Epidemiologic Trends and Issues in Breast Cancer

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Introduction

Breast cancer is the most common cancer among women in the United States (US), other than skin cancer. Though rare, men can also get breast cancer (Center for Disease Control and Prevention (CDC), 2011). Breast cancer is the second leading cause of cancer death in US women, after lung cancer. Among Hispanic women, it is the leading cause of cancer death. The chance of a woman having breast cancer is about 1 in 8 (ACS, 2013). The chance of dying from breast cancer is about 1 in 36. (ACS, 2013). Globally, breast cancer is the most common cancer in women; 16% of all female cancers (World Health Organization (WHO), 2013).

The National Cancer Institute last reported Surveillance Epidemiology End Results (SEER) data from 2006-2010 (NCI a., 2010). During that time period, the median age at diagnosis for cancer of the breast was 61 years of age (NCI a., 2010). 11% of breast cancers occur in women under the age of 35 and 25% occur in women under 40 (NCI a., 2010).

According to the Journal of American Medical Association, there is a slight increase in advanced stage breast cancer among women between the ages of 25 and 39 (Johnson, Chien, & Bleyer, 2013.) The incidence rate of breast cancer in 1976 for women aged 25-39 was 1.53 per 100,000 compared to the incidence rate in 2009-2.90 per 100,000 (Johnson, et al., 2013). In the category of 5 year or less survival, 25-39 year old women had the highest mortality rate (Johnson, et al., 2013).

On a more positive note, breast cancer death rates overall have been going down, most likely due to earlier detection and better Treatment (ACS, 2013). There are complex factors involved with breast cancer such as: causality theories, risk factors, genetic and hormonal components, prevention, treatment, psychosocial issues, quality of life, and late effects.
PROBLEM STATEMENT: With an increase in prevalence of and mortality from breast cancer in women under 40 years of age, there is a need for increased education and prevention. Women less than 40 years old diagnosed with breast cancer have a higher rate of mortality and metastatic disease and are less likely to engage in screening tests for breast cancer unless they are aware of a breast cancer family history (Johnson, et al., 2013). Advanced practice nurses are in a good position to help women become more aware of risk factors, implement preventative lifestyle changes, and detect changes in breast history and examination for early intervention (Macha & McDonough, 2012). This paper will address these issues as well as the importance of interventions to improve psychological and quality of life symptoms in breast cancer, particularly important in survivors under age 40.

Literature Review

Cancer has been effecting people for centuries, though the “modern” fight against cancer in the US may have begun with President Nixon’s declaration of a “War on Cancer” in 1971 (Lieberman, 2012). The word “cancer” was first used to describe the disease by Hippocrates, Greek physician and father of medicine, who thought tumors looked like crabs (as depicted in the photograph below from: http://www.123rf.com/photo_6833709_growing-cancer-cell.html):

![Cancer Cell Image](http://www.123rf.com/photo_6833709_growing-cancer-cell.html)

William Halsted was considered to be a founding father of modern surgery who began promoting radical mastectomy for breast cancer in the late 19th century (Napoli, 2001). This
procedure removed the cancerous breast, surrounding lymph nodes, and chest wall muscles and remained the standard treatment throughout most of the 20th century (Gray, 2000). Some surgeons like Ian McDonald and George Crile expressed concern about the radical procedures in the 1950s (Gray, 2000). Crile presented data in women’s magazines that showed the same mortality rate for women who had radical mastectomy and those with less radical surgeries (Gray, 2000).

The National Cancer Institute (NCI) funded Dr. Bernard Fisher who proved in 1985 that breast cancer was systemic rather than localized, a concept first proposed by Dr. Geoffrey Keynes in the 1930s (Napoli, 2001). Dr. Fisher’s findings supported Crile’s theory that mastectomy offered no survival advantage over tumor removal plus radiation (Napoli, 2001).

Ellen Leopold, a breast cancer survivor and feminist, traces the evolution of breast cancer treatment to broader changes in society like the women’s health movement (Gray, 2000). Leopold’s book *A darker ribbon: breast cancer, women and their doctors in the twentieth century*, provides further insight into the history of breast cancer and treatment.

The National Cancer Institute (NCI) was created by Congress in 1937 and strengthened by the National Cancer Act in 1971 (NCI, 2013). Breast cancer was first recognized as a population issue and top cancer killer thirty years ago (WHO, 2013). The Breast and Cervical Cancer Prevention and Treatment Act of 2000 signed by President Clinton, and the Native American Breast and Cervical Treatment Technical Ammendment Act of 2001 signed by President Bush provided Medicaid for women low income and underinsured women so that all were provided with treatment for breast and cervical cancer (CDC, 2012).
Risk factors for breast cancer fall into four main categories: family history/genetic, reproductive/hormonal, proliferative benign breast pathology, and mammographic density (Cuzick, 2003). Specific common risk factors for breast cancer are portrayed in Figure 1 below:

**Figure 1: Common risk factors for breast cancer**

![Common risk factors for breast cancer](image)


No direct association has been shown between smoking and breast cancer, though there are direct associations between smoking and other cancers (Key, Verkasalo, & Banks, 2001).

Though much information is available in the literature about breast cancer risk factors and diagnosis, direct causative factors for breast cancer are unknown. Early menarche and late menopause increase the risk of breast cancer by extending exposure of the breasts to oestradiol (Key, et al., 2001). Oestradiol and other female hormones affect growth of the mammary gland and are potential risk factors for breast cancer (ESHRE Capri Workshop Group, 2004).

In addition to hormonal factors, genetic mutations are an important possible cause of breast cancer. Five mutations in the genes BRCA1, BRCA2, P53, PTEN, and ATM predispose women to breast cancer (Key, et al., 2001). Though hereditary genetic mutations are a possible cause of breast cancer in a small percentage of survivors, environmental and lifestyle factors play...
a bigger role for most breast cancer survivors. In a study of 45,000 pairs of twins in three Nordic countries, hereditary factors were estimated to contribute to about 25% of breast cancer cases; environmental and lifestyle factors were estimated to contribute to about 75% of breast cancer cases (Lichtenstein, Holm, Verkasalo, et. al, 2000).

According to the American Cancer Society, the causes of breast cancer are not known. BRCA1 and BRCA2 are tumor suppressor genes that prevent cancer tumors. When these tumor suppressor mutate, cancer is more likely to develop (ACS, 2012). Most breast cancer DNA changes are not caused by inheritance, but happen in single breast cells over a woman's lifespan. The ACS added that at this time, the causes of most of the DNA mutations leading to breast cancer are not known (ACS, 2012).

Though breast cancer is mainly a postmenopausal disease, premenopausal women’s breast tumors often exhibit more aggressive features and worse prognosis (Pollan, 2010). Epidemiology of breast cancer is different in post and premenopausal women. For example, incidence of breast cancer is higher in black women at younger ages in the US and higher in non-black women over 50 years of age (Pollan, 2010.) Older adults adjust their perception about health while younger adults may hold higher expectations for their physical health (Bloom, Stewart, Chang, & Banks, 2011). Quality of life tends to be better in older breast cancer survivors compared to younger survivors (Ganz, Desmond, Leedham, Rowland, Myerowitz, & Belin, 2001).

Quality of life includes the following domains: physical well-being, psychological well-being, social well-being, and spiritual well-being (Bloom, et. al, 2004). In a study of 185 San Francisco bay area women who were under 50 years old at diagnosis and cancer free 5 years later, 92% rated their health as good or excellent though quality of life issues in the other
domains were rated lower, particularly in women under 50 (Bloom, et al., 2004). Median age of breast cancer survivors in this study was 45, and the sample included highly educated women. Women who could not speak English were also excluded, both factors contributing to selection bias, a limitation of the study (Bloom, et al., 2004).

In a cross-sectional survey of 202 Greater Boston and New Hampshire area women diagnosed with breast cancer at age 50 or younger in the last 3.5 years, general aches and pains and unhappiness with appearance were reported by more than 70% of women (Avis, Crawford, & Manuel, 2005). Younger women have greater psychological morbidity and poorer quality of life (QOL) after breast cancer diagnosis than older women (Ganz, et al., 2002). Younger breast cancer survivors at risk for impaired QOL several years after diagnosis need interventions that specifically target issues of menopausal symptoms, problems with relationships, sexual functioning, body image, depression and anxiety (Avis, et al., 2005).

Interventions to decrease morbidity and mortality in breast cancer survivors should not only focus on improving education and early detection; targeted interventions to improve QOL and psychological support are important for breast cancer survivors of all ages.

**Current State of Breast Cancer Epidemiology**

Approximately $16.5 billion is spent in the US each year on breast cancer treatment (NCI b, 2013). The NCI alone spent over $631 million on breast cancer research in 2010, more than double the amount of research dollars spent on other types of cancer (NCI b, 2013). In 2005, the Susan G. Komen foundation spent $724,073 lobbying legislators, almost double the amount from 2004, and the National Breast Cancer Coalition (NBCC) spent $432,680 during 2006 (Alexander, 2006). Breast cancer survivors have commented in psychotherapy with this author that the amount of attention breast cancer receives sometimes adds to anxiety and post-traumatic
stress as well as survivor guilt. Other cancer survivors have commented to this author that the disproportionate attention to breast cancer creates a bit of animosity.

Breast cancer research has yet to reveal direct causes of breast cancer though many risk factors are known. What is not known about breast cancer risk factors is summarized in Table 3 below:

<table>
<thead>
<tr>
<th>Table 3: What we don't know: possible breast cancer risk factors and myths</th>
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<tr>
<td><strong>Diet and vitamin intake:</strong> Many studies have looked for a link between what women eat and breast cancer risk, but so far there are no clear answers. Some studies seemed to show that diet may play a role, while others found no evidence that diet has an effect on breast cancer risk. Studies have looked at the amount of fat in the diet, intake of fruits and vegetables, and intake of meat. No clear link to breast cancer risk was found. Studies have also looked at vitamin levels, but again the results are not clear. So far, no study has shown that taking vitamins lowers breast cancer risk. Most studies found that breast cancer is less common in countries where the typical diet is low in fat.</td>
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<td><strong>Antiperspirants and bras:</strong> Internet e-mail rumors have suggested that underarm antiperspirants can cause breast cancer. There is very little evidence to support this idea. A large study of breast cancer causes found no increase in breast cancer in women who used antiperspirants. Also, there is no evidence to support the idea that bras cause breast cancer.</td>
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<td><strong>Induced abortions:</strong> Several studies show that induced abortions do not increase the risk of breast cancer. Also, there is no evidence to show a direct link between miscarriages and breast cancer.</td>
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<td><strong>Breast implants:</strong> Silicone breast implants can cause scar tissue to form in the breast. But studies have found that this does not increase breast cancer risk. If you have breast implants, you might need special x-ray pictures during mammograms.</td>
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<td><strong>Pollution:</strong> A lot of research is being done to learn how the environment might affect breast cancer risk. This issue understandably invokes a great deal of public concern, but at this time research does not show a clear link between breast cancer risk and exposure to things like plastics, certain cosmetics and personal care products, and pesticides (such as DDE). More research is needed to better define the possible health effects of these and similar compounds.</td>
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<td><strong>Tobacco smoke:</strong> For a long time, studies found no link between active cigarette smoking and breast cancer. In recent years, though, more studies have found that smoking may increase the risk of breast cancer. The increased risk seems to affect certain groups, such as women who started smoking when they were young. In 2009, the International Agency for Research on Cancer concluded that there is limited evidence that tobacco smoking causes breast cancer. The evidence about secondhand smoke and breast cancer risk in human studies is not clear. In any case, a possible link to breast cancer is yet another reason to avoid being around secondhand smoke.</td>
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<td><strong>Night work:</strong> A few studies have suggested that women who work at night (nurses on the night shift, for instance) have a higher risk of breast cancer. This is a fairly recent finding, and more studies are being done to look at this.</td>
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*Source: The American Cancer Society, 2012.*
There is a wealth of information in the literature about breast cancer morbidity, mortality, risk factors, current detection, management and treatment strategies, though strategies for caring for breast cancer patients continues to evolve (Howard & Bland, 2012). Screening techniques for breast cancer include: mammography, breast ultrasound, magnetic resonance imaging (MRI), genetic testing, clinical breast examination (CBE) and breast self-examination (BSE).

In recent years, an independent government appointed panel recommended that women over 40 should no longer get annual mammograms based on a Swedish study (Stein, 2009). The American Cancer Society, the American College of Radiology and other experts condemned that recommendation, emphasizing that the benefits of routine mammography have been clearly demonstrated and play a key role in reducing the number of mastectomies and the death toll from one of the most common cancers (Stein, 2009). A publication from Memorial Sloan Kettering Cancer Center (MSKCC) in New York City suggests that neither BSE nor CBE find breast cancer any more than mammograms, though different recommendations for screening are listed for women at high risk and women with regular risk (MSKCC, 2013).

Treatments for breast cancer include breast conservation therapy, nipple sparing mastectomy, prophylactic mastectomy, axillary staging, radiation therapy, chemotherapy, and hormonal therapies like Tamoxifen and other selective estrogen-receptor modulators (SERMs) (Key, et al., 2001). Treatment of breast cancer is evolving towards a personal algorithm (Howard & Bland, 2012). As genetic, environmental, and psychosocial research expands, personalized medicine and treatment plans will evolve to prevent breast cancer and reduce morbidity and mortality.
Literature Critique

Because of the wealth of information available in the literature, it is difficult to concisely summarize all aspects of breast cancer epidemiology, treatment, and future areas for research. Many randomized clinical trials (RCTs) and qualitative studies like those presented in this review have contributed to the vast knowledge on breast cancer at present. More literature was available on general breast cancer information compared to studies completed with young breast cancer survivors. There is a disproportionate amount of research and literature on genetic testing and heredity compared to quality of life and psychosocial issues of breast cancer survivors.

Research on physical health quality of life issues is prominent in the literature. Until recently, there have been few RCTs on improving psychological quality of life (Baucom, Porter, Kirby, Gremore, & Keefe, 2005-2006). Women demonstrate considerable psychological distress the first year after breast cancer diagnosis such as: shock, emotional numbness, depression, and anxiety (Avis, et al., 2005, Bloom, et al., 2004, and Baucom, et al., 2005-2006). Young breast cancer survivors with higher levels of marital problems reported lower levels of global, physical, emotional, and breast cancer-specific QOL; worse even than women with no partners (Baucom, et al., 2005-2006).

Zimmerman, Heinricks, & Baucom (2005) presented a meta-analysis of psychosocial interventions for breast cancer patients and concluded that traditional psychotherapy may work better for other cancer survivors compared to breast cancer survivors. Couple-based interventions may be more helpful to breast cancer survivors (Baucom, et al., 2005-2006). Non-traditional psychosocial interventions such as “Casting for Recovery,” a therapeutic weekend retreat for breast cancer survivors, has been shown to decrease emotional distress (Henry, 2012).
Lay literature on breast cancer screening and general medical information is readily available in the literature (Coleman, Coon, Mohrman, Hardin, Stewart, Gibson, Cantrell, Lord, and Heard, 2008; CDC, 2011, ACS, 2012). More literature and interventions on quality of life and psychosocial issues of breast cancer survivors is needed, particularly for young breast cancer survivors.

**Synthesis and Discussion**

Future research on quality of life and psychosocial issues of breast cancer survivors is needed, particularly for young breast cancer survivors. Young breast cancer survivors suffer from severe psychological distress, infertility, premature menopause, decreased physical activity and weight gain, marital issues, worries about children, fertility and dating (Irwin, 2012). A study at the University of California Los Angeles (UCLA)’s Jonsson Comprehensive Cancer Center in 2010 showed that chronic stress acted as a fertilizer that fed breast cancer progression (Irwin, 2012).

UCLA researchers reviewed 28 studies conducted between 1990 and 2010 that focused on overall quality of life, psychosocial effects, menopause and fertility-rated concerns, and behavioral outcomes (Howard-Anderson, Ganz, Bower, & Stanton, 2012). One of the conclusions from this review was the need for more research on efforts at intervention to manage quality of life symptoms and adverse health outcomes (Howard-Anderson, et al., 2012).

Internet-based approaches may be a viable format for engaging young breast cancer survivors in quality of life and psychosocial research (Menses, McNees, Aauero, & Jukkala, 2010). Improved communication between various healthcare professionals, a more proactive approach in recommending rehabilitation after breast cancer treatment, as well as better insurance coverage and financial assistance for physical and psychological rehabilitation are
recommended by one qualitative study of young breast cancer survivors conducted in Canada (Easley & Miedema, 2012). Advanced practice nurses must become involved in conducting literature reviews, supporting public health efforts and breast cancer organizations, conducting research to evaluate existing quality of life programs, and in developing new interventions and programs for breast cancer survivors.
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