

5-2017

The Role of Hope and Optimism in Breast Cancer Patients: A Systematic Review

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Recommended Citation

Novalany, Jennifer. (2017). The Role of Hope and Optimism in Breast Cancer Patients: A Systematic Review. Retrieved from Sophia, the St. Catherine University repository website: https://sophia.stkate.edu/msw_papers/779

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HOPE AND OPTIMISM IN BREAST CANCER PATIENTS

The Role of Hope and Optimism in Breast Cancer Patients: A Systematic Review

by

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MSW Clinical Research Paper

Presented to the Faculty of the
School of Social Work
St. Catherine University and the University of St. Thomas St. Paul, Minnesota
in Partial fulfillment of the Requirements for the Degree of

Master of Social Work

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Melissa Lundquist, MSW, Ph.D., LGSW (Chair)
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Pat Clark, MSW, LICSW

The Clinical Research Project is a graduation requirement for MSW students at St. Catherine University/University of St. Thomas School of Social Work in St. Paul, Minnesota and is conducted within a nine-month time frame to demonstrate facility with basic social research methods. Students must independently conceptualize a research problem, formulate a research design that is approved by a research committee and the university Institutional Review Board, implement the project, and publicly present the findings of the study. This project is neither a Master's thesis nor a dissertation.

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Abstract

The purpose of this systematic literature review was to explore the question: How does using hope and optimism effect the psychosocial adjustment to a diagnosis of breast cancer in women? The electronic databases used to identify studies for this review included PsycINFO (PsycNet), SocINDEX, and MEDLINE. Five quantitative studies met criteria and were reviewed and analyzed. The four themes that emerged within these studies were; optimism levels, medical and demographic variables, coping strategies, and fear of cancer recurrence. The research shows that differing levels of optimism linked with other coping strategies, such as; focusing on the positive, fighting spirit, active acceptance, turning to religion, and social support improved the psychosocial adjustment, well-being, and/or quality of life for women across time. Additional research is required to understand the full impact that personality traits such as, hope and optimism, can have on the psychosocial adjustment for breast cancer survivors.

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Acknowledgements

First, I would like to thank my research chair, Melissa Lundquist, MSW, PhD, LGSW, for her support, guidance, and encouraging words throughout this process. A very special thank you to my committee members, Nicole Larsen, LICSW and Pat Clark, LICSW. I am truly grateful that you both took time out of your busy schedules and shared your insight, wisdom, and expertise with me in order to bring this project to another level.

I would like to thank my loving fiancé, Brandon, for putting up with me and being so supportive over the last three years, especially when times were tough. Thank you to my wonderful parents and sister, Michelle, who offered endless words of encouragement and guidance during my time in the MSW program. I could not have done it without all of your love and support.

And finally, thank you to all my friends, classmates, and colleagues for your understanding during both the good and the bad over the last three years. Your commitment and support has allowed me to pursue my dreams and passion of helping others and for that, I thank you.

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Breast cancer is one of the most commonly diagnosed cancers among women today. “Each year it is estimated that over 246,660 women in the United States will be diagnosed with breast cancer, and more than 40,000 will die” (National Breast Cancer Foundation, 2016). Breast cancer takes a significant toll on the everyday lives of individuals who are affected by this diagnosis. This impact can include physical, financial, relational, and psychological concerns.

Over the years, there has been an increasing number of psychological interventions used for people living with cancer in order to increase their quality of life and overall well-being. The role of hope, optimism, and social support are among the psychological interventions used, and although future research is needed to determine the effectiveness of psychological interventions and their role in the cancer community, hope, optimism, and social support have been shown to improve the psychological outcomes for both the individuals living with cancer and their families and friends who are also effected.

The purpose of this systematic literature review is to determine if hope and optimism are useful for the psychosocial adjustment in women who are diagnosed with breast cancer. The following literature review and overall findings in this report will include information gathered from scholarly articles from several disciplines and databases. The information presented in this report will help in answering the research question; How does using hope and optimism effect the psychosocial adjustment to a diagnosis of breast cancer in women?

Literature Review

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Breast Cancer

According to the National Cancer Institute, the rate in which a woman was diagnosed with breast cancer in the 1970's was estimated to be one in ten. Today, it is estimated that one in eight, or 12.4 percent of women born in the United States will develop breast cancer at some point during her lifetime (National Cancer Institute, 2016). Research shows that there are many contributing factors that lead to a diagnosis of breast cancer. Some of these factors include; being female, age, family history, inherited genes, race and ethnicity, having dense breast tissue, early menstruation, menopause later in life, lifestyle choices, and environmental factors (American Cancer Society, 2016). Because the rate in which women are being diagnosed with breast cancer is increasing, it is important to understand what it is, the stages of diagnosis, the treatment options, and how these factors impact the individual faced with a diagnosis.

The National Cancer Institute (2016) defines breast cancer as a “cancer that forms in tissues of the breast. The most common type of breast cancer is ductal carcinoma, which begins in the lining of the milk ducts (thin tubes that carry milk from the lobules of the breast to the nipple). Another type of breast cancer is lobular carcinoma, which begins in the lobules (milk glands) of the breast. Invasive breast cancer is breast cancer that has spread from where it began in the breast ducts or lobules to surrounding normal tissue.”

Breast Cancer Prevention

From a young age, women are encouraged by their physician to complete self-examinations regularly in order to monitor any changes in their body. One study that included 626 participants under the age of 40 found that 71% of tumors were discovered by self-examination, 24% were detected by using mammography, less than 1% was found by magnetic resonance imaging (MRI), and the remaining 4% was found after an examination by a healthcare professional

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(Samphao, Wheeler, Raferty, Michaelson, Specht, Gadd, Hughes, & Smith, 2009). According to the World Health Organization, the only breast cancer screening method that has proved to be effective is mammography screening (WHO, 2016). “Recent advances in breast imaging technologies also may contribute to early detection of breast cancer in young women. Digital mammography was shown to provide improved detection of breast cancers compared with conventional film screen mammography among women younger than age 50” (Samphao et al., 2009). Likewise, Zujewski and Kamin (2008) report that utilizing mammographic screenings and systematic therapies have been effective in the screening and detection of breast cancer, and have resulted in a decline of mortality from breast cancer over the past ten years.

Breast Cancer Treatment

Women are often put into difficult situations when asked to make decisions regarding treatment for a diagnosis of breast cancer. “The purpose of cancer treatment is primarily to eradicate cancer, but if that cannot be accomplished, the purpose shifts to preserving quality of life and extending life” (Wyk & Carbonatto, p. 442, 2013). Many women opt for surgery to remove the cancer, with the most common operations being a lumpectomy, partial mastectomy, and total mastectomy (Bellenir, 2009). Because all of the cancer that is present cannot be taken out with surgery alone, many women have to go through radiation therapy, chemotherapy, or hormone therapy to kill any remaining cancer cells (Bellenir, 2009). Following their treatment regimen, many women then contemplate whether or not they want to pursue reconstruction surgery (Fernandes-Taylor & Bloom, 2007).

Wyk and Carbonatto (2013), provide the following definitions for cancer treatments, “radiation therapy entails the use of high-dose radiation to a localized target causing damage to cell DNA and damage to cells’ reproductive ability. Chemotherapy is the use of chemical agents, and

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can be used as an initial treatment, in conjunction with surgery or radiation therapy, or can be used when other treatments are not possible. And finally, hormone therapy is given in order to hamper tumor growth by blocking hormones, such as; estrogen for breast cancer” (p. 443).

Limited research was found regarding women’s feelings of the above treatment options and their outcomes, however, one study looked at post-treatment regret among young breast cancer survivors. This study included women diagnosed before the age of 51 who all lived in the San Francisco Bay Area. Forty-three percent of the women who participated in this study reported regret over some aspect of their treatment. The most common themes reported in this study were, dissatisfaction with the information regarding their treatment and the alternative options and side effects, and regret with not having a mastectomy, not obtaining a second opinion, and not being an active participant in their care (Fernandes-Taylor & Bloom, 2011).

Post-Treatment Side Effects. Some of the literature surrounding post-treatment side effects and expectations have shown that following treatment, many women hope to return to a “normal life,” and do not expect many treatment-related effects after their radiation or chemotherapy (Costanzo, Lutgendorf, Mattes, Trehan, Robinson, Tewfik, & Roman, 2007). This has proved to be difficult as, fatigue, tiredness, lack of energy, pain, and cognitive impairment (also referred to as chemobrain or chemofog) are some of the most common physical effects following a cancer treatment (Brem & Kumar, 2010). Research has also shown that post-treatment physical and psychological effects can be long term and/or permanent. In one study, 34% of patients reported limited movement in their arm and shoulder on the side they received treatment, and 13% reported no improvement in these areas after a four-year period (Brem & Kumar, 2010).

Lengacher, Reich, Post-White, Moscoso, Shelton, Barta, Le, & Budhrani (2011) recruited 84 women from a Cancer Center who all had completed treatment within 18 months before the

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study. They also found that breast cancer survivors experience multiple post-treatment side effects, with the most common being; gastrointestinal, cognitive-psychological, and fatigue and sleep disturbance concerns.

Impact of Cancer

A diagnosis of breast cancer can be a devastating and challenging time for women. As we have seen in the literature, many experience both psychological and physical issues, including; depression, anxiety, fatigue, pain, difficulty concentrating, social isolation, sexuality concerns, and self-blame (Al-Azri, Al-Awisi, Al-Rasbi, El-Shafie, Al-Hinai, Al-Habsi, & Al-Moundhri, 2014). One study that included 19 women who had been diagnosed with breast cancer, found high levels of stress in regards to uncertainty, reactions from their family members, perceptions from society, and worry of recurrence (Al-Azri, et al., 2014). Similarly, another study that included 18 women with metastatic breast cancer, all described their diagnosis as a significant and life-changing event with feelings of uncertainty, anxiety, and fear (Lewis, Willis, Yee, & Kilbreath, 2015).

Depression and Anxiety. Much research has been done on depression and anxiety and its prevalence among women following a diagnosis of breast cancer. According to Tojal and Costa (2015), the rates of depression are higher among breast cancer survivors, than that of the general population or in patients with other types of cancer. Brem and Kumar (2010) also report higher depression rates in individuals with breast cancer over other cancer types, and concluded that this is related to menopause and estrogen decline as these are both related to depression. In one study, they found that more than half (56.5%) of the women interviewed had clinically significant depressive symptoms and only a fifth (18.4%) had no clinically significant symptoms

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(Tojal & Costa, 2015). Another study compared younger and older patients, and the differing effects age had in relation to cancer. The results showed significant differences in rates of depression, with lower levels among older patients. This study also showed that younger women relied directly on social support to cope with their depression, and older women relied on hope as an inner resource and did not turn to social support to deal with their depression (Hasson-Ohayon, Goldzweig, Dorfman, & Uziely, 2014). Similarly, one study which assessed post-treatment distress in breast cancer also found that younger women were significantly more likely to experience depression, anxiety, and cancer-related stress and women who self-reported a history of depression and/or anxiety were more likely to experience an elevated rate of depression between 3 weeks and 3 months' post-treatment (Costanzo et al., 2007).

Impact on Relationships. There are many studies that have looked at the impact on intimate relationships after a diagnosis of breast cancer and have shown that this impact can be significant. Many couples have a difficult time coping with a diagnosis, and face an increased level of distress in relation to their communication, changes in their lifestyle, taking on additional roles in the household, change in work schedules, issues with their physical relationship, and thoughts of mortality and loss (Duggleby, Thomas, Montford, Thomas, Nekolaichuk, Ghosh, Cumming, & Tonkin, 2015). A study including 30 individuals was completed to evaluate the impact of breast cancer on intimate relationships. They found many relationship dynamics among these couples including; communication barriers, withholding-withdrawing information, under-burdening, conflicting intentions, negotiating support, accommodating change in one another, coping with sexual disruption, and incorporating death and separation (Fergus & Gray, 2009). This study also found that when these challenges were successfully overcome and worked through,

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the couples relationships were strengthened and partners were drawn closer to one another (Fergus & Gray, 2009).

Interestingly, one study compared 100 breast cancer patients with 100 disease-free healthy men and women. In this study, they found that 52% of the breast cancer patients felt that their friends and family members had avoided them since their diagnosis, and 61% of the disease free healthy men and women admitted to avoiding those with cancer due to their own vulnerabilities surrounding the idea of death and dying (Trusson & Pilnick, 2016). These research findings, among others, reinforce the importance of offering support to those impacted by cancer in order to move forward and provide overall well-being and improved quality of life.

Current Psychosocial Interventions Used

Psychosocial interventions have been shown to promote the quality of life and well-being for the cancer community. According to Fawzy (1999) the most effective psychosocial interventions include education, coping, emotional support, and psychotherapy. “Psychosocial interventions also have a range of pleasing effects. They can help patients to cope better with very distressing situations, they can positively improve affective state, and they certainly help to reduce the physical side effects of the disease or its treatment” (Fawzy, p. 1559, 1999). Hope and optimism, sometimes referred to as positivity or positive outlook, are among the psychosocial interventions that will be looked at in this research.

Hope. Hope is conceptualized among some of the studies as the belief that an individual has a desire and the motivation to move towards their goals and the energy to initiate and maintain future goals (Thornton, Cheavens, Heitzmann, Dorfman, Wu, & Andersen, 2014; Hasson-Ohayon et al., 2014). One study on hope and cancer survivorship examined the perceived role of

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hope in restoring health, and found that attachment and spiritual resources were vital. The findings also suggest that hope, attachment, mastery, survival, and spirituality may improve the hope-physical health relationship among breast cancer survivors (Scioli, Scioli-Salter, Sykes, Anderson, & Fedele, 2015).

Another study included 32 women who participated in mindfulness, hope therapy, and biobehavioral treatment to determine if it would improve their affect and quality of life. They found that negative mood and anxiety showed improvement, one third of participants achieved reliable change, and negative affect was decreasing while positive affect and quality of life were increasing (Thornton, Cheavens, Heitzmann, Dorfman, Wu, & Anderson, 2014). Similar findings were shown in a study done on mindfulness based stress reduction (MBSR). This is another common intervention that has been used to train individuals for stress-reduction. Results showed that MBSR tactics decreased symptoms of fatigue, mood disturbance, stress, anxiety, depression, anger, and confusion in a sample of 84 women with breast cancer (Lengacher et al., 2011).

Optimism. Similarly to hope and mindfulness, research shows that optimism can promote better emotional and psychological adjustment, feelings of physical attractiveness, and greater satisfaction with life (Shelby, Crespino, Gregorio, Lamdan, Siegel, & Taylor, 2008). Optimism has been operationalized in some studies as “a personality trait that can be thought of as the generalized expectancy of good outcomes, even in the face of adversity” (McGregor, Bowen, Ankerst, Andersen, Yasui, & McTiernan, p. 339, 2004; Shelby, Crespino, Wells-Di Gregorio, Lamdan, Siegel, & Taylor, p. 433, 2008). In one study, 77 African American women who had recently completed treatment were chosen. They found that the levels of optimism, social support, and adjustment among these women were similar to other samples, however, in this study,

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findings suggested that social support could be an important resource for women with low optimism as optimism was negatively associated with psychological distress and positively associated with well-being and social support (Shelby, Crespino, Gregorio, Lamdan, Siegel, & Taylor, 2008).

Another study examined the relationship between optimism, perceived risk of breast cancer, and cancer worry among 1,366 women. Not all of the women who participated in this study had a diagnosis of breast cancer, as they were a mixed community-based sample. The results showed that the mean optimism score was similar among those who did not have breast cancer to those who were breast cancer survivors. Results also showed that the women with higher levels of optimism had lower levels of cancer worry and distress, which is consistent to previous findings as these individuals normally expect good outcomes (McGregor et al., 2004).

Positivity. According to Caprara et al. (2015), positivity is defined as “a basic and broad tendency to view oneself, one’s life and one’s future with a positive outlook” (p. 525). A sample of 27 women were invited to take part in a semi-structured interview to assess the process of positive change after a cancer diagnosis. The three main responses regarding positive change were; increase in self-confidence, belief about what is important in life, and an exploration of values and beliefs with increased empathy for others (Horgan, Holcombe, & Salmon, 2010). Finally, in a study of 135 patients with pulmonary, colorectal, and breast cancer, they found that positivity levels did not differ between males or females across different cancer diagnoses, but they did find that positivity was associated with fewer physical, emotional, cognitive, and social impairments and those with higher positivity levels reported fewer health related conditions. Therefore, “we are inclined to believe that positivity equips patients with the attitude that is needed to deal

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efficaciously with severe illness by predisposing them to comply with medical treatment, to benefit from available supports, and to use cognitive strategies that enable them to cope with illness” (Caprara et al., p. 531, 2015).

Purpose Statement

The literature presented in this report suggests that psychosocial interventions play an important role in the lives of those impacted by breast cancer. Not only can these interventions improve psychological and physical health outcomes, they can also promote the well-being and quality of life for individuals and families facing cancer. As social workers, it is imperative that we have the knowledge and skills to effectively and competently work with our clients. In order to fully understand the impact and role that hope and optimism has on the psychosocial adjustment to breast cancer, a systematic review will be conducted.

Conceptual Framework

One of the primary goals of social work practice is to provide support, help promote positive change, and enhance the resilience of those we work with. By using stress and coping theory as the primary framework to this research, it helps identify how resiliency theory can then grow out of it in order to reduce stress and enhance ones quality of life and well-being. Resiliency can be a very effective tool when working with individuals who have been effected by a cancer diagnosis. Research suggests that those with a higher resilience score experience less fatigue, depression, and a higher quality of life. One study showed that individuals who were resilient played an active role in their problem-solving, experienced situations in a positive-light during a time of suffering, gained positive attention, and focused in on faith to maintain a positive life view (Ledesma, 2014).

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Stress and Coping. Stressful and traumatic life events lead individuals to having and experiencing many different emotions, actions, and beliefs due to the uncertainty of these situations. Many times, denial is present in those who are faced with a significant illness, such as breast cancer (Lazarus, 1999). Stress and Coping theory historically used problem-focused coping, emotion-focused coping, and meaning-focused coping as a framework for studying stress (Folkman, 2010). These coping models are directly related to what an appropriate intervention would look like for a breast cancer patient in all stages as they have utilized tactics for problem-solving, information gathering, decision making, emotional support, goal revision, and focusing in on strengths to motivate and allow individuals to concentrate on their coping needs (Folkman, 2010).

Resiliency. Resiliency theory can be defined as, “the process of identifying or developing resources and strengths that enable the individual to flexibly manage adversity, leading to positive health outcomes such as a sense of confidence/mastery, self-transcendence, self-esteem, and ultimately enhanced quality of life (conceptualized as well-being)” (Eicher, Matzka, Dubey, & White, p. 5, 2015). Although an individual does not have any power in relation to their cancer diagnosis, they may have the power to control what actions and/or feelings they may be having in their daily lives. One intervention that was found to be useful in reducing distress and improve quality of life in breast cancer patients, was the use of stress management and resilience training using a group-based cognitive behavioral therapy model. In this model, individuals were taught to redirect their stressful experiences and instead focus in on adjustment and growth (Molina, Yi, Martinez-Gutierrez, Reding, Yi-Frazier, & Rosenberg, 2013). Likewise, Loprinzi, Prasad, Schroeder, & Sood (2011) suggest that individual resilience can be increased by training which

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then offers meaningful outcomes and is a feasible and useful intervention that promotes the well-being of an individual.

As we have learned, breast cancer patients experience many obstacles and barriers prior to, during, and post treatment. Many individuals look to accomplish goals and develop a sense of meaning during this difficult time. Using stress and coping theory and resiliency theory as a framework helped shape this research from the beginning all the way through to the search terms and ideas. Hope and optimism inform my research question, search terms, inclusion criteria, and exclusion criteria. This framework could also help healthcare providers, patient's, and all individuals impacted by cancer in the process of identifying inner strengths in order to adapt to new stressors, finding purpose and meaning in life, and adjusting to a new normal.

Methods

A systematic literature review “attempts to identify, appraise and synthesize all the empirical evidence that meets pre-specified eligibility criteria to answer a given research question. Researchers conducting systematic reviews use explicit methods aimed at minimizing bias, to produce more reliable findings that can be used to inform decision making” (Cochrane Collaboration, 2016).

Research Purpose

The purpose of this systematic literature review was to explore the question: How does using hope and optimism effect the psychosocial adjustment to a diagnosis of breast cancer in women?

Because the focus of this study was on hope and optimism and their role in the adjustment to breast cancer, the following terms are defined. Hope is a positive state of mind and emotion that is defined as, “a pattern of thinking which includes both the capacities and routes one

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has to his or her desired goals and the motivation one has in order to use these capacities and routes” (Hasson-Ohayon, Goldzweig, Dorfman, & Uziely, p. 1305, 2014). Optimism refers to the belief that situations will turn out more positive than negative and is defined as, “a personality trait that can be thought of as the generalized expectancy of good outcomes, even in the face of adversity” (McGregor et al., p. 339, 2004). Psychosocial adjustment is an ongoing process that was defined in this study as the emotional health, feelings, and behaviors of an individual and their response to all aspects in their environment (Hoskins & Budin, 2000).

Types of Studies

The collection of data for this systematic literature review was done through analyzing both qualitative and quantitative studies. According to Milner (2015), both are helpful in the systematic review process. Milner suggests that using a qualitative research design is most helpful in answering questions regarding a person’s beliefs and values, whereas using a quantitative research design can be most helpful in answering questions about effective treatment and therapy interventions with providing an unbiased view (Milner, 2015).

Inclusion Criteria. Because the purpose of this systematic literature review was to look at the role of hope and optimism in the psychosocial adjustment of women with breast cancer, the researcher reviewed all relevant research to the topic. For the purpose of this study, the term breast cancer includes all stages and types of breast cancer that has been diagnosed among women of all ages. Women who have been diagnosed a single time, have experienced recurrence, or have been diagnosed separately a second time were included and women currently receiving treatment, are out of treatment, or are in remission were also included in this study. The following search terms were used in each database; “*breast cancer*” and, “*hope*”, “*optimism*”,

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“interventions”, “coping”, “psychosocial”, “adjustment”, “meaning”, “resilience”, “well-being”, “quality of life”, “positivity”, and “positive attitude”.

Exclusion Criteria. Although men contribute to 1% of breast cancer cases, they were excluded in this study as the focus is specifically on women’s adjustment to breast cancer (National Breast Cancer Foundation, 2016). Any articles published prior to the year 1997 were not used. Additional exclusion criteria included: articles that focused on men with breast cancer, had a focus on other cancer types, articles that focused on family or friends and not the woman diagnosed with breast cancer, and studies that focused on oncology as a whole. Articles that did not mention hope or optimism were excluded, and articles that discussed alternative interventions that did not fit this researcher’s inclusion criteria were also excluded in the search.

Search Protocol

This review used and analyzed peer-reviewed articles. Information published from the years 1997-2016 were included in this search. The databases that were used to retrieve peer-reviewed literature included PsycINFO (PsycNet), SocINDEX, and MEDLINE.

The first database the researcher used was PsycINFO (PsycNet) which produced seventy-eight articles after combining the search terms of, “breast cancer” AND, “hope”, OR “optimism”, OR “positive emotions”, OR “positivism”, OR “quality of life”, OR “well-being” AND “adjustment”, OR “adaptability”. Out of the seventy-eight articles produced, sixty-three articles did not meet criteria. Seven articles were published prior to the year 1997, the other articles did not meet criteria due to no mention of hope or optimism as an intervention or the focus was on other cancer types or people, such as men or couples. Three articles could have been used, however, were not accessible. During an initial search and analysis of the abstracts, five articles were included.

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The next database utilized was SocINDEX which produced a smaller number of articles. Fifteen results were produced after combining the search terms of, “breast cancer” AND “hope” OR “optimism” AND “adjustment”, OR “well-being”. When additional inclusion terms were searched, no results were found. Out of the fifteen articles originally produced, fourteen articles did not meet criteria. Two articles were published prior to the year 1997, two articles were duplicates from the above database, and the others did not meet other inclusion criteria. During an initial search and analysis of the abstracts, one article was included.

The final database used was MEDLINE which produced eighty-three results after combining the search terms of, “breast cancer” AND “hope” OR “optimism” AND “psychosocial adjustment” OR “well-being” OR “coping”. Eighty articles did not meet criteria. One article was published prior to the year 1997, three articles were already included from the above databases, and the others focused on alternative interventions or had no mention of hope or optimism. After an initial search and analysis of the abstracts, three articles were included.

A total of 176 articles from the databases searched were produced. Initially, nine articles were thought to meet criteria. After further analysis, four articles did not identify a measurement for psychosocial adjustment which is the focus of this research, therefore, did not fit the inclusion criteria. Five articles out of the 176 articles analyzed met the inclusion criteria for this systematic review. Out of these five articles used in this study, three are longitudinal design, one is cross-sectional, and one is a prospective design. A chart was created and includes the title, author, and date, the participants and sample size, the design, the psychosocial measurement used, and the primary finding in each of the five articles (see table 1).

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Table 1.

Article, Author, and Date	Participants/Sample	Design of Study	Psychosocial Adjustment Measure Used	Primary Findings
<p>Self-Efficacy, adjustment style and well-being in breast cancer patients: a longitudinal study</p> <p>Rottman, Dalton, Christensen, Frederikson, and Johansen</p> <p>2010</p>	<p>684 women with a diagnosis of breast cancer who participated in a 6-day residential rehabilitation course in Denmark.</p>	<p>Longitudinal study</p> <p>Quantitative Design</p>	<p>Mental Adjustment to Cancer Scale.</p> <p>5 subscales (fighting spirit, fatalism, cognitive avoidance, anxious preoccupation, and helplessness-hopelessness)</p> <p>Score 1-4 (“it definitely does not apply” to “it definitely applies”)</p>	<p>Greater self-efficacy at baseline was associated with emotional well-being after 12 months.</p> <p>Subscales: fighting spirit, anxious preoccupation, and helplessness-hopelessness mediated the effect of self-efficacy.</p> <p>Self-efficacy also had a direct effect on emotional functioning.</p> <p>Association between self-efficacy and education, time since diagnosis, and well-being and age, education, and time since diagnosis.</p>

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Article, Author, and Date	Participants/Sample	Design of Study	Psychosocial Adjustment Measure Used	Primary Findings
<p>Optimism, social support, and adjustment in African American women with breast cancer</p> <p>Shelby, Crespín, Wells-Di Gregorio, Lamdan, Siegel, and Taylor</p> <p>2008</p>	<p>77 African American women with stage 0-III A nonmetastatic breast cancer who had completed surgical treatment.</p>	<p>Longitudinal study</p> <p>Quantitative Design</p>	<p>Medial Outcomes Study 17-item Mental Health Inventory (MHI)</p> <p>Score 1-6 (“all of the time” to “none of the time”)</p>	<p>Social support was a moderator of the optimism-adjustment relationship. It buffered the negative impact of low optimism on psychological distress, well-being, and psychosocial functioning.</p> <p>Women with higher levels of social support experienced better adjustment even with low optimism and those with high optimism did not have added benefit with increased social support.</p>
<p>Short Communication: Stress-related predictors of optimism in breast cancer survivors</p> <p>Karademas, Karvelis, and Argyropoulou</p> <p>2007</p>	<p>92 breast cancer survivors who had undergone a mastectomy.</p>	<p>Cross-Sectional study</p> <p>Quantitative Design</p>	<p>Resilience Self-Efficacy scale Likert-Type</p> <p>Score 1-4 (“not at all” to “a lot”)</p>	<p>Illness-related stress exerted influence on optimism through coping, whereas self-efficacy exerted influence both directly and through coping.</p> <p>Stress was predicted by time since diagnosis and time since mastectomy.</p>

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Article, Author, and Date	Participants/Sample	Design of Study	Psychosocial Adjustment Measure Used	Primary Findings
<p>Optimistic Personality and Psychosocial Well-Being During Treatment Predict Psychosocial Well-Being Among Long Term Survivors of Breast Cancer</p> <p>Carver, Smith, Antoni, Petronis, Weiss, and Derhagopian</p> <p>2005</p>	<p>163 early stage breast cancer patients and were reassessed again 5-13 years after their surgery (long-term breast cancer survivors).</p>	<p>Prospective Design</p> <p>Quantitative Design</p>	<p>Self-Related Quality of Life Scale included 10 questions addressing diverse aspects of the participant's life.</p> <p>Score 1-7 ("terrible" to "delighted")</p>	<p>Initial reports of well-being were relatively strong predictors of follow-up well-being.</p> <p>Initial optimism and marital status also predicted follow-up adjustment.</p> <p>There is substantial continuity of subjective well-being over many years of breast cancer survivorship.</p>

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Article, Author, and Date	Participants/Sample	Design of Study	Psychosocial Adjustment Measure Used	Primary Findings
<p>The First Year After Breast Cancer Diagnosis: Hope and Coping Strategies as Predictors of Adjustment</p> <p>Stanton, Danoff-Burg, and Huggins</p> <p>2002</p>	<p>70 women with Stage I-II breast cancer who were newly diagnosed, who received surgical treatment at one of two hospital sites.</p>	<p>Longitudinal study</p> <p>Quantitative Design</p>	<p>The Profile of Mood States (POMS) was completed at all assessment points.</p> <p>Score 1-5 (“not at all” to “extremely”)</p> <p>They created a POMS Distress Index within their study</p>	<p>Coping through active acceptance at diagnosis predicted more positive adjustment across time.</p> <p>Avoidance-oriented coping predicted greater fear of cancer recurrence.</p> <p>Religious coping was more useful for less hopeful women.</p> <p>Approach-oriented coping added benefit for highly hopeful women.</p>

Findings

Throughout the data analysis process, common themes emerged. The five studies that were included in this review were broken down by category. All five articles included women who had completed some type of treatment for their breast cancer diagnosis. Four of the studies looked at women who had received surgical treatment, three were specific to either receiving a lumpectomy (breast conservation) or mastectomy, where as one was looking only at women who had undergone a mastectomy, and the final study looked at women who had received a primary treatment, although did not state the specific treatment given.

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The focus of two of the articles was on optimism as a critical variable for long-term adjustment and/or well-being. Two additional articles focused on a variety of coping strategies to predict positive adjustment over time for those with high hope or optimism levels, and one article focused on self-efficacy as a predictor of adjustment styles. The four major themes that the researcher found throughout the articles were; optimism levels, medical and demographic variables, coping strategies, and fear of cancer recurrence.

The five studies that were included in this research used a variety of adjustment scales to track the overall quality of life and well-being of the participants. Because these scales were not consistent, it is difficult to determine the true effects of hope and optimism in the psychosocial adjustment to breast cancer. The five scales that were used are described below.

Adjustment Scales. Rottmann, Dalton, Christensen, Frederiksen, & Johansen (2010) used the Mental Adjustment to Cancer scale which is comprised of five sub scales to track fighting spirit, fatalism, cognitive avoidance, anxious preoccupation, and helplessness-hopelessness. Each scale offered a range from one to four, with one being, “it definitely does not apply” to four being, “it definitely applies”. They added up the total sum score for each participant. If the total score was high, it represented a higher level of a respective adjustment style.

Shelby, Crespin, Gregorio, Lamdan, Siegel, & Taylor (2008) used the Medical Outcomes Study 17-item Mental Health Inventory (MHI). This scale consisted of two sub scales to assess psychological distress and psychological well-being. The scale offered a range from one to six, with one being, “all of the time” to six being, “none of the time”. The higher the score on the well-being scale indicated better psychological adjustment, whereas higher scores on the distress scale indicated more distress for participants.

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Karademas, Karvelis, & Argyropoulou (2007) used a Resilience Self-Efficacy scale that consisted of a seven item Likert-type scale ranging from one to four, with one indicating, “not at all” to four indicating, “a lot”. The questions that were included in this scale, obtained responses to determine if participants had the ability to bear negative consequences in stressful situations.

Carver, Smith, Antoni, Petronis, Weiss, & Derhagopian (2005) used a variety of measures to assess psychosocial adjustment in breast cancer in earlier projects, as they used a longitudinal design. One scale that was used was the Self-Related Quality of Life scale which included ten questions addressing diverse aspects of the participant’s life. This scale offered a range from one to seven, with one being, “terrible” and seven being, “delighted”. This measure was used several times throughout this study to track results.

Stanton, Danoff-Burg, & Huggins (2002) used a psychological adjustment scale called the Profile of Mood States (POMS). This scale consists of 65 adjectives and is rated on a 5-point scale, and offers a range from one to four, with one being, “not at all” to four being, “extremely”. They assessed both positive and negative mood, with high scores indicating higher distress on the POMS Distress Index which was created in this study.

Optimism Levels. As defined earlier in this paper, optimism is “a personality trait that can be thought of as the generalized expectancy of good outcomes, even in the face of adversity” (McGregor et al., p. 339, 2004). Some of the research has compared initial optimism and high vs. low optimism as a factor in the adjustment and well-being following a breast cancer diagnosis.

Shelby et. al (2005) looked at the relationship between optimism, social support, and adjustment in African American women with non-metastatic breast cancer. In their study, they used a Life Orientation Test (LOT) to measure optimism. This scale included eight items and offered a range from zero to four, with zero indicating, “strongly disagree” to four indicating,

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“strongly agree”. Total scores added up to 32, with the higher score indicating higher optimism. Levels of optimism were found to be consistent in this study as were found in previous studies, with the mean optimism score being 30.70. In terms of optimism levels, they found that women with low optimism had greater well-being with higher levels of social support, although there was no association with social support among women with high optimism (Shelby, Crespin, Gregorio, Lamdan, Siegel, & Taylor, 2008).

Carver et al. (2005) predicted that optimism would similarly predict well-being long term. This prospective design used a sample early in the cancer experience compared to later in the cancer experience. In this study, they used the Life Orientation Test (LOT) to assess generalized optimism versus pessimism. This scale contains eight items, and offers a range from one to four, with one indicating, “I agree a lot” and four indicating, “I disagree a lot”. In terms of optimism they found that the level of initial optimism predicted more positive optimism and long term well-being at the follow-up.

Karademas, Karvelis, & Argyropoulou (2007) looked at the relationship between optimism, self-efficacy, illness-related stress, coping, and medical factors in the psychosocial adjustment of breast cancer survivors who had undergone a mastectomy. They used the Personal Optimism Scale which consists of eight items offering a range from one to four, with one indicating, “not agree”, and four indicating, “agree a lot”. Through their results, they found that “optimism is predicted by self-efficacy directly and through focusing on the positive, as well as by stress through both coping strategies” (Karademas, Karvelis, & Argyropoulou, p. 164, 2007).

Hope. Stanton, Danoff-Burg, & Huggins (2002) predicted that social support seeking, problem-focused coping, positive reinterpretation, and active acceptance may be a predictor of more positive adjustment for women high in hope vs. low in hope. Although this finding does

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not fall under the theme of optimism, it was mentioned here as the focus of this research is on both optimism and hope in the psychosocial adjustment to breast cancer. In their study, they used the Hope Scale containing eight items to assess goal-directed determination and ability to achieve goals. They found that hope positively impacted adjustment, over time, when using specific coping strategies, such as turning to religion or spirituality. Specifically, they found that women who identified high hope were less likely to turn to religion, as women low in hope who found turning to religion was more useful (Stanton, Danoff-Burg, & Huggins, 2002).

Medical and Demographic Variables. Another common theme among all five of the articles discussed the differences that both medical and demographic variables play in the adjustment to breast cancer. For purposes of this research study, the term medical variable includes data involving; time since diagnosis, stage of cancer, type of surgical procedure, time since surgery, medication, chemotherapy, radiation, and/or hormonal treatments. In comparison, the term demographic variable refers to data involving; age, marital status, education level, income, employment status, and ethnicity (Carver et al., 2005; Karademas, Karvelis, & Argyropoulou, 2007; Rottmann et al., 2010; Shelby et al., 2005; Stanton, & Danoff-Burg, & Huggins, 2002). The correlation among these variables within all five studies are explained below.

Demographic Variables. Carver et al. (2005) found that more demographic variables impacted women's adjustment than medical variables in their study, although there was no connection to hope or optimism with this variable in their study. Within their sample size of 163 women, findings showed that women who had a significant other earlier in the cancer experience compared with later reported less depression (158), less mood disturbance (158), better quality of life (156), and less social disruption (152). Results also found that higher education played a role in having less depression and less social disruption at the later follow-up compared to those with

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lower education levels. On the other hand, being employed reported more social disruption (152) and those who identified as Hispanic (n=33) reported more follow-up depression and social disruption than that of the white (n=113) or black participants (n=14) (Carver, Smith, Antoni, Petronis, Weiss, & Derhagopain, 2005).

Rottmann et al. (2010) found limited correlation between demographic variables and adjustment in their study which included 684 participants, but did report similar findings to that of Carver et al. (2005) in terms of education levels. Their findings showed that higher education levels, which in this study amounted to 343 individuals were associated with better self-efficacy and better physical functioning than those with lower education levels, which included 341 participants in this study.

Shelby et al. (2008) found differing results than the above studies, with no association between adjustment and education or partner status. They did, however, find that among their 77 participants, being employed (43) was associated with higher psychological well-being and lower distress, which is different than that of Carver et al. (2005). They also found that age and income were negatively associated with psychological distress and concerns. Stanton, Danoff-Burg, & Huggins (2002) also had some differing results among their sample of 70 women and found that age was one of the only demographic variables that had a significant correlation to adjustment. They found that older women reported less distress, more vigor, and less fear at each follow-up (3 months and 1 year). All of the studies mentioned here did have a connection to adjustment with this variable, however, no connection was found between hope and optimism with the demographic variables used.

Medical Variables. Although Karademas, Karvelis, & Argyropoulou (2007) did not find a strong correlation between optimism and demographic variables among their 92 participants,

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they did find that certain medical variables, including; time since diagnosis and time since mastectomy predicted optimism. With this finding, they also noted that "...more time since initial diagnosis is associated with more stress and less optimism, whereas more time since mastectomy is related to less illness-related stress and more optimism" (p. 166). Similarly, Rottman et al. (2010) also found that more time since diagnosis was associated with poorer self-efficacy and well-being in their study. Carver et al. (2005) found a correlation between time since surgery and generalized optimism that aligns with the findings of Karademas, Karelis, & Argyropoulou (2007). Specifically, Carver et al. (2005) suggests that more time since surgery showed less mood disturbance for 158 participants, less depression for 158 participants, and less social disruption at the later follow-up for 152 of their participants.

Both Shelby et al. (2008) and Carver et al. (2005) found that individuals who received chemotherapy following a diagnosis of breast cancer experienced greater psychological distress, greater physical concerns, and greater psychosocial concerns than those who did not receive chemotherapy. There was however, no association with the stage of disease, type of surgery, time since surgery, radiation, and hormonal therapy in their study (Shelby et al. 2008).

Coping Strategies

Throughout the research, various coping strategies have been found to be useful for individuals in their adjustment to breast cancer. For purposes of this research, the term coping strategy is defined as, "willful cognitive or behavioral efforts to manage external or internal demands and as contingent on appraisal" (Rottmann et al., p. 828, 2010). Furthermore, according to Stanton, Danoff-Burg, & Huggins (2002), "Given the marked variability, it becomes important to specify factors that set the stage for adaptive survivorship or that bode ill for women's adjustment over the long run" (p. 93).

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Acceptance. A successful coping strategy found in three of the articles was acceptance or positive attitude. These terms are defined as coming to terms with the reality of the situation and holding the expectancy that outcomes will be positive (Stanton, Danoff-Burg, & Huggins, 2002).

Stanton, Danoff-Burg, & Huggins (2002) used the scale, COPE, which is a 60-item inventory that includes 15 coping strategies. The scale offered a range from one to four, with one indicating, “I don’t do this at all”, to four indicating, “I do this a lot”. They found that the most frequent coping approach was acceptance, and although it was not related to dispositional hope, it was connected with optimism. They contributed this finding to the prediction that individuals facilitate acceptance if they hold the expectancy of positive outcomes. Coping through acceptance was also associated with decreased distress and positive mood after one year. Furthermore, women who actively accepted their cancer diagnosis were found to have a more positive adjustment long-term.

Karademas, Karvelis, & Argyropoulou (2007) also looked at differing coping strategies, including; focusing on the positive, social support, cognitive avoidance, passive hope, and behavioral avoidance. They used a revised Ways of Coping Questionnaire to identify effective coping strategies among their participants. This survey offered a four-point Likert-type scale with a rating of one to three, with one being, “not used” and three being, “used a great deal.” Results surrounding the differing coping strategies found that focusing on the positive was positively related to optimism and avoidance was negatively associated to optimism.

Similarly, Rottman et al. (2010) created a positive attitude scale to evaluate adjustment by combining the fighting spirit and fatalism sub scale. Their results indicated that fighting spirit was correlated with adaptive adjustment and related to fatalism, however, fatalism was not related to well-being alone.

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Religion/Spirituality. Turning to Religion and/or Spirituality as a coping strategy was also found to have a strong correlation to adjustment in one of the studies. These terms are defined in this study as relying on a higher power in order to have a sense of control to overcome obstacles (Stanton, Danoff-Burg, & Huggins, 2002).

Stanton, Danoff-Burg, & Huggins (2002) found a positive interaction between hope and coping through religion. For women low in hope, they found that if they turned to religion it would create positive adjustment over time, and for women who did not turn to religion it would predict poorer adjustment over time. Their findings suggest the opposite, and in contrast they found that women who were high in hope had better adjustment when they turned less to religious coping.

Social Support. A coping strategy that was found to have a strong correlation within three of the articles was social support. There are multiple forms of social support. In these studies, this concept included;

- (1) appraisal support or the availability of someone to talk to about problems,
- (2) tangible support or the availability of material aid or instrumental support,
- (3) belonging support or the availability of people to do things with, and
- (4) self-esteem support or the availability of positive comparison when comparing the self with others (Shelby et al, p. 436, 2008).

The study done by Stanton, Danoff-Burg, & Huggins (2002) predicted that social support seeking, problem-focused coping, positive reinterpretation, and active acceptance may be a predictor of more positive adjustment for women high in hope vs. low in hope. Their results were consistent with their hypothesis, as they found that social support was more effective for women

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who were high in hope. They found highly hopeful women who seek social support is more effective than that of women who have low hope. They contribute this finding to the fact that women low in hope do not use positive appraisal as often and take a more avoidant form of coping due to their level of perceived social support.

Carver et al. (2005) included two sub scales in their study to assess social activities and recreation and pastime activities. They used the Sickness Impact Profile to measure the adverse impact of breast cancer and treatment on social and recreational behavior. The higher the score indicated more disruption. Within this study, they found that women who have better quality among their social resources would likely have an easier trajectory of psychological well-being across time. They also noted that the quality of these social resources during treatment and afterward could have an impact on the level of well-being.

The most significant results from Shelby et al. (2008) found that:

higher levels of social support were associated with greater well-being among women with low levels of optimism, but there was no association between social support and well-being among women with high optimism. For psychosocial concerns, higher social support was associated with fewer concerns among women with high optimism, but social support did not impact psychosocial functioning among women with high levels of optimism (p. 439-440).

These results were assessed using the short-form of the Interpersonal Support Evaluations List (ISEL). This scale includes 16 items to assess different types of support and offers a scale from one to four, with one indicating, “definitely true” to four indicating, “probably false”. Total

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scores ranged from 16-64, with higher scores indicating greater perceived social support. Overall, this study found that social support is an important resource when an individual has low optimism, and serves as a resource for coping with stressors to improve quality of life.

Fear of Cancer Recurrence

Finally, fear of cancer recurrence is worth discussing, as it is known to be a significant worry among the cancer community as a whole. In the study by Karademas, Karvelis, & Argyropoulou (2007), they found that more than one third or 36.6% of their participants rated fear and insecurity about the future as very stressful, and only 23.3% of participants rated it as not stressful. Likewise, another study looked at fear of recurrence, and used a short version of the Northouse (1981) Fear of Recurrence scale which included a six-item scale asking questions such as; "I worry that my cancer will return" (Stanton, Danoff-Burg, & Huggins, p. 96, 2002). Results indicated a mean score of 18.49 at three months and 18.35 at one year, therefore, these results did not change significantly at each assessment point, but were still above the midpoint score which ranged from 6-30 (Stanton, Danoff-Burg, & Huggins, 2002). Results in this study did not have a strong connection to hope or optimism, but did find that using strategies, such as positive reinterpretation, may be effective for highly hopeful women in regards to positive outcomes and recovery. They contribute this finding to the fact that women who are low in hope use a more avoidant form of coping, which may predict cancer progression, whereas highly hopeful women have a belief that they contribute positively and benefit from their experiences. (Stanton, Danoff-Burg, & Huggins, 2002).

The results surrounding fear of cancer recurrence among this population reiterates the importance of this research topic. By evaluating the most appropriate interventions, we can provide

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the opportunity for women to improve their overall well-being and quality of life in terms of their psychosocial adjustment when faced with a breast cancer diagnosis.

Discussion

This systematic review aimed to examine the current research regarding the role of hope and optimism in the psychosocial adjustment to a diagnosis of breast cancer in women. Through the research and findings, it is evident that a breast cancer diagnosis is life changing and comes with both psychological and physical concerns for those impacted. This study included five articles that were systematically reviewed and focused on women who had undergone some type of treatment for their cancer diagnosis, including; a lumpectomy (breast conservation), mastectomy, chemotherapy, radiation therapy, immunotherapy, and/or medication use. Although there was limited research found on the role of hope in breast cancer, many of the studies found that differing levels of optimism linked with another coping strategy improved the psychosocial adjustment, well-being, and/or quality of life for women over time.

There were many strengths found among the five studies analyzed. One strength that was identified was that four of the five studies involved a design where they could examine participants throughout different points of their cancer experience. Only one study used a single assessment. These studies examined the correlation between short term and long term adjustment after a breast cancer diagnosis. Overall, their results found that there was a strong correlation between participant's well-being shortly after diagnosis or treatment compared to their long-term follow up. Specifically looking at hope and optimism, findings determined that the level of initial optimism predicted more positive optimism and long term well-being at follow-up, which in many of the studies follow-up was at one year after diagnosis or treatment. In addition to hope and optimism, other strategies did seem to have a positive effect on the participants overall well-being

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and quality of life in the studies that were included. These strategies included; focusing on the positive, fighting spirit, active acceptance, turning to religion, and social support which were all discussed in detail above (Carver et al, 2005; Karademas, Karvelis, & Argyropoulou, 2007; Rottman et al., 2010; Stanton, Danoff-Burg, & Huggins, 2002).

Because results found that overall adjustment shortly after a diagnosis is similar to that of a later follow-up, it is imperative that we understand the options that are presented to the individuals and treatment effects initially after one is diagnosed with breast cancer.

Body image and self-esteem is a topic that is not widely discussed, but did come up in some of the research studies as a potential barrier for women who have undergone surgery and/or treatments following a breast cancer diagnosis. Although this was not identified as a theme among this research study, studies that were included in the initial literature review did mention the impact that breast cancer has on feeling like a woman.

A study done by Wyk & Carbonatto (2010) which included eight participants, found that the women's self-image was compromised following surgery, chemotherapy, and radiation therapy. Some of the participant's reported feeling uglier, feeling different, and feeling shameful or embarrassed because of the changes in their body and breast structure. Similarly, another study found that 16-54% of women reported a dislike of their body image following their treatments (Wyk & Carbonatto, 2010). Although the above findings showed that some participants experienced a lowered self-image, the same study found that all eight participants did experience a change in their personality following breast cancer diagnosis and treatment. These personality changes included; gratefulness, having hope, focusing on the important things in life, and ac-

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ceptance. (Wyk & Carbonatto, 2010). With the findings surrounding body-image and self-esteem, it is likely that the prevalence of depression and/or anxiety are also higher due to the stressors of the physical and psychological pain following cancer treatments.

Therefore, depression and anxiety among women with breast cancer is an important aspect to discuss, although it was not identified as a major theme among this research study. As mentioned previously, the rates of depression are higher among breast cancer survivors, than that of the general population or in patients with other types of cancer (Tojal & Costa, 2015).

Many studies have found that age is a major factor in the distress level among women. Stanton, Danoff-Burg, & Huggins (2002) found that younger age showed greater distress after one year, which could be due to specific role responsibilities, treatment, and the shock that comes with a diagnosis at a younger age. Similarly, another study found that levels of depression were lower among older patients than that of younger patients. Interestingly, this study found that younger women rely on social support to cope with depression, whereas older women use hope as an inner resource and do not rely on social support to cope with their depression (Hasson-Ohayon, Goldzweig, Dorfman, & Uziely, 2014).

As described above, breast cancer and the treatments that accompany this illness incorporate many stressful events and trigger a great amount of psychological distress among women. One intervention that was not found as a major theme in this research, but has been found to be useful in other studies is belonging to a support group. A study by Trusson & Pilnick (2016) suggested that peer support is beneficial and allows an opportunity for individuals to express their worries and anxieties. They found that stoicism, sympathy/empathy, information, and humor were categories of interaction that were proven to be mutually beneficial among patients being

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treated for cancer. Shelby et al. (2008) also identified the benefits of a 10-week cognitive-behavioral stress management group in their study. Results from this group showed an increase in optimism level over time for those who participated. Furthermore, other studies have found that both in-person support groups and online support groups have been helpful because women can share the ins and outs of their cancer experiences. In this way, they have a safe place to identify and connect with one another and not feel alone throughout their cancer journey (Trusson & Pilnick, 2016).

Limitations and Implications for Research

As social workers, it is imperative that we have the knowledge and skills to effectively and competently work with our clients. Due to some of the limitations presented in this study, it is difficult to know what interventions or strategies may be more useful for our differing client populations. Many of the studies presented here were conducted in predominately white samples, with limited participants from other races. Although coping strategies including; focusing on the positive, fighting spirit, active acceptance, turning to religion, and social support were found to be helpful in the adjustment to breast cancer in some samples, this may not be the case for all the populations.

Additional research is required to understand the full impact that personality traits such as, hope and optimism, can have on the psychosocial adjustment for breast cancer survivors. Limited data was found in this study, with only five articles to systematically review. With this finding alone, it is clear that there is limited research on the specific role of hope and optimism in the psychosocial adjustment to breast cancer.

Furthermore, with the studies that were reviewed, all the psychosocial adjustment scales that were used were different, therefore, it was difficult to compare and contrast the data. The

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population of the studies, size of the studies, and the timeline of the studies were also a limitation. Many of the participants that were included were white, non-hispanic females. One study did focus on women who were African American, but this sample size was quite small, and used a single assessment point. Also, the studies relied on self-report questionnaires which could have impacted results. Data collection through qualitative in-depth interviews may have provided additional insight, clarification, and/or results. Although this research was specific to breast cancer, it may be useful in future studies to open it up to all cancer types to receive more validity in this topic.

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