ASSOCIATIONS AMONG ANXIETY, DEPRESSION, PHYSICAL QUALITY

OF LIFE, AND FEAR OF RECURRENCE IN POST-THYROIDECTOMY THYROID

CANCER SURVIVORS

by

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Associations among Anxiety, Depression, Physical Quality of Life, and Fear of Recurrence in Post-thyroidectomy Thyroid Cancer Survivors

Thesis directed by Assistant Professor Kristin Kilbourn.

Thyroid cancer survivors experience a survival rate upwards of 90%. Despite their excellent prognosis, these survivors often experience lower levels of quality of life, anxiety, and depression. This decreased functioning has been shown to be related to fear of cancer recurrence in studies of survivors of other types of cancer. Fear of cancer recurrence occurs in cancer survivors regardless of cancer type or time since treatment. Establishing the prevalence of fear of recurrence in thyroid cancer survivors, as well as determining the relationship between quality of life and fear of recurrence is important to assess if interventions could be warranted. The current cross-sectional observational study of 57 thyroid cancer survivors, who have undergone total thyroidectomy surgery in the past ten years, used an online survey to assess quality of life, anxiety, depression, and fear of cancer recurrence. Participants had a mean duration of 2.61 years from thyroid removal surgery. Around half (47.3%) of participants reported moderate or severe level of concern regarding cancer recurrence. Thirty-six percent of patients experienced clinically significant levels of anxiety. Higher levels of fears of recurrence were found to be related to decreased quality of life, decreased physical quality of life, and higher levels of general anxiety. Depression was not found to be related to fear of recurrence. These results reflect those found in survivors of other cancer types. Strategies to decrease distress in thyroid cancer survivors should be examined, particularly interventions targeting anxiety.

The form and content of this abstract are approved. I recommend its publication.

Approved: Kristin Kilbourn

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I.   INTRODUCTION

Well-differentiated thyroid cancer (DTC) patients have an excellent survival

rate, upwards of 90% (Farrar, Cooperman, & James, 1980; Gilliland, Hunt, Morris, &

Key, 1997). DTC is a category of thyroid cancer classified by cells that have very

similar size and shape (Skugor, 2009). Cancers in this category are made up of

papillary and follicular cell carcinomas (Tagay et al., 2005). Differentiated thyroid

cancer accounts for eighty to ninety percent of thyroid cancers and has a good

prognosis (Skugor, 2009). Alternatively, poorly differentiated thyroid cancers, known

as medullary or anaplastic types, are a category of thyroid cancers that have a

jumbled appearance (Skugor, 2009). Medullary carcinomas occur in five to 10

percent of thyroid cancer cases and have a good prognosis if the cancer has not

metastasized (Skugor, 2009). Most cancer patients with thyroid cancer are cured after

their initial treatment (Roberts, Lepore, & Urken, 2008). A limited body of research

regarding thyroid cancer survivors exists in regards to quality of life and psychosocial

issues in this population of survivors. Because more people are living as thyroid

cancer survivors, more exploration is needed in order to evaluate long term quality of

life in these survivors.

Thyroid cancer is different from many other cancers not only because of the

high survival rates, but also in regards to the population this cancer typically effects.

Compared to cancers that are more prevalent in older populations, thyroid cancer is

generally diagnosed in middle age with mean age of incidence around 40 to 45 years (Howlader et al., 2010; Gilliland et al., 1997; Pelttari, Sintonen, Schalin-Jantti, & Valimaki, 2009; Tan, Nan, Thumboo, Sundram, & Tan, 2007). Differentiated thyroid cancer also occurs in women at a three times greater rate than it occurs in men (Roberts et al., 2007). Other risk factors include a family history of thyroid cancer or exposure to radiation (Skugor, 2009).

Thyroid cancer begins as a thyroid nodule, which is a lump in the thyroid gland. Nodules may go undetected for long periods of time, and as many as 95% of nodules are benign (Welker & Orlov, 2003). Often, thyroid nodules are detected when patients present with symptoms such as pressure while swallowing, throat pain, or hoarseness. Once a thyroid nodule is detected, a doctor will perform an ultrasound of the neck area. If the nodule is large, typically larger than one centimeter, and has an asymmetrical appearance, a fine-needle aspiration biopsy is taken (Welker & Orlov, 2003). This procedure uses a small needle to collect cells from the nodule. The biopsy is then analyzed to see if the cells in the nodule are cancerous or benign. If the cells are cancerous, the typical treatment is a total thyroidectomy (Crevenna et al., 2003; Hoftijzer et al., 2008; Lee et al., 2010; Pelttari et al., 2009; Tagay et al., 2005). In this surgical procedure, an incision is made at the base of the neck, and the entire thyroid is removed. This surgery is often followed by radioiodine ablation (Baker, Denniston, Smith, & West, 2005; Hoftijzer et al., 2008; Lee et al., 2010). Radioiodine ablation destroys any additional cancer cells that have been left after thyroidectomy surgery.

After treatment is complete, thyroid cancer survivors need to take daily

thyroid hormone replacement for the rest of their lives to regulate their thyroid

hormone levels (Lee et al., 2010; Pelttari et al., 2009; Roberts et al., 2008; Schultz,

Stava, Vassilopoulou-Sellin, 2003). Follow-up monitoring in thyroid cancer survivors

is necessary to ensure the cancer has not returned. Although the frequency and type of

monitoring varies by patient, thyroid cancer survivors are monitored for the rest of

their lives to detect recurrence. Radioiodine whole-body scans and blood tests

examining serum thyroglobulin and thyroid stimulating hormone levels are

commonly used methods of surveillance (Huang, Lee, Chien, Liu, & Tai, 2004;

Tagay et al., 2006). In order for the doctor to perform these checkups, it is often

necessary for DTC survivors to stop taking their thyroid hormone replacement

medication for up to four weeks (Lee et al., 2010; Tagay et al., 2005). This essentially

causes hypothyroidism in the body, which can cause a variety of symptoms, such as

weight gain, fatigue, and sluggishness (Tagay et al., 2005).

Physical Quality of Life

As mentioned earlier, DTC has a good prognosis, but involves invasive surgery and

lifelong hormone supplementation (Lee et al., 2010). Like survivors of other types of

cancer, thyroid cancer survivors have been reported to experience a

variety of physical symptoms. These symptoms can result from the medication,

surgery, or follow-up monitoring and can have a negative impact on overall quality of

life. Fatigue, sleep problems, dry skin, and intolerance to cold or heat are commonly

reported symptoms (Hoftijzer et al., 2008; Huang et al., 2004; Lee et al., 2010;

Roberts et al., 2008). Shultz and colleagues (2003) found 18.1% of DTC survivors

report memory loss, which was found to be significantly higher when compared to survivors of other cancers. Differentiated thyroid cancer survivors also reported more migraine headaches than survivors of other cancers (Schultz et al., 2003). After surgical treatment, symptoms of hoarseness can last for more than six months (Tan et al., 2007). Other symptoms include weight change (Schultz et al., 2003; Tagay et al., 2006), hair loss (Schultz et al., 2003), slow movement, sweating problems, and constipation (Tagay et al., 2006). These symptoms tend to be pervasive and negatively affect quality of life in DTC survivors.

Only a few studies have been conducted focusing on the health related or physical quality of life of thyroid cancer survivors. Lee and colleagues (2010) have shown fatigue to have a negative influence on global health, quality of life, and physical functioning in DTC survivors. Other studies have reported a similar decrease in the physical realm of quality of life (Hoftjzer et al., 2008; Lee et al., 2010; Tagay et al., 2006; Tan et al., 2007). Thus, it is important to note that although most thyroid cancer survivors do not experience a recurrence of their cancer, many of these survivors experience pervasive physical symptoms and an overall decrease in quality of life associated with their cancer treatment and on-going cancer surveillance.

Anxiety and Depression

Two recent studies found DTC survivors to have significantly higher levels of anxiety and depression when compared to healthy controls (Hoftijzer et al., 2008; Lee et al., 2010). However, these results have not been consistent across studies. Tagay and colleagues (2006) found anxiety, but not depression, to be significantly higher among DTC survivors. Anxiety and depression in DTC survivors are associated with

decreased quality of life and lowered physical functioning. Lower scores on physical functioning measured by the Short Form-36, a quality of life inventory, have been correlated with higher levels of depression (Tagay et al., 2006). Lee and colleagues (2010) found depression to have a negative impact on quality of life and global health. Furthermore, Tagay's group (2006) also found lower scores on mental functioning to be related to anxiety, depression, and increased physical complaints. Overall, depression and anxiety in thyroid cancer survivors appear to be associated with higher levels of physical symptoms and lower levels of overall quality of life.

Fear of Recurrence

Fear of cancer recurrence, commonly known as fear of recurrence (FoR), is defined as, "the fear or worry that the cancer will return or progress in the same organ or in another part of the body" (Simard, Savard, & Ivers, 2010, p. 361). Fear of recurrence is a constant, specific worry about the return of cancer. The construct differs from anxiety, as anxiety is a generalized, persistent worry. Not only do cancer patients worry about the possible return of their cancer while going through treatment, but they continue to experience FoR once they have completed their treatment. Baker and colleagues (2005) found FoR to be one of the primary concerns among breast, colorectal, prostate, and lung cancer survivors. Despite the differences in cancer type, FoR is commonly experienced among cancer survivors, "even those who do not necessarily suffer long-term impact to QOL" (Llewellyn, Weinman, McGurk, & Humphris, 2008, p. 525).

Previous research has shown an association between age and FoR, with younger survivors experiencing more FoR. In a study of over 1000 breast cancer

survivors older age was found to be associated with less FoR (Mehnert, Berg, Henrich, & Herschbach, 2009). Additionally, younger age was found to predict greater distress and higher levels of FoRat three months and one year following breast cancer diagnosis (Stanton, Danoff-Burg, & Huggins, 2002). This relationship was replicated in orofacial cancer survivors (Humphris, Rogers, McNally, Lee-Jones, Brown, &Vaughan, 2003). Additionally, Humphris and colleagues (2003) found a relationship between gender and FoR, reporting women to experience more FoR.

Despite the good prognosis of DTC, a small proportion of survivors will experience a recurrence. Schlumberger (1998) found, "five to 20 percent of patients with DTC have local or regional recurrences" (p. 298). Additionally, 10-15 percent of survivors may develop distant metastases (Schlumberger, 1998). Although the rate of recurrence is relatively low, FoR is a legitimate concern among thyroid cancer survivors. However, almost no studies have examined the prevalence or impact of FoR in thyroid cancer survivors (Roberts et al., 2008).

Despite the lack of studies examining FoR in thyroid cancer survivors, there have been a few studies examining FoR in other cancer populations. In head and neck cancer survivors, it was found that FoR did not significantly decrease in six to eight months post diagnosis compared to ratings prior to treatment (Llewellyn et al., 2008). In testicular cancer survivors, with an average of eleven years since diagnosis at follow up, 31% of survivors reported "quite a bit" or "very much" FoR (Skaali et al., 2009). Also, in breast cancer survivors it was found that, "[FoR] does not differ in women at different time points post-cancer diagnosis" (Mehnert et al., 2009, p.1278). Although it may wane over time for some cancer survivors, it seems that FoR can be

a concern for all cancer survivors, regardless of how long it has been since they completed treatment.

High levels of FoR have been shown to have a negative impact in many areas of functioning. In terms of physical quality of life, it has been shown in prostate cancer survivors that improved, or lower levels of, FoR relates to better physical health (Bellizzi, Latini, Cowan, DuChane, & Carroll, 2008). Skaali and colleagues (2009) found increased FoR to be related to increased fatigue in testicular cancer survivors. A relationship between physical quality of life and FoR in breast cancer survivors was also found (Mehnert et al., 2009).

Fear of recurrence has also been shown to be related to psychological symptoms in cancer survivors. In testicular cancer survivors, increased FoR was related to anxiety and depression (Skaali et al., 2009). In head and neck cancer survivors, a positive correlation was found between FoR and anxiety after initial diagnosis and, again, six months post diagnosis (Llewellyn et al., 2008). Additionally, a moderate correlation was found between mental quality of life and FoR in breast cancer survivors (Mehnert et al., 2009). These findings suggest that FoR is a common experience among cancer survivors and has been shown to have a concerning relationship with physical quality of life, anxiety, and depression.

The Current Study

The overall goal of the current study was to understand the relationship between FoR, levels of distress, and physical quality of life. This is based on the premise that, because of regular checkups, daily medication, and physical symptoms such as fatigue and hoarseness, thyroid cancer survivors are frequently reminded that

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they had cancer, which may make FoR more salient and result in higher levels of distress in which could impact physical quality of life. Specifically, it is hypothesized that a decrease in physical quality of life will be associated with higher levels of anxiety and depression, and that this relationship can be explained in part by FoR as a mediator/partial mediator between the two variables. That is, it is hypothesized that FoR will at least partially explain the variance between physical quality of life and anxiety and depression.
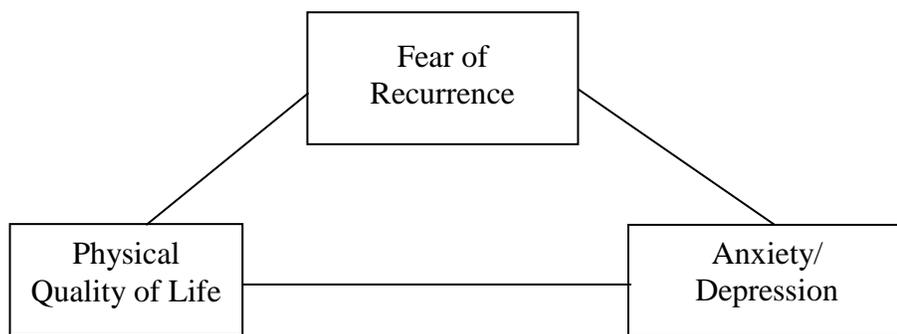
Figure I.1 Relationship between Physical Quality of Life, Fear of Recurrence and Emotional Distress.

Very few studies have examined psychosocial adjustment in thyroid cancer survivors, and, to the best of our knowledge, only one published study has examined FoR in thyroid cancer survivors (Roberts et al., 2008). The few studies that have examined psychosocial variables in thyroid cancer survivors have focused primarily on quality of life. Therefore, there is a need for additional survey research with thyroid cancer survivors in order to better understand quality of life, anxiety, depression, and FoR, as well as determining how these constructs relate to each other.

Research Aims

Research Aim 1 To examine the relationship between FoR and demographic variables in thyroid cancer survivors.

     Hypothesis 1.1. Younger thyroid cancer survivors will experience higher levels of FoR than older thyroid cancer survivors.

     Hypothesis 1.2. Female thyroid cancer survivors will experience higher levels of FoR than male thyroid cancer survivors.

Research Aim 2 To examine the relationship between FoR and quality of life in thyroid cancer survivors.

     Hypothesis 2.1. Thyroid cancer survivors who experience lower levels of overall quality of life will experience higher levels of FoR.

     Hypothesis 2.2. Thyroid cancer survivors who experience lower levels of physical quality of life will experience higher levels of FoR.

Research Aim 3 To examine the relationship between FoR and anxiety and depression.

     Hypothesis 3.1. Thyroid cancer survivors who experience higher levels of FoR will have higher levels of anxiety.

     Hypothesis 3.2. Thyroid cancer survivors who experience higher levels of FoR will have higher levels of depression.

Research Aim 4 To examine the relationship between physical quality of life, FoR, anxiety, and depression.

     Hypothesis 4.1. Thyroid cancer survivors who experience lower levels of physical quality of life will experience higher levels of anxiety.

Hypothesis 4.2. Thyroid cancer survivors who experience lower levels of physical quality of life will experience higher levels of depression.

Hypothesis 4.3. In thyroid cancer survivors, FoR will partially mediates the relationship between physical quality of life and anxiety.

Hypothesis 4.4. In thyroid cancer survivors, FoR will partially mediates the relationship between physical quality of life and depression.

CHAPTER

II.   Methods

Participants

The current study used data from a cross-sectional study on thyroid cancer

survivors conducted by Drs. Joshua Klopper and Kristin Kilbourn (COMIRB protocol

#10-1478). For this study, men and women, ages 18 to 72, who had been diagnosed

with thyroid cancer and treated by total thyroidectomy were recruited. In order to

participate in this study, six months or more must have passed between surgery and

the time of survey invitation. In addition, participants had to be conversant in English

and able to read the recruitment invitation in order to participate. To conduct the

appropriate analyses, outlined below, it was estimated that the study would need to

include at least 55 participants who completed the survey. This number was

determined with an a priori power analysis from G*power (Erdfelder, Faul, &

Buchner, 1996), using a two-tailed, alpha < .05 linear regression with two predictors,

power at 0.80, and effect size set to 0.15. The effect size of .15 in a linear model, such

as a multiple regression model is a medium effect size.

Procedure

This study utilized a cross-sectional observational research design.

Individuals were recruited from The University of Colorado Hospital. Participants

were identified according to the previously listed criteria and subsequently mailed or

emailed a participation invitation. The study used a composite survey based on

validated measures as well as questions that were created by the principal

investigator, Dr. Joshua Klopper. The survey was uploaded to SurveyMonkey.com, a website which allows surveys to be taken confidentially online. The participation invitation included a link to the SurveyMonkey survey and a unique identification number. This invitation informed participants that the questionnaire was completely voluntary and electing not to participate would not affect their medical care.

When accessing the survey, a consent page appeared on the first page of the website. Drs. Klopper and Kilbourn's contact information was provided on this page in the event that the participant had any questions about the consent process. After reviewing the consent, the participant was asked to either click "agree" or "disagree". Clicking "agree" indicated that the participant had read the consent and agreed to complete the questionnaire. Clicking "disagree" indicated the participant did not wish to take the questionnaire. If participants decided not to participate in this study, they were taken out of the survey after clicking "disagree". For those participants who wished to complete the survey, a prompt for an identification number appeared on the page following the consent.

To ensure confidentiality and privacy for participants, the survey results were stored with encryption services through the SurveyMonkey website. Once the data were accessed, they were stored on Dr. Klopper's computer and on the computer in Dr. Kilbourn's lab. Both of these computers are password protected and located in locked offices with restricted access. Furthermore, an identification number was randomly assigned to each participant. The identification number, but not the participant's identifying information, was stored with the survey responses, in order to separate the participant's identification information and their questionnaire

responses. The study team securely maintained a separate tracking document that contained the identifying names of study participants with their corresponding identification numbers to protect confidentiality.

Instruments

Demographics General demographic information was assessed with questions regarding gender, age, marital status, education, income, and race. Gender was coded as a dichotomous variable. Age was a scale variable. Marital status was a nominal variable, assessing if the participant was married or living with a partner, divorced, widowed, separated, or never married. Education was assessed as "the highest grade or year of school you have completed". There were seven ordinal responses to assess education. Annual household income was assessed by six ordinal responses. Race was assessed by seven nominal responses, White or non-Hispanic, Hispanic, Black or African American, Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, or Other. The "Other" item had a prompt to fill in the participant's race.

Medical Variables The number of existing co-morbid illnesses that were present was used as a descriptive variable, and measured by the Charlson Co-Morbidity Index (Charlson, 1987). This measure was developed to predict the 10-year survival rate of individuals with co-morbid conditions, but in this sample was used to assess only the number of comorbid conditions. The measure consists of 19 items (eg. "Have you ever been diagnosed with Myocardial Infarct (Heart Attack)"). Additionally, an item inquiring date of surgery was asked. Time from surgery was calculated in years.

Anxiety Anxiety was measured using the "trait" portion of the State Trait Anxiety Inventory (STAI). The STAI (Kendall, Finch, Auerback, Hooke, & Mikulka, 1976) is a scale measuring two constructs, state anxiety and trait anxiety and has been found to have validity by previous research (Ramaniah, Frazen, & Schill, 1983). Each construct is scored separately, with scores ranging from 20-80 on each scale and higher scores indicating more anxiety. Scores of 40 or higher indicated clinically significant levels of anxiety, as consistent with previous literature (Weinstein, 1995). Missing items were controlled for using the participants' mean score on the STAI instead of the total score in correlation and regression equations. Scores were not used if two or more items were not answered.

Each scale on the STAI consists of 20 items and is rated on a four-point Likert type scale. The items are rated not at all, somewhat, moderately so, and very much so. The trait portion (STAI-T) of this measure was used in the current study in order to assess general feelings of anxiety. STAI-T has been found to show evidence of internal reliability, with a Cronbach's alpha of .92 in the general population (Ramaniah et al., 1983). The STAI has been used frequently in cancer populations and found to maintain similar levels of reliability in these populations. In a study of breast cancer survivors, internal consistency was found to be .94 for the STAI-T (Rothrock, Mathews, Sellergren, Fleming, & List, 2005). In this study, the internal reliability of the STAI-T was found to be .917.

Depression Depression was measured by the Center for Epidemiological Studies Depression Scale (CESD; Radloff, 1977). This measure is a 20-item self-report scale, measuring depressive symptoms that have occurred over the previous week. Items are

assessed on a four-point Likert type scale, with items being rated rarely or none of the time, some or a little of the time, occasionally or moderate amount of time, or most or all of the time. Positive items were reverse scored. Total scores were calculated from adding the 16 negative items and the four reverse scored positive items. The total potential score ranges from zero to 60 on the CESD, with a higher score indicating more depressive symptoms. A cut-off score of 16, proposed by Radloff (1977), has been generally accepted. A score of 16 or higher indicates that the participant has depressive symptomatology. Missing items were controlled for using the participants' mean score on the CESD instead of the total score in correlation and regression equations. Scores were not used if two or more items were not answered.

The internal consistency of the CESD was found to be .85 in the general population (Radloff, 1977). In this study, the internal consistency was found to be .899. Radloff (1977) found a test-retest reliability of .59 with in interval of eight weeks and split-half reliability of .76-.77 in three samples of members of the general population. In a sample of psychiatric patients, split-half reliability was found to be .85. In the three samples of members of the general population, Radloff (1977) found a mean score of 7.94-9.45, and a mean score in a psychiatric population of 24.42 (SD=13.51). A study conducted by Hann, Winter, and Jacobsen (1999) looking at the psychometric properties of the CESD in breast cancer patients found a Cronbach's alpha of .89 and a test-retest reliability of .57 for two to three weeks. The authors also found the CESD to be significantly correlated with the Profile of Mood States, state anxiety, and Short Form-36, indicating convergent validity among cancer patients.

Quality of Life Quality of life was assessed using the fourth version of the

Functional Assessment of Cancer Therapy General Scale (FACT-G; Cella et al.,

1993). This scale consists of 27 items separated into four subscales: Physical Well-

Being (PWB), Social/Family Well-Being, Emotional Well-Being, and Functional

Well-Being. Overall Well-Being is assessed by reverse scoring negatively worded

items and then summing the 27 items. Items are scored on a five-point Likert type

scale ranging from "Not at All" to "Very Much". The highest possible score on the

FACT-G is 108. Physical quality of life was assessed using the PWB scale. This

subscale consists of seven items and has a highest possible score of 28. Higher scores

indicate higher levels of quality of life. Participants' scores were used if the total item

response was greater than 80% (Brucker, Yost, Cashy, Webster, & Cella, 2005).

Participants' mean scores were used for both the FACT-G and PWB subscale to

attempt to control for missing data. These scores were used in correlation and

regression analyses.

General population and cancer patient population norms have been established

for this measure (Brucker et al., 2005). In the general population (N=1075), a mean of

80.1 (SD=18.1) for FACT-G and a mean of 22.7 (SD=5.4) for PWB was found. In the

cancer patient population (N=2236), a mean of 80.9 (SD=17.0) for the FACT-G and a

mean of 21.3 (SD=6.0) for PWB was found. The FACT-G was examined across 78

studies for reliability and the average alpha coefficient was found to be .88

(Victorson, Barocas, Song, & Cella, 2008). The mean Chronbach's alpha for PWB

was found to be .81. In this study, the internal reliability for the FACT-G .919 and for

the PWB .792.

Fear of Recurrence The Fear of Recurrence Questionnaire was developed for use with breast cancer patients (Northouse, 1981). The original FoR scale was 22-items, but has henceforth been shortened by Stanton, Danoff-Burg, and Huggins (2002) to a six-item scale. The items on the six-item Fear of Recurrence Questionnaire investigate an individual's cancer symptoms, current health and illness perception, and how the experience effects the individual's current functioning. These items are assessed with a five-point Likert type scale, ranging from "strongly disagree" to "strongly agree". Potential scores range from six-30, with higher scores indicating higher levels of FoR. Scores were not used if two or more items were missing. Participants' mean scores were used in correlation and regression analyses. Stanton and colleagues (2002) found a mean score of 18.35 (SD=5.06) at one year from diagnosis in breast cancer survivors. This group found an alpha coefficient of .76 at three months follow-up and .87 at 12 months after surgery. In this study, internal reliability was found to be .899. The six-item fear of recurrence scale had a negative, significant correlation with the Profile of Mood States distress and vigor scales, indicating evidence of construct validity.

Data Analysis

Statistical analyses were conducted using SPSS 17. In order to examine the strength of the relationship between age and FoR (Hypothesis 1.1), Pearson correlation coefficients were used. Both of these variables, age and FoR, are continuous. To determine the strength of the relationship between gender and FoR (Hypothesis 1.2), a point-biserial coefficient was used, because gender is a dichotomous variable. A Pearson correlation coefficient was also used to determine

the relationship between FoR and overall quality of life (Hypothesis 2.1). Overall quality of life was determined by using the composite score on the FACT-G.

In order to demonstrate FoR as a mediator in the relationship between physical quality of life and anxiety and depression, Baron and Kenny's mediation approach was used. Two separate mediation models were tested to determine this effect. The first model used anxiety as the outcome variable (Hypotheses 2.2, 3.1, 4.1, 4.3), and the second used depression as the outcome variable (Hypotheses 2.2, 3.2, 4.2, 4.4). These variables are continuous and were obtained from the summed scores on the STAI-T and the CES-D respectively. Baron and Kenny's approach uses three separate regression models to determine the effect of the mediating variable on the relationship (Baron & Kenny, 1986).

According to Baron and Kenny, there are four steps in establishing a mediation model. I will describe how this analysis will be done with anxiety—the same steps would be taken with depression. As applied to this study, first a relationship needs to be determined between PWB and STAI-T. This is done in order to establish that there was an effect that could be mediated. Second, it needs to be shown that PWB is related to the mediator, which in this case is FoR. Next, it is needed to be shown that FoR has an effect on STAI-T, controlling for PWB. This wull be done by using a regression model, with STAI-T as the outcome variable, and FoR and PWB as the predictors. Lastly, the relationship between physical quality of life and anxiety, controlling for FoR, will be evaluated and compared to the value found in the initial step. In order to establish the degree to which FoR mediated the relationship between PWB and STAI-T, a significance testing model, Sobel's test,

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will be used. Sobel's test is used to establish the degree of significance between the direct effect (C in Figure 2.1, see below) and the indirect effect (C' in Figure 2.2). The direct effect is found from the initial regression model, used to establish the relationship between PWB and STAI-T. This model does not include the mediator. The indirect effect is found from the final regression model, that uses STAI-T as the dependent variable and both PWB and FoR as independent variables. In order to show a full or partial mediation, the direct and indirect effect must be different in order to show if FoR accounted for some of the variance in STAI-T. A Sobel's test needs to be used in order to tell if the decrease from the direct effect to indirect effect is significant. The Sobel's test uses the unstandardized coefficients of path 'A' and path 'B' and the standard errors of path 'A' and path 'B' to calculate a z statsistic and if the path is significantly different from zero.
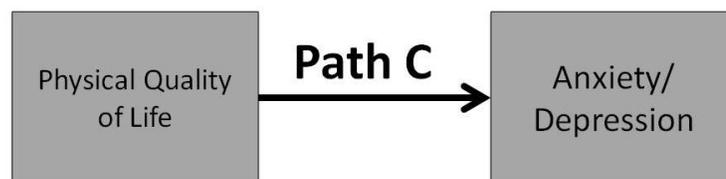

Figure II.1 Direct Effect.
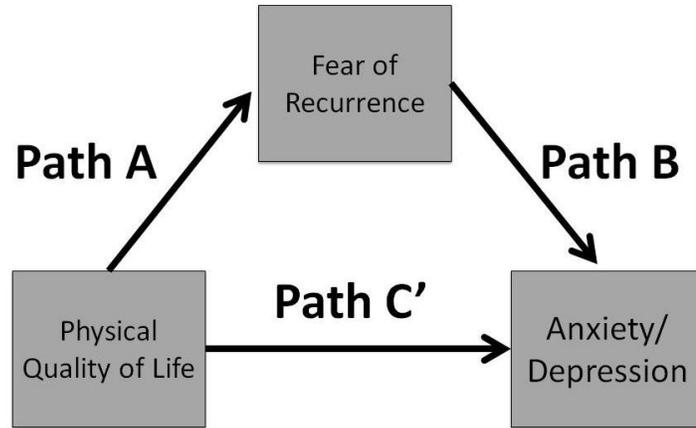
Figure II.2 Indirect Effect.

CHAPTER

III.   Results

Responses

A total of 288 survey invitations were mailed. Seventeen invitations were unable to be delivered due to incorrect or changed addresses. Surveys were completed by 71 participants, showing a 26.2% response rate. Of the 71 responses, data from 14 participants were unable to be used.   Reasons for non-inclusion were the following: six participants had received only partial thyroidectomies, five participants were outside of the age range (18-72), two participants did not have a history of thyroid cancer, and one participant began but did not complete the survey. Data from 57 participants (80.3%) were used in this study. Of the total survey invitations mailed, 19.8% of those contacted were used for this study.

Demographics

The age of participants ranged from 19 to 68 with a mean age of 46.5 (SD=11.53). Age was negatively distributed with a skewness of -.303 (SE=.316) and kurtosis of -.468 (SE=.623). In terms of gender, participants included 50 females and six males. One participant did not report gender.

Table IIII.1 Socio-demographic and medical variables.

	No.	(%)
Marital Status		
Married	47	82.5%
Divorced	3	5.3%
Never Married	7	12.3%
Annual Household Income		
<10,000	2	3.6%
10,001-25,000	3	5.4%
25,001-50,000	4	7.1%
50,001-75,000	8	14.3%
75,001-100,000	18	32.1%
100,001+	21	37.5%
Education level		
Grade 12 or GED	7	12.3%
Some college or associate's degree	11	19.3%
College graduate	26	45.8%
Graduate degree	13	22.8%
Race/Ethnicity		
White/Non-Hispanic	49	86%
Hispanic/Latino	3	5.3%
Asian	2	3.5%
American Indian/Native American	2	3.5%
Indian	1	1.8%
Stage		
Stage 1	19	32.8%
Stage 2	7	12.5%
Stage 3	10	17.9%
Stage 4	7	12.5%
I don't know	13	23.2%
Mean Co-morbid Illnesses (SD)	.407 (.714)	
Mean time from surgery (SD)	2.91 years (1.94)	

Psychosocial and Quality of Life Outcomes

The mean CESD score was 12.75 (SD=11.13). Scores on the CESD ranged from 0-41 with 16 being the clinical cut-off for depression (Radloff, 1977). Twenty-two (35.7%) participants had scores of 16 or above. Data from 56 participants were used in calculations, because one participant failed to respond to two items on the measure. Additionally, five participants each failed to respond to one item. The average mean score was .643 (SD=.563), with scores ranging from zero to four and scores at the higher end indicating more severe depressive symptoms. There was a skewness of .751 (SE=.319) and kurtosis of -.559 (SE=.628).

The mean STAI-T score was 37.45 (SD=11.94). The scores ranged from 21 to 76. Data from all 57 participants were used for these calculations. Two participants failed to respond to one item each. The average mean score was 1.88 (SD=.597). There was a skewness of .905 (SE=.316) and a kurtosis of .781 (.623). Twenty-one participants (36.8%) had clinically significant levels of anxiety, indicated by scores of 40 or over.

The average PWB score was 23.82 (SD=4.39), with scores ranging from 6 to 28. The score of 6 was considered an outlier and was therefore removed from the analysis. Data from 56 participants were used. One participant failed to respond to one item on the measure. The average mean score was 3.48 (SD=.526), with scores ranging from zero to four and higher scores indicating better quality of life. The data had a skewness of -1.95 (SE=.316), and kurtosis of 4.71 (SE=.623). Brucker and colleagues (2005) found the general population to have a mean score of 22.7

(N=1075) and the cancer population to have a mean score of 21.3 (N=2236). A one

sample t-test, conducted to compare the PWB mean scores between this sample of

thyroid cancer survivors and the general population, found no significant difference

between the mean values (t(55)=1.89, p>.05). Another t-test comparing the sample of

thyroid cancer survivors and the cancer population found the sample of thyroid cancer

survivors to experience a significantly higher level of physical QOL (t(55)=4.26,

p<.005).

The average FACT-G score was 85.20 (SD=15.74), with scores ranging from

36 to 108. Data from 56 participants were used in these calculations. One participant

failed to complete 13 items on this measure and was not included in the calculations.

The average mean score was 3.16 (SD=.603), with a score of four indicating "very

good" quality of life. The data were negatively skewed, with a skewness of -.748

(SE=.319) and a kurtosis of .240 (SE=.628). Previously, a mean score for the general

population on the FACT-G was found to be 80.1 (SD=18.1) and the mean score for a

cancer population was 80.9 (SD=17.0) (Brucker et al., 2005). A one sample t-test was

performed to compare the FACT-G mean score in this sample of thyroid cancer

survivors and the general population and found the sample of thyroid cancer survivors

to have a significantly higher quality of life score (t(55)=2.41, p<.01). Additionally,

compared to the cancer population, thyroid cancer survivors had a significantly higher

mean score on the FACT-G (t(55)=2.02,p<.05).

The average FoR score was 17.86 (SD=6.48), with scores in the range of six

to 29. One participant failed to respond, leaving 56 participants with useable data.

The average mean score on the FoR measure was 2.98 (SD=1.08). The scores were normally distributed with a skewness of .003 (SE=.319), and a kurtosis of -.967 (SE=.628). Twenty-seven participants (47.3%) responded to the item "I worry that my cancer has returned", with ratings of moderately agree (29.8%) or strongly agree (17.5%).

Correlational Analyses

Fear of Recurrence (Research Aim 1 and Research Aim 3) No significant correlation was found between FoR and age, $r(56) = -.122, p = .370$. Fear of recurrence and female gender were not significantly correlated either, $r(55) = .043, p = .754$. Fear of recurrence and STAI-T, the trait portion of the STAI measure, were positively, significantly correlated (see Table 3.2). Alternatively, FoR and CESD were not positively correlated to a significant degree (see Table 3.2).

Quality of Life (Research Aim 2) Fear of recurrence and overall QOL were negatively, significantly correlated (see Table 3.2 below). Physical QOL and FoR were negatively, significantly correlated (see Table 3.2).

Table IIII.2 Correlations between measures.

	STAI-T	PWB	FACT-G	FoR
CESD	.812**(.000)	-.585**(.000)	-.779**(.000)	.181(1.91)
STAI-T		-.597**(.000)	-.765**(.000)	.334*(.012)
PWB			.740**(.000)	-.378*(.004)
FACT-G				-.314*(.020)

*p<.01, **p<.001*

Mediation Analyses

Anxiety Physical QOL and STAI-T were negatively, significantly correlated (see Table 3.2). To determine if FoR partially mediated the relationship between PWB and STAI-T, the Baron and Kenny mediation steps were followed. Physical QOL significantly predicted STAI-T scores, $\beta = -.597$, t(55) = -5.48, $p < .001$; this relationship is the direct effect (see Figure 3.1) Also, PWB accounted for a significant amount of the variance in the STAI-T scores, $R^2 = .357$, F(1,55) = 30.0, $p < .001$. Physical QOL significantly predicted FoR scores, $\beta = -.374$, t(54) = -2.94, $p = .005$. This relationship is path A (see Figure 3.1). In addition, PWB accounted for a significant amount of the variance in FoR scores, $R^2 = .140$, F(1,54) = 8.61, $p = .005$. In a multiple regression model with FoR and PWB as predictors of STAI-T, FoR and PWB accounted for a significant amount of variance in STAI-T, $R^2 = .393$, F(2,54) = 16.9, $p < .001$. Fear of recurrence did not significantly predict STAI-T when controlling for PWB, $\beta = .115$, t(54) = .984, $p = .330$. This step is path B. Because FoR failed to predicted STAI-T, FoR did not mediate the relationship between PWB and STAI-T.
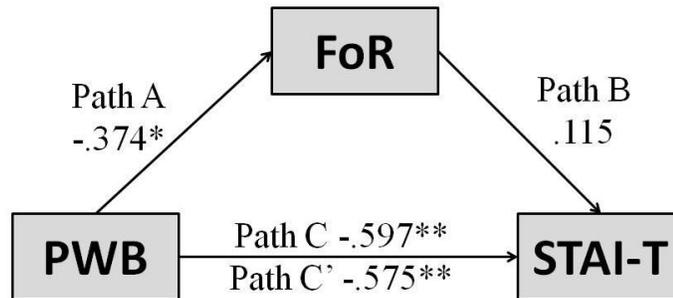
Figure IIII.1 Anxiety Mediation Model.
Standardized Regression Coefficients for the Relationship between PWB and STAI-T
as Mediated by FoR. * p<.01, **p<.001

Depression Physical QOL and CESD were negatively, significantly

correlated (see Table 3.2). Physical QOL significantly predicted CESD scores, $\beta = -$

$.585$, t(53) = -5.20, $p < .001$; this relationship is the direct effect (see Figure 3.2)

Also, PWB accounted for a significant amount of the variance in the CESD scores, R^2

$= .342$, F(1,53) = 27.1, $p < .001$. Physical QOL significantly predicted FoR scores, β

$= -.374$, t(54) = -2.94, $p = .005$. This relationship is path A, and the same as in the

anxiety mediation model (see Figure 3.2). In addition, PWB accounted for a

significant amount of the variance in FoR scores, $R^2 = .140$, F(1,54) = 8.61, $p = .005$.

In a multiple regression model with FoR and PWB as predictors of CESD, FoR and

PWB accounted for a significant amount of variance in CESD, $R^2 = .302$, F(2,54) =

10.8, $p < .001$. Fear of recurrence did not significantly predict CESD when

controlling for PWB, $\beta = -.041$, t(54) = -.326, $p = .746$. This step is path B. Because

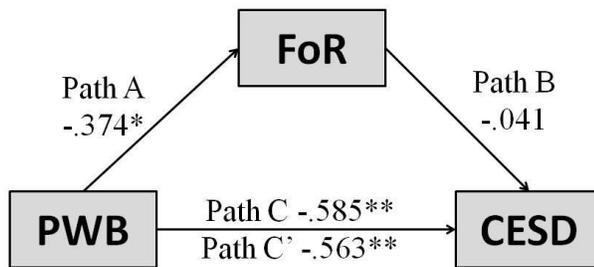FoR failed to predicted CESD, FoR did not mediate the relationship between PWB

and CESD.

Figure IIII.2 Depression Mediation Model.
Standardized Regression Coefficients for the Relationship between PWB and CESD
as Mediated by FoR. * p<.01, **p<.001

CHAPTER

IV. Discussion

Thyroid cancer typically affects middle aged women and has a survival rate upwards of 90%, making it unique to other cancers. Most thyroid cancer survivors "are advised to expect a completely normal life" (Tagay et al., 2005, p.760). However, survivors are dependent on exogenous hormone replacement the rest of their lives and have been shown to experience a multitude of psychological and physical symptoms. Previous studies regarding thyroid cancer survivors have examined health related quality of life and psychological symptoms. To the best of our knowledge, this is the first study to examine FoR and surrounding psychological and physical symptoms in thyroid cancer survivors who have undergone total thyroidectomy surgery and are now clinically free of disease. This study set out to examine the relationship between anxiety, depression, physical quality of life, and fear of recurrence in this unique population and found relationships between many of the variables.

Identifying some of the predictors of high levels of FoR in thyroid cancer survivors will be important to aid medical staff in recognizing who is at risk for increased fears and potential decreased quality of life. Research Aim 1 sought to determine if age or gender was significantly related to FoR in this sample. Based on previous literature, it was believed that the younger a thyroid cancer survivor was, the

more likely they would be to experience FoR (Hypothesis 1.1; Stanton et al., 2002; Mehnert et al., 2009; Pedersen et al., 2011). Stanton and colleagues (2002) proposed that the relationship between FoR and age in a sample of breast cancer survivors could be related to competing role responsibilities and the unexpected diagnosis of breast cancer in younger women. In contrast to Hypothesis 1.1, no significant relationship was found between FoR and age. These observations are consistent with those of Mellon and colleagues (2007) who found no significant relationship between FoR and age or those of Skaali's team (2009) who also found no significant relationship in testicular cancer survivors.

Previous research has shown women to experience FoR more than men (Humphris et al., 2003). The hypothesis that females will experience more FoR than males (Hypothesis 1.2) was also not supported, with a non-significant correlation between FoR and gender. This indicates that men experienced the same amount of FoR as some women. With the small sample of men in this study (n=6), power is very low. A post hoc power analysis reveled power of .061. This makes it the results of this correlation lack meaning.

Thyroid cancer survivors experience significant levels of FoR regardless of age or gender. It is important to establish variables that may be related to FoR in order to aid doctors in recognizing who is at risk. One alternative factor that has been found to be related to FoR is coping styles. Llewellyn and colleague (2008) explored fear of recurrence and coping styles in head and neck cancer survivors The authors found the use of denial, positive reframing, and planning strategies to be significantly

associated with FoR, indicating the use of these particular coping strategies to have a relationship with higher levels of FoR in cancer survivors. Additionally, the authors found optimism to be predictive of lower levels of FoR at follow-up, six to eight months after treatment. This study leads to the belief that FoR may be associated with other factors such as personality and coping, rather than demographic variables.

The relationship between quality of life and FoR in thyroid cancer survivors has not been addressed in current literature, but has been well documented in survivors of other cancer types (Bellizzi et al., 2008; Mehnert et al., 2009; van den Beuken-van Everdigen et al., 2008). Hypothesis 2.1, which stated that thyroid cancer survivors who experience lower levels of overall QOL would experience higher scores on the FoR measure, was supported in this study. This moderate, negative correlation value suggests that lower QOL scores are associated with higher FoR.

Physical symptoms such as pain and fatigue have shown to be related to FoR (Skaali et al., 2009; Pedersen et al., 2011). The hypothesis that thyroid cancer survivors who experience lower levels of physical QOL will experience higher levels of FoR (Hypothesis 2.2) was supported. This relationship was expected based upon research in testicular and breast cancer survivors where FoR was found to be significantly related to quality of life (Skaali et al., 2009; Mehnert et al., 2009). One potential explanation for the relationship between physical symptoms and FoR may be associated with hypervigilance to physical symptoms and the recurrent monitoring of bodily changes and feelings (Lee-Jones, Humphris, Dixon, & Hatcher, 1997). Taylor, Richardson, and Cowley (2011) examined recurrence monitoring in colorectal

cancer survivors and found many survivors to be uncertain about how their bodies should feel after cancer. They also found that in some survivors, recurrence monitoring added to their feelings of uncertainty regarding cancer recurrence. There is a possibility this increased monitoring may lead to normal physical experiences being interpreted as "dangerous" leading to increased levels of FoR.

Symptoms of anxiety and depression, as well as clinical diagnosis of these disorders in cancer survivors, is well documented (Hutton & Williams, 2004; Kleiboer, Bennett, Hodges, Walker, Thekkurnreuath, Sharpe, 2011). Aim 3 examined the relationship between FoR and STAI-T and CESD. Anxiety is a construct representing general feelings of fear in daily life, while FoR represents fear specific to the recurrence of cancer. Although these constructs are theoretically different, they appeared to overlap. In this sample, the relationship between FoR and STAI-T (Hypothesis 3.1), showed a positive correlation of about 30%. This finding is consistent with previous literature examining anxiety in cancer survivors (Simard et al., 2010; Skaali et al., 2009; Llewllyn et al, 2008), suggesting that FoR and anxiety are different constructs but are associated. However, this relationship may have been influenced by the small sample size and low response rate. Additionally, validity for the FoR scale has not been previously established, and the six-item FoR scale could be potentially measuring a construct other than FoR.

The link between depression and FoR remains somewhat unclear in the current literature on cancer survivors. Some studies have found a significant relationship between depression and FoR (Skaali et al., 2009; Simard et al., 2010), while others

have found no significant relationship (Llewellyn et al., 2008). Hypothesis 3.2 states that thyroid cancer survivors who experience more FoR will have higher levels of depression. This hypothesis was not supported by the relationship between FoR and CESD. Further exploration is needed to fully understand this finding. The lack of a correlation could be due to a coping styles or personality variables, such as denial. Perhaps those who are very depressed choose not to think about their illness as a method of coping; thus, have no reported fear of recurrence because they are using denial to cope.

Research Aim 4 examined the relationship between PWB, FoR, STAI-T, and CESD. Hypothesis 4.1 states that thyroid cancer survivors who experience lower levels of physical quality of life will experience higher levels of anxiety. This hypothesis was supported with a negative correlation between PWB and STAI-T. Fear of recurrence was not found to partially mediate the relationship between PWB and STAI-T (Hypothesis 4.3). Once PWB was added to the regression model, FoR no longer significantly predicted STAI-T. This indicates that the relationship between FoR and anxiety could potentially be explained by physical quality of life. Perhaps continued fears of recurrence turn into anxiety, becoming more generalized, once the survivor is continuously reminded of their cancer through negative physical quality of life. As previously mentioned, a hypervigilance to body monitoring could be a possible explanation, which raises the issue of physical quality of life and physical symptoms as FoR triggers.

Hypothesis 4.2 states that thyroid cancer survivors who experience lower levels of physical quality of life also experience higher levels of depression. This hypothesis was supported with a negative correlation. However, once FoR was added to the model, PWB continued to predict CESD and FoR failed to predict CESD, showing FoR did not act as a mediator in the relationship between PWB and CESD. Although the hypothesis was not supported, this shows a strong and important relationship between physical quality of life and depression that needs to be better understood in future research.

Limitations

This study has several possible limitations, including a relatively small sample size and a low response rate (26.2%). The low response rate raises the issue of reporting bias. Those with levels of high depression and high FoR may have chosen not to respond to the survey, leaving the results skewed. It is important to mention that QOL among this sample of survivors was high compared to the general population. The participants who chose not to participate could have wished to avoid triggers related to their cancer (Simard et al., 2009). Potentially, those who did not respond to the survey no longer identify themselves as cancer survivors and have very low levels of emotionally distress, falsely inflating the levels of distress. Additionally, the survey could have acted as a trigger and brought up fears of cancer recurrence, falsely inflating the rates of FoR of those who participated.

The participants were a well educated sample, showing the potential underrepresentation of survivors with lower socioeconomic statuses. The majority of

this sample reported their ethnicity as white/ non-Hispanic. This under-representation of minority groups limits the generalization of findings to these ethnic groups. Further exploration is needed to determine differences that may emerge among thyroid cancer survivors of different ethnic and economic backgrounds.

Feasibility and study design also played into limitations of the current study. The body of research on thyroid cancer survivors is small, making it difficult to establish reliability of the results. Additionally, only individuals seeking treatment at The University of Colorado Hospital were recruited for participation, which puts limits on the generalizability by region of the country, and may have limited generalizability to certain economic groups or ethnicities. The data were collected at one point in time, preventing a timeline from being established. Thus, it could not be determined if a specific symptom or construct existed prior to another.

The explorative nature of this study may have missed key variables, showing another potential limitation. Of the participants who reported high levels of anxiety and depression, it is unknown whether these individuals meet clinical diagnostic criteria for these disorders or met the criteria prior to ever experiencing cancer. In order to parse out whether pre-existing psychological disorder affect FoR levels more than anxiety and depression experienced following cancer diagnosis, a longitudinal study needs to be conducted.

Further studies will need to be conducted to gain a deeper understanding of the directionality and causality in the relationships examined in this study. Fear of cancer recurrence in thyroid cancer survivors needs to be further explored to

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determine other factors that may be associated, particularly those that could be identified as risk factors. Well-documented risk factors can allow medical staff to identify those who are likely to experience FoR and its related variables, such as anxiety, depression, and decreased quality of life. However, the identification of these factors will only be important if it is understood the best way to target and decrease these fears. Additionally, it is necessary to determine if a non-harmful level of FoR exists where no relationship between high levels of emotional distress and low levels of quality of life is found.

Implications

The relationship between FoR and anxiety is important to examine in future research. These findings lead to the clinical implication that psychological and medical interventions should be examined for efficacy in thyroid cancer survivors, targeting those with high FoR and high anxiety. Potentially, interventions targeting doctor-patient relationships may decrease levels of FoR. Thompson and colleagues (2010) showed in a study of lymphoma survivors that better doctor-patient relationships were related to lower levels of FoR. Gil and colleagues (2004) suggest many survivors may not know what to expect long-term to which healthcare professionals should address long-term symptoms and side effects that may appear long after treatment has finished. These potential interventions could be used by medical staff during follow-up appointments, decreasing the need for survivors or patients to see additional doctors. This and previous studies (Lee et al., 2010; Tagay et al., 2006) have suggested that a high levels of thyroid cancer survivors and patients

experience clinically significant levels of anxiety. This leads to the recommendation

that all thyroid cancer patients should be screened for anxiety both before and after

treatment.

APPENDIX A: GENERAL DEMOGRAPHICS

1) What is your gender
   a) Male
   b) Female

2) What is your age? _____

3) Are you (check one)
   a) Married or living with a partner
   b) Divorced
   c) Widowed
   d) Separated
   e) Never Married

4) What is your annual household income?
   a) 0-$10,000
   b) $10,001 - $25,000
   c) $25,001 - $50,000
   d) $50,001 - $75,000
   e) $75,001 - $100,000
   f) $100,001 +

5) What is the highest grade or year of school you have completed (check one)?
   a) Never attended school or only kindergarten
   b) Grades 1-8
   c) Grades 9-11 (some high school)
   d) Grade 12 or GED
   e) Some college or Associate's Degree
   f) College graduate
   g) Graduate degree

6) Which one of these groups would you say best represents your race?
   a) White or non-Hispanic
   b) Hispanic
   c) Black or African American
   d) Asian
   e) Native Hawaiian or Other Pacific Islander
   f) American Indian or Alaska Native
   g) Other [please specify] _____

APPENDIX B: CENTER FOR EPIDEMIOLOGICAL STUDIES DEPRESSION SCALE

The following questions are asked to better understand your experiences and feelings around thyroid cancer survivorship. Please answer all questions to the best of your ability.

Below is a list of the ways you may have felt or behaved over the past week. Please indicate how often you have felt this way <u>during the past week</u>. Use these response choices:

      1 = Rarely or none of the time (less than 1 day)
      2 = Some or a little of the time (1-2 days)
      3 = Occasionally or moderate amount of time (3-4 days)
      4 = Most or all of the time (5-7 days)

During the past week . . .

_____ 1. I was bothered by things that *usually* don't bother me.
_____ 2. I did not feel like eating; my appetite was poor.
_____ 3. I felt that I could not shake off sad feelings even with help from my family or friends.
_____ 4. I felt that I was just as good as other people.
_____ 5. I had trouble keeping my mind on what I was doing.
_____ 6. I felt depressed.
_____ 7. I felt that everything I did was an effort.
_____ 8. I felt hopeful about the future.
_____ 9. I thought my life had been a failure.
_____ 10. I felt fearful.
_____ 11. My sleep was restless.
_____ 12. I was happy.
_____ 13. I talked less than usual.
_____ 14. I felt lonely.
_____ 15. People were unfriendly.
_____ 16. I enjoyed life.
_____ 17. I had crying spells.
_____ 18. I felt sad.
_____ 19. I felt that people disliked me.
_____ 20. I could not get "going."

APPENDIX C: STAIT TRAIT ANXIETY INVENTORY: TRAIT

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *GENERALLY* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally

	Not at all	Somewhat	Moderately So	Very Much So
1. I feel pleasant	1	2	3	4
2. I tire quickly	1	2	3	4
3. I feel like crying	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I am losing out on things because I can't make up my mind soon enough	1	2	3	4
6. I feel rested	1	2	3	4
7. I am "calm, cool, and collected"	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that doesn't really matter	1	2	3	4
10. I am happy	1	2	3	4
11. I am inclined to take things hard	1	2	3	4
12. I lack self confidence	1	2	3	4
13. I feel secure	1	2	3	4
14. I try to avoid facing a crisis or difficulty	1	2	3	4
15. I feel blue	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I become tense and upset when I think about my present concerns	1	2	3	4

APPRENDIX D: FUNCTIONAL ASSESSMENT OF CANCER THERAPY GENERAL SCALE

Below is a list of statements that other people with your illness have said are important. By selecting one number per line, please 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
1	2	3	4	5

Physical Well Being
___ 1. I have a lack of energy
___ 2. I have nausea
___ 3. Because of my physical condition, I have trouble meeting the needs of my
     family
___ 4. I have pain
___ 5. I am bothered by side effects of treatment
___ 6. I feel ill
___ 7. I am forced to spend time in bed

Social/Family Well Being
___ 8. I feel close to my friends
___ 9. I get emotional support from my family
___ 10. I get support from my friends
___ 11. My family has accepted my illness
___ 12. I am satisfied with family communication about my illness
___ 13. I feel close to my partner (or the person who is my main support)

Emotional well being
___ 15. I feel sad
___ 16. I am satisfied with how I am coping with my illness
___ 17. I am losing hope in the fight against my illness
___ 18. I feel nervous
___ 19. I worry about dying
___ 20. I worry that my condition will get worse

Functional Well Being
___ 21. I am able to work (include work at home)
___ 22. My work (include work at home) is fulfilling
___ 23. I am able to enjoy life
___ 24. I have accepted my illness
___ 25. I am sleeping well
___ 26. I am enjoying the things I usually do for fun
___ 27. I am content with the quality of my life right now

APPENDIX E: FEAR OF RECURRENCE QUESTIONAIRE

Using the scale below, please respond to the following questions by placing the number that best reflects your degree of agreement in the blank to the left of each item.

1 = strongly disagree
2 = moderately disagree
3 = neither agree nor disagree
4 = moderately agree
5 = strongly agree

_____ 1. I would like to feel more certain about my health.
_____ 2. I worry that my cancer will return.
_____ 3. I feel that there is little need to worry about my future health status.
_____ 4. I am bothered by the uncertainty about my health status.
_____ 5. When I think about my future health status, I feel some uneasiness.
_____ 6. I am preoccupied with thoughts of the cancer returning.

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