adjustment, were the domestic environment ($M = 48.78, SD = 10.58$), psychological distress ($M = 48.08, SD = 10.90$), health care environment ($M = 47.16, SD = 11.11$), and social environment ($M = 44.44, SD = 12.61$). There were greater adjustment problems in the areas of extended family relationships ($M = 54.26, SD = 9.51$), sexual relationships ($M = 54.07, SD = 10.11$), and the vocational environment ($M = 52.78, SD = 5.83$). Ten of 18 subjects in the top quartile of adjustment scores had total scores greater than 400, placing them in the 85th centile of the normative group. For this subgroup, greater adjustment problems were in the areas of extended family relationships ($M = 68.40, SD = 3.10$), psychological distress ($M = 67.10, SD = 5.45$), and domestic environment ($M = 64.80, SD = 6.76$).

There were no statistically significant differences in total scores for the PAIS-SR based on any demographic variable, diagnostic group, or cancer stage categories. The PAIS-SR total score was significantly correlated with all independent variables (Table 3). Better psychosocial adjustment was significantly associated with older age and higher scores for challenge appraisal, benign/irrelevant appraisal, social support, and self-efficacy for coping.

Cognitive appraisal and psychosocial adjustment

More than 52% of the variability in psychosocial adjustment was predicted by the stage of cancer, age, and scores for uncertainty, symptom distress, and the four types of cognitive appraisal (Table 4). The observed effect size was large ($f^2 = 1.09$). Given the sample size of 73 for the multiple regression analyses, the achieved power with eight predictors and alpha set at .05 was calculated to be 1.0 (Faul, Erdfelder, Lang, & Buchner, 2007). Cognitive appraisal of health was not a significant explanatory variable for psychosocial adjustment when controlling for uncertainty, cancer stage, age, and symptom distress. There were no moderating effects of social support or self-efficacy for coping found on the relationship between any type of cognitive appraisal and psychosocial adjustment.

Predictors of cognitive appraisal

Of eight independent variables, three were determined to be significant predictors of at least one type of appraisal. Uncertainty was a statistically significant predictor for all four types of appraisal, having a direct relationship with threat appraisal ($\beta = 0.574, p < .001$) and harm/loss appraisal ($\beta = 0.564, p < .001$) and an inverse relationship with challenge appraisal ($\beta = -0.450, p < .001$) and benign/irrelevant appraisal ($\beta = -0.329, p < .01$). Age had a statistically significant inverse relationship with threat appraisal ($\beta = -0.251, p < .05$) and harm/loss appraisal ($\beta = -0.347, p < .01$) and a direct relationship with benign/irrelevant appraisal ($\beta = 0.322, p < .01$). Cancer stage had a statistically significant direct relationship with harm/loss appraisal ($\beta = 0.270, p < .01$).

Discussion

The post-radiation treatment transition was conceptualized in this study as a critical period along the cancer trajectory during which the patient is potentially vulnerable for poor psychosocial adjustment. Yet, the results indicate that most patients were adjusting fairly well during the transition when compared to other cancer patients. One month after radiation therapy, the subjects in this study were doing “average” as the mean total score for psychosocial adjustment placed the subjects in the 50th centile of the normative cancer population. The total PAIS-SR mean score of 349.58 was very similar to the mean scores, reported by Dow and Lafferty (2000), of young women with breast cancer at the end of radiation therapy (357.06) and six months post-radiation therapy (346.44). Average scores for adjustment are somewhat consistent with reports of improved QOL one month after radiation therapy (Deshields et al., 2005). However, the finding that 10 subjects were in the 85th centile of the normative group, indicates that there was a vulnerable subgroup of patients who were having difficulty adjusting after radiation treatment.

The finding that subjects did not exhibit high levels of threat appraisal, harm appraisal, or benign/irrelevant appraisal two weeks prior to completing radiation therapy is consistent with appraisal scores reported in the literature. Mid-range stress appraisal scores rather than extreme values were noted in patients receiving initial treatment with chemotherapy (Munkres, et al., 1992) and in patients undergoing radiation therapy (Oberst, et al., 1991). One explanation for the result found in the current study is that the median time since diagnosis was 207 days, 85% of the patients had received prior treatment, and most had completed the bulk of their radiation treatments. These were “seasoned” cancer patients who had likely encountered the numerous stressors associated with the diagnostic and early treatment phases and had reframed any threat and harm appraisals earlier in their cancer experience. Also, by the end of radiation treatment, most patients have become accustomed to treatment side effects and their patterns, and are likely feeling more in control of their health and less frightened. Another factor that might explain the low levels of threat and harm/loss appraisals is the plan for post-radiation hormonal treatment in approximately 50%

of the sample. Subjects with ongoing treatment, in the form of a daily pill or periodic injection, may find reassurance and comfort in that something is actively being done to treat their cancer, resulting in less stress appraisal.

The finding that cognitive appraisal did not predict adjustment was unexpected given prior evidence that threat appraisal predicted psychological functioning in women with breast cancer (Gallagher, et al., 2002) and harm/loss appraisal predicted mental health functioning in men with prostate cancer (Ahmad, et al., 2005). The discrepancy in results may be due to the current study's broad focus on psychosocial adjustment rather than psychological functioning. In addition, the present study controlled for variables that have been shown to significantly influence adjustment: uncertainty, age, cancer stage, and symptom distress, whereas the other studies did not control for these variables.

The most striking finding in this study was that symptom distress made a large unique contribution to explaining variability in psychosocial adjustment and was the only significant explanatory variable seen in the regression analyses. This result was unexpected given the evidence in the literature that threat appraisal was predictive of poor psychological functioning and accounted for more variance than symptom distress (Munkres, et al., 1992; Oberst, et al., 1991). However, the result is consistent with Budin (1998), who reported that symptom distress, alone, accounted for 56.9% of the variance in psychosocial adjustment (measured by the PAIS), in women with breast cancer, some of whom were receiving radiation therapy. The high prevalence of self-reported symptoms was notable in this study and is consistent with Cheng and colleagues (2005), who also used the MSAS, and reported a high prevalence of physical and psychological symptoms in cancer patients within the first twelve months of completing treatment. Because the MSAS focuses on all current symptoms, the scope of symptoms reported by subjects in this study was beyond the expected side effects associated with the radiation treatment field.

The prevalence of psychological symptoms and the associated distress supports the concept that nearing the completion of radiation treatment is an emotionally vulnerable time for some patients. Worry was reported by more than half of the subjects and was ranked with pain as the second most distressing side effect. Feeling sad was reported by approximately half of the sample. Difficulty sleeping, which may be due to psychological distress, was another prevalent symptom, reported by 42.5% of the sample.

The use of a convenience sample and the small number of subjects with lung cancer limits generalizability of results. The differential loss of subjects and significant differences noted between the dropouts and those subjects who remained in the study is a threat to internal validity. Additionally, the accuracy of the area t-scores for the PAIS-SR subscales was limited by the mismatch between the referent group and the sample in this study. The referent group consisted of 114 patients with mixed cancer diagnoses (excluding prostate cancer) and was characterized as being mostly female and almost entirely Caucasian, with 50–60% of the subjects having metastasis (Derogatis & Derogatis, 1990). Another limitation is that psychosocial adjustment was not measured at the first time point and we are thus unable to determine if adjustment prior to completing treatment is the best predictor of post-treatment adjustment. Implications for practice and research

This study has several implications for clinical practice related to screening, assessment, and education of patients during the transition. First, clinicians should screen patients for factors associated with poor psychosocial adjustment: young age; high levels of uncertainty, symptom distress, threat appraisal, and harm/loss appraisal; and low levels of social support and self-efficacy for coping. Of critical importance is the need for a comprehensive assessment throughout treatment of the patient's symptom distress, broadening the

assessment beyond the expected radiation-induced side effects. Recognition that patients have significant symptom distress related to other conditions than cancer and active management of the problem to reduce the distress are essential to promoting psychosocial adjustment after radiation therapy. The MSAS is a simple tool that can be used to assess symptom distress at the beginning of radiation therapy, mid-treatment, and during the follow-up phase.

The findings in this study also support the need for assessment of psychosocial adjustment during the post-radiation period. Use of a tool, such as the PAIS-SR, would provide comprehensive information of the domains of psychosocial adjustment and allow for comparison of the individual to a normative group. A more focused assessment of extended family relationships and sexual relationships using more in-depth tools is recommended.

Education of the patient who is undergoing radiation therapy should be broadened to include preparation for the physical, social, and emotional tasks of the transition and should be integrated into the patient's weekly visit with the healthcare team. Education to dispel common myths of the end-of-treatment transition, as described by Stanton and colleagues (2005), should acknowledge that it is a time of mixed emotions, that recovery is not instantaneous, that patients often feel a new sense of normalcy in their lives, and that support is usually needed.

Descriptive studies are needed to examine the post-radiation treatment transition in populations other than patients with breast cancer or prostate cancer. The concept of transition should be expanded to include the post-chemotherapy period. The family's experience of the post-cancer treatment transition should also be explored to identify needs, concerns, and misconceptions.

In this study, symptom distress played a major role in predicting psychosocial adjustment, despite little variability in distress scores due to the homogeneous sample. It is possible that the true nature of this relationship was underestimated and that an even stronger relationship between symptom distress and adjustment may be found in a more diverse sample. Future studies might further confirm this relationship between symptom distress and psychosocial adjustment by using a more heterogeneous sample in terms of diagnoses, cancer stage, and treatments. Interventional studies should be targeted towards reducing symptom distress prior to the post-radiation treatment transition. Testing the feasibility of integrating a screening tool for symptom distress into clinical practice is an essential step in identifying vulnerable patients for interventions designed to match the intensity of the patient's distress.

References

- Ahmad MM, Musil CM, Zauszniewski JA, Resnick MI. Prostate cancer: appraisal, coping, and health status. *J Gerontol Nurs.* 2005; 31(10):34–43. [PubMed: 16262089]
- Arnold EM. The cessation of cancer treatment as a crisis. *Soc Work Health Care.* 1999; 29(2):21–38. [PubMed: 10576250]
- Back M, Ahern V, Delaney G, Graham P, Steigler A, Wratten C. Absence of adverse early quality of life outcomes of radiation therapy in breast conservation therapy for early breast cancer. *Australasian Radiology.* 2005; 49:39–43. [PubMed: 15727608]
- Baron RM, Kenny DA. The moderator – mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology.* 1986; 51(6):1173–1182. [PubMed: 3806354]
- Bowman KF, Deimling GT, Smerglia V, Sage P, Kahana B. Appraisal of the cancer experience by older long-term survivors. *Psychooncology.* 2003; 12(3):226–238. [PubMed: 12673807]
- Brennan J. Adjustment to cancer - coping or personal transition? *Psychooncology.* 2001; 10(1):1–18. [PubMed: 11180573]

- Budin WC. Psychosocial adjustment to breast cancer in unmarried women. *Research in Nursing & Health*. 1998; 21:155–166. [PubMed: 9535407]
- Carlsson AH, Bjorvatn C, Engebretsen LF, Berglund G, Natvig GK. Psychosocial factors associated with quality of life among individuals attending genetic counseling for hereditary cancer. *J Genet Couns*. 2004; 13(5):425–445. [PubMed: 15604640]
- Champion V, Williams SD, Miller A, Reuille KM, Wagler-Ziner K, Monahan PO, et al. Quality of life in long-term survivors of ovarian germ cell tumors: a Gynecologic Oncology Group study. *Gynecol Oncol*. 2007; 105(3):687–694. [PubMed: 17355890]
- Chang VT, Hwang SS, Feuerman M, Kasimis BS, Thaler HT. The memorial symptom assessment scale short form (MSAS-SF). *Cancer*. 2000; 89(5):1162–1171. [PubMed: 10964347]
- Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis*. 1987; 40(5):373–383. [PubMed: 3558716]
- Cheng KKF, Thompson DR, Ling WM, Chan CWH. Measuring symptom prevalence, serverity and distress of cancer survivors. *Clinical Effectiveness in Nursing*. 2005; 9:154–160.
- Christman NJ. Uncertainty and adjustment during radiotherapy. *Nurs Res*. 1990; 39(1):17–20. 47. [PubMed: 2294509]
- Derogatis LR. The psychosocial adjustment to illness scale (PAIS). *J Psychosom Res*. 1986; 30(1):77–91. [PubMed: 3701670]
- Derogatis, LR.; Derogatis, MF. The psychosocial adjustment to illness scale (PAIS & PAIS-SR) administration, scoring, and procedures manual-II. Maryland: Clinical Psychometric Research, Inc; 1990.
- Deshields T, Tibbs T, Fan MY, Bayer L, Taylor M, Fisher E. Ending treatment: the course of emotional adjustment and quality of life among breast cancer survivors immediately following radiation therapy. *Support Care Cancer*. 2005; 13(12):1018–1026. [PubMed: 15800768]
- Dow KH, Lafferty P. Quality of life, survivorship, and psychosocial adjustment of young women with breast cancer after breast-conserving surgery and radiation therapy. *Oncol Nurs Forum*. 2000; 27(10):1555–1564. [PubMed: 11103374]
- Extermann M, Overcash J, Lyman GH, Parr J, Balducci L. Comorbidity and functional status are independent in older cancer patients. *Journal of Clinical Oncology*. 1998; 16(4):1582–1587. [PubMed: 9552069]
- Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods*. 2007; 39(2):175–191. [PubMed: 17695343]
- Gallagher J, Parle M, Cairns D. Appraisal and psychological distress six months after diagnosis of breast cancer. *Br J Health Psychol*. 2002; 7(Part 3):365–376. [PubMed: 12614506]
- Goodell TT, Nail LM. Operationalizing symptom distress in adults with cancer: a literature synthesis. *Oncol Nurs Forum*. 2005; 32(2):E42–47. [PubMed: 15759060]
- Graydon JE. Women with breast cancer: their quality of life following a course of radiation therapy. *J Adv Nurs*. 1994; 19(4):617–622. [PubMed: 8021381]
- Holland JC, Reznik I. Pathways for psychosocial care of cancer survivors. *Cancer*. 2005; 104(11 Suppl):2624–2637. [PubMed: 16258931]
- Kessler TA. The Cognitive Appraisal of Health Scale: development of psychometric evaluation. *Res Nurs Health*. 1998; 21(1):73–82. [PubMed: 9472239]
- Klee M, Thranov I, Machin D. Life after radiotherapy: the psychological and social effects experienced by women treated for advanced stages of cervical cancer. *Gynecol Oncol*. 2000; 76(1):5–13. [PubMed: 10620434]
- Kreitler S, Peleg D, Ehrenfeld M. Stress, self-efficacy and quality of life in cancer patients. *Psychooncology*. 2007; 16(4):329–341. [PubMed: 16888704]
- Lazarus, RS.; Folkman, S. Stress, appraisal and coping. New York: Springer Publishing Company, Inc; 1984.
- Lazarus, RS. Emotion and adaptation. New York: Oxford University Press; 1991.

- Lethborg CE, Kissane D, Burns WI, Snyder R. "Cast Adrift": The experience of completing treatment among women with early stage breast cancer. *Journal of Psychosocial Oncology*. 2000; 18(4):73–90.
- Lewis JA, Manne SL, DuHamel KN, Vickburg SM, Bovbjerg DH, Currie V, et al. Social support, intrusive thoughts, and quality of life in breast cancer survivors. *J Behav Med*. 2001; 24(3):231–245. [PubMed: 11436544]
- Martinez Sanchez MA. Toward a model of factors that contribute to adjustment in persons coping with cancer. *Dissertation Abstracts International*. 1996; 57(3-B):2210.
- Merluzzi TV, Sanchez MM. Factor structure of the psychosocial adjustment to illness scale (self-report) for persons with cancer. *Psychological Assessment*. 1997; 9(3):269–276.
- Merluzzi TV, Nairn RC, Hegde K, Martinez Sanchez MA, Dunn L. Self-efficacy for coping with cancer: revision of the Cancer Behavior Inventory (version 2.0). *Psychooncology*. 2001; 10(3):206–217. [PubMed: 11351373]
- Mishel MH. The measurement of uncertainty in illness. *Nurs Res*. 1981; 30(5):258–263. [PubMed: 6912987]
- Mishel MH. Uncertainty in illness. *IMAGE: Journal of Nursing Scholarship*. 1988; 20(4):225–232.
- Mishel, MH. Uncertainty in illness scales manual. Chapel Hill, NC: University of North Carolina; 1997.
- Munkres A, Oberst MT, Hughes SH. Appraisal of illness, symptom distress, self-care burden, and mood states in patients receiving chemotherapy for initial and recurrent cancer. *Oncol Nurs Forum*. 1992; 19(8):1201–1209. [PubMed: 1408961]
- Northouse LL, Caffey M, Deichelbohrer L, Schmidt L, Guziatke-Trojnick L, West S, et al. The quality of life of African American women with breast cancer. *Res Nurs Health*. 1999; 22(6):449–460. [PubMed: 10630287]
- Northouse LL, Mood D, Kershaw T, Schafenacker A, Mellon S, Walker J, et al. Quality of life of women with recurrent breast cancer and their family members. *J Clin Oncol*. 2002; 20(19):4050–4064. [PubMed: 12351603]
- Oberst MT, Hughes SH, Chang AS, McCubbin MA. Self-care burden, stress appraisal, and mood among persons receiving radiotherapy. *Cancer Nurs*. 1991; 14(2):71–78. [PubMed: 2044064]
- O'Reilly P. Methodological issues in social support and social network research. *Social Science Medicine*. 1988; 26(8):863–873. [PubMed: 3287636]
- Padilla GV, Mishel MH, Grant MM. Uncertainty, appraisal and quality of life. *Qual Life Res*. 1992; 1(3):155–165. [PubMed: 1301125]
- Rose P, Yates P. Quality of life experienced by patients receiving radiation treatment for cancers of the head and neck. *Cancer Nurs*. 2001; 24(4):255–263. [PubMed: 11502033]
- Schreier AM, Williams SA. Anxiety and quality of life of women who receive radiation or chemotherapy for breast cancer. *Oncology Nursing Forum*. 2004; 31(1):127–130. [PubMed: 14722597]
- Schumacher KL. Shifting patterns of self-care and caregiving during chemotherapy. *Dissertation Abstracts International*. 1994; 56(1-B):175.
- Sherbourne CD, Stewart AL. The MOS social support survey. *Soc Sci Med*. 1991; 32(6):705–714. [PubMed: 2035047]
- Singh B, Bhaya M, Stern J, Roland JT, Zimble M, Rosenfeld RM, et al. Validation of the Charlson comorbidity index in patients with head and neck cancer: a multi-institutional study. *Laryngoscope*. 1997; 107(11):1469–1475. [PubMed: 9369392]
- Stanton AL, Ganz PA, Rowland JH, Meyerowitz BE, Krupnick JL, Sears SR. Promoting adjustment after treatment for cancer. *Cancer*. 2005; 104(11 Suppl):2608–2613. [PubMed: 16247779]
- Wallace M. Uncertainty and quality of life of older men who undergo watchful waiting for prostate cancer. *Oncol Nurs Forum*. 2003; 30(2):303–309. [PubMed: 12692664]
- Wonghongkul T, Dechaprom N, Phumivichuvate L, Losawatkul S. Uncertainty appraisal coping and quality of life in breast cancer survivors. *Cancer Nurs*. 2006; 29(3):250–257. [PubMed: 16783127]

Wonghongkul T, Moore SM, Musil C, Schneider S, Deimling G. The influence of uncertainty in illness, stress appraisal, and hope on coping in survivors of breast cancer. *Cancer Nurs.* 2000; 23(6):422–429. [PubMed: 11128121]

Figure 1.
Study model

Table 1

Sample Characteristics (N = 80)

Characteristic	n (%)
Gender - Female	47 (58.8)
Race/Ethnicity	
Caucasian	52 (65.0)
African American	27 (33.8)
Asian	1 (1.3)
Marital status – Married	51 (63.8)
Employment Status	
Employed	31 (38.8)
Not Employed/Retired	49 (61.2)
Annual Household Income ^a	
\$20,000 or less	17 (22.1)
\$21,000 to \$49,999	27 (35.1)
\$50,000 or greater	33 (42.9)
Education	
High School or less	46 (57.5)
Post High School	34 (42.5)
Stage of Disease	
0	6 (7.5)
I	24 (30.0)
II	40 (50.0)
III	10 (12.5)
Prior Treatment	
Chemotherapy	1 (1.3)
Surgery	23 (28.8)
Hormone Therapy	15 (18.8)
Surgery & Chemotherapy	25 (31.3)
Surgery & Hormone Therapy	4 (5.0)
None	12 (15.0)

^a n = 77 due to missing data.

Table 2

Mean Scores for Independent Variables (N = 80)

Variable	Mean (SD)	95% Confidence Interval	Possible Range
Threat Appraisal	11.57 (3.59)	10.77 – 12.37	5 – 25
Challenge Appraisal	23.44 (3.63)	22.63 – 24.24	6 – 30
Harm/Loss Appraisal	17.40 (6.08)	16.05 – 18.76	8 – 40
Benign Appraisal	11.22 (3.66)	10.40 – 12.03	4 – 20
Uncertainty	48.79 (11.72)	46.18 – 51.40	23 – 115
Symptom Distress (total)	.64 (.45)	.54 – .74	0 – 4
Self-Efficacy for Coping	246.35 (36.70)	238.08 – 254.62	33 – 297
Social Support (total)	4.22 (.76)	4.04 – 4.38	1 – 5
Comorbidity	.31 (.648)	.17 – .46	0 – 37

Table 3

Correlations Between PAIS-SR Total Score and Independent Variables (N = 73)

Variable	<i>r</i>	95% CI <i>r</i>	<i>p</i>	Power ^a
Age	-.281	-.478 to -.050	.016	.55
Threat Appraisal	.448	.245 to .617	.000	.97
Challenge Appraisal	-.373	-.558 to -.159	.001	.84
Harm/Loss Appraisal	.558	.380 to .696	.000	.97
Benign/Irrelevant	-.583	-.716 to -.405	.000	.97
Uncertainty	.420	.207 to .592	.000	.93
Symptom Distress	.677	.530 to .786	.000	.97
Social Support	-.348	-.537 to -.129	.003	.84
Self-Efficacy for Coping	-.592	-.726 to -.422	.000	.97
Comorbidity	-.254	-.454 to -.030	.030	.45

^a Observed power was calculated conservatively using a sample size of 70, alpha of .05 and the observed *r* value (Corty, 2007).

Summary of Hierarchical Regression Analysis of Variables Predicting Psychosocial Adjustment (N = 73)

Table 4

Variable	B	SE B	t	p	R ² _{adj}	R ²
Model 1					.474	.503 [*]
Uncertainty	.836	.397	2.109	.039		
Cancer Stage	2.846	5.607	.508	.613		
Age	-.542	.372	-.135	.150		
Symptom Distress	62.786	10.983	5.717	.000		
Model 2					.521	.071 ^{**}
Uncertainty	.080	.482	.167	.868		
Cancer Stage	-.345	5.785	-.060	.953		
Age	-.034	.407	-.082	.935		
Symptom Distress	53.367	11.277	4.732	.000		
Threat Appraisal	.030	1.877	.016	.987		
Challenge Appraisal	-1.669	1.295	-1.289	.202		
Harm/Loss Appraisal	1.208	1.120	.148	.285		
Benign Appraisal	-2.549	1.915	-1.331	.188		

^{*} *p* < .001.

^{**} *p* < .05.