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UNIVERSITY OF MIAMI

IMPACT OF ETHNIC IDENTITY ON ADAPTATION TO SURGERY FOR BREAST CANCER IN HISPANIC AND NON-HISPANIC WHITE WOMEN

By

Devika R. Jutagir

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IMPACT OF ETHNIC IDENTITY ON ADAPTATION TO SURGERY FOR BREAST CANCER IN HISPANIC AND NON-HISPANIC WHITE WOMEN

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Women vary widely in their ability to adapt psychologically and physiologically to the stressors of diagnosis and treatment for breast cancer, and such adaptation may depend on a number of cognitive and cultural individual difference factors. Research has found that women differ in the degree to which they identify with their ethnic group and in the type of strategies they use for coping. These differences have been associated with differences in various aspects of quality of life, psychosocial and physiological adaptation in particular, in women with early stage breast cancer.

However, research has yet to clarify the roles of ethnicity, with a focus on individual difference factors such as cognitive and cultural factors, in the psychosocial and physiological adaptation to breast cancer. Thus, the current study had 3 aims: Specific Aim 1: To test whether Hispanic and NH White women differ in adaptation after surgery for breast cancer through assessments of quality of life, general distress, intrusive thoughts, and serum cortisol levels. It was hypothesized that Hispanic women would have poorer quality of life, greater distress, and greater levels of cortisol than NH White women. Specific Aim 2: To test the interaction of ethnic group (Hispanic versus NH White) and ethnic identity on adaptation to breast cancer. It was hypothesized that ethnic group would interact with ethnic identity to predict adaptation such that in Hispanic

women greater ethnic identity would be associated with better psychological and physiological adaptation, whereas in NH White women those with greater and lower ethnic identity would not differ in their adaptation to breast cancer. Exploratory Aim: To test the interaction of ethnic group (Hispanic versus NH White) and emotionally expressive coping on adapting to breast cancer. It was hypothesized that ethnic group would interact with emotionally expressive coping to predict adaptation.

In total, 362 women (38% Hispanic, 62% non-Hispanic White) who recently underwent surgery for non-metastatic breast cancer provided valid data. They provided an afternoon blood sample and completed self-report questionnaires including the Affects Balance Scale (ABS), a measure of mood states to indicate general distress; the Physical Well-Being and Emotional Well-Being subscales of the Functional Assessment of Cancer Therapy – Breast (FACT-B); the Impact of Events Scale (IES) Intrusive Thoughts subscale, a measure of cancer-specific distress; the Multigroup Ethnic Identity Scale (MEIM), an indicator of ethnic identity; and the Emotional Approach Coping Scale (EAC), which measures emotional expression. Multiple regression analysis was used.

Findings showed no ethnic group differences in adaptation to breast cancer, and no significant ethnic group by ethnic identity or ethnic group by emotionally expressive coping interaction effects on psychological or physiological outcomes in this cohort of women undergoing primary treatment for non-metastatic breast cancer. These results were discrepant with those of prior studies, which have reported ethnic differences in adaptation to breast cancer, a positive association between ethnic identity and well-being in minorities, and ethnic differences in benefits associated with certain coping strategies. These differences point to a need to examine under what conditions ethnic disparities in adaptation to breast cancer exist. Further research to identify sociocultural factors that play significant roles in Hispanic women’s adjustment to breast cancer is needed.

TABLE OF CONTENTS

Chapter

LIST OF TABLES

CHAPTER 1: INTRODUCTION

Breast cancer is the leading cause of cancer death among women, including Hispanic women and non-Hispanic (NH) White women (American Cancer Society, 2012). The rates of breast cancer incidence and mortality are lower in Hispanic women relative to NH White women (American Cancer Society, 2011). However, given that Hispanics currently account for the majority of population growth in the United States, Hispanic women will soon represent a larger proportion of breast cancer patients in the United States (Pew Research Hispanic Center, 2011). Nevertheless, little research has tested whether Hispanic and NH White women differ in their adaptation to breast cancer. Determining the levels of psychological and physiological adaptation in Hispanic breast cancer patients compared with that of their NH White counterparts and identifying psychosocial predictors of better adaptation would aid in the development of psychosocial interventions for women with breast cancer that specifically target Hispanic women.

Causes of and Risk Factors for Breast Cancer

Cancer occurs when genetic operations in cells of the body are altered so that they lose differentiation and replicate rapidly. These cells can spread to nearby tissues and may metastasize to different areas of the body. Breast cancer accounts for nearly 1 out of 3 cases of cancer in women in the United States, while men account for only 1% of all breast cancer cases (American Cancer Society, 2011). Risk of developing breast cancer increases with age, and 95% of breast cancer cases occur in women above the age of 40 years (American Cancer Society, 2011). Other risk factors include a family history of breast cancer, carrying the BRCA1 or BRCA2 gene, a menstrual cycle that starts before the age of 12 years, menopause after the age of 55 years, alcohol use, no full term pregnancies, giving birth after the age of 30 years, menopausal hormone therapy including estrogen and progesterone therapy, obesity, and chest exposure to high-dose radiation (American Cancer Society, 2011). In sum, breast cancer is prevalent in the United States, and there are many contributing risk factors to the development of the disease.

The Cancer Experience Requires Adaptation

Patients diagnosed with and treated for breast cancer may show wide variation in their ability to adapt to the demands of treatment (Andrykowski, Lykins, & Floyd, 2008; Blomberg et al., 2009; Donovan, Small, Andrykowski, Munster, & Jacobsen, 2007). Adaptation to cancer consists of psychological, behavioral, physical, physiological, and social domains (Antoni, 2012). Psychological symptoms may consist of posttraumatic stress disorder symptoms such as intrusive thoughts about breast cancer (Andrykowski, Cordova, McGrath, Sloan, & Kenady, 2000), psychosexual symptoms (Kinsinger, Laurenceau, Carver, & Antoni, 2011), and anxiety and depression (Kawase et al., 2012). Physical concerns include symptoms from disease and side effects of treatment such as fatigue (Bower et al., 2000) and pain (Miaskowski et al., 2012). Physiological factors include dysregulation of cortisol levels (van der Pompe, Antoni, & Heijnen, 1996). Behavioral domains linked to adaptation to breast cancer include diet (Maunsell, Drolet, Brisson, Robert, & Deschenes, 2002), exercise (Kolden et al., 2002), and the ability to relax (Phillips et al., 2008). Coping style has also been found to influence adaptation to breast cancer (Dedert et al., 2012). Altogether, these findings indicate that several different processes contribute to adaptation to breast cancer.

This area of psycho-oncology research has generated much interest in identifying individual difference variables that may explain how women adapt to the breast cancer experience (Kornblith & Ligibel, 2003; Luecken & Compas, 2002). Research on this topic has been conducted primarily in samples of NH White women. Although less work has focused on identifying variables related to cancer adaptation in ethnic minority populations, there is a growing appreciation for the need to identify differences among ethnic groups as well as cultural factors that may need to be considered (Meyerowitz, Richardson, Hudson, & Leedham, 1998; Stanton, Revenson, & Tennen, 2007). Taken together, extant literature suggests that Hispanic and NH White women may differ in their adaptation to diagnosis and surgery for both early stage and metastatic breast cancer.

Quality of Life

Quality of life, or well-being, is a multidimensional construct that encompasses physical and psychological domains of adaptation (Brady et al., 1997) and may differ between Hispanic and NH White women diagnosed with breast cancer. Health-related quality of life (HRQoL) encompasses both physical and mental quality of life, including perception of physical, social, and mental and general health function (Hayes et al., 2011). A review of 22 studies concluded that Hispanic cancer patients report lower psychological and physical quality of life than NH White patients (Yanez, Thompson, & Stanton, 2011). One study used structural equation modeling of cross-sectional data to show that Hispanic women between 3 and 9 months from diagnosis of breast cancer who have completed treatment report lower quality of life (using a latent variable consisting of health, depression, generalized anxiety, and breast cancer-specific anxiety), than NH White women (Maly, Stein, Umezawa, Leake, & Anglin, 2008). Another recent study also found that Hispanic women who had been diagnosed with breast cancer between 1 and 5 years prior to assessment reported a lower average overall quality of life than has been reported by NH White and African American women (Graves et al., 2012). Generally, research shows ethnic disparities in quality of life during adaptation to breast cancer.

Physical Well-Being

In particular, the physical well-being domain of quality of life, which encompasses pain, fatigue, and physical symptoms (Cella, 1994), differs by ethnicity (Fu et al., 2009). With regard to physical well-being, in samples of primarily NH White women it has been shown that many women are affected by pain after surgery for breast cancer, and that after treatment for early stage breast cancer they report more fatigue than age and geography-matched women with no history of cancer (Carpenter et al., 1998; Jacobsen et al., 2007). Even so, Hispanic women within 1 to 5 years of a diagnosis of early stage breast cancer report significantly lower HRQoL than African American, Asian American, and European American women (Ashing-Giwa, Tejero, Kim, Padilla, & Hellemann, 2007). A recent study by Sammarco and Konecny (2010) compared Hispanic and NH White women a year after treatment for breast cancer and found that the NH Whites reported greater physical quality of life than the Hispanic women. Moreover, Hispanic women who have completed breast cancer treatment report more physical symptoms than women from other ethnic groups (Giedzinska, Meyerowitz, Ganz, & Rowland, 2004). Overall, research shows that physical quality of life differs between Hispanic and NH White women who have been diagnosed with and treated for breast cancer.

Emotional Well-Being

Emotional well-being, the domain of quality of life that is often measured by levels of negative emotion such as anxiety and depression (Naughton & Shumaker, 2003), is also known to diverge in Hispanic and NH White breast cancer patients (Fu et al., 2009). A review of the literature found that cancer patients experience significant distress, including depression and anxiety, after diagnosis of cancer, during treatment, and following completion of primary treatment for cancer (Andrykowski et al., 2008). Prior to treatment, NH White women newly diagnosed with stage I or stage II breast cancer report distress, which is positively associated with insomnia, fatigue, and lack of concentration (Cimprich, 1999). Yet, research shows that after treatment for breast cancer, Hispanic women report greater concerns related to breast cancer than NH White women (Spencer et al., 1999). Among women diagnosed with their first incidence of breast cancer, those who were Hispanic reported poorer mental health than those of a NH White background (Bowen et al., 2007). Hispanic women who have been treated for early stage breast cancer also report greater distress than NH White women (Carver, Lehman, & Antoni, 2003). Furthermore, Hispanic women in treatment for early stage breast cancer report a significant increase in distress between 6 and 12 months after surgery, while NH White women do not (Culver, Arena, Antoni, & Carver, 2002). In comparison to NH White long-term breast cancer survivors, Hispanic breast cancer survivors report higher distress 5 to 13 years after surgery (Carver, Smith, Petronis, & Antoni, 2006). In sum, distress is an indicator of psychological adaptation in women with breast cancer, and Hispanic and NH White women show differences in multiple measures of emotional well-being at several stages of breast cancer treatment.

Physiological Adaptation

The hormone cortisol has been measured as a physiological indicator of stress in prior research (Miller, Chen, & Zhou, 2007) and in studies of women with breast cancer (Sephton et al., 2012). In response to stressors, cortisol is secreted to liberate glucose from glycogen in tissue in order to increase energy (Kudielka & Kirschbaum, 2005). When chronic stress occurs, cortisol levels may become dysregulated and no longer follow the typical diurnal pattern of peaking at awakening and decreasing over the course of the day (Miller, Chen, & Zhou, 2007; Fries, Dettenborn, & Kirschbaum, 2009). Investigators have used an altered salivary cortisol diurnal slope as an indicator of chronic stress effects (Sephton, Sapolsky, Kraemer, & Spiegel, 2000; Weinrib et al., 2010). Diurnal salivary cortisol slopes are abnormal or flattened in women who have been treated for breast cancer (Abercrombie et al., 2004). Serum cortisol levels may also be elevated or show flattened daily patterns in women with breast cancer (Touitou, Bogdan, Levi, Benavides, & Auzeby, 1996; van der Pompe, Antoni, & Heijnen, 1996).

Not only are dysregulated plasma cortisol levels and salivary cortisol often present in women with breast cancer, they are positively correlated with symptoms associated with breast cancer. In one study, cancer patients including those with breast cancer self-reported current levels of depression on the Hamilton Depression Scale, and concentration of post-dexamethasone cortisol in their plasma was also measured

(Musselman et al., 2001). Although the directionality of the effect could not be determined, it was found that post-dexamethasone cortisol plasma levels were positively correlated with depression symptoms, with cortisol increasing with depression scores. This association between cortisol levels and depression symptoms in patients with breast cancer has been replicated in a more recent study of women with new diagnoses of metastatic or recurrent breast cancer who provided morning plasma cortisol samples and self-reported pain, depression, and fatigue (Thornton, Andersen, & Blakely, 2010). Plasma cortisol level was found to significantly positively correlate with all three symptoms. Irregular patterns in salivary cortisol have also been associated with greater fatigue symptomology in breast cancer (Bower et al., 2005). In this study, breast cancer patients at stage 0, I, or II of the disease who self-reported levels of fatigue were assessed for salivary cortisol 4 times each day over the course of 2 days. Participants with higher levels of fatigue also showed flattened cortisol patterns, with flattening increasing with fatigue level. Furthermore, breast cancer patients with greater fatigue showed a flatter diurnal cortisol pattern than non-fatigued patients in response to stress (Bower, Ganz, & Aziz, 2005). High cortisol levels and dysregulated diurnal cortisol have thus been linked to physical symptoms, such as fatigue, in breast cancer patients.

It follows that cortisol levels are also positively correlated with disease recurrence in women with breast cancer (Thornton, Andersen, & Carson, 2008). In this study, women who had been diagnosed with and had undergone surgery for non-metastatic breast cancer were followed for 10 years. Participants who experienced a recurrence of breast cancer more than 12 months after surgery had higher salivary cortisol levels than those who remained free of disease. Flattening of daily cortisol slope is also associated with decreased survival in metastatic breast cancer (Sephton, Sapolsky, Kraemer, & Spiegel, 2000). Salivary cortisol was collected 4 times each day for 3 days from women with metastatic breast cancer. Women who showed abnormal diurnal cortisol levels, or flattening in diurnal cortisol levels, survived for significantly shorter periods. Flattened cortisol slopes in patients with early to advanced lung cancer are also associated with increased mortality, and cortisol slope predicts length of survival from the time of diagnosis in these patients (Sephton et al., 2012). Furthermore, in patients with renal cell carcinoma, cortisol slope is associated with survival time from diagnosis of metastatic renal cell carcinoma, and a greater cortisol slope predicts longer survival time (Cohen et al., 2012). In sum, dysregulated cortisol may be found in breast cancer patients and is positively correlated with breast cancer symptomatology, recurrence, and mortality. Ethnic differences in diurnal salivary cortisol patterns have been found (Hajat et al., 2010). However, research on ethnic differences in physiological adaptation to breast cancer measured through cortisol levels and diurnal cortisol slope is lacking.

Correlates of Adaptation

Cultural Values

Adaptation to breast cancer in Hispanic women may be shaped by their cultural beliefs and values (Lopez-Class et al., 2011). It should be noted that there is no singular Hispanic culture, as Hispanic ethnicity is comprised of widely different subcultures. Hispanics of different national origins have been found to differ in their health and use of health care systems (Ai, Appel, Huang, & Lee, 2012; Ai, Noel, Appel, Huang, & Hefley, 2013), in their cancer-related health behaviors (Coups et al., 2012), and in their sources of stress and worry (Long et al., 2012), which are all relevant to individual differences in adaptation to chronic illness. Nevertheless, *familism*, prioritizing the family over the self, is highly valued by many Hispanic subgroups (Schwartz, 2007) and persists among Hispanics in the United States despite level of acculturation (Villarreal, Blozis, & Widaman, 2005). As such, Hispanic women who have completed treatment for breast cancer state that they receive high levels of support from relatives (Lopez-Class et al., 2011). On the other hand, if the family is not present during the episode of breast cancer, Hispanic women may experience emotional distress (Lopez-Class et al., 2011). Hispanic women also report that taking care of their families interferes with attending to their own breast health (Teran, Baezconde-Garbanati, Marquez, Castellanos, & Belkic, 2007). Aspiring to put family first over self-care may also come at the cost of the physical health of Hispanic women (D'Alonzo, 2012). *Machismo*, a belief associated with Hispanic masculinity that promotes emotional restraint (Getrich et al., 2012), may explain why, despite *familisim,* Hispanic women anecdotally report that they receive low emotional support from their husbands (Lopez-Class et al., 2011). Moy, Park, Feibelmann, Chiang, & Weissman (2006) suggest that breast health is not typically discussed in the Hispanic community, which may be a barrier to seeking social support from family, friends, and health professionals. In comparison to NH White women, Hispanics are more likely to endorse *fatalistic* views about cancer and believe that cancer is a divine punishment that cannot be prevented or treated (Perez-Stable, Sabogal, Otero-Sabogal, Hiatt, & McPhee, 1992). Cancer fatalism is negatively associated with physical quality of life in Hispanic women diagnosed with breast cancer (Graves et al., 2012). Overall, the research on

Hispanic values suggests mechanisms by which culture may relate to emotional distress and decreased self-care and usage of health care resources in Hispanic patients diagnosed with cancer. Nonetheless, cultural values such as *familism* may also contribute to resilience in Hispanic women with cancer.

The degree to which Hispanics identify with the values of their culture is known as ethnic identity (Smith & Silva, 2011). Phinney (1992) conceptualizes ethnic identity as a person's knowledge that they belong to an ethnic group, and their understanding of the value and significance of belonging to that group. Ethnic identity may be divided into 2 separate constructs that measure affirmation and identity search (Phinney, 1992). Affirmation consists of a sense of belonging to a group, while identity search consists of exploration of ethnic identity (Phinney, 1992). Overall ethnic identity may be linked to mental health outcomes (Smith & Silva, 2011). One meta-analysis found that in a sample of people of color that included Hispanics, higher levels of psychological quality of life were positively correlated with ethnic identity (Smith & Silva, 2011). It has also been found that ethnic identity may affect level of stress in minority women with chronic illness. A study on African American women infected with *human immunodeficiency virus* found that higher levels of ethnic identity were related to lower perceived stress (Lopez, Antoni, Fekete, & Penedo, 2012). In this study, ethnic identity affirmation, rather than ethnic identity search, predicted perceived stress in minority women with chronic illness (Lopez, Antoni, Fekete, & Penedo, 2012). In all, these studies indicate that ethnic identity may be associated with well-being in ethnic minorities.

However, results of some studies suggest that higher ethnic identity may negatively impact health outcomes in Hispanic women. Higher ethnic identity in

Hispanic women with breast cancer is associated with greater perceived discrimination from health care providers (Campesino, Saenz, Choi, & Krouse, 2012). Hispanics with higher levels of ethnic identity demonstrate a lower pain sensitivity range than NH White Americans (Rahim-Williams et al., 2007). As can be seen, although some studies link ethnic identity to positive mental health outcomes in minority women, higher ethnic identity is also associated with factors that could increase stress and decrease quality of life in Hispanic women. Research also suggests that ethnic identity may not be a resilience factor in NH White women, given that identification with one's ethnicity may not be of importance to them (Roberts, 1999). Further research is needed to understand the relationship between ethnic identity and adaptation to surgery for breast cancer.

Coping

Coping is a cognitive process that has been linked to adaptation to breast cancer in both NH White and Hispanic women. Coping through spirituality has been positively correlated with quality of life in a sample of primarily NH White women diagnosed with stage II or stage III breast cancer (Purnell, Andersen, & Wilmot, 2009). Hispanic women within 1 and 5 years of a diagnosis of breast cancer have been found to report high religiosity and spirituality (Lopez-Class et al., 2011), which has been correlated with greater social and functional quality of life (Wildes, Miller, de Majors, & Ramirez, 2009). Therefore, coping mechanisms, such as spirituality and religion, are associated with adaptation in both Hispanic and NH White women diagnosed with breast cancer.

While breast cancer patients of different ethnicities may benefit from some of the same methods of coping, these women may differ in the frequency with which they use various coping strategies. Comparing Hispanic and NH White women who have been diagnosed with breast cancer, it has been found that Hispanic women use more avoidant coping than the NH White women. Specifically, Hispanic women report greater use of self-distraction strategies, whereas NH White women report greater use of humor (Culver, Arena, Antoni, & Carver, 2002). It has also been shown that the relationship between type of coping and distress differs between Hispanic and NH White women. While behavioral disengagement before surgery for breast cancer predicts greater post-surgical distress among NH White women, it predicts less distress after surgery in Hispanic women (Culver, Arena, Antoni, & Carver, 2002). In short, coping has been associated with adaptation to breast cancer in Hispanic and NH White women, and some coping mechanisms may be used more frequently or may be more adaptive in one ethnic group than in the other.

Emotional approach coping in particular has been associated with adaptation to breast cancer in NH White women (Stanton et al., 2000). Emotional approach coping is a type of emotion-focused coping that involves regulating emotion in response to a stressful event (Stanton, Danoff-Burg, Cameron, & Ellis, 1994). It can be divided into two types: processing emotions, which includes acknowledging and seeking to understand emotions, and expressing emotions (Austenfeld & Stanton, 2004; Stanton, Danoff-Burg, Cameron, & Ellis, 1994). Stanton et al. (2000) observed that in a sample of primarily NH White women, women who reported higher emotionally expressive coping reported better physical health and reduced distress in the months following treatment for early stage breast cancer. Therefore, in NH women, coping through emotional expression is associated with increased psychological and physical adaptation to breast cancer.

However, research on emotionally expressive coping in Hispanics is lacking. Garza (1978) found that expression of emotion differs between cultures, such that those of Hispanic origin value and accept expression of affect more than those of NH White origin. Hispanics show different patterns of emotional expression than people of other ethnicities, such that Hispanics make less effort to control expression of their emotions than those in other ethnic groups (Soto, Levenson, & Ebling, 2005). Comparing Hispanic and NH White women who have been diagnosed with breast cancer, it has been found that Hispanic women use venting to cope more often than NH White women (Culver, Arena, Antoni, & Carver, 2002). These studies suggest that Hispanics may be more emotionally expressive than those of other ethnicities, but it remains unknown whether emotionally expressive coping is related to adaptation in Hispanic women diagnosed with breast cancer.

Current Study

As shown above, breast cancer patients vary widely in their ability to adapt psychologically and physiologically to the stressors of diagnosis and treatment for breast cancer. There are differences in distress and quality of life in women with early stage breast cancer. Some women with breast cancer also have dysregulated cortisol levels, which relate to increased breast cancer symptoms, breast cancer recurrence, and higher mortality rates. The majority of studies conducted on adaptation to breast cancer have been carried out in samples of NH White women, but the existing research on Hispanic women suggests that Hispanic and NH White women may differ in their adaptation to breast cancer. Hispanic women show greater levels of distress and lower levels of quality of life after treatment for breast cancer, which may be related to Hispanic cultural values. However, ethnic identity has been shown to be positively correlated with quality of life in Hispanics and related to lower stress in minority women with chronic illness. Research has found individual and ethnic differences in the type of strategies women use for coping, which has been found to be related to psychological adaptation in women with breast cancer.

Further research is necessary in order to clarify what differences in psychosocial and physiological adaptation after surgery for breast cancer exist between Hispanic and NH White women. Many women experience emotional distress after diagnosis and initial treatment for breast cancer (Jacobsen, Bovbjerg, & Redd, 1993; Koopman et al., 2002; Manganiello, Hoga, Reberte, Miranda, & Rocha, 2011). However, few studies have specifically examined this phenomenon in the weeks after surgery, prior to adjuvant treatment. Furthermore, research examining ethnic differences in cortisol levels in breast cancer patients during this time is lacking, despite the relationship between cortisol and recurrence and mortality rates in cancer patients. The possible role of ethnic identity in resilience during recovery from surgery for breast cancer also remains unexplored. While many studies have concluded that coping is related to psychological adaptation in women diagnosed with breast cancer, the role of emotionally expressive coping in adaptation to breast cancer among Hispanic women is unknown. The current study addresses a number of these issues in a sample of women who have recently undergone surgery for non-metastatic breast cancer.

Current Study Aims and Hypotheses

Specific Aim 1: To test whether Hispanic and NH White women differ in adaptation after surgery for breast cancer through assessments of distress, quality of life, and serum cortisol levels.

Hypothesis 1: Hispanic women will have greater distress, poorer quality of life, and greater dysregulation in cortisol than NH White women.

Specific Aim 2: To test the interaction of ethnic group (Hispanic versus NH White) and ethnic identity on adaptation after surgery for breast cancer.

Hypothesis 2: Ethnic group will interact with ethnic identity to explain adaptation for those Aim 1 analyses showing significant effects. In Hispanic women, higher ethnic identity will be associated with better psychological and physiological adaptation and lower ethnic identity will be associated with poorer adaptation. NH White women with high ethnic identity and with low ethnic identity will not differ in their adaptation to breast cancer.

Exploratory Aim 1: To test whether, in a larger sample combining the Phase 3 and Phase 4 samples, Hispanic and NH White women differ in adaptation after surgery for breast cancer through assessments of distress, quality of life, and serum cortisol levels.

Exploratory Hypothesis 1: Hispanic women will have poorer quality of life, greater distress, and greater dysregulation in cortisol than NH White women.

Exploratory Aim 2: To test the interaction of ethnic group (Hispanic versus NH White) and ethnic identity on adaptation after surgery for breast cancer regardless of whether Specific Aim 1 analyses are significant.

Exploratory Hypothesis 2: Ethnic group will interact with ethnic identity to explain adaptation. In Hispanic women, higher ethnic identity will be associated with better psychological and physiological adaptation and lower ethnic identity will be associated with poorer adaptation. NH White women with high ethnic identity and with low ethnic identity will not differ in their adaptation to breast cancer.

Exploratory Aim 3: Potential moderating variables other than ethnic identity will be explored. This aim will test the interaction of ethnic group (Hispanic versus NH White) and emotionally expressive coping on adaptation after surgery for breast cancer, regardless of whether Specific Aim 1 analyses are significant.

Exploratory Hypothesis 3: Ethnic group will interact with emotionally expressive coping to explain adaptation.

CHAPTER 2: METHOD

Participants

Hispanic and NH White women (N = 365) who had received a diagnosis of non-metastatic breast cancer (stage 0 - III) were invited to participate in the study through their physician's offices. Participants were required to speak English fluently, and were excluded for having started adjuvant treatment, for diagnosis of prior cancer other than minor skin cancer, and for diagnosis of severe psychiatric disorder.

Procedures

Data collection was approved by the Institutional Review Board at the University of Miami, and two archival data sets were collected at the University of Miami and at the Miller School of Medicine at the University of Miami. The first data set, Phase 3, was collected between the years 1999 and 2005, and the second data set, Phase 4, was collected between the years 2006 and 2013. Women were invited to participate in the study between 2 and 12 weeks after they underwent surgery, but before they began adjuvant treatment. Women were invited to complete a blood draw between 4:00pm and 6:30pm in order to minimize diurnal variability in circulating cortisol levels. Participants were asked to complete a packet of questionnaires as close as possible to the time of the blood sample collection. Self-report questionnaires were self-administered, and women were requested to bring the questionnaires with them to the blood draw. Participants received compensation of $50 for their participation upon completion of the blood draw and the questionnaires.

Measures

Psychological adaptation was measured by quality of life, by negative affect as a measure of distress, and by intrusive thoughts as a measure of cancer-specific distress. Physiological adaptation was measured by serum levels of cortisol. The following measures were used to assess adaptation.

Demographics

Age, ethnicity, number of years of living in the United States, years of education, income, employment status, marital status, menopausal status, days since surgery, and number of lymph nodes were collected using a self-report paper and pencil questionnaire. Type of surgery, and estrogen and progesterone receptor status were collected from medical charts. Stage of disease was collected from the self-report questionnaire and validated where possible from medical charts.

General Distress/Negative Affect

The Affects Balance Scale (ABS) was used to measure general distress/negative affect (Derogatis, 1975). The ABS is a self-report questionnaire that lists 40 adjectives describing different feelings. Participants are asked to rate how often in the past week they have experienced each feeling (e.g., “angry”). There are 5 possible response options ranging from 1 (never) to 5 (always). The ABS has been used in many studies of women with breast cancer (Northouse, 1989). In women with non-metastatic breast cancer the

ABS has demonstrated high internal consistency (α = 0.86) (Antoni et al., 2006). The Positive Affect Scale, the Negative Affect Scale, and the difference between them, known as the Affects Balance Subscale, were used in the present study. Internal consistency for the Positive Affect Scale was found to be high in the Phase 3 sample (α = 0.95) as well as in the Phase 4 sample (α = 0.95). Internal consistency for the Negative Affect Scale was found to be high in the Phase 3 sample (α = 0.92) as well as in the Phase 4 sample (α = 0.92). Internal consistency for the Affects Balance Subscale was found to be moderate in the Phase 3 sample (α = 0.80) as well as in the Phase 4 sample (α = 0.76).

Cancer-Specific Distress

The Intrusion subscale of the Impact of Event Scale (IES) is a self-report measure that was used in the Phase 3 sample to assess intrusive thoughts related to breast cancer (e.g. "I thought about it when I didn't mean to") during the past 2 weeks (Horowitz, Wilner & Alvarez, 1979). The IES consists of 15 items, and patients rate each item from 1 (not at all) to 4 (often). The IES has been found to have high internal consistency (α = 0.86) in samples of women in treatment for non-metastatic breast cancer (Antoni et al., 2006). Internal consistency for the IES-Intrusion scale was found to be moderate in the Phase 3 sample (α = 0.84).

The Intrusion subscale of the Impact of Event Scale - Revised (IES-R), a 22-item revised version of the IES self-report measure, was used to measure intrusive thoughts in the Phase 4 sample (Wilson & Keane, 1996). Patients rate each item from 0 (not at all) to 4 (extremely). The Intrusion subscale of the IES-R has been found to have moderate internal consistency in patients who have undergone surgery (α = 0.80) (Baumert, Simon, Gündel, Schmitt, & Ladwig, 2004), and has been used in samples of women diagnosed with breast cancer (Shim et al., 2006). Internal consistency for the IES-Intrusion scale was found to be high in the Phase 4 sample (α = 0.88).

Quality of Life

The Physical Well-Being and Emotional Well-Being subscales of the Functional Assessment of Cancer Therapy – Breast (FACT-B) were used to assess self-reported quality of life over the past 7 days. The FACT-B is a 36-item scale with 5 response choices ranging from 1 (not at all) to 5 (very much). The items may be combined into a total score, or may be divided into Physical Well-Being (e.g., "I have pain"), Social/Family Well-Being (e.g., "I get support from my friends"), Emotional Well-Being (e.g., "I feel sad"), and Functional Well-Being (e.g., "I am able to work"). The FACT-B Emotional Well-Being subscale has been found to have low internal consistency (α = 0.69), and the Physical Well-being subscale has been found to have moderate internal consistency (α = 0.81) in a sample of women with breast cancer (Brady et al., 1997). Internal consistency for the FACT-B Physical Well-Being scale was found to be high in the Phase 3 sample (α = 0.85), and moderate in the Phase 4 sample (α = 0.80). In the Phase 3 data set, internal consistency for the emotional well-being scale was found to be moderate (α = 0.77), as was the case in the Phase 4 sample (α = 0.83).

Cortisol

Serum cortisol was used as a measure of physiological stress. Serum cortisol was measured from a blood sample collected by a phlebotomist between 2 and 12 weeks after surgery, between the hours of 4:00pm and 6:30pm. Due to diurnal variability in cortisol output, blood was drawn during this same window of time for all participants. Collecting all of the blood samples at the same time of day allows all measurements of serum cortisol levels to be directly compared. Blood was collected in tubes without anticoagulants. Serum cortisol was measured by competitive enzyme immunoassay kits, initially from Diagnostic Systems Laboratories (Webster, Texas). Later, due to the previous kit being no longer available, a competitive immunoassay from ALPCO Diagnostics (Salem, NH) was used. Both kits were specifically designed for quantitative measurement of cortisol in human serum, and gave equivalent results when validated using internal controls.

Ethnic Identity

The Affirmation subscale of the Multigroup Ethnic Identity Measure (MEIM) was included as a measure of ethnic identity. The MEIM is a self-report instrument that measures a person's knowledge that they belong to an ethnic group, and their understanding of the value and significance of belonging to that group (Phinney, 1992). The MEIM is a 13-item measure on which response options for items 1 through 12 range from 1 (strongly agree) to 4 (strongly disagree), and the final item asks about racial or ethnic group. The Affirmation subscale is composed of items 3, 5, 6, 7, 9, 11 and 12, and includes items about an individual's sense of belonging to a group (e.g., "I have a clear sense of my ethnic background and what it means for me"). The Ethnic Identity Search subscale contains items 1, 2, 4, 8, and 10 and is composed of questions regarding exploration of ethnic identity (e.g., "I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs"). Internal consistency for the Affirmation subscale has been found to be high in a sample of minority women with chronic illness ($\alpha = 0.86$) (Lopez, 2012). Internal consistency for the Affirmation subscale was high in the Phase 4 sample ($\alpha = 0.90$).

Emotionally Expressive Coping

The Emotional Approach Coping Scale (EAC) is a self-report assessment that asks patients how actively they express emotions ("I've been taking time to express my emotions") (Stanton, Kirk, Cameron, & Danoff-Burg, 2000). The EAC is a 15-item self-report measure with 4 possible responses ranging from 1 ("I haven't been doing this at all") to 4 ("I've been doing this a lot"). In a sample of undergraduate students, the Emotionally Expressive Coping subscale was found to be moderately reliable (α = 0.82) (Stanton, Kirk, Cameron, & Danoff-Burg, 2000). Among women with breast cancer, the Emotionally Expressive Coping subscale was found to be highly reliable (α = 0.85) (Stanton & Low, 2012). In this study, the internal consistency for the Emotionally Expressive Coping subscale was high in the Phase 4 sample (α = 0.93).

Sleep Disturbance

The Pittsburgh Sleep Quality Index (PSQI) was used to measure quality of sleep (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The PSQI is a self-report measure that assesses sleep quality and sleep disturbance over the course of the past month (e.g., "During the past month, to what extent have your sleeping difficulties interfered with your daily functioning?"). Possible response options range from 1 to 4, or 1 to 5, depending on the item. The full measure was administered in the Phase 3 sample, and an abbreviated 5-item version was administered in the Phase 4 sample. The five item scores were totaled in order to generate a total sleep disturbance score, with higher scores indicating greater sleep disturbance. Internal consistency for the PSQI has been found to be moderate in a sample of women diagnosed with breast cancer (α = 0.80) (Carpenter & Andrykowski, 1998). The internal consistency for the total scale was low in the Phase 3 sample (α = 0.62), and moderate in the Phase 4 sample (α = 0.76).

Statistical Analyses

Preliminary Analyses

To test for the assumption of normal distribution, all variables were measured for a skewness index less than 3.0 and for a kurtosis index less than 8.0. Outliers were defined as values that are 2.5 or more standard deviations away from the mean of the variable. Outliers 2.5 or more standard deviations away from the mean of the variable were winsorized. Any bivariate outliers with a Cook's D of + 1 or -1 were also winsorized. Any variables still not found to be normally distributed were logarithmically transformed. Multiple imputation with 21 iterations was used to account for any missing values. All results were pooled using procedures outlined in Rubin (1987). Multiple imputation was conducted for two data sets separately, due to differences in the measures administered in the two data sets. The Phase 3 data that were collected between the years 1999 and 2005 comprised the first imputation group (N = 211). The Phase 4 data set collected between the years 2006 and 2013 comprised the second imputation group (N = 151). Specific Aim 1 was tested in both data sets. Specific Aim 2 and Exploratory Aims 2 and 3 were conducted on the Phase 4 sample only due to differences in the psychosocial measures administered to each group. Exploratory Aim 1 was conducted in a data set that combined Phase 3 and 4.

Control Variables

Prior literature has demonstrated that psychological adjustment in women with breast cancer is related to age, menopausal status, acculturation as measured by number of years of living in the United States (Christie, Meyerowitz, & Maly, 2010), type of surgery and income (Giedzinska et al., 2004), stage of disease (Sohl et al., 2012), and time since surgery (Shi et al., 2011). Cortisol levels have been associated with sleep (Fukuda & Morimoto, 2001). All of these variables were considered as potential covariates in the study analyses. A control variable was included in the analyses if it was theoretically related to a specific outcome, and if it was associated with the outcome variable at a significance of $p < 0.05$.

Primary Analyses

This study used multiple regression analysis to test hypotheses associated with the following 6 aims:

Specific Aim 1

Specific Aim 1 tested whether Hispanic and NH White women differ in adaptation after surgery for breast cancer through assessments of affect balance, positive and negative affect, intrusive thoughts, quality of life, and serum cortisol levels. It was hypothesized that Hispanic women would have greater distress, poorer quality of life, and greater dysregulation in cortisol (greater serum levels) than NH White women. The hypothesis was tested separately in 2 different data sets, the first collected between the years 1999 and 2005 (Phase 3), and the second collected between the years 2006 and 2013 (Phase 4). Multiple regression analyses were used to determine the main effect of ethnicity on adaptation. The predictor variable, ethnicity, is categorical, and was dummy coded. Covariates were added to the first block of the analysis. Ethnicity was added in the second block of the analysis. Holm's step-down Bonferroni procedure was applied to correct for multiple comparisons (Holm, 1979).

Specific Aim 2

Specific Aim 2 tested the interaction of ethnic group (Hispanic versus NH White) and ethnic identity on adaptation. It was hypothesized that ethnic group would interact with ethnic identity to explain adaptation for those Specific Aim 1 analyses showing significant effects. Specifically, in Hispanic women, it was hypothesized that higher ethnic identity would be associated with better psychological and physiological adaptation. For NH White women, it was hypothesized that ethnic identity would not relate to adaptation. All Specific Aim 2 analyses were conducted in the Phase 4 data set only, as this was the only study in which ethnic identity was measured. The MEIM variable was centered by subtracting the sample mean from each individual's scores on the variable, so that the sample mean became equal to 0. Ethnicity is categorical and was therefore dummy coded. To create the interaction term, the coded variables of ethnicity and of ethnic identity were multiplied together. All covariates were added to the first block of the analysis, then the predictor variables, which are ethnicity and ethnic identity were added, followed by the interaction term. Holm's step-down Bonferroni procedure was applied to correct for multiple comparisons (Holm, 1979). Significant interactions were decomposed using methodology outlined in Holmbeck (2002). In order to create two new conditional moderator variables, the dichotomous variable, ethnicity, was recoded twice. Hispanic was coded as 0 in one analysis and NH White as 1, and Hispanic was coded as -1 in one analysis and NH White as 0. Two new interaction terms were then created by multiplying each moderator by the predictor. Two post-hoc regressions were conducted by entering the main effect of the continuous variable, one of the conditional group variables, and the interaction term containing that group variable. The slopes of the regression line relating the independent and dependent variables were compared at each level of the moderator using t-tests.

Exploratory Aim 1

Exploratory Aim 1 tested, in a sample composed of Phase 3 and Phase 4 combined, whether Hispanic and NH White women differ in adaptation after surgery for breast cancer as operationalized by measures of quality of life, positive and negative affect, intrusive thoughts, and serum cortisol levels. It was hypothesized that Hispanic women would have poorer quality of life, greater distress, and greater dysregulation in cortisol (greater serum levels) than NH White women. Multiple regression analyses were conducted as explained in Specific Aim 1.

Exploratory Aim 2

Exploratory Aim 2 tested the interaction of ethnic group (Hispanic versus NH White) and ethnic identity on adaptation after surgery for breast cancer on all outcome measures, regardless of whether the main effects tested by the Specific Aim 1 analyses were significant. It was hypothesized that ethnic group would interact with ethnic identity to explain adaptation such that in Hispanic women, higher ethnic identity would be associated with better psychological and physiological adaptation and lower ethnic identity would be associated with poorer adaptation. NH White women with high ethnic identity and with low ethnic identity were not predicted to differ in their adaptation to breast cancer. Statistical analyses were conducted using multiple regression as specified in Specific Aim 2.

Exploratory Aim 3

Exploratory Aim 3 tested the interaction of ethnic group (Hispanic versus NH White) and emotionally expressive coping on adaptation after surgery for breast cancer using all outcome measures irrespective of the significance of Specific Aim 1 results. It was hypothesized that ethnic group and emotionally expressive coping would interact to explain adaptation. Multiple regression analysis was conducted in the Phase 4 data set in which emotionally expressive coping was measured. The emotionally expressive coping variable was centered. Dummy coding was used for the categorical ethnicity variable. The coded variables of ethnicity and emotionally expressive coping were then multiplied together, resulting in the interaction term. All covariates were added to the first block of the analysis, then the predictor variables, which are ethnicity and emotionally expressive coping, were added, followed by the interaction term. Holm's step-down Bonferroni procedure was used to correct for multiple comparisons (Holm, 1979). Significant interactions were decomposed using methodology outlined in Holmbeck (2002). In order to create two new conditional moderator variables, the dichotomous variable, ethnicity, was recoded two times. Each ethnic group was coded as 0 in one analysis. Hispanic was coded as 0 in one analysis and NH White as 1, and Hispanic was coded as -1 in one analysis and NH White as 0. Two new interaction terms were then created by multiplying each moderator by the predictor variable. Two post-hoc regressions were conducted by entering the main effect of the continuous variable, one of the conditional group variables, and the interaction term containing that group variable. T-tests comparing the slopes of the line relating the independent and dependent variables at each of the two levels of the moderator were conducted.

CHAPTER 3: RESULTS

Preliminary Analyses

Sample Characteristics

Listwise deletion was used to exclude participants who had missing data that could not be imputed. Three participants from the Phase 4 data set were therefore excluded for missing information on the type of surgery they had undergone, which is categorical data that could not be imputed. Therefore, the Phase 3 final sample consisted of 61 Hispanic women and 150 NH White women, and the Phase 4 final sample consisted of 75 Hispanic women and 76 NH White women. Table 1 shows the demographic and medical characteristics for the Phase 3, Phase 4, and combined samples before imputation. The pre-imputation descriptive statistics for the physiological data and the self-report data of the samples can be found in Table 3. Table 2 shows the demographic and medical characteristics for the Phase 3, Phase 4, and combined samples after imputation. Post-imputation descriptive statistics for the physiological data and the self-report data from both samples are in Table 4.

In Phase 3 the sample was 28.9% Hispanic, and 41.0% of these Hispanic women were Cuban-American, 6.6% were Puerto Rican, and 52.5% were of an unspecified ancestry. The average age of the sample was 50.79 years (SD = 9.10), and the participants had resided in the United States for 44.77 years on average (SD = 15.49). The participants were highly educated, and both Hispanic and NH White participants completed at least some college on average. They were of middle income, with Hispanic and NH Whites earning above $75,000 annually on average. At the start of the study, on average 40.38 days after surgery (SD = 21.30), the majority of women were employed full time (71.6%), while 28.4% worked part-time or did not work. Approximately 63.5% of the women were married or had a partner, 2.4% were separated, 19.4% were divorced, 5.2% were widowed, and 9.5% were single. The majority of women were peri- or post-menopausal (58.8%) and the rest were pre-menopausal (41.2%). Over half of the women had undergone a lumpectomy (53.1%), and under half were treated with a mastectomy (46.9%). Approximately 14.7% were diagnosed with stage 0 breast cancer, while 39.8% had stage I breast cancer, 37.4% had stage II breast cancer, and 7.1% had stage III breast cancer. Most of the women had no positive lymph nodes (62.1%), while 37.4% had some positive lymph nodes, (M = 1.50, SD = 3.21). The majority of women were estrogen receptor positive (54.5%), 13.7% were estrogen receptor negative, and 31.7% lacked data on their estrogen receptor status. Approximately 32.7% of the women were progesterone receptor positive, while 22.3% were progesterone receptor negative and 45.0% had an unknown status.

Hispanics comprised 49.7% of the Phase 4 sample. Forty-eight percent of them were of Cuban-American descent, 14.7% were Puerto Rican, 2.7% were Venezuelan, 6.7% were Columbian, and 28% were of another Hispanic ancestry. In Phase 4, women were 55.19 years of age on average (SD = 9.75), and had lived in the United States for 46.93 years on average (SD = 16.35). The participants were also highly educated, and the Hispanic and NH White groups on average had each completed at least some college. The overall sample earned approximately $108,000 annually, and each ethnic group earned a middle level of income. The women in this sample began the study on average 35.08 days after surgery (SD = 16.74), during which time the majority of the women were employed (70.2%) and 26.5% did not work. Approximately 66.9% of the women were married or partnered, 1.3% were separated, 17.9% were divorced, 6.0% were widowed, and 6.6% were single. The participants were primarily peri- or post-menopausal (65.6%) and the remaining women were pre-menopausal (30.5%). Approximately half of the women had undergone a lumpectomy (50.3%), and the other half of women was treated with a mastectomy (49.7%). Approximately 17.2% were diagnosed with stage 0 breast cancer, while 57.0% had stage I breast cancer, 18.5% had stage II breast cancer, and 4.6% had stage III breast cancer. Most of the women had no positive lymph nodes (53.6%), while 15.2% had some positive lymph nodes. The number of positive lymph nodes averaged 0.42 (SD = 1.28). The majority of women were estrogen receptor positive (54.6%) and 9.3% were estrogen receptor negative, but receptor status was unknown in 36.4% of the women. Approximately half of the women were progesterone receptor positive (47.7%) while 15.2% were progesterone receptor negative and 37.1% had an unknown receptor status.

When the Phase 3 and Phase 4 data sets were combined, Hispanic women comprised 37.6% of the sample. Of these Hispanic women, 44.9% were Cuban-American, 11.0% were Puerto Rican, 1.50% were Venezuelan, 3.7% were Columbian, and 39.0% were of an unspecified national origin. The women were of middle age with an average age of 52.47 years (SD = 10.01), and they reported having lived in the United States for 45.73 years on average (SD = 15.66). Both Hispanic and NH White women had completed at least some college on average. The group was of middle income, and both Hispanic and NH White women earned on average $89,300 annually. The women joined the study on average 37.93 days after surgery (SD = 19.46), at which time the majority of them were employed (71.0%), although 27.6% reported that they did not work. The majority of the women (64.9%) were married or partnered, 1.9% had separated from their spouse, 18.8% were divorced, 5.5% had been widowed, and 8.3% were single. The majority of women were peri- or post-menopausal (61.6%), and 36.7% were pre-menopausal. Slightly over half of the women had undergone a lumpectomy before joining the study (51.9%), and slightly under half had been treated with a mastectomy (48.1%). Approximately 15.7% were diagnosed with stage 0 breast cancer, while 47.0% had stage I breast cancer, 29.6% had stage II breast cancer, and 6.1% had stage III breast cancer. Most of the women had no positive lymph nodes (58.8%), although 28.2% reported that some lymph nodes had been found to be positive (M = 1.14, SD = 2.78). The majority of women were estrogen receptor positive (54.4%), 11.9% were estrogen receptor negative, and 33.7% lacked data on their estrogen receptor status. Approximately 39.2% of the women were progesterone receptor positive, while 19.3% were progesterone receptor negative and 41.4% had an unknown progesterone receptor status.

Two-tailed independent t-test and chi-square analyses were conducted to examine whether the women in Phase 3 and Phase 4 differed on demographic and medical characteristics before imputation. The women in the Phase 4 sample (M = 55.19, SD = 9.75) were significantly older than those in the Phase 3 sample (M = 50.79, SD = 9.10) [t(360) = -4.4, p = 0.000]. Annual income in thousands was also significantly higher in the Phase 4 (M = 108.59, SD = 78.01) sample than in the Phase 3 sample (M = 77.11, SD = 51.29) [t(314) = -4.0, p = 0.000]. Average number of days between the assessment and surgery was significantly higher in Phase 3 (M = 40.38, SD = 21.30) than in Phase 4 (M = 35.08, SD = 16.74) [t(348) = 2.6, p = 0.010]. Women in Phase 3 (M = 1.50, SD = 3.21) also had more positive lymph nodes on average than their Phase 4 counterparts (M = 0.42, SD = 1.28) [t(311) = 4.2, p = 0.000]. Average years in the United States and years of education did not differ between the samples.

Phase (3 versus 4) was not found to be significantly related to ER status, surgery type, menopausal status, employment status, or marital status. Phase was significantly related to PR status [$\chi^2(1, N = 212), = 6.5, p = 0.011$] such that the probability of being PR negative was 2.04 times more likely when the participant was in Phase 3 versus in Phase 4, whereas the probability of being PR positive was 1.06 times more likely in Phase 4. Phase was significantly related to presence of positive lymph nodes [$\chi^2(1, N = 313), = 9.4, p = 0.002$]. The probability of having positive lymph nodes was 3.76 times more likely when the participant was in Phase 3. Phase was significantly related to ethnicity [$\chi^2(1, N = 362), = 16.2, p = 0.000$], and the probability of being NH White was 1.98 times more likely when the participant was in Phase 3, and the probability of being Hispanic was 1.23 times more likely when the participant was in Phase 4. Phase was significantly related to disease stage [$\chi^2(3, N = 356), = 17.4, p = 0.001$]. Differences among the proportions were examined with follow-up pairwise comparisons. The pairwise difference between stage 0 and stage II was significant. The probability of being at stage II was 2.88 times more likely and the probability of being at stage 0 was 1.19 times more likely when the participant was in Phase 3 versus in Phase 4. The pairwise difference between stage I and stage II was also significant, and the probability of being at stage II was 2.88 times more likely and the probability of being at stage 0 was only 1.19 times more likely when the participant was in Phase 3 versus in Phase 4. The probability of being at stage II was 2.88 times more likely when the participant was in

Phase 3 versus in Phase 4, whereas the probability of being at stage I was 1.02 times more likely in Phase 4 versus in Phase 3.

Little's test of missing completely at random was conducted in order to determine if all data points had an equal likelihood of being missing (Little, 1988). Little's test was not statistically significant in the Phase 3 data set, $\chi^2(62, 211) = 54.54$, $p = 0.739$, in the Phase 4 data set, $\chi^2(203, 151) = 211.70$, $p = 0.323$, or in the combined data set, $\chi^2(185, 362) = 206.344$, $p = 0.135$, indicating that missing data was missing completely at random.

Analysis of Covariates

Bivariate correlations, one-way analyses of variance (ANOVAs), and 2-tailed t-tests were used to assess whether demographic and medical variables were correlated with the outcome variables and should therefore be included in the model as covariates. Age, menopausal status, years of living in the United States, surgery type, income, disease stage, days since surgery, and sleep disturbance were assessed. If the relationship between the demographic or medical variable and the outcome variable was significant at a level of $p < 0.05$, then the variable was included as a covariate in all analyses conducted on the sample.

In the Phase 3 sample, age was significantly positively correlated with emotional well-being ($r = 0.18$, $p = 0.009$), physical well-being ($r = 0.21$, $p = 0.002$), positive affect ($r = 0.19$, $p = 0.007$), and affect balance ($r = 0.19$, $p = 0.006$), and negatively correlated with thought intrusions ($r = -0.19$, $p = 0.006$). Sleep disturbance was significantly negatively correlated with emotional well-being ($r = -0.38$, $p = 0.000$), indicating that emotional well-being was higher as sleep disturbances decreased. Sleep disturbance was also significantly negatively related to physical well-being (r = -0.51, p = 0.000), positive affect (r = -0.39, p = 0.000), and affect balance (r = -0.44, p = 0.000), and positively associated with thought intrusions (r = 0.29, p = 0.000) and negative affect (r = 0.36, p = 0.000). Years of living in the United States was positively correlated with positive affect (r = 0.16 p = 0.021) and affect balance (r = 0.16, p = 0.021). Stage of disease was significantly related to positive affect [F(5, 205) = 2.8, p = 0.018.]. Positive affect was significantly higher in stage 0 (M = 3.48, SD = 0.49) than in stage III (M = 3.02, SD = 0.63), [t(44) = 2.7, p = 0.007], higher in stage I (M = 3.48, SD = 0.60) than in stage II (M = 3.27, SD = 0.06) [t(161) = 2.4, p = 0.017], and higher in stage I (M = 3.48, SD = 0.07) than in stage III (M = 3.02, SD = 0.16) [t(97) = 2.7, p = 0.006]. Stage of disease was also significantly related to physical well-being [F(5, 205) = 2.7, p = 0.023]. Physical well-being was significantly higher in stage 0 (M = 22.65, SD = 4.69) than in stage II (M = 20.14, SD = 5.83) [t(108) = 2.1, p = 0.032], higher in stage 0 (M = 22.65, SD = 4.69) than in stage III (M = 17.69, SD = 5.29), [t(44) = 3.2, p = 0.001], higher in stage I (M = 21.91, SD = 5.18) than in stage II (M = 20.14, SD = 5.83) [t(161) = 2.1, p = 0.039], and higher in stage I (M = 21.91, SD = 5.18) than in stage III (M = 17.69, SD = 5.29) [t(97) = 2.9, p = 0.004]. Physical well-being differed by type of surgery [t(209) = -3.2, p = 0.002], such that levels were lower in women who had a mastectomy (M = 19.80, SD = 5.50) as compared with those who had a lumpectomy (M = 22.15, SD = 5.26).

In the Phase 4 sample, age was significantly positively related to positive affect (r = 0.16, p = 0.048) and affect balance (r = 0.17, p = 0.037). Sleep disturbance was significantly positively associated with thought intrusions (r = 0.59, p = 0.000) and negative affect (r = 0.52, p = 0.000), and negatively correlated with emotional well-being (r = -0.51, p = 0.000), physical well-being (r = -0.62, p = 0.000), positive affect (r = -0.43, p = 0.000), and affect balance (r = -0.53, p = 0.000). Stage of disease was significantly related to emotional well-being [F(7, 143) = 2.6, p = 0.016], and women with stage I breast cancer (M = 18.95, SD = 4.46) reported higher emotional well-being than women with stage II breast cancer (M = 16.96, SD = 4.62) [t(112) = 2.0, p = 0.043]. Disease stage was also significantly related to physical well-being [F(7, 143) = 3.1, p = 0.005], such that women with stage I breast cancer (M = 23.59, SD = 3.99) had higher physical well-being than women with stage II breast cancer (M = 20.73, SD = 4.98) [t(112) = 3.1, p = 0.002]. Stage of disease was also significantly related to affect balance [F(7, 143) = 2.1, p = 0.047] such that women in stage I (M = 1.63, SD = 1.00) had higher affect balance than women in stage II (M = 1.10, SD = 1.23) [t(112) = 2.3, p = 0.021]. Physical well-being was significantly different between surgery types [t(149) = -3.3, p = 0.001], and women who were treated with a mastectomy (M = 21.37, SD = 4.86) reported lower levels than women who underwent a lumpectomy (M = 23.77, SD = 4.10). Emotional well-being was significantly different between surgery types [t(149) = -2.0, p = 0.041], and women who were treated with a mastectomy (M = 17.57, SD = 5.11) reported lower levels than women who underwent a lumpectomy (M = 19.15, SD = 4.27). Positive affect was significantly lower [t(149) = -2.1, p = 0.036] in women who had a mastectomy (M = 3.30, SD = 0.72) as compared with women who had a lumpectomy (M = 3.52, SD = 0.58). Affect balance [t(149) = -2.1, p = 0.035] was also lower in women receiving a mastectomy (M = 1.23, SD = 1.20) versus a lumpectomy (M = 1.61, SD = 0.96). Menopausal status was significantly associated with emotional well-being, with peri- and post-menopausal (M = 17.67, SD = 5.14) women revealing lower emotional well-being than pre-menopausal women (M=19.63, SD = 3.62), [t(143) = 2.6, p = 0.008].

In the sample that combined Phase 3 and Phase 4, age was significantly positively related to emotional well-being (r = 0.20, p = 0.000), physical well-being (r = 0.24, p = 0.000), affect balance (r = 0.14, p = 0.010), and positive affect (r = 0.15, p = 0.004). Income was significantly negatively associated with negative affect (r = -0.11, p = 0.040) and was positively correlated with positive affect (r = 0.13, p = 0.023) and affect balance (r = 0.14, p = 0.013). Sleep disturbance was significantly negatively associated with emotional well-being (r = -0.43, p = 0.000), physical well-being (r = -0.54, p = 0.000), positive affect (r = -0.41, p = 0.000), and affect balance (r = -0.48, p = 0.000) and positively correlated with negative affect (r = 0.44, p = 0.000). Stage of disease was significantly related to emotional well-being [F(9, 352) = 2.3, p = 0.009], and women with stage 0 breast cancer (M = 19.19, SD = 3.36) reported higher emotional well-being than women with stage II breast cancer (M = 17.04, SD = 3.90) [t(162) = 3.5, p = 0.000], women with stage 0 breast cancer (M = 19.19, SD = 3.36) reported higher emotional well-being than women with stage III breast cancer (M = 17.05, SD = 4.51) [t(77) = 2.3, p = 0.022], and women with stage 1 breast cancer (M = 18.54, SD = 0.06) reported higher emotional well-being than women with stage II breast cancer (M = 17.04, SD = 3.90) [t(275) = 2.9, p = 0.004]. Disease stage was also significantly related to physical well-being [F(9, 352) = 4.1, p = 0.000], such that women with stage 0 breast cancer (M = 22.37, SD = 4.71) had higher physical well-being than women with stage II breast cancer (M = 20.14, SD = 5.79) [t(162) = 2.5, p = 0.013], women with stage 0 breast cancer (M = 22.37, SD = 4.71) had higher physical well-being than women with stage III breast cancer (M = 18.33, SD = 5.55) [t(77) = 3.2, p = 0.001], women with stage I breast cancer (M = 22.79, SD = 4.60) had higher physical well-being than women with stage II breast cancer (M = 20.14, SD = 5.79) [t(275) = 4.0, p = 0.000], and women with stage I breast cancer (M = 22.79, SD = 4.60) had higher physical well-being than women with stage III breast cancer (M = 18.33, SD = 5.55) [t(190) = 3.6, p = 0.000]. Stage of disease was significantly related to positive affect [F(9, 352) = 2.7, p = 0.002] such that women with stage 0 breast cancer (M = 3.44, SD = 0.55) had significantly higher positive affect than women in stage II (M = 3.24, SD = 0.60) [t(162) = 2.1, p = 0.040], women with stage 0 breast cancer (M = 3.44, SD = 0.55) had significantly higher positive affect than women in stage III (M = 3.05, SD = 0.66) [t(77) = 2.6, p = 0.009], women with stage I breast cancer (M = 3.51, SD = 0.61) had significantly higher positive affect than women in stage II (M = 3.24, SD = 0.60) [t(275) = 3.6, p = 0.000], and women with stage I breast cancer (M = 3.51, SD = 0.61) had significantly higher positive affect than women in stage III (M = 3.05, SD = 0.66) [t(190) = 3.3, p = 0.001]. Stage of disease was also significantly related to affect balance [F(9, 352) = 2.5, p = 0.005] such that women in stage 0 (M = 1.44, SD = 0.94) had higher affect balance than women in stage III (M = 0.95, SD = 1.07) [t(77) = 2.0, p = 0.049], women in stage I (M = 1.57, SD = 0.97) had higher affect balance than women in stage II (M = 1.11, SD = 1.05) [t(275) = 3.7, p = 0.000], and women in stage I (M = 1.57, SD = 0.97) had higher affect balance than women in stage III (M = 0.95, SD = 1.07) [t(190) = 2.8, p = 0.006]. Stage of disease was also significantly related to negative affect [F(9, 352) = 2.5, p = 0.005] such that women in stage I (M = 1.94, SD = 0.50) had lower negative affect than women in stage II (M = 2.13, SD = 0.59) [t(275) = -2.8, p = 0.005]. Women who had undergone a mastectomy

(M = 20.36, SD = 5.44) reported lower levels of physical well-being than those who had a lumpectomy (M = 22.83, SD = 4.79), [t(360) = -4.6, p = 0.000].

Primary Analyses

Specific Aim 1

It was hypothesized that Hispanic women would have greater distress, poorer quality of life, and greater dysregulation in cortisol than NH White women. Multiple regression analysis was conducted to examine the main effects of ethnicity on affect balance, positive affect, negative affect, thought intrusions, emotional well-being, physical well-being, and serum cortisol. Results of Phase 3 analyses (Table 5) indicate that ethnicity was not found to be a significant predictor of affect balance (β = -0.01, p = 0.842), positive affect (β = -0.10, p = 0.189), negative affect (β = -0.08, p = 0.278), thought intrusions (β = 0.07, p = 0.391), emotional well-being (β = -0.02, p = 0.750), physical well-being (β = 0.02, p = 0.760), or serum cortisol (β = 0.05, p = 0.626).

In Phase 4 analyses (Table 5), ethnicity did not significantly explain affect balance (β = -0.01, p = 0.839), positive affect (β = -0.06, p = 0.424), negative affect (β = -0.04, p = 0.551), thought intrusions (β = -0.05, p = 0.479), emotional well-being (β = 0.07, p = 0.328), physical well-being (β = -0.06, p = 0.375), or serum cortisol level (β = 0.15, p = 0.071). Hispanic women from these samples therefore did not have poorer quality of life, greater distress, or greater dysregulation in cortisol than NH White women in the period after surgery for breast cancer.

Specific Aim 2

Given that none of the Specific Aim 1 analyses were statistically significant, no Specific Aim 2 analyses were carried out.

Exploratory Analyses

Exploratory Aim 1

Combining the Phase 3 and Phase 4 data into a single data set increased statistical power to detect effects. Multiple imputation was carried out in the new combined data set in order to account for missing data. Multiple regression analysis was used to test whether ethnicity significantly explained affect balance, positive affect, negative affect, emotional well-being, physical well-being, and serum cortisol. Main effects on thought intrusions could not be tested since the measure of thought intrusions differed between the data sets.

Ethnicity did not significantly relate to affect balance ($\beta = 0.02$, $p = 0.670$), positive affect ($\beta = -0.02$, $p = 0.636$), negative affect ($\beta = -0.06$, $p = 0.193$), emotional well-being ($\beta = 0.05$, $p = 0.337$), physical well-being ($\beta = -0.03$, $p = 0.500$), or serum cortisol ($\beta = -0.03$, $p = 0.631$) (see Table 5). Thus, even in the larger combined sample, ethnicity was not found to significantly explain adaptation to breast cancer during the weeks after surgery.

Exploratory Aim 2

Significant interaction effects may exist even in the absence of significant main effects of a predictor variable. Therefore, effects of the interactions on adaptation were tested for all variables in the Phase 4 data set. It was hypothesized that ethnic group would interact with ethnic identity to explain adaptation. Specifically, in Hispanic women, it was hypothesized that higher ethnic identity would be associated with better psychological and physiological adaptation. For NH White women it was hypothesized that ethnic identity would not relate to adaptation. Multiple regression analysis showed that the interaction of ethnicity and ethnic identity affirmation did not significantly explain affect balance (β = -0.03, p = 0.353), positive affect (β = -0.05, p = 0.116), negative affect (β = -0.01, p = 0.895), thought intrusions (β = -0.13, p = 0.110), emotional well-being (β = 0.06, p = 0.490), physical well-being (β = -0.10, p = 0.495), or serum cortisol (β = -0.09, p = 0.446) (see Table 6). Ethnic identity therefore did not significantly moderate the relationship between ethnicity and adaptation to breast cancer.

Exploratory Aim 3

It was also hypothesized that ethnicity would interact with emotionally expressive coping in explaining adaptation. Multiple regression analysis (Table 6) revealed that the interaction of ethnicity and emotionally expressive coping did not significantly relate to affect balance (β = -0.06, p = 0.514), positive affect (β = -0.15, p = 0.111), negative affect (β = -0.06, p = 0.528), thought intrusions (β = -0.16, p = 0.072), emotional well-being (β = -0.08, p = 0.393), physical well-being (β = 0.01, p = 0.918), or serum cortisol level (β = -0.02, p = 0.836) (see Table 6). Therefore, exploratory hypothesis 3 was not supported, and emotionally expressive coping did not significantly moderate the relationship between ethnicity and adaptation after surgery for breast cancer.

CHAPTER 4: DISCUSSION

This study was designed in order to determine whether ethnic differences exist in psychological and physiological adaptation to early stage breast cancer between Hispanic and NH White women. Several hypotheses were tested using 2 samples of women who had recently completed surgery for non-metastatic breast cancer. The two samples of women were drawn from two different studies, one designated as Phase 3, and the other as Phase 4. The samples in the two studies were similar in terms of years living in the United States, education, employment status, marital status, menopausal status, surgery type, and ER status, but differed somewhat in age, ethnicity, income, days since surgery, presence and number of positive lymph nodes, stage, and PR status.

The first hypothesis predicted that Hispanic women would show poorer adaptation to breast cancer, as measured by affect balance, positive and negative affect, thought intrusions, emotional and physical well-being, and cortisol. This hypothesis was not supported by the data. Ethnicity did not significantly explain adaptation to breast cancer in either of the two samples, or when the two samples were combined. Therefore, in this cohort of women, Hispanics did not reveal differences from NH White women in psychological and physiological adaptation.

These results are inconsistent with a prior body of literature demonstrating that Hispanics show poorer psychological adaptation to chronic illness than NH Whites, especially with regard to quality of life. Among patients diagnosed with cardiovascular disease, the mental health component of HRQoL has been shown to be lower in Hispanics than in non-Hispanics in a sample that included NH Whites (Xie et al., 2008). Poorer HRQoL, in particular physical functioning, is predicted by Hispanic ethnicity among low-income men diagnosed with non-metastatic prostate cancer (Krupski et al., 2005). Furthermore, a meta-analysis of HRQoL in patients diagnosed with breast and other types of cancer detected disparities in HRQoL, such that ethnic minorities reported greater distress and depression than their NH White counterparts (Luckett et al., 2011). Follow-up analyses showed that the effects were only present in Hispanic patients (Luckett et al., 2011). In contrast to the bulk of research that provides evidence of ethnic disparities in psychological adaptation to chronic illness, several studies have found that Hispanic patients with cardiovascular disease report HRQoL levels higher than those reported by NH Whites (Riegel et al., 2008; Urizar & Sears, 2006). The results of the current study are also at odds with these findings, since no ethnic differences were detected.

It is possible that ethnic disparities in psychological adaptation to breast cancer were not found in this sample due to the time period at which the data were collected. In this study, women were assessed after surgery for breast cancer, prior to the start of adjuvant treatment. However, the majority of studies that have detected ethnic differences in adaptation to breast cancer included participants who were already receiving adjuvant treatment (Maly, Stein, Umezawa, Leake, & Anglin, 2008; Culver, Arena, Antoni, & Carver, 2002) or who were 1 or more years post-surgery (Sammarco & Konecny, 2010; Graves et al., 2012; Ashing-Giwa, Tejero, Kim, Padilla, & Hellemann, 2007; Giedzinska, Meyerowitz, Ganz, & Rowland, 2004; Carver, Lehman, & Antoni, 2003; Fu et al., 2009; Carver, Smith, Petronis, & Antoni, 2006). Furthermore, in a sample of patients with cardiovascular disease, approximately half of whom had been newly diagnosed with the illness, no differences in emotional, physical, or total HRQoL between Hispanic and NH

White patients were found (Riegel, Carlson, Glaser, & Romero, 2003). It is possible that the impact of ethnicity on adaptation to cancer is revealed longitudinally. It has been found that the demands on women with breast cancer change over time as they begin adjuvant treatment such as chemotherapy, at which time ratings of quality of life have been shown to decrease (Hwang, Chang, & Park, 2013). Furthermore, as patients finish their treatment, fear of recurrence of the disease becomes strong in some patients (Koch et al., 2013). As such, many women of diverse ethnicities report declining emotional well-being between 9 months and 4 years after surgery (Janz et al, 2013). The level of social support that women diagnosed with breast cancer receive also decreases in the year following surgery (Makabe & Nomizu, 2007), which may reflect others' belief that the patient is no longer in a sick role and therefore is no longer in need of assistance. Perhaps ethnic variation occurs in adaptation to difficulties that arise in the year following surgery for breast cancer, which include receiving adjuvant treatment, fear of recurrence, and declining social support.

It is also possible that the inconsistency between the results of this study and previous findings may be explained by the national origin of the Hispanic participants. In contrast to previous samples, which were recruited in areas of the United States where Hispanics are primarily of Central American origin (Maly, Stein, Umezawa, Leake, & Anglin, 2008; Graves et al., 2012; Ashing-Giwa, Tejero, Kim, Padilla, & Helleman, 2007; Bowen et al., 2007), almost half of the participants in this study were of Cuban-American descent. The discrepancy between the results of this study and the findings of other studies on ethnic differences in adaptation to breast cancer may be attributable to the inclusion of primarily Cuban-American participants, who may respond to diagnosis and surgery for breast cancer differently than people in other Hispanic subgroups.

Another explanation for the lack of significant ethnic differences in adaptation is that Hispanic women being treated in Miami-Dade County may experience fewer incidents of discrimination. Although Hispanics only accounted for 16.9% of the United States population in the year 2012 (U.S. Census Bureau, 2013), they comprised 64.3% of the population of Miami-Dade County (U.S. Census Bureau, 2013). Discrimination has been found to predict poor mental health outcomes including depression (Walker, Ruiz, Chinn, Marti, & Ricks, 2012) and suicide attempts (Gomez, Miranda, & Polanco, 2011) in Hispanic adults. The women in the present samples reported that they had lived in the United States for an average of upwards of 30 years. They may therefore not experience much acculturative stress, which is positively associated with anxiety and depression in Hispanics (Crockett et al., 2007; Hovey & King, 1996). It should be noted that both samples of Hispanic women in the present study were highly educated and attended on average at least some college, and were of middle income. Their socio-economic background therefore differs from that of many past samples in studies that detected a Hispanic disadvantage in adaptation, in which there were notable discrepancies in income and education level between ethnic groups (Culver, Arena, Antoni, & Carver, 2002; Maly, Stein, Umezawa, Leake, & Anglin, 2008; Yanez, Thompson, & Stanton, 2011; Sammarco & Konecny, 2010). Those women who spoke Spanish would also have been able to find a large number of medical professionals and caregivers who were fluent in Spanish, and would therefore be less marginalized in the health care system. It is therefore possible that there were no significant differences between ethnic groups due to the predominantly Hispanic community in which the women were receiving treatment.

A series of exploratory analyses were conducted in the Phase 4 sample to determine whether the ethnic identity by ethnic group interaction explained adaptation in the absence of significant main effects of ethnicity. It was hypothesized that in Hispanic women, greater ethnic identity would be associated with better psychological and physiological adaptation, while lower ethnic identity would be associated with poorer adaptation. In contrast, it was predicted that NH White women with greater versus lower ethnic identity would not differ in their adaptation to breast cancer. This theory was not upheld by the findings. It was found that the interaction did not explain the outcome variables. These findings do not support previous studies that found that ethnic identity might be a resilience factor against mental illness in minority populations. Ethnic identity is associated with fewer depressive symptoms in Filipino Americans (Mossakowski, 2003), and predicts lower suicidal ideation in African American college students (Walker, Wingate, Obasi, & Joiner, 2008). Findings are also inconsistent with prior research demonstrating that higher ethnic identity predicts better well-being in Hispanic college students (French & Chavez, 2010) and lower depression among female Hispanic college students (Iturbide, Raffaelli, & Carlo, 2009). Furthermore, the findings are at odds with previous literature that suggests that ethnic identity or strong ethnic ties might be protective against physical symptoms in minority populations including African Americans (Utsey, Chae, Brown, & Kelly, 2002), and against chronic illness in Hispanics (Alarcón et al., 1999). Findings of the present study are also inconsistent with findings that associate ethnic identity with factors that could contribute to negative mental and physical health outcomes in Hispanics (Campesino, Saenz, Choi, & Krouse, 2012; Rahim-Williams et al., 2007).

Another set of exploratory analyses was conducted in the Phase 4 sample to test whether emotionally expressive coping interacts with ethnicity to explain adaptation to breast cancer regardless of the lack of absence of significant main effects of ethnicity. It was hypothesized that ethnic group would interact with emotionally expressive coping to explain adaptation. These predictions were not upheld by the findings. These findings do not support previous research showing that the same coping mechanism may be associated with different outcomes in Hispanic versus NH White women. Although the construct of emotionally expressive coping has been investigated extensively in NH White women with breast cancer (Stanton et al., 2000), this aim was exploratory due to the lack of published studies examining the role of emotionally expressive coping in Hispanic women.

Strengths

The study had several strengths, especially with regard to the sampling procedures. The study included the use of two data samples, which made it possible to see consistent results across two samples. In both samples the Hispanic women were well matched to the NH White women on several demographic and medical variables including age, income, education, employment status, marital status, and days since surgery, which would have allowed any differences between the ethnic groups to be attributed to cultural factors. On average, both groups were well educated and of middle income. The absence of disparity in economic class would have made it possible for any differences accounted for only by ethnicity to come to light. Furthermore, multiple ancestries were represented in the Hispanic group, creating a reasonably diverse sample. Therefore, the results of the study may be generalizable to Hispanic women of various descents. Another strength was the homogeneity of the sample in terms of the treatment stage they were in, such that all of the women were in a specified time period after surgery and had not yet received adjuvant therapy. Finally, the use of multiple imputation to generate estimates for missing data values decreased biases that result from listwise deletion of missing data, and increased statistical power to detect results.

Limitations

There were some limitations to the study that should be taken into account when considering the results. All of the psychosocial variables were collected from self-report measures at a single time point, and are therefore subject to bias including demand effects and social desirability. Furthermore, several of the self-report measures were retrospective, requiring participants to remember information from up to 30 days prior. Biases in memory may have decreased the accuracy of these measurements.

The small size of the sample limited the analyses that could be conducted. Although heterogeneity among Hispanics of different ancestries is recognized, this study was constrained by the use of a convenience sample that did not include sufficient numbers of Hispanics from different national origins to compare adaptation to cancer between Hispanic subgroups. A larger sample size would also have allowed for more robust types of statistical analysis, such as Structural Equation Modeling, to be conducted.

A further limitation of the study is the lack of inclusion of some control variables. A variable encompassing comorbid physical health conditions has been included as a covariate in studies of psychological adjustment to breast cancer (Christie, Meyerowitz, & Maly, 2010). However, comprehensive records of physical health comorbidities were unavailable for the women in our sample. Similarly, although body mass index (BMI) is related to cortisol level (Kumari, Chandola, Brunner, & Kivimaki, 2010; Ruttle et al., 2013), data were unavailable to examine the participants' BMI.

The study may also be limited in the generalizability of the results. Due to the high educational and income level of the participants, the results may only apply to well-educated and middle class Hispanic and NH White women with breast cancer. Generalizability of the study is also limited to women with non-metastatic breast cancer, since women with stage IV breast cancer were excluded from participation. For the same reason, the results may not be applicable to patients with types of cancer other than breast cancer.

Some of the measures used in the present study may have limited the ability to detect significant results. Serum cortisol was measured at one time point on a single day. However, diurnal cortisol slope averaged over at least 2 days is a better indicator of psychosocial differences between people and has been associated with negative psychosocial outcomes in patients with breast cancer (Weinrib et al., 2010). The measure of ethnic identity used may also have limited the ability to detect relationships. The version of the MEIM administered to the participants did not include an item asking participants to report the ethnic group they considered when answering the questions. Therefore, it is possible that some of the participants of multi-ethnic background were responding to the questionnaire by referencing ethnic groups other than the groups in which we had categorized them for the study. Furthermore, the MEIM may be somewhat limited in its ability to detect ethnic identity. Although its use of general questions about ethnic identity that lack specificity with regard to individual ethnic groups makes the questionnaire applicable to all ethnic groups, the abstract nature of the questions may make it difficult for participants to answer accurately (Campesino, Saenz, Choi, & Krouse, 2012). The MEIM has also been criticized for including racial designations, such as Black and Asian, as response choices to the final item measuring ethnicity, which leads to questions regarding whether the questionnaire is measuring ethnic or racial identity and makes interpretation of the questionnaire difficult (Ponterotto, Gretchen, Utsey, Stracuzzi, & Saya, 2003). Furthermore, the 2 factor structure of the MEIM does not hold as well among European Americans as among Hispanics, begging the question of whether NH Whites do not ethnically identify as strongly as minorities, or whether the items on the MEIM do not adequately capture ethnic identity in NH Whites (Roberts et al., 1999). The PSQI, used to measure sleep, had been shortened and was not the same as the version that has been standardized, which resulted in low reliability. Flaws in some of the measures administered in the study therefore may have created measurement error that contributed to the lack of significant findings.

Future Directions

Future research should be conducted to address the limitations of this study. As our sample size was too small to divide the Hispanic women into subgroups of differing national origins, other studies should be designed to recruit larger numbers of Hispanic women of different descents. When examining adaptation to illness in Hispanic populations residing in areas of the United States where Hispanic culture is dominant, measures of acculturative stress and perceived discrimination should be included to test whether these variables could help to explain why Hispanics included in this sample did not appear to be at a disadvantage in adapting to breast cancer. Studies should consider including measures of ethnic identity that contain items asking about specific aspects of the ethnic group under investigation, and that are designed to target Hispanics and NH Whites.

Future research should also examine the relationship between the variables studied here in other ethnic minorities. Additionally, given discrepant findings regarding the role of ethnic identity on quality of life in minority groups, more studies on ethnic identity are needed to elucidate its relationship to adaptation to medical illness. Further studies should also examine the role of emotionally expressive coping in adaptation to breast cancer, particularly in Hispanic women. For example, it is possible that studies of less acculturated Hispanic women or Hispanic women who had been in treatment for breast cancer for longer than one month would reveal moderating effects of ethnic identity and of emotionally expressive coping on adaptation. Future studies of ethnic differences in physiological adaptation to breast cancer should also include cortisol measurement at multiple times each day across multiple days. In order to determine whether the lack of findings could be attributable to the time point of data collection, just after surgery, the hypotheses should be tested in a similar sample during and after adjuvant treatment. Finally, recruiting larger samples would allow for the use of more robust analyses, such as Structural Equation Modeling.

Conclusions

In conclusion, this study found that Hispanic and NH White women receiving treatment in Miami-Dade County did not differ in psychological or physiological adaptation to breast cancer in the time directly after surgery, prior to adjuvant treatment. The interactions of ethnicity and ethnic identity, and of ethnicity and emotionally expressive coping did not explain adaptation to breast cancer. It is possible that the time during which the data were collected, the high socio-economic status of the women, or their primarily Cuban-American lineage explain why the results of this study differ from prior research demonstrating ethnic disparities in psychological adaptation to chronic illness. The participants had lived in the United States for an extended period of time, and were therefore not likely experiencing much acculturative stress. It is also possible that living in a primarily Hispanic community may reduce the incidence of perceived discrimination and therefore contribute to adaptation equal to that of NH White women. Data should be collected in larger and more diverse samples using measures less subject to bias, and should be analyzed using more robust statistical analyses in order to determine under what circumstances disparities in psychological and physiological adaptation to breast cancer may exist between Hispanic and NH White women.

Tables

Table 1. Demographic and medical characteristics of the samples before imputation

	Phase 3			Phase 4			Combined		
Variable	Hispanic	NHW	Total	Hispanic	NHW	Total	Hispanic	NHW	Total
Age after surgery	47.03 (8.87)	52.31 (8.77)	50.79 (9.10)	52.24 (8.69)	58.09 (9.93)	55.19 (9.75)	49.54 (10.15)	54.23 (9.53)	52.47 (10.01)
Ethnic Identification									
non-Hispanic White	0 (0.0%)	150 (100.0%)	150 (71.1%)	--	76 (100.0%)	76 (50.3%)	0 (0.0%)	226 (100.0%)	226 (62.4%)
Hispanic/Latino	61 (100.0%)	--	61 (28.9%)	75 (100.0%)	--	75 (49.7%)	136 (100.0%)	0 (0.0%)	136 (37.6%)
Cuban-American	25 (41.0%)	--	25 (11.8%)	36 (48.0%)	--	36 (23.8%)	61 (44.9%)	--	61 (16.9%)
Puerto Rican	4 (6.6%)	--	4 (1.9%)	11 (14.7%)	--	11 (7.3%)	15 (11.0%)	--	15 (4.1%)
Venezuelan	--	--	--	2 (2.7%)	--	2 (2.3%)	2 (1.5%)	--	2 (0.6%)
Colombian	--	--	--	5 (6.7%)	--	5 (3.3%)	5 (3.7%)	--	5 (1.4%)
Hispanic/Other	32 (52.5%)	--	32 (15.2%)	21 (28.0%)	--	21 (13.9%)	53 (39.0%)	--	53 (14.6%)
Years in the United States	31.39 (15.09)	50.21 (11.98)	44.77 (15.49)	39.77 (13.51)	54.00 (15.90)	46.93 (16.35)	36.02 (14.57)	51.57 (13.23)	45.73 (15.66)

Years of Education	15.97 (2.70)	15.48 (2.22)	15.62 (2.37)	15.03 (3.07)	16.11 (2.97)	15.58 (3.06)	15.46 (2.93)	15.69 (2.51)	15.60 (2.67)
Income	78.22 (52.38)	76.65 (51.02)	77.11 (51.29)	95.70 (70.05)	122.10 (84.00)	108.59 (78.01)	87.13 (61.75)	90.64 (66.16)	89.30 (64.43)
Employment									
Employed	46 (75.4%)	105 (70.0%)	151 (71.6%)	55 (73.3%)	51 (67.1%)	106 (70.2%)	101 (74.3%)	156 (69.0%)	257 (71.0%)
Not employed	15 (24.6%)	45 (30.0%)	60 (28.4%)	18 (24.0%)	22 (28.9%)	40 (26.5%)	33 (24.3%)	67 (29.6%)	100 (27.6%)
Unknown	--	--	--	2 (2.7%)	3 (3.9%)	5 (3.3%)	2 (1.5%)	3 (1.3%)	5 (1.4%)
Marital Status									
Married/Partnered	44 (72.1%)	90 (60.0%)	134 (63.5%)	50 (66.7%)	51 (67.1%)	101 (66.9%)	94 (69.1%)	141 (62.4%)	235 (64.9%)
Separated	2 (3.3%)	3 (2.0%)	5 (2.4%)	1 (1.3%)	1 (1.3%)	2 (1.3%)	3 (2.2%)	4 (1.8%)	7 (1.9%)
Divorced	10 (16.4%)	31 (20.7%)	41 (19.4%)	13 (17.3%)	14 (18.4%)	27 (17.9%)	23 (16.9%)	45 (19.9%)	68 (18.8%)
Widowed	2 (3.3%)	9 (6.0%)	11 (5.2%)	5 (6.7%)	4 (5.3%)	9 (6.0%)	7 (5.1%)	13 (5.8%)	20 (5.5%)
Single	3 (4.9%)	17 (11.3%)	20 (9.5%)	4 (5.3%)	6 (7.9%)	10 (6.6%)	7 (5.1%)	23 (10.2%)	30 (8.3%)
Unknown	--	--	--	2 (2.7%)	--	2 (1.3%)	2 (1.5%)	0 (0.0%)	2 (0.6%)

Menopausal Status									
Pre	31 (50.8%)	56 (37.3%)	87 (41.2%)	31 (41.3%)	15 (19.7%)	46 (30.5%)	62 (45.6%)	71 (31.4%)	133 (36.7%)
Peri/Post	30 (49.2%)	94 (62.7%)	124 (58.8%)	41 (54.7%)	58 (76.3%)	99 (65.6%)	71 (52.2%)	152 (67.3%)	223 (61.6%)
Unknown	--	--	--	3 (4.0%)	3 (3.9%)	6 (4.0%)	3 (2.2%)	3 (1.3%)	6 (1.7%)
Surgery									
Lumpectomy	30 (49.2%)	82 (54.7%)	112 (53.1%)	31 (41.3%)	45 (59.2%)	76 (50.3%)	61 (44.9%)	127 (56.2%)	188 (51.9%)
Mastectomy	31 (50.8%)	68 (45.3%)	99 (46.9%)	44 (58.7%)	31 (40.8%)	75 (49.7%)	75 (55.1%)	99 (43.8%)	174 (48.1%)
Days since Surgery	44.85 (21.52)	38.59 (21.02)	40.38 (21.30)	33.93 (14.88)	36.24 (18.46)	35.08 (16.74)	38.08 (18.25)	37.84 (20.19)	37.93 (19.46)
Cancer Stage									
Stage 0	13 (21.3%)	18 (12.0%)	31 (14.7%)	9 (12.0%)	17 (22.4%)	26 (17.2%)	22 (16.2%)	35 (15.5%)	57 (15.7%)
Stage 1	20 (32.8%)	64 (42.7%)	84 (39.8%)	50 (66.7%)	36 (47.4%)	86 (57.0%)	70 (51.5%)	100 (44.2%)	170 (47.0%)
Stage 2	20 (32.8%)	59 (39.3%)	79 (37.4%)	10 (13.3%)	18 (23.7%)	28 (18.5%)	30 (22.1%)	77 (34.1%)	107 (29.6%)
Stage 3	8 (13.1%)	7 (4.7%)	15 (7.1%)	4 (5.3%)	3 (3.9%)	7 (4.6%)	12 (8.8%)	10 (4.4%)	22 (6.1%)
Unknown	--	2 (1.3%)	2 (0.9%)	2 (2.7%)	2 (2.6%)	4 (2.6%)	2 (1.5%)	4 (1.8%)	6 (1.7%)

Positive lymph nodes									
Yes	24 (39.3%)	55 (36.7%)	79 (37.4%)	15 (20.0%)	8 (10.5%)	23 (15.2%)	39 (28.7%)	63 (27.9%)	102 (28.2%)
No	37 (60.7%)	94 (62.7%)	131 (62.1%)	36 (48.0%)	45 (59.2%)	81 (53.6%)	73 (53.7%)	140 (61.9%)	213 (58.8%)
Unknown	--	1 (0.7%)	1 (0.5%)	24 (32.0%)	23 (30.3%)	47 (31.1%)	24 (17.6%)	23 (10.2%)	47 (13.0%)
Number of Lymph Nodes	1.39 (2.70)	1.54 (3.41)	1.50 (3.21)	0.64 (1.74)	0.21 (0.53)	0.42 (1.28)	1.05 (2.33)	1.19 (2.30)	1.14 (2.78)
Estrogen Receptor									
Positive	31 (50.8%)	84 (56.0%)	115 (54.5%)	38 (50.7%)	44 (57.9%)	82 (54.3%)	69 (50.7%)	128 (56.6%)	197 (54.4%)
Negative	9 (14.8%)	20 (13.3%)	29 (13.7%)	5 (6.7%)	9 (11.8%)	14 (9.3%)	14 (10.3%)	29 (12.8%)	43 (11.9%)
Unknown	21 (34.4%)	46 (30.7%)	67 (31.7%)	32 (42.7%)	23 (30.3%)	55 (36.4%)	53 (39.0%)	69 (30.5%)	122 (33.7%)
Progesterone Receptor									
Positive	19 (31.1%)	50 (33.3%)	69 (32.7%)	35 (46.7%)	37 (48.7%)	72 (47.7%)	55 (40.4%)	87 (38.5%)	142 (39.2%)
Negative	16 (26.2%)	31 (20.7%)	47 (22.3%)	7 (9.3%)	16 (21.1%)	23 (15.2%)	23 (16.9%)	47 (20.8%)	70 (19.3%)
Unknown	26 (42.6%)	69 (46.0%)	95 (45.0%)	33 (44.0%)	23 (30.3%)	56 (37.1%)	58 (42.6%)	92 (40.7%)	150 (41.4%)

Note: Standard deviations and percentiles are listed in parentheses.

Table 2. Demographic and medical characteristics of the samples after imputation

	Phase 3			Phase 4			Combined		
Variable	Hispanic	NHW	Total	Hispanic	NHW	Total	Hispanic	NHW	Total
Years of Age After Surgery	47.03 (8.87)	52.31 (8.77)	50.79 (9.10)	52.24 (8.69)	58.09 (9.93)	55.19 (9.75)	49.54 (10.15)	54.23 (9.53)	52.47 (10.01)
Years in the United States	31.39 (15.09)	50.21 (11.98)	44.77 (15.49)	39.77 (13.51)	54.00 (15.90)	46.93 (16.35)	36.02 (14.57)	51.57 (13.23)	45.73 (15.66)
Income (US Dollars in Thousands)	77.97 (51.37)	77.59 (50.61)	77.70 (50.72)	99.28 (71.04)	122.52 (82.34)	110.98 (77.60)	87.99 (61.00)	92.37 (65.00)	90.72 (63.49)
Days Since Surgery	44.67 (21.39)	38.58 (21.02)	40.34 (21.26)	34.19 (15.08)	36.00 (18.42)	35.10 (16.82)	38.18 (18.28)	37.86 (20.14)	37.98 (19.44)

Note: Standard deviations are listed in parentheses.

Table 3. Descriptive statistics of self-report and physiological variables before imputation

	Phase 3			Phase 4			Combined		
Variable	Hispanic	NHW	Total	Hispanic	NHW	Total	Hispanic	NHW	Total
Affect Balance	1.17 (0.98)	1.37 (0.90)	1.31 (0.92)	1.38 (1.23)	1.47 (0.95)	1.42 (1.10)	1.29 (1.16)	1.40 (0.93)	1.36 (1.02)
Positive Affect	3.34 (0.58)	3.38 (0.57)	3.37 (0.57)	3.41 (0.74)	3.41 (0.58)	3.41 (0.66)	3.37 (0.67)	3.39 (0.59)	3.38 (0.62)
Negative Affect	2.17 (0.57)	2.02 (0.47)	2.06 (0.51)	2.04 (0.61)	1.94 (0.53)	2.00 (0.57)	2.08 (0.62)	1.99 (0.49)	2.03 (0.55)
Thought Intrusions	2.34 (0.67)	2.30 (0.75)	2.31 (0.72)	1.26 (0.85)	1.1.2 (0.76)	1.19 (0.80)	--	--	--
Emotional Well-Being	17.41 (3.97)	17.91 (3.69)	17.77 (3.77)	17.99 (4.91)	18.81 (4.61)	18.41 (4.76)	17.63 (4.61)	18.29 (3.87)	18.05 (4.17)
Physical Well-Being	20.41 (6.21)	21.31 (5.16)	21.05 (5.48)	22.65 (4.98)	22.60 (4.30)	22.63 (4.63)	21.49 (5.89)	21.76 (4.85)	21.66 (5.26)
Serum Cortisol (Nanomoles/Liter)	7.38 (1.76)	7.51 (1.65)	7.47 (1.68)	11.02 (1.76)	13.13 (1.78)	12.01 (1.79)	9.85 (1.80)	9.71 (1.83)	9.77 (1.82)
MEIM Affirmation	--	--	--	3.29 (0.57)	2.96 (0.50)	3.12 (0.56)	--	--	--
Emotionally Expressive Coping	--	--	--	17.01 (5.25)	16.48 (4.51)	16.74 (4.88)	--	--	--
Sleep Quality	10.92 (2.85)	10.36 (3.05)	10.52 (3.00)	9.66 (3.73)	9.64 (3.45)	9.65 (3.57)	10.24 (3.40)	10.12 (3.20)	10.16 (3.27)

Note: Standard deviations are listed in parentheses.

Table 4. Descriptive statistics of self-report and physiological variables after imputation

	Phase3			Phase 4			Combined		
Variable	Hispanic	NHW	Total	Hispanic	NHW	Total	Hispanic	NHW	Total
Affect Balance	1.17 (0.98)	1.37 (0.90)	1.31 (0.92)	1.38 (1.24)	1.47 (0.95)	1.42 (1.10)	1.30 (1.16)	1.40 (0.93)	1.36 (1.02)
Positive Affect	3.34 (0.58)	3.38 (0.57)	3.37 (0.57)	3.41 (0.74)	3.41 (0.58)	3.41 (0.66)	3.38 (0.67)	3.39 (0.59)	3.38 (0.62)
Negative Affect	2.17 (0.57)	2.02 (0.47)	2.06 (0.51)	2.04 (0.61)	1.94 (0.52)	1.99 (0.57)	2.08 (0.62)	1.99 (0.49)	2.02 (0.55)
Thought Intrusions	2.34 (0.67)	2.30 (0.75)	2.31 (0.72)	1.27 (0.84)	1.13 (0.76)	1.2 (0.80)	--	--	--
Emotional Well-Being	17.41 (3.97)	17.91 (3.69)	17.77 (3.77)	17.96 (4.89)	18.76 (4.62)	18.36 (4.76)	17.62 (4.59)	18.29 (3.87)	18.04 (4.16)
Physical Well-Being	20.41 (6.21)	21.31 (5.16)	21.05 (5.48)	22.59 (4.97)	22.56 (4.31)	22.58 (4.63)	21.46 (5.87)	21.75 (4.85)	21.64 (5.25)
Serum Cortisol (Nanomoles/Liter)	7.38 (0.25)	7.23 (0.23)	7.27 (0.24)	11.02 (0.24)	13.07 (0.25)	12.01 (0.25)	9.77 (0.26)	9.73 (0.26)	9.74 (0.26)
MEIM Affirmation	--	--	--	3.29 (0.57)	2.96 (0.50)	3.12 (0.56)	--	--	--
Emotionally Expressive Coping	--	--	--	17.27 (5.25)	16.74 (4.51)	17 (4.88)	--	--	--
Sleep Quality	10.92 (2.85)	10.36 (3.05)	10.52 (3.00)	9.75 (3.70)	9.64 (3.45)	9.7 (3.56)	10.28 (3.39)	10.12 (3.20)	10.18 (3.27)

Note: Standard deviations are listed in parentheses.

Table 5. Regression predicting adaptation from ethnicity

Variable	Phase 3 Ethnicity β (SE)	ΔR^2	Phase 4 Ethnicity β (SE)	ΔR^2	Combined Ethnicity β (SE)	ΔR^2
Affect Balance	-0.01 (0.151)	0.000	-0.01 (0.159)	0.000	0.02 (0.100)	0.000
Positive Affect	-0.10 (0.095)	0.007	-0.06 (0.103)	0.004	-0.02 (0.063)	0.001
Negative Affect	-0.08 (0.087)	0.005	-0.04 (0.084)	0.002	-0.06 (0.055)	0.004
Thought Intrusions	0.07 (0.127)	0.003	-0.05 (0.109)	0.002	--	--
Emotional Well-Being	-0.02 (0.640)	0.000	0.07 (0.688)	0.005	0.05 (0.414)	0.002
Physical Well-Being	0.02 (0.842)	0.000	-0.06 (0.617)	0.003	-0.03 (0.475)	0.001
Serum Cortisol	0.05 (0.054)	0.004	0.15 (0.042)	0.021	-0.03 (0.032)	0.001

* Significant at the $p < 0.05$ level.
** Significant at the $p < 0.01$ level.

Table 6. Moderated regressions predicting adaptation from interaction of ethnicity with ethnic identity, and with emotionally expressive coping

	Phase 4 Ethnicity*Ethnic Identity		Phase 4 Ethnicity*Emotionally Expressive Coping	
Variable	β (SE)	ΔR^2	β (SE)	ΔR^2
Affect Balance	-0.03 (0.291)	0.000	-0.06 (0.030)	0.002
Positive Affect	-0.05 (0.186)	0.001	-0.15 (0.019)	0.012
Negative Affect	-0.01 (0.154)	0.000	-0.06 (0.017)	0.002
Thought Intrusions	-0.13 (0.201)	0.009	-0.16 (0.022)	0.014
Emotional Well-Being	0.06 (1.253)	0.002	-0.08 (0.133)	0.003
Physical Well-Being	-0.10 (1.140)	0.005	0.01 (0.123)	0.000
Serum Cortisol	-0.09 (0.077)	0.004	-0.02 (0.008)	0.000

* Significant at the $p < 0.05$ level.
** Significant at the $p < 0.01$ level.

Note: Hispanics were coded as 0 and non-Hispanic Whites were coded as 1.

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APPENDIX OF MEASURES

Affects Balance Scale (ABS)

Instructions: Next is a list of words that describe the way people sometimes feel. Please indicate whether you have been having any of these feelings during the past week, including today. Indicate the degree to which you have felt each emotion by choosing from one of the following responses:

Please write your answer on the line.

1 = Never
2 = Rarely
3 = Sometimes
4 = Frequently
5 = Always

1. Nervous
2. Sad
3. Regretful
4. Irritable
5. Happy
6. Pleased
7. Excited
8. Passionate
9. Timid
10. Hopeless
11. Blameworthy
12. Resentful
13. Glad
14. Calm
15. Energetic
16. Loving
17. Tense
18. Worthless
19. Ashamed
20. Angry
21. Cheerful
22. Satisfied
23. Active
24. Friendly
25. Anxious
26. Miserable
27. Guilty
28. Enraged
29. Delighted
30. Relaxed
31. Vigorous
32. Affectionate
33. Afraid
34. Unhappy
35. Remorseful
36. Bitter
37. Joyous
38. Contented
39. Lively
40. Warm

Impact of Event Scale (IES)

The next items are comments often made by people after stressful life events. When responding to these items, think of your diagnosis and surgery together as the “event” being referred to. For each item, indicate how frequently these comments have been true for you during the **past two weeks**. If they did *not* occur during that time period, report “not at all.” The response choices are:

1 = Not at all
2 = Rarely
3 = Sometimes
4 = Often

1. I thought about it when I didn’t mean to.
2. I avoided letting myself get upset when I thought about it or was reminded of it.
3. I tried to remove it from my memory.
4. I had trouble falling asleep or staying asleep because of pictures or thoughts about it that came into my head.
5. I had waves of strong feelings about it.
6. I had dreams about it.
7. I felt as if it hadn’t happened or wasn’t real.
8. I tried not to talk about it.
9. Pictures about it popped into my mind.
10. I stayed away from reminders of it.
11. Other things kept making me think about it.
12. I was aware that I still had a lot of feelings about it, but I didn’t deal with them.
13. I tried not to think about it.
14. Any reminder brought back feelings about it.
15. My feelings about it were kind of numb.

Impact of Event Scale – Revised (IES-R)

Instructions: Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to breast cancer, how much were you distressed or bothered by these difficulties.

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

1. Any reminder brought back feelings about it.
2. I had trouble staying asleep.
3. Other things kept making me think about it.
4. I felt irritable and angry.
5. I avoided letting myself get upset when I thought about it or was reminded of it.
6. I thought about it when I didn't mean to.
7. I felt as if it hadn't happened or wasn't real.
8. I stayed away from reminders of it.
9. Pictures about it popped into my mind.
10. I was jumpy and easily startled.
11. I tried not to think about it.
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them
13. My feelings about it were kind of numb.
14. I found myself acting or feeling as though I was back at that time (e.g., your diagnosis).
15. I had trouble falling asleep.
16. I had waves of strong feelings about it.
17. I tried to remove it from my memory.
18. I had trouble concentrating.
19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.
20. I had dreams about it.
21. I felt watchful and on-guard.
22. I tried not to talk about it.

Functional Assessment of Cancer Therapy – Breast (FACT-B)

Instructions: Below is a list of statements that other women with breast cancer have said are important. By writing one (1) number per line, please indicate how true each statement has been for you **during the past 7 days.**

1 = Not at all
2 = A little bit
3 = Somewhat
4 = Quite a bit
5 = Very much

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

1. I feel close to my friends.
2. I get emotional support from my family.
3. I get support from my friends.
4. My family has accepted my illness.
5. I am satisfied with family communication about my illness.
6. I feel close to my partner (or the person who is my main support). Regardless of your current level of sexual activity, please, answer the following question. If you prefer not to answer it, please check this box [ ] and go to the next section.
7. I am satisfied with my sex life.

Emotional Well-Being

1. I feel sad.
2. I am satisfied with how I am coping with my illness.
3. I am losing hope in the fight against my illness.
4. I feel nervous.
5. I worry about dying.
6. I worry that my condition will get worse.

Functional Well-Being

1. I am able to work (include work at home).
2. My work (include work at home) is fulfilling.
3. I am able to enjoy life.
4. I have accepted my illness.
5. I am sleeping well.

6. I am enjoying the things I usually do for fun.
7. I am content with the quality of my life right now.

Additional Concerns

1. I have been short of breath.
2. I am self-conscious about the way I dress.
3. One or both of my arms are swollen or tender.
4. I feel sexually attractive.
5. I am bothered by hair loss.
6. I worry that other members of my family might some day get the same illness I have.
7. I worry about the effect of stress on my illness.
8. I am bothered by a change in weight.
9. I am able to feel like a woman.

Multigroup Ethnic Identity Measure (MEIM)

Instructions: In the U.S. people come from many different countries and cultures, and there are many different words to describe the different backgrounds or ethnic groups that people come from. Some examples of the names of ethnic groups are Hispanic or Latino, Black or African American, Asian American, Mexican American, Caucasian or White. These questions are about your ethnicity and your ethnic group and how you feel about it or react to it. Choose the answer to indicate how much you agree or disagree with each statement.

4 = Strongly agree
3 = Agree
2 = Disagree
1 = Strongly disagree

1. I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs.
2. I am active in organizations or social groups that include mostly members of my own ethnic group.
3. I have a clear sense of my ethnic background and what it means for me.
4. I think a lot about how my life will be affected by my ethnic group membership.
5. I am happy that I am a member of the group I belong to.
6. I have a strong sense of belonging to my own ethnic group.
7. I understand pretty well what my ethnic group membership means to me.
8. In order to learn more about my ethnic background, I have often talked to other people about my ethnic group.
9. I have a lot of pride in my ethnic group.
10. I participate in cultural practices of my own group, such as special food, music, or customs.
11. I feel a strong attachment towards my own ethnic group.
12. I feel good about my cultural or ethnic background.
13. My ethnicity is

    (1) Asian or Asian American
    (2) Black/African American
    (3) Hispanic or Latino
    (4) Non-Hispanic White
    (5) American Indian/Native American
    (6) Mixed; Parents are from two different groups
    (7) Other (and specify): ____

Emotional Approach Coping Scale (EAC)

Instructions: For each of these statements, please indicate the extent to which you agree or disagree by writing the appropriate number. Please be as honest and accurate as you can throughout. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

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

1. I've been letting my feelings come out freely.
2. I've been taking time to figure out what I'm really feeling.
3. I've been expressing the feelings I am having.
4. I've been trying to understand my feelings.
5. I've been letting my mind be a blank.
6. I've been finding a way to express my emotions.
7. I've been trying to figure out what my feelings mean.
8. I've been trying to remove myself from my thoughts and feelings about breast cancer.
9. I've been getting my feelings out in the open.
10. I've been exploring my emotions.
11. I've been taking time to express my emotions.
12. I've been realizing that my feelings are valid and important.
13. I've been trying not to have feelings about breast cancer.
14. I've been allowing myself to express my emotions.
15. I've been working on understanding my feelings.

Pittsburgh Sleep Quality Index (PSQI)

Instructions: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate response for the majority of days and nights in the past month. Please answer all questions. Please mark your answer with a check mark.

1. During the past month, how would you rate your sleep quality overall?
    1) Very good
    2) Fairly good
    3) Fairly bad
    4) Very bad

2. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?
    1) Not during the past month
    2) Less than once a week
    3) Once or twice a week
    4) Three or more times a week

3. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?
    1) Not during the past month
    2) Less than once a week
    3) Once or twice a week
    4) Three or more times a week

4. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?
    1) No problem at all
    2) Only a very slight problem
    3) Somewhat of a problem
    4) A very big problem

5. During the past month, to what extent have your sleeping difficulties interfered with your daily functioning (e.g., daytime fatigue, ability to function at work/chores, concentration, mood, memory, etc.)?
    1) Not at all
    2) Slightly
    3) Moderately
    4) Quite a bit
    5) Extremely