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Predictors of quality of life among ethnically diverse breast cancer survivors

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Abstract

Purpose—Few studies have examined predictors of quality of life (QOL) of breast cancer survivors over time.

Methods—Breast cancer survivors (n=116) were asked to complete measures of QOL, mood, spirituality, and social support every 6 months from 2–4 years post treatment.

Results—Overall QOL at 4 years was predicted by previous physical and functional well-being, the breast cancer-specific items, and vigor and current levels of social support (Adj R^2=.72, F=30.53, p<.001). Physical QOL was predicted by previous levels of physical and functional well-being and current levels of functional and social/family well-being (Adj R^2=.84, F=44.30, p<.001). Functional well- being was predicted by prior levels of physical, functional, and social/family well-being and current levels of physical well-being and vigor (Adj R^2=.72, F=3–.53, p<.001). Emotional well-being was predicted by previous levels of emotional well-being and current physical well-being, the breast cancer-specific items, and anxiety (Adj R^2=.60, F=26.30, p<.001). Social/family well-being was predicted by previous levels of social/family well-being, social support, and confusion (Adj R^2=.71, F=34.18, p<<000). The breast cancer-specific items were predicted by age, previous levels of the breast cancer-specific items, confusion and current levels of emotional and functional well-being and spirituality (Adj R^2=.58, F=17.57, p<.001).

Conclusions—Over all and specific dimensions of QOL at 4 years were predicted by different combinations of QOL, mood, and spirituality. Interventions should be tailored to which dimensions of QOL are affected and other types of QOL as well as social support, mood, and spirituality as coping mechanisms that influence the specific dimension of QOL affected.

Keywords

breast cancer; quality of life; racial/ethnic/cultural differences; social support; spirituality

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Objectives

Quality of life (QOL) has been defined as multidimensional construct that is dynamic over time and includes a range of domains: physical, functional, emotional, spiritual, economic and social (Ashing-Giwa, 2005). It has been well studied among cancer patients (e.g., Badger, Braden, Mishel, & Longman, 2004; Cheng et al., 2011; DiSipio, Hayes, Newman, & Janda, 2008; Ganz, Kwan, Stanton, Bower, & Belin, 2011; Hartl, Engel, Herschbach, Reinecker, Sommer, & Friese, 2009; Hulbert-Williams, Neal, Morrison, Hood, & Wilkinson, 2011; Paskett et al., 2008). However, there are few long-term studies of QOL in breast cancer patients. A number of researchers have found that some types of QOL improve over time (Cheng et al., DiSipio, Hayes, Battistutta, Newman, & Janda, 2011; Rottman, Dalton, Christensen, Frederiksen, & Johansen, 2010; Shi, Uen, Yes, Culbertson, Juan, & Hou, 2011; Taira et al., 2011). However, most of the studies followed patients from six months to one year after surgery or treatment. Quality of life is influenced by body image, depression, type of adjuvant therapy, type of surgery (DiSipio et al., 2011; Shi et al., Taira et al.), fatigue, age (DiSipio et al., 2008; Noal et al., Shi et al.), coping style (DiSipio et al., 2011; Rottman et al.), preoperative QOL (Shi et al.), and social support (Leung, Pachana, & McLaughlin, 2014).

Two areas that have not been adequately explored are the contributions of spirituality and racial/cultural differences in QOL. Spirituality is important to cancer patients, especially those from ethnic minorities (Kristeller, Sheets, Johnson, & Frank, 2011; Levine, Yoo, Aviv, Ewing, & Au, 2007; Whitford, Olver, & Peterson, 2008) and has been shown to interact with social support to affect QOL (Fisch et al., Howsepian, & Merluzzi, 2009; Thuné-Boyle Stygall, Keshtgar, & Newman, 2006). Spirituality is also directly related to better QOL (Kristeller et al.; Whitford et al., Thuné-Boyle et al.; Dapueto, Servente, Fancolino, & Hahn, 2005; Edmondson, Park, Blank, Fenster, & Mills, 2008; Levine & Targ, 2002; Tarakeshwar, Vanderwerker, Paulk, Pearce, Kasl, & Prigerson, 2006).

Quality of life may be lower in some minority groups as compared to Whites (Ashing-Giwa, 2005; Ashing-Giwa & Lim, 2009; Ashing-Giwa, Tejero, Kim, Padilla, & Hellemann, 2007; Bowen et al., 2007; Giedzinska, Meyerowitz, Ganz, & Rowland, 2004; Kwan et al., 2010; Luckett et al., 2011). For example, Bowen et al. and Giedzinska et al. found that African American women had higher emotional well-being than other groups. However, after controlling for medical and demographic factors Gieddzinska et al. found no difference in terms of emotional QOL. Ashing-Giwa and Lim found that income and education moderated the relationship between ethnicity and QOL in that low-income Whites had greater QOL than other low-income groups. There were no significant differences among higher income groups.

Given the lack of long-term research into changes in QOL over time among breast cancer survivors as well as the influence of ethnicity and spirituality on QOL, this study was carried out to examine predictors of QOL over time in a multi-ethnic sample. The research questions were:

1. Does QOL change over time among breast cancer patients?

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2. Is ethnicity/race predictive of QOL over time?
3. Is mood predictive of QOL over time?
4. Is social support predictive of QOL over time?
5. Is spirituality predictive of QOL over time?

Design

Participants

Women who were on average two years post-treatment for breast cancer were recruited from various sites in the San Francisco Bay Area. Eligibility criteria for study participants were: 1) diagnosed not more than four years previously; 2) over the age of 18 at diagnosis; 3) Stage 0, I, or II disease; 4) able to read and speak English, Chinese, or Spanish; and 5) no prior history of breast cancer. All recruitment procedures followed HIPPA regulations. IRB approval was obtained from all participating investigators' research institutions and the Cancer Prevention Institute of California (CPIC). The women were recruited from a number of different sites (e.g., hospitals, ethnic organizations, cancer resource centers, health fairs). Initially, 348 letters were sent to women who had been seen at a local cancer center. An additional 1,097 letters were sent to women who were in the CPIC registry. The final sample was 180, representing 50% of the 356 women (12% of the total of women to whom letters were sent) who contacted the study. Of the 356 women who contacted us 176 were not eligible for the study. Reasons for ineligibility included: unable to contact (13), diagnosed longer than four years previously (9), did not have Stage 0, I, or II cancer (10), lived too far away to be interviewed (22), was currently in treatment (10), and did not speak English, Spanish, or Chinese (5). Reasons for ineligibility were not addressed for 109 women. A further 22 women dropped out of the study after the first interview. By the end of the time period 116 women remained. Twenty-five percent of the women with Stage I-II disease, 41% of the women with Stage II–III disease and 35% of the women with DCIS dropped out of the study (p=.006). In addition, half of the African Americans, 21% of the Asians, 32% of the Whites, and 42% of the Latinas dropped out (p= .018). There were no significant differences between the ones who dropped out and the ones who remained on any of the other demographic variables.

Methods

Once a woman was found to fit all of the eligibility criteria, a research assistant contacted her to set up an interview. At the time of the interview the women also completed the questionnaires. The women also received questionnaires every six months for two years. At the end of two years (on average four years since diagnosis) each woman participated in an exit interview.

Measures

All of the measures have been used with cancer patients from various racial/ethnic backgrounds (e.g., DiSipio et al., 2011; Edmondson et al., 2008; Janz et al., 2009; Levine & Targ, 2002).

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1. Quality of Life was measured using the Functional Assessment of Cancer Therapy-Breast (FACT-B; Cella, 1997), which is made up of 28 items designed to assess physical, social/family, emotional, functional well-being, and breast cancer-specific items. Internal consistencies for the subscales range from .81 (social/family) to .92 (overall scale). Among racial/ethnic groups reliability was .77–.92 for African Americans, .77–.91 for Asian Americans, and .72–.91 for Latinas (Ashing-Giwa et a., 2004) Chronbach's alphas for this sample at baseline were: physical .83, social/family .78, functional .84, emotional .58, and breast cancer items. 61.

2. Spirituality was measured using the Functional Assessment of Chronic Illness Therapy-Sp-EX (Peterman, Fitchett, Brady, Hernandez, & Cella, 2002) which consists of 22 items divided into three subscales: faith/spiritual beliefs, meaning/peace, and additional spiritual concerns (connectedness, compassion, forgiveness). Although the original factor analysis of the short version of the scale resulted in only two factors (meaning/peace and faith/assurance; Peterman et al.), Murphy et al. (2009) conducted a confirmatory factor analysis, which showed three subscales: meaning, peace, and faith. Reliability is .87 (total scale), .78 for meaning, .83 for peace, 88 for faith, and .89 for the additional items (Bormann et al., 2006; Peterman et al.). Since Cronbach's alphas for this population on both the meaning and peace subscales were unacceptably low (alpha=.27 for meaning, .22 for peace) the two scales were combined. However, even the combined scales had an unacceptably low alpha (.46) and were not included in the analyses Chronbach's alpha for the faith subscale was .85 and for the additional items .85.

3. Social support was measured using the MOS Social Support Survey (Sherbourne & Stewart, 1991), which is a 19-item scale that covers five dimensions of support: emotional/informational, tangible, positive social interaction, and affection. Reliability is .96 for emotional/informational, .92 for tangible, .94 for positive social interaction, .91 for affection, and .97 overall. In this sample reliability was .94 for emotional/informational, .93 for tangible, .95 for affectionate, and .96 for positive social interaction.

4. Mood was measured using the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1981). The scale measures anxiety, depression, anger, vigor, fatigue, and confusion as well as an overall distress score. Internal consistency ranges from .79 (Confusion) to .93 (Depression; 74).

5. Socioeconomic and demographic variables included age, income, education, and employment status. Self-rated health, marital status, religion, stage of cancer, family history of cancer, and type of treatment were also measured.

Statistics

First, Pearson correlations were conducted for the continuous variables and Spearman's Rho for the categorical variables with QOL. Due to the large number of correlations a Bonferroni correction of $p<.001$ was used to determine significance. Using the variables that were

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significantly correlated with QOL, stepwise regressions predicting overall QOL as well as each subscale were conducted. Because many of the variables were intercorrelated collinearity diagnostics were also conducted. All of the VIF levels were below 3.00, indicating lack of significant multicollinearity.

Results

The mean age of the participants was 57 (sd=12.0, range =31–83) and time since diagnosis was 23 months (sd=9.93, range = 4–48). Almost half of the women (49%) were within two years post treatment. As seen in Table 1 there was an even distribution of race/ethnicity, with the exception of the Latina group. There were no significant differences between the racial/ethnic groups on age. Over half (54%) of the sample was married, and the majority of the women (87%) had at least some college education or had graduated from college.

As seen in Table 2, 10 women (6%) stated that they had Stage 0 or 0-I disease while 83 (46%) had Stage I or I– II disease, 85 (46%) had Stage II or said that they had Stage II–III disease. Almost all of the women had surgery (97%) and/or radiation therapy (70%), half (54%) had chemotherapy, and over half (62%) were undergoing hormonal therapy. Hormone therapy use was much more common among White women (81%) and African Americans were the least likely to have hormonal therapy (46%, p=.003). The majority of the women (61%) had a family history of cancer, with more White than Latina women having a family history (p=.03). White women were more likely to rate their health as very good to excellent (80%) while only 40% of the Latinas rated their health as very good to excellent (p=.009). Most of the African-American (76%) and 42% of the Asian women rated their health as very good to excellent.

Changes in QOL over time

While QOL improved over time, there were no significant differences over time (F= 2.20, p= .08). At baseline mean QOL was 110.94 (sd =21.08) and at four years since diagnosis (on average) was 113.76 (sd=17.95). This degree of change is lower than the minimal important differences for the FACT-B (Eton et al., 2004).

Correlations

Significant correlations between all of the variables and QOL at the two-year follow-up are shown in Table 3. Self-rated health and age were the only demographic variables that were significantly correlated with QOL at four years. As expected, the individual subscales on the FACIT-B were intercorrelated at all time points. Overall QOL was significantly correlated with various aspects of mood, vigor, and social support at all time points. However, physical well-being was only associated with social support at the 3.5 and 4 year time points, and with the exception of the last time point was only associated with anxiety and fatigue. Functional well-being was significantly correlated with anxiety, fatigue, and spirituality at 3 years. Social/family well-being was associated with anxiety, vigor, and social support, while emotional well-being was associated with anxiety and fatigue, but only with social support at the last time point. The breast cancer specific items were significantly correlated with age,

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anxiety, vigor, and spirituality (at 3 and 4 years). QOL was not significantly related to race/ethnicity or type of adjuvant therapy.

Regression Analyses

As shown in Table 4 previous QOL predicted overall QOL at 4 years after treatment. However, the only other predictors of QOL overall that were significant were functional well-being and physical well- being at 3 years, and the breast cancer-specific items at 3.5 years. In addition, vigor at 2.5 years and at 4 years was a significant predictor of overall QOL as well as informational/emotional support at 4 years. The combination of these predictors explained 72% of the variance in overall QOL ($F= 30.53$, $p<.000$). A combination of physical well-being at baseline and at 3 years, functional well-being at 2.5 years and 4 years, and social well-being at 4 years accounted for 70% of the variance in physical well-being at 4 years ($F= 33.62$, $p<.000$). Functional well-being was predicted by physical well-being at baseline, 2.5 years and 4 years, functional well-being at 2.5, 3 years, and 3.5 years, social/family well-being at 3.5 years, and vigor at 4 years. This combination explained 84% of the variance in functional well-being ($F= 44.30$, $p<.001$). Emotional well-being was predicted by physical well-being at baseline and 4 years, emotional well-being at baseline, 3 years, and 3.5 years, breast cancer specific items at 4 years, anxiety at 3 years and 4 years, and informational/emotional support at 2.5 years. However, since greater physical well-being at baseline was related to poor emotional well-being at all time points except at 4 years, multicollinearity was suspected. When the analysis was conducted again without physical well-being at baseline a combination of emotional well-being at baseline and at 3 years, physical well-being at 4 years, the breast cancer-specific items at 4 years, and anxiety at 4 years predicted 62% of the variance ($F=26.30$, $p<.001$). Social/family well-being was predicted by social/family well- being at baseline and at 2.5 years, emotional well-being at 3 years, appraisal support at baseline, informational/emotional support at baseline, and positive social interaction at baseline, accounting for 71% of the variance ($F= 34.18$, $p<.001$). Finally, 58% ($F= 17.57$, $p<.001$) of the variance in breast cancer specific items at 4 years were predicted by age, emotional well-being at 4 years, functional well-being at 4 years, breast cancer specific items only at 3 years, confusion at 3.5 years, and spirituality at 4 years.

Conclusions

The results of this study are consistent with other studies that showed that QOL over time is predicted by previous QOL as well as mood (Badger et al., 2004; Hartl et al., 2009). However, in this study QOL of life did not significantly improve over time, which is inconsistent with the findings of others who found that QOL improved from diagnosis to two years (Hartl et al.) and five years (Bloom, Stewart, Chang, & Banks, 2004) post-diagnosis. Our results are consistent with the findings of Hulbert-Williams et al. (2011), Taira et al. (2011), and Beatty, Lee, and Wade (2009) who did not find significant changes in QOL over six months and with two and five years respectively. In addition, Janz, Friese, Li, Graff, Hamilton, and Hawley (2014) found that emotional well-being decreased over four years post treatment for breast cancer in 24.9% of their sample, while there was no change for 39% of the women in their sample.

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It is possible that the improvements found by other researchers were a result of the end of surgery and adjuvant treatment. Our population was assessed after they had completed their therapy. By the time that the women in our study were recruited, they may have reached their pre-diagnosis level of QOL and therefore no further changes were seen.

While many of the significant predictors of overall QOL at 4 years were previous levels of QOL, vigor and informational/emotional support also emerged as significant predictors of overall QOL, although only at the 4-year point for support and 2.5 and 4 years for vigor. This is similar to the findings of Kwan et al. (2010) using the same measures. However, Kwan et al. also found that tangible support and positive social interaction were predictive of overall QOL. While in this study types of social support and overall QOL were significantly correlated to each other, they were not predictive in the model. These results are similar to those found by Leung et al. (2014) in their longitudinal study of breast cancer survivors. Since the Kwan et al. study was cross-sectional it may be that tangible support and positive social was not needed as much over time and therefore did not predict long-term QOL.

It is not surprising that current levels of vigor were significant predictors of overall QOL as well as the subscales. While some researchers have examined the role of fatigue on QOL (Assimakopoulos Karaivazoglou, Ifanti, Gerolymos, Kalafonos, & Iconomou, 2009; Noal et al., 2011), few have examined the relationship between fatigue and overall QOL, or vigor by itself. It seems that both vigor and fatigue have distinct relationships with QOL. In addition, although self-rated health at baseline was significantly correlated with overall QOL and physical well-being, it was not a predictive variable. It may be that self-rated health at 4 years would be a predictor of QOL. Unfortunately, it was not measured at that time point.

Emotional well-being was also predicted by a combination of physical well-being, emotional well-being, the breast cancer-specific items, anxiety, and informational/emotional support. Since having greater physical well-being can influence emotional well-being it is not surprising that both physical well-being and the breast cancer-specific items at four years were predictive of emotional well-being. Seven out of 10 of the items on the breast cancer items subscale relate to emotional feelings (I am bothered by hair loss, I worry that other members of my family might someday get the same illness I have, I worry about the effects of stress on my illness, I am self-conscious about the way I dress, I feel sexually attractive, I am bothered by a change in weight, I am able to feel like a women). The remaining items relate to pain, lymphedema, and shortness of breath, all of which may cause a person distress. Janz et al. (2014) found that decline in emotional well-being was predicted by past and current depression, fears of recurrence, and higher spirituality. Neither depression nor spirituality was a significant predictor of QOL.

In this study social support at baseline (appraisal, emotional/informational, & positive social interaction) was predictive of social/family well-being. This is consistent with the findings of Kwan et al. (2010), who found that emotional/informational, tangible, and affectionate support were predictive of social well-being in newly diagnosed cancer patients. However, they found that emotional/informational support and positive social interaction were predictive of emotional well-being, while in this study only emotional/informational support at baseline was a significant predictor of emotional well-being. This could be due to the fact

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that the patients in the Kwan et al. study were newly diagnosed as well as the cross-sectional nature of that study.

While spirituality was only a significant predictor at 4 years for the breast cancer related items, it was significantly correlated with overall and functional QOL. This latter finding is consistent with the results of others (Assimakopoulos et al., 2009; Dapueto et al., 2005; Edmondson et al., 2008; Kristeller et al., 2011; Levine & Targ, 2002; Manning-Walsh, 2005; Tarakeshwar et al., 2006; Thuné-Boyle et al., 2006; Whitford et al., 2008). Many cancer patients use spirituality as a way of coping with their illness, and women who use religious and or spiritual coping to a high degree have higher levels of overall QOL (Assimakopoulos et al.; Kristeller et al.). While it was expected that spirituality would be correlated with the other subscales on the FACT-B it may be that the low reliability of the meaning and peace subscales in this sample affected any relationships. Janz et al. (2014) found that higher spiritual beliefs were predictive of decline in emotional QOL. However, they did not assess spirituality over time and their measure of spirituality only consisted of four items. Therefore, their measure may not have tapped aspects of spirituality that are important predictors of emotional well-being. In addition, Edmondson et al. found that existential well-being was a significant predictor of overall QOL. However, while Levine and Targ found significant correlations between the items on the FACIT-Sp and physical and functional well-being, Tarakeshwar et al. did not find a relationship between spirituality and QOL with the exception of psychological QOL. This may be due to the fact that Tarakeshwar et al. investigated the more negative aspects of spirituality (spiritual suffering & seeking spirituality), and not the positive aspects of spirituality and spiritual coping. While there is research on the relationship between spirituality and other aspects of QOL, few studies have been specifically focused on the relationships between spirituality and specific symptoms associated with having cancer. Some researchers have found a relationship between symptom distress and spirituality (Leak, Hu, & King, 2008; Zavala, Maliski, Kwan, Fink, & Litvin, 2009), but they used other measures to assess QOL and in the case of Leak et al. different measures of spirituality as well. Using the FACT-B Manning-Walsh found that the breast cancer-specific items were significantly correlated with the short version of the FACIT-SP. However, Morgan, Gaston-Johansson, and Mock (2006) only found significant correlations between the FACIT-SP and emotional and functional well-being. This different finding may be due to the fact that their sample solely consisted of African Americans.

As expected, age was also a significant predictor of the breast cancer specific items. Decreases in the severity of the breast cancer specific items were related to increasing age. This is consistent with the literature comparing younger and older breast cancer survivors (Baker, Denniston, Smith, & West, 2005; Kroenke, Rosner, Chen, Kawachi, Colditz, & Holmes, 2004; Kwan et al., 2010; Wenzel et al., 1999). Age also predicted overall QOL over time (Taira et al., 2011). However, it is surprising that age was not related to any of the other measures of QOL, since younger women have been shown to have lower physical, emotional, social, and functional QOL (Kroenke et al.; Kwan et al., 2010). However, Sammarco (2009) and Parker, Baile, deMoor, and Cohen (2003) were not able to show a relationship between physical QOL and age, and Wenzel et al. (1999) did not find that age was related to physical, or social QOL. To our knowledge, Kwan et al. and Wenzel et al. are the only researchers that compared age differences in the breast cancer specific items of the

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FACT-B and both found that younger women had lower QOL in terms of the breast cancer specific items.

The breast cancer specific subscale has a mixture of physical and psychosocial concerns, and age differences may vary based on the type of concern. Two of the concerns on that scale are sexuality and body image. Younger women tend to have more problems with sexual issues, including premature menopause than older women (Mosher & Danoff-Burg, 2005; Paskett et al., 2008), although Wenzel et al. (1999) did not find a relationship between age and either body image or sexual functioning once type of treatment was controlled for. However, Taira et al. (2011) found that poorer body image predicted overall QOL two years after breast cancer surgery.

Ethnicity was not associated with any of the QOL measures with the exception of faith and assurance. This is contrary to the meta-analysis by Luckett et al. (2011) who found that minorities, especially Hispanics in the US had lower QOL than Whites, and Morgan et al. (2006) found significant correlations between spirituality and emotional and functional well-being in their sample of African American women.

Limitations

There are several limitations to this study. The first limitation is that co-morbidities that could influence QOL were not assessed. It is possible that the women had other physical and or mental illnesses that influenced their QOL. Future studies could also add health care aspects (e.g., patient-provider relationship, adherence to medication, patient-physician communication, etc.), socioeconomic factors and health self-efficacy as indicated in Ashing-Giwa's (2005) model In addition, the overall small sample size, particularly for the Latinas may have resulted in a lack of power to detect important relationships with QOL. The majority of the women had at least some college education, therefore, less educated women were not adequately represented. In addition, the women had early stage disease. Therefore, these results may not generalize to women with later stage cancer or to people with other cancers. Finally, as mentioned previously the low reliability of the FACIT-Sp-EX meaning and peace subscales could explain why more relationships between them and QOL were found.

Even with these limitations not only was overall QOL predicted by previous levels of QOL, current physical status (e.g., vigor), and social support, the individual types of QOL were related to different areas of QOL, social support, mood, and spirituality. While many clinicians and researchers tend to assess overall QOL, the individual aspects should also be assessed and tailored interventions developed based on where the difficulties in QOL lie for the person and what aspects predict QOL in that area. For example, if a person reported low social and or family well-being attention can be paid to previous levels of social and or family well-being as well as type of and appraisal of his or her sources of social support. If ability to function is an issue, attention could be paid not only to physical symptoms but also to energy levels and social and or family well-being as well.

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References

Ashing-Giwa KT. The contextual model of HRQoL: A paradigm for expanding the HRQoL framework. Quality of Life Research. 2005; 14:297–307. [PubMed: 15892421]

Ashing-Giwa KT, Lim J-W. Examining the impact of socioeconomic status and socioecologic status on physical and mental health quality of life among breast cancer survivors. Oncology Nursing Forum. 2009; 36:79–88. [PubMed: 19136341]

Ashing-Giwa KT, Padilla G, Tejero J, Kraemer J, Wright K, Coscarelli A, Hills D. Understanding the breast cancer experience of women: A qualitative study of African American, Asian American, Latina, and Caucasian cancer survivors. Psycho-Oncology. 2004; 13:408–428. [PubMed: 15188447]

Ashing-Giwa KT, Tejero JS, Kim J, Padilla GV, Hellemann G. Examining predictive models of HRQOL in a population-based, multiethnic sample of women with breast carcinoma. Quality of Life Research. 2007; 16:413–428. [PubMed: 17279444]

Assimakopoulos K, Karaivazoglou K, Ifanti AA, Gerolymos MK, Kalafonos HP, Iconomou G. Religiosity and its relation to quality of life in Christian Orthodox cancer patients undergoing chemotherapy. Psycho-Oncology. 2009; 18:284–289. [PubMed: 18702046]

Baker F, Denniston M, Smith T, West MM. Adult cancer survivors: how are they faring? Cancer. 2005; 104:2565–2576. [PubMed: 16258929]

Beatty L, Lee C, Wade TD. A prospective examination of perceived stress as a mediator of the relationship between life-events and QOL following breast cancer. British Journal of Health Psychology. 2009; 14:789–804. [PubMed: 19267960]

Bloom JR, Stewart SL, Chang S, Banks PJ. Then and now: Quality of life of young breast cancer survivors. Psycho-Oncology. 2004; 13:147–160. [PubMed: 15022150]

Bormann JE, Gifford AL, Shively M, Smith TL, Redwine L, Kelly A, Belding W. Effects of spiritual mantram repetition in HIV outcomes: A randomized clinical trial. Annals of Behavioral Medicine. 2006; 29(4):359–376.

Bowen DJ, Alfano CM, McGregor BA, Kuniyuki A, Bernstein L, Meeske K, Barbash RB. Possible socioeconomic and ethnic disparities in quality of life in a cohort of breast cancer survivors. Breast Cancer Research and Treatment. 2007; 106:85–95. [PubMed: 17260096]

Cella, DF. Manual: Functional Assessment of Chronic Illness Therapy (FACIT) Scales. Chicago: Center on Outcomes, Research, and Education, Evanston Northwestern Healthcare and Northwestern University; 1997.

Cheng S-Y, Lai Y-H, Chen S-C, Shun S-C, Liao Y-M, Tu S-H, Chen C-M. Changes in quality of life among newly diagnosed breast cancer patients in Taiwan. Journal of Clinical Nursing. 2011; 21:70–79. [PubMed: 21702860]

Dapueto JJ, Servente L, Fancolino C, Hahn EA. Determinants of quality of life in patients with cancer. Cancer. 2005; 103:1072–1081. [PubMed: 15666324]

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DiSipio T, Hayes S, Battistutta D, Newman B, Janda M. Patterns, correlated, and prognostic significance of quality of life following breast cancer. Psycho-Oncology. 2011; 20:1084–1091. [PubMed: 20672245]

DiSipio T, Hayes S, Newman B, Janda M. Health-related quality of life 18 months after breast cancer: comparison with the general population of Queensland, Australia. Supportive Care Cancer. 2008; 16:1141–1150.

Edmondson D, Park CL, Blank TO, Fenster JR, Mills MA. Deconstructing spiritual well-being: Existential well-being and HRQOL in cancer survivors. Psycho-Oncology. 2008; 17:161–169. [PubMed: 17506077]

Eton DT, Cella D, Yost KJ, Yount SE, Peterman AH, Neuberg DS, Wood WC. A combination of distribution- and anchor-based approaches determined minimally important differences (MIDs) for four endpoints in a breast cancer scale. Journal of Clinical Epidemiology. 2004; 57:898–910. [PubMed: 15504633]

Fisch MJ, Titzer ML, Kristeller JL, Shen J, Loehrer PJ, Jung S-H, Einhorn LH. Assessment of quality of life in outpatients with advanced cancer: The accuracy of clinician estimations and the relevance of spiritual well-being- A Hoosier Oncology group study. Journal of Clinical Oncology. 2003; 21:2754–2759. [PubMed: 12860955]

Ganz PA, Kwan L, Stanton AL, Bower JE, Belin TR. Physical and psychosocial recovery in the year after primary treatment for breast cancer. Journal of Clinical Oncology. 2011; 29(9):1101–1109. [PubMed: 21300931]

Giedzinska AS, Meyerowitz BE, Ganz PA, Rowland JH. Health-related quality of life in a multiethnic sample of breast cancer survivors. Annals of Behavioral Medicine. 2004; 28:39–51. [PubMed: 15249258]

Hartl K, Engel J, Herschbach P, Reinecker H, Sommer H, Friese K. Personality traits and psychosocial stress: quality of life over 2 years following breast cancer diagnosis and psychological impact factors. Psycho-Oncology. 2009; 19:160–169.

Howsepian BA, Merluzzi TV. Religious beliefs, social support, self-efficacy, and adjustment to cancer. Psycho-Oncology. 2009; 18:1069–1079. [PubMed: 19189320]

Hulbert-Williams N, Neal R, Morrison V, Hood K, Wilkinson C. Anxiety, depression and quality of life after cancer diagnosis: What psychosocial variables best predict how patients adjust? Psycho-Oncology. 2011; 21:857–867. [PubMed: 21695744]

Janz NK, Friese CR, Li Y, Graff JJ, Hamilton AS, Hawley ST. Emotional well- being years post-treatment for breast cancer: Prospective, multi-ethnic, and population-based analysis. Journal of Cancer Survivorship. 2014; 8:131–142. [PubMed: 24222081]

Janz NK, Mujahid MS, Hawley ST, Griggs JJ, Alderman A, Hamilton AS, Katz SJ. Racial/ethnic differences in quality of life after diagnosis of breast cancer. Journal of Cancer Survivorship. 2009; 3:212–222. [PubMed: 19760151]

Kristeller JL, Sheets V, Johnson T, Frank B. Understanding religious and spiritual influences on adjustment to cancer: Individual patterns and differences. Journal of Behavioral Medicine. 2011; 34(6):550–561. [PubMed: 21442244]

Kroenke CH, Rosner B, Chen WY, Kawachi I, Colditz GA, Holmes MD. Functional impact of breast cancer by age at diagnosis. Journal of Clinical Oncology. 2004; 22:1849–1856. [PubMed: 15143077]

Kwan ML, Ergas IJ, Somkin CP, Quesenberry CP Jr, Neugut AL, Hershman DL, Kushi LH. Quality of life of women recently diagnosed with invasive breast cancer: the Pathways Study. Breast Cancer Research and Treatment. 2010; 123:507–524. [PubMed: 20140494]

Leak A, Hu J, King CR. Symptom distress, spirituality, and quality of life in African American breast cancer survivors. Cancer Nursing. 2008; 31(1):E15–E21. [PubMed: 18176122]

Lee TS, Killbreath SL, Refshauge KM, Pendlebury SC, Beith JM, Lee MJ. Quality of life of women treated with radiotherapy for breast cancer. Supportive Care Cancer. 2008; 16:39–405.

Levine EG, Targ E. Spiritual correlates of functional well-being in women with breast cancer. Integrative Cancer Therapies. 2002; 1:166–174. [PubMed: 14664742]

Levine EG, Yoo G, Aviv C, Ewing C, Au A. Ethnicity and spirituality in breast cancer survivors. Journal of Cancer Survivorship. 2007; 1:212–225. [PubMed: 18648972]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Leung J, Pachana NA, McLaughlin D. Social support and health related quality of life in women with breast cancer: a longitudinal study. Psycho-Oncology. 2014; 23:1014–1020. [PubMed: 24700668]

Luckett T, Goldstein D, Butow PN, Gebski V, Aldridge LJ, McGrane J, King MT. Psychological morbidity and quality of life of ethnic minority patients with cancer: A systematic review and meta-analysis. Lancet Oncology. 2011; 12:1240–1248. [PubMed: 21996168]

Manning-Walsh J. Spiritual struggle: Effect on quality of life and life satisfaction in women with breast cancer. Journal of Holistic Nursing. 2005; 23:120–140. [PubMed: 15883461]

McNair, DM., Lorr, M., Droppleman, LF. Profile of Mood States. 2nd. San Diego: Educational and Industrial Testing Service; 1981.

Morgan, PD., Gaston-Johansson, F., Mock, V. The ABNF Journal. Vol. 17. Spring; 2006. Spiritual well-being, religious coping, and the quality of life of African American breast cancer treatment: A pilot study; p. 73-77.

Mosher CE, Danoff-Burg S. A review of age differences in psychological adjustment to breast cancer. Journal of Psychosocial Oncology. 2005; 23:101–114. [PubMed: 16492654]

Murphy PA, Canada AL, Fitchett G, Stein K, Portier K, Crammer C, Peterman AH. An examination of the 3-factor model and structural invariance across racial/ethnic groups for the FACIT-Sp: A report from the American Cancer Society's Study of Cancer Survivors-II (SCS-II). Psycho-Oncology. 2009; 19(3):264–272.

Noal S, Levy C, Hardouin A, Rieux C, Heutte N, Segura C, Jolly F. One-year longitudinal study of fatigue, cognitive functions, and quality of life after adjuvant radiotherapy for breast cancer. International Journal of Radiation Oncology. 2011; 81(3):795–803.

Parker PA, Baile WF, de Moor C, Cohen L. Psychosocial and demographic predictors of quality of life in a large sample of cancer patients. Psycho-Oncology. 2003; 12:183–193. [PubMed: 12619150]

Paskett ED, Herndon JE 2nd, Day JM, Stark NN, Winer EP, Grubbs SS, Pavy MD, Bittoni MA. Cancer and Leukemia Group B. Applying a conceptual model for examining health-related quality of life in long-term breast cancer survivors: CALGB study 79804. Psycho-Oncology. 2008; 17:1108–1120. [PubMed: 18314912]

Peterman AH, Fitchett G, Brady MJ, Hernandez L, Cella D. Measuring spiritual well-being in people with cancer: The Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-Sp). Annals of Behavioral Medicine. 2002; 24:49–58. [PubMed: 12008794]

Rottman N, Dalton SO, Christensen J, Frederiksen K, Johansen C. Self-efficacy, adjustment style, and well-being in breast cancer patients: A longitudinal study. Quality of Life Research. 2010; 19:827–836. [PubMed: 20401551]

Sammarco A. Quality of life of breast cancer survivors: A comparative study of age cohorts. Cancer Nursing. 2009; 32:347–356. [PubMed: 19661800]

Sherbourne C, Stewart A. The MOS social support survey. Social Science and Medicine. 1991; 32:705–714. [PubMed: 2035047]

Shi HY, Uen YH, Yes LC, Culbertson R, Juan CH, Hou MF. Two-year quality of life after breast cancer surgery: A comparison of three surgical procedures. European Journal of Surgical Oncology. 2011; 37:695–702. [PubMed: 21664099]

Taira N, Shimozuma K, Shirowla T, Ohsumi S, Kuroi K, Saji S, Katsumata N. Associations among baseline variables, treatment-related factors and health-related quality of life 2 years after breast cancer surgery. Breast Cancer Research & Treatment. 2011; 128(735–747)

Tarakeshwar N, Vanderwerker LC, Paulk E, Pearce MJ, Kasl SV, Prigerson HG. Religious coping is associated with the quality of life of patients with advanced cancer. Journal of Palliative Medicine. 2006; 9:646–657. [PubMed: 16752970]

Thuné-Boyle IC, Stygall JA, Keshtgar MR, Newman SP. Do religious/spiritual coping strategies affect illness adjustment in patients with cancer? A systematic review of the literature. Social Science and Medicine. 2006; 63:151–164. [PubMed: 16427173]

Wenzel LB, Fairclough DL, Brady MJ, Cella D, Garrett KM, Kluhsman BC, Marcus AC. Age-related differences in the quality of life of breast carcinoma patients after treatment. Cancer. 1999; 86:1768–1774. DOI: 10.1002/(SICI)1097-0142(19991101)86:9<1768::AID-CNCR19>3.0.CO;2-O. [PubMed: 10547550]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Whitford HS, Olver IN, Peterson MJ. Spirituality as a core domain in the assessment of quality of life in oncology. Psycho-Oncology. 2008; 17:1121–1128. [PubMed: 18322902]

Zavala MW, Maliski SL, Kwan L, Fink A, Litvin MS. Spirituality and quality of life in low- income men with metastatic prostate cancer. Psycho-Oncology. 2009; 18(7):753–761. [PubMed: 19061194]

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Table 1

Demographics

Variable	N(%)
Age M(sd)	57(12)
Time since diagnosis M(sd)	23(9.93)
Ethnicity	
African American	47(26)
Asian/Pacific Islander	52(29)
White	54(30)
Latina	25(14)
Relationship	
Married	96(54)
Divorced	29(16)
Single	31(17)
Widowed	20(11)
Education	
High School or less	19(10)
Some college	50(28)
College graduate	55(30)
Post Graduate	52(29)
Religion	
None/Not practicing	33(18)
Catholic	45(25)
Protestant	58(32)
Jewish	7(14)
Other	28(16)
Family history of cancer	109(61)
Income	
Less than $29,000	43(24)
$30,000–$59,000	32(17)
$60,000–$89,000	32(18)
$90,000–$129,000	24(13)
Greater than $130,000	25(14)
Missing	23(13)

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Table 2

Medical Characteristics

Variable	N(%)
Stage	
0 or DCIS	10(6)
Stage I	83(46)
Stage II	85(46)
Type of Therapy	
Surgery	173(97)
Chemotherapy	96(54)
Radiation	125(70)
Hormonal Therapy	110(62)
Self-rating Health	
Excellent	26(14)
Very good	57(32)
Good	43(24)
Fair	21(12)
Poor	5(3)

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Table 3

Significant Correlations with QOL at 4 Years *

Variable	Overall	Physical	Functional	Social	Emotional	Breast Cancer Specific
Age						.30
Self-rated Health	−.42	−.37				
Time 1						
Physical Well-Being	.53	.60	.34		.41	.44
Functional Well-Being	.56	.43	.57	.41	.38	.41
Social/Family Well-Being	.42	.50	.38	.68		
Emotional Well-Being	.54	.41	.37	.33	.60	.42
Breast Cancer Items	.60	.49	.34		.57	
Additional Spiritual Items				.31		
Anxiety	−.39	−.26			−.44	−.38
Vigor	.38		.38			
Appraisal	.32			.35		
Emotional/Informational	.42		.33	.42		.31
Support						
Tangible Support	.29		.31	.38		
Affectionate Support	.35		.35	.45		
Positive Social Interaction	.38		.41			
Time 2						
Physical Well-Being	.54	.64	.30		.47	.44
Functional Well-Being	.67	.46	.71	.49	.42	.43
Social/Family Well-Being	.46		.36	.75		
Emotional Well-Being	.54	.35	.36	.34	.56	.45
Breast Cancer Items	.63	.42	.41	.49	.54	.60
Anxiety	−.39		−.34		−.38	
Confusion	−.31					

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Variable	Overall	Physical	Functional	Social	Emotional	Breast Cancer Specific
Vigor	.38		.32			.32
Fatigue		−.34				
Informational/Emotional	.37		.38	.45	.45	.38
Support						
Tangible Support	.38		.33	.44		
Affectionate Support	.42		.37	.54		
Positive Social Interaction	.34			.52		
Time 3						
Physical Well-Being	.58	.68	.39	.68	.51	.47
Functional Well-Being	.68	.49	.74	.49	.37	.46
Social/Family Well-Being	.50					.38
Emotional Well-Being	.44	.32		.32	.51	.38
Breast Cancer Items	.60	.36		.36	.51	.64
Additional Spiritual Items	.32	.31				.32
Anxiety	−.34	−.38			−.38	
Depression				−.33		
Vigor	.36			.35		
Fatigue	−.34	−.36			−.32	
Informational/Emotional	.47		.38	.45		.36
Support						
Tangible Support	.44	.37	.33	.42		
Affectionate Support	.40		.36	.52		
Positive Social Interaction	.47		.43	.54		
Time 4						
Physical Well-Being	.53	.65	.36		.51	.39
Functional Well-Being	.64	.48	.64	.44	.37	.45
Social/Family Well-Being	.52	.30	.32	.69		.31
Emotional Well-Being	.56	.46	.37		.51	.40

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Variable	Overall	Physical	Functional	Social	Emotional	Breast Cancer Specific
Breast Cancer Items	.63	.48		.40	.51	.70
Anxiety	−.39					−.31
Vigor	.45		.40		−.40	.41
Fatigue	−.37	−.31	−.30	−.31	−.34	
Confusion				−.32	−.32	−.32
Informational/Emotional	.50		.36	.57	.31	.38
Support						
Tangible Support	.43	.42	.37	.44		
Affectionate Support	.44		.37	.51		
Positive Social Interaction	.45	.35	.51	.48		
Time 5						
Physical Well-Being			.57	.31	.57	.50
Functional Well-Being		.57		.46	.48	.44
Social/Family Well-Being		.31	.46			.46
Anxiety	−.38	−.35		−.35	−.48	
Depression	−.30					
Vigor	.54	.39	.49	.42	.32	.41
Fatigue	−.43	−.51	−.37	−.51	−.34	
Confusion	−.39	−.31	−.34	−.36	−.34	−.34
Emotional Well-Being		.57	.48			.58
Additional Spiritual Items	.41		.39			.38
Breast Cancer Items		.50	.44	.37	.38	
Informational/Emotional	.45		.32	.57		.32
Support						
Tangible Support	.39			.37		.30
Positive Social Interaction	.51		.49	.54		.32

*All p values for the listed correlations are at the <.001 level

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Table 4

Regression QOL at 4 Years*

	Overall		Physical		Functional	
	Beta	**p**	**Beta**	**p**	**Beta**	**P**
Time 1						
Physical Well-Being			.221	.007	−.164	.04
Time 2						
Physical Well-Being					−.210	.02
Functional Well-Being					.222	.006
Social/Family Well-Being						
Vigor	−.184	.02				
Time 3						
Physical Well-Being	.321	.000	.457	.000		
Functional Well-Being	.323	.001	−.406	.001	.398	.000
Time 4						
Functional Well-Being					.269	.001
Social/Family Well-Being					−.145	.02
Breast Cancer Items	.175	.02				
Time 5						
Physical Well-Being					.388	.000
Functional Well-Being			.631	.000		
Social/Family Well-Being			.153	.04		
Vigor	.351	.02			.247	.000
Informational/Emotional	.172	.02				
Support						

	Emotional		Social/Family		Breast Cancer Specific	
	Beta	**p**	**Beta**	**p**	**Beta**	**P**
Age					.176	.05

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	Emotional		Social/Family		Breast Cancer Specific	
	Beta	p	Beta	p	Beta	P
Time 1						
Emotional Well-Being	.182	.03				
Social/Family Well-Being			.309	.001		
Informational/Emotional			.240	.002		
Support						
Positive Social Interaction			.177	.02		
Time 2						
Social/Family Well-Being			.396	.000		
Time 3						
Emotional Well-Being	.231	.009	.169	.01		
Breast Cancer Specific Items					.351	.001
Time 4						
Confusion					.241	.006
Time 5						
Anxiety	−.174	.04				
Physical Well-Being	.262	.002				
Emotional Well-Being					.349	.001
Functional Well-Being					.197	.04
Breast Cancer Specific	.267	.001				
Additional Spiritual Items					.195	.03

Overall Adjusted R^2= .72 F= 30.53, p<.000

Physical Well-Being Adjusted R^2= .70 F= 33.62, p<.000

Functional Well-Being Adjusted R^2= .84 F= 44.30, p<.000

Emotional Well-Being Adjusted R^2= .60 F= 26.30, p<.000

Social/Family Well-Being Adjusted R^2= .71 F= 34.18, p<.000

Breast Cancer Specific Items Adjusted R^2= .58 F= 17.57, p<.000