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Biological and Psychosocial Predictors of Psychological Functioning among African American Breast Cancer Survivors

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Biological and Psychosocial Predictors of Psychological Functioning among African American Breast Cancer Survivors

A dissertation submitted in partial satisfaction of the requirements for the degree of Doctor of Philosophy in Nursing

by

Claudia Maggie Davis

2013
ABSTRACT OF THE DISSERTATION

Biological and Psychological Predictors of Psychological Functioning among African American Breast Cancer Survivors

by

Claudia Maggie Davis

Doctor of Philosophy in Nursing
University of California, Los Angeles, 2013

Professor Mary A. Lewis, Chair

California ranked within the top percentile among states that had the highest breast cancer mortality rates among African American women. To that end, the purpose of this dissertation was to gain an understanding of the breast cancer survivorship trajectory for African American women. The first arm utilized a qualitative approach to investigate the meaning of survivorship and utilization of resources among (n=155) African American breast cancer survivors (AABCS). Written responses were analyzed using Contemporary Narrative Inquiry (CNI). Results revealed that through their lived experiences, the participants self-identified with the meaning of survivor, exuded resilience and had a strong sense of spirituality. The Meaning of
Survivorship model was developed for AABCS. The study findings revealed the important facets of their survivorship experience. The second arm of the study was comprehensive review of empirical studies of contributors to breast cancer disparities, including histopathological grade, hormone receptors, gene mutations, biological markers, age of diagnosis, parity, anthropometric factors, advanced stage at diagnosis, socioeconomic position, chronic stress burden, difference in breast cancer treatment, quality of care, and patient/physician factors. The review provided substantial evidence for development of the Biopsychosocial Model of Breast Cancer Survivorship (BBCS) for African American women. This conceptual explanatory model identified several key biological and psychosocial risk factors that may contribute to a severe disease trajectory. The final arm of the study examined the relationships between several biological predictors, specifically Estrogen (ER), progesterone (PR), triple negative breast cancer (TNBC), BReast CAncer gene (BRCA1/2), Tumor Protein 53 (p53) age ≤ 45 at diagnosis, Basal Metabolic Index (BMI), age ≤ 30 at first pregnancy, and psychosocial risk factors (socioeconomic position [SEP], chronic stress), that may affect the psychological functioning (anxiety, depression) of African American breast cancer survivors. Using general linear modeling (GLM), a modified model was tested with a sample (n = 155) of AABCS from Northern and Southern California. Results revealed that some biological and psychological risk factors were significant predictors for anxiety and depression among AABCS. Overall, the findings from this dissertation may serve as a benchmark for collaboration of various disciplines to develop interventions that address breast cancer disparities among these women.

**Word count:** 350

**Key words:** African American women, breast cancer disparities, predictors, psychological functioning, breast cancer survivors
This dissertation of Claudia Maggie Davis is approved.

Hector F. Myers

Adeline M. Nyamathi

Nalo M. Hamilton

Mary-Lynn Brecht

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University of California, Los Angeles

2013
Dedication

I, Claudia Maggie Davis dedicate this scholarly work to my father Cuthbert Joel Lewis (deceased) who always stressed the value of an education which was quite formative in my upbringing; to my family, specifically my husband Ricardo R. Davis, my children Camille, Addison and Ethan Davis, my parents Monica Dunbar, Lawrence Dunbar, my aunts, uncles, cousins and friends for their unwavering support throughout this journey. And to my ancestors who paved the way, toiled many soils so that there can be a ‘brighter day’.

In addition, this work is also dedicated to the African American breast cancer survivors who have shared their experiences and allowed me to learn from those experiences; the ladies that I have met, who put up a courageous fight, but sadly succumbed to breast cancer, they are forever in my heart. To the ladies who are surviving and thriving, you are a pillar of strength.
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Success is to be measured not so much by the position that one has reached in life as by the obstacles which he has overcome while trying to succeed.

Booker T. Washington (1901)

I can do all things in Christ who strengthens me.

Philippians 4:13

My pursuit of knowledge will never cease and my personal progression has never been an independent feat. I am extremely grateful and fortunate to be surrounded by caring individuals who have been deeply rooted in my success and have supported me throughout this journey.

Historically, I must first acknowledge my father, the late Cuthbert Joel Lewis, a humble, loving individual who inspired and instilled core values and principles that assisted me in my pursuit of excellence. My mother, Monica Lewis Dunbar whose drive as a successful business woman (nationally and internationally) also inspired me to be goal oriented.

I must acknowledge my immediate family, specifically my husband Ricardo, my confidant, biggest supporter, my source of stability throughout this journey, the best provider and father to our children. Love, I could not have done this without your unwavering bedrock commitment and support. This is our dissertation as you have earned it right along me with me…I thank you. Our children, Camille, Addison and Ethan have each contributed to this process and have earned their PhD as well; from organizing the study packets, collating, assisting with the preparation of the meals for each support group, eagerly anticipating and asking “how many participated Mom?” Your “Team Davis” approach is what kept me going. The “Team
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I wish to similarly recognize the members of committee who have all contributed to my success throughout this journey and final completion. They have been exceptional mentors and I am deeply thankful. To my chairwoman, Dr. Mary Ann Lewis (who twenty-five years ago was on my thesis committee), I have deep admiration for her professionalism, classiness, calmness, integrity, and foresight-with keen ability to hone in on what’s important. I am forever grateful.

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I extend a warm and heartfelt thank you to all of my invaluable committee members. Unequivocally, I can say that collectively, I am a better researcher, better person and better teacher because of my involvement with these rare individuals.

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Mr. and Mrs. Lee, and my Racquetball buddies-I am immensely grateful for your continued support.

I would like to acknowledge the following co-authors who have assisted me with the following publications:


*Chapter 1 is a version of African American Women and Breast Cancer: Voices of Survivors.*


*Chapter 2 is a version of Disentangling Ethnicity and Socioeconomic Position in Breast Cancer: An Integrative Review and Conceptual Model.*

Regarding Chapter 2, the author would like to acknowledge Felicia Hodge for her initial editorial assistance.


*Chapter 3 is a version of Biological and Psychosocial Predictors of Psychological Functioning among African American Breast Cancer Survivors.*
VITA


Davis, C.M. (Invited Speaker/Podium Presentation) Clinical Trials in the African American Community. African American Cancer Conference, podium presentation, presented by ACT-NOW and the JW Vines Medical Society, Cross Word Church, Moreno Valley California. April 2011.


Davis, C.M. Invited guest, along with a representative from the American Cancer Society, American Cancer Society Resources, The Sassy Survivor Show, host DeBorrah Carter. Pasadena Community Access Channel 32, Pasadena CA. January 2012
Introduction to the Dissertation

World-wide, it is estimated that over 1.38 million women are diagnosed with breast cancer (Globoscan, 2008). Across the nation, while the incidence of breast cancer is lower among racial ethnic groups, the mortality rates are considerably higher among African American women (American Cancer Society, 2011). In fact, African American women who are between age 35 and 45, the incidence and mortality rates of breast cancer are considerably higher than among women from other racial/ethnic groups (American Cancer Society, 2008, Ries et al., 2005). Along the diverse geographical landscape (inclusive of Louisiana, Tennessee, and Missouri), California was in the top 10 percentile of states with the highest breast cancer mortality rates for African American women (American Cancer Society, 2012). Further, African American women have a tendency to present with breast cancers that are: poorly differentiated (Mooris et al., 2007), have a more aggressive phenotype (Amend, Hicks & Ambrosone, 2006), more likely to be Estrogen Receptor Negative (Joslyn, 2002), more likely to be diagnosed with triple negative breast cancer (TNBC) (Lund et al., 2009), manifested by an early relapse (Dent et al., 2009) and therefore, more challenging to treat (Guarneri, Dieci, & Conte, 2013). Coupled with an aggressive disease and complex treatment regimen, African American women may be more likely to report high life stress burdens (Schults, Parker, Israel & Fisher, 2001), including more over discriminations and microaggressions (Hall & Fields, 2012), subtle forms of racism and discrimination (Williams, Neighbors & Jackson, 2003), and socio-economic disparities (Arozullah et al., 2004). Given the aggressive nature of breast cancer that African American women may be diagnosed with, the experience of chronic stress, coupled with their lower socioeconomic position within society, three major questions are addressed in this study: (1)
What are the experiences of African American women who are breast cancer survivors? (2) What is the evidence of factors that contribute to the breast cancer disparities among African American women? (3) Based on the evidence, are there biological and psychosocial risk factors that may affect their psychological well-being as a breast cancer survivor? These questions formulate the aims of this dissertation in an attempt to fill the gaps in research in this specific area.

There is a paucity of research that investigates the meaning of survivorship, and the literature is quite sparse on the examination of biological and psychosocial predictors that may contribute to their overall well-being as cancer survivors of African descent. In an effort to begin to address these gaps, this dissertation focused first on investigating the meaning of survivorship, what factors were helpful to them during their survivorship trajectory, and what recommendations can be offered for the development of survivorship care plans for African American Breast Cancer survivors. A second manuscript focused on the development of a Biopsychosocial model of breast cancer survivorship for African American women (BBCS) conceptual model that hypothesized the relationships among biological and psychosocial risk factors on their quality of their lives, as moderated by quality of health care and psychological resources (resilience, spirituality), thus impacting their quality of life. Additionally, an in-depth integrative review of extant literature on the major constructs was identified including identification of the gaps in the literature and recommendations for future research. Finally, a third manuscript report the results of a series of general linear models (GLM) that tested a modified BBCS conceptual model based on interview data from a sample of 155 African American breast cancer survivors who had completed active treatment. Each manuscript will be
submitted as an independent publication to selected journals with a broad readership from diverse disciplines.

To accomplish the aims of the dissertation, a sample of 155 African American breast cancer survivors who were diagnosed between ages 31-77 years and who had survived breast cancer from 1-27 years. Eligibility included, self-identification as female, African American, Black American, or of African descent, age 25 or older, diagnosed with breast cancer at least one year post-active treatment, and capable of giving informed consent. Participants were recruited using 3 methods: (1) 12 African American breast cancer support groups located from Sacramento to Southern California, (2) word-of-mouth, (3) placement of flyers in civic groups, hair salons, unisex barber shops, etc… that were located in predominantly African American communities.

Chapter one entitled “Breast Cancer and African American Women: Voices of Survivors” was a qualitative study that explored the meaning of survivorship and the use of resources for coping among African American Breast Cancer Survivors. Qualitative research is a meaningful methodological approach to further the development of nursing knowledge (Speziale & Carpenter, 2003). Philosophically, qualitative research is firmly established in the descriptive modes of scientific inquiry (Speziale & Carpenter, 2003). The bedrock principle that undergirds qualitative research is finding meaning in the human experience (Denzin & Lincoln, 1994). To that end, the core questions emanated from an open discussion with 25 African American Breast Cancer Survivors during a verbal feedback session for a pilot study that was conducted to assess feasibility of the primary survey study. During this engagement, several members discussed their trajectory as a survivor and used the term survivor as a
metaphor for many things. Results of these discussions led to the development of two open-ended questions that were designed to gain an understanding of the meaning of survivorship and the utility of resources during their breast cancer trajectory. These two questions were incorporated into the main study, specifically on the demographic data questionnaire. The participants self-identified with the term survivorship. Additionally, their spiritual faith was viewed as an important resource. These aforementioned questions formed the basis for the qualitative manuscript in Chapter one.

Chapter two, entitled “Disentangling of Ethnicity and Socioeconomic Position in Breast Cancer: An Integrative Review and Conceptual Model” reviewed the extant literature on risk factors and psychosocial resources that have been implicated in accounting for breast cancer disparities among women of African descent. The comprehensive integrative review of published empirical studies from 1993-2013, provided evidence to substantiate the development of the Biopsychosocial model of Breast Cancer Survivorship for African American women (BBCS). The BBCS model identifies several biological and psychosocial risk factors that pose a greater risk for developing an aggressive form of breast cancer for African American women. These vulnerabilities coupled with a difference in the quality of care received may contribute to a greater increase in breast cancer mortality among these women. We also proposed that an individuals' psychological resilience may moderate the impact of breast cancer and disease trajectory.

Our comprehensive literature review of empirical studies identified the following factors as important contributors to cancer disparities, including: that ancestry, histopathological grade, hormone receptors, aggressive disease, gene mutations, biological markers, age of diagnosis,
parity, anthropometric factors, socioeconomic position, chronic stress burden, including
discrimination, quality of health care along the breast cancer trajectory, advanced stage at
diagnosis, disparities in breast cancer treatment, and patient/physician factors. A select number
of these factors formed the basis for the third manuscript that reported the results of the empirical
test of key components of this model.

Chapter three, entitled Biological and Psychosocial Predictors of Psychological
Functioning among African American Breast Cancer Survivors, used general linear modeling
(GLM) to test a modified BBCS model with a convenience sample. The study examined the
relationship between a set of biological predictors, specifically ER, PR, triple negative breast
cancer (TNBC), BReastCancer gene (BRCA1/2), Tumor Protein 53 gene (TP53, p53), age ≤45-
at diagnosis, Basal Metabolic Index (BMI), age ≤30-age of first pregnancy, and psychosocial
risk factors (socioeconomic position [SEP]), and chronic stress that may affect the psychological
functioning (anxiety, depression) of African American breast cancer survivors. Collectively,
these manuscripts may serve as a benchmark for a multidisciplinary collaboration by researchers,
community organizations, and funding agencies to develop and support interventions that
address the needs of African American breast cancer survivors, thereby decreasing breast cancer
disparities among these women.
References


Chapter 1

The Meaning of Survivorship as Defined by African American Breast Cancer Survivors

Abstract

There is a paucity of research on African American breast cancer survivors and survivorship. Identifying their perspective is important in developing survivorship care plans that are relevant for cancer survivors. To date, the meaning of survivorship has not been reported among African American breast cancer survivors. This study explored the meaning of survivorship and the utilization of resource by these women. African American breast cancer survivors were recruited from breast cancer support groups and word-of-mouth throughout Northern and Southern California. A structured questionnaire was administered to 155 survivors. Two open-ended questions explored the meaning of survivorship and resources that captured their lived experiences. Written responses were analyzed utilizing Contemporary Narrative Inquiry. African Americans who were diagnosed with breast cancer identify with the meaning of being a survivor. Through their lived experiences they exuded resilience, had a strong spirituality, thriving and eager to assist other breast cancer survivors. The study findings "give a voice" and validates what was important and meaningful to these survivors. These results provide an important understanding of their perspectives and may help in developing cancer survivorship care plans that are relevant and culturally appropriate, thereby improving coordination and quality of care. An understanding of African American breast cancer survivors’ experiences may inform family members, other breast cancer survivors, and health care providers about the defining experiences. This investigation may serve as the foundation upon which to build survivorship care plans that are more culturally responsive and patient centered.
Keywords: African American, breast cancer survivors, survivorship, survivor identity, resilience, spirituality, altruism, survivorship care plans,
Introduction

A cancer diagnosis is no longer an automatic death sentence. There are currently 13.7 million cancer survivors in the United States (US), and breast cancer survivors (22%) are the single largest portion of this group (Siegel et al., 2012). With an aging population, along with an emphasis on early detection and effective treatment, it is anticipated that this percentage will increase not only nationwide, but also worldwide. Given the growing number of cancer survivors and their awareness of cancer screening, treatment and control, the emergence of cancer survivorship as an important topic is gaining attention. Evidence of this increased attention is the recent Institute of Medicine’s (IOM) report “From Cancer Patient to Cancer Survivor: Lost in Transition” which provides a comprehensive review of the long-term treatment sequelae that cancer survivors may experience (Hewitt, Greenfield, & Stovall, 2005). The report also establishes survivorship care as a distinct phase of the cancer care trajectory. Four components identified in this phase of cancer care: phase 1 includes the prevention and detection of new cancers; phase 2 notes the need for surveillance to identify cancer recurrence and appropriate interventions; phase 3 reviews the need for psychological management; and phase 4 encourages collaboration and coordination between various health care providers to ensure that survivors' needs are met (Hewitt et al., 2005).

The IOM report also recommends the survivorship care plan (SCP) as a mechanism to promote coordination of care between the multidisciplinary providers in order to provide seamless coordination of care (Hewitt et al., 2005). The SCP is not only a roadmap to ensure quality cancer care in the United States, but is also emerging in other countries to address the increasing specialty care needs of cancer survivors. For example, the United Kingdom has established the National Cancer Survivorship Initiative (NCSI) to address the ongoing needs
associated with survivorship (Richards, Corner, & Maher, 2011). In Canada, the Canadian Strategy for Cancer Control (CSCC) has developed a program that integrates supportive, psychosocial, rehabilitative and palliative care throughout its cancer facilities (Campaign to Control Cancer, 2013).

Essentially, the SCP offers a method of communication and collaboration between the survivor and the health care team regarding previous treatment, recommendations, current care, and future plans. The SCP can also inform family members, other breast cancer survivors, as well the survivors themselves. Although communication is key for a good SCP, it is also important to gain an understanding of the meaning of survivorship, particularly from African American women whose breast cancer is more likely to be diagnosed at an early age (Eversley et al., 2005), more likely to be aggressive (Crowe et al., 2005; Shavers, Harlan, & Stevens, 2003) and thus requiring aggressive treatment (Taylor et al., 2002). These women are more likely to experience a higher economic burden (Arozullah et al., 2004) and experience a poorer quality of life, poorer physical functioning, and role limitations when compared to other women even after controlling for educational level, life events and co-morbidities (Paskett et al., 2008). Therefore, this study, utilizing Contemporary Narrative Inquiry (CNI), addresses the notable gap in the literature to identify the meaning of survivorship and utilization of resources by AABCS as they navigate the landscape of survivorship.

**Background**

The National Coalition for Cancer Survivorship (NCCS, 2013) defines a cancer survivor as a person who has survived cancer at the time of diagnosis and who continues to live for months or years thereafter. This definition recognizes that people diagnosed with cancer are on a survivorship journey from the moment of first diagnosis (NCCS, 2013). The understanding and
acceptance of the nomenclature of survivorship varies among women. The meaning of survivorship may be based upon a woman’s socio-cultural background, life experience, ethnicity, age, stage of disease, and resource availability. Recent literature is robust with narratives provided by many Caucasian breast cancer survivors (Documet, Trauth, & Key, 2012; Morris, Campbell, & Dwyer, 2011; Stanton et al., 2002), and while these stories add to the knowledge base of cancer survivorship, only a few studies addressed issues that were relevant to AABCS (Ashing-Giwa & Ganz, 1997; Coggin & Shaw-Perry, 2006; von-Friederichs-Fitzwater & Denyse, 2012). Ashing-Giwa and Ganz (1997) reported upon the lack of information and support care received by African American women diagnosed with breast cancer. Ashing-Giwa and Ganz (1997) interviewed and compared statements obtained from 12 key informants (physicians, nurses, and administrators who worked in cancer prevention or management) and 23 African American adult cancer survivors. These statements highlighted the perception of inadequate support and insufficient cancer management information held by the African American survivors. They reported that healthcare providers offered low levels of support during diagnosis and treatment and provided poor information on their cancer diagnosis, treatment plans, and referrals.

Coggin and Shaw-Perry (2006) utilized the Delphi technique, a multiple survey process for establishing group consensus to identify breast cancer survivors' expressed needs. These investigators mailed three rounds of surveys to AABCS and ended up with 62 AABCS who were members of a national AABCS support group. The findings revealed that the needs of AABCS included affordable, acceptable, appropriate medical care and support services; follow-up information regarding breast cancer treatment symptomology and related health problems and access to adequate resources for them and their families.
Most recently, von Friederichs-Fitzwater and Denyse (2012) conducted semi-structured telephone interviews of 137 AABCS residing in Northern California in order to explore their experiences and concerns. The authors found that survivors’ primary concern was twofold: provider competency regarding treatment effects based on race and a lack of transparency in diagnosis and treatment. Survivors were uncertain if healthcare providers knew that AABCS might respond differently to cancer treatment compared to other groups of women. Survivors were also concerned that there was a lack of transparency and less than full disclosure on important cancer management and treatment information, possibly due to their race.

Exploring the meaning of survivorship is important as thus far researchers have not investigated how the meaning of survivorship might shape the disease experiences of AABCS. Therefore the purpose of our study was to explore the meaning of survivorship and utility of resources that AABCS used to navigate the landscape of survivorship. Understanding the experiences of AABCS may promote a more culturally responsive patient-centered health care service delivery model that would inform the team of providers and provide valuable support for the survivor and their families.

Methods

Design

The study design was a cross-sectional convenience sample of 155 African American adult women diagnosed with breast cancer who had not been in treatment for at least one year. To determine the feasibility of a larger study, semi-structured surveys were developed and pilot tested in 2009 with 25 AABCS from the Southern California Witness Project, Inc. Approval for the pilot study was obtained by the University of California, Los Angeles Institutional Review Board (IRB). In the current study, data was collected via one-time, face-to-face, and self-
administered questionnaires at the site of each breast cancer support group meeting. The Principal Investigator (PI) assisted with the administration of the surveys. Assistance was provided to participants who preferred to have their surveys read to them; responses were hand-written, verbatim. For participants who were not members of a support group, the surveys were self-administered in a public or a private location.

**Sample Selection**

Study eligibility criteria included female; aged 25 years or older; self-identified as African, African American, Black or Black American; diagnosed with breast cancer; at least one year post-active treatment (surgery, chemotherapy, and/or radiation); and capable of providing informed consent. Written informed consent was obtained from each participant as required by the University of California Los Angeles Institutional Review Board (IRB) where the study received IRB approval.

**Participant Recruitment**

A convenience sample of 155 AABCS who were residents of California was recruited using three methods of outreach and recruitment: breast cancer survivor groups, word-of-mouth, and placing flyers in key community locations. Meetings with the executive directors of 12 African American breast cancer support group organizations in Northern and Southern California were conducted at the beginning of recruitment. Outreach presentations were made to these groups in order to obtain permission to post flyers at their organizations and to recruit from their membership. Flyers were posted and distributed to members to facilitate recruitment. Additional flyers were placed strategically at various community settings in predominantly African American community sites, including civic groups, non-profit organizations, local churches, hair salons, and unisex barber shops.
Interested individuals who were identified by these methods were instructed by the flyer to contact the study PI by calling a designated research telephone number. Upon calling the research telephone number, a telephone script (approved by IRB) was initiated. All potential participants were screened to determine if they met the eligibility criteria. Once eligibility was determined, the potential participants were informed that they were eligible to participate in the study. They were then asked how they heard about the study, if they belonged to a support group and, if applicable, the name of their breast cancer support group. Women who were members of a support group met the PI at their monthly meeting. Women who were not members of a support group and were recruited by word-of-mouth or via recruitment flyers were assessed for eligibility by phone. Once determined to be eligible, arrangements were made between the PI and the potential participants to meet at an agreed upon location within their community.

**Procedures**

All potential participants were screened for eligibility, informed of the purpose of the study, that it would take approximately 1 hour to complete the surveys, and that they would receive a $10 Target gift card for expenses associated with gas and local travel. After the study was explained and questions about the study were answered, potential participants were given two consents. One consent form was signed and retained by the PI and the other consent copy was given to the participant. The study packet which included a battery of measures was given to the participants. A recruitment flier was also provided, as well as a thank you letter. Every participant was provided access to a table and chair to complete her study packet. A healthy lunch was served at each support group meeting after completion of the surveys. To show appreciation, each table was decorated with table cloths, African American figurines, and fresh flowers and/or rose petals.
Prospective participants who were recruited via word-of-mouth met with the PI at a public space or private place of their choosing (e.g., public rooms in libraries, coffee houses, etc.). Two days prior to the meeting, the PI contacted (via telephone) each interested participant to remind her of the meeting. During the phone call, the PI determined her geographical location and an agreed upon time and location was confirmed. At the confirmed location, participants were informed about the purpose of the study, and any additional questions were addressed. If they agreed to participate, the consent was signed and retained by the PI. The other consent was given to the participants for their personal copy. The study packet which included a battery of measures was given to the participants. A recruitment flier was also provided as well as a thank you letter. Every participant had a table and chair to complete her study packet.

**Measures**

The survey instrument included a combination of closed- and open-ended questions. Thirty-two closed-ended questions collected socio-demographic data including age, relationship status, religion, education, annual income; and health history data including questions about breast cancer treatment inclusive of stage of breast cancer, type of treatment, and years of survivorship. Open-ended questions were designed to collect information on the experiences of the breast cancer survivors. The following two open-ended questions explored the meaning of survivorship and resource utilization:

1. "‘Survivorship’ has many different meanings for a lot of people; from your experience, how would you define survivorship?”

2. "In looking back, what do you think has helped you the most during the experience of becoming a cancer survivor?"
The second question explored supportive resources that were used by the AABCS. We wanted to specifically capture those resources that were utilized and that were most helpful to each participant post diagnosis. Supportive resources were defined as emotional support which is support that makes an individual feel better, more secure and/or better understood, focuses upon love, trust, caring and empathy (Chantler, Podbilewicz-Schuller, & Mortimer, 2005). Tangible support from others (family, friends, support group members, neighbors) was defined as specific resources that others may provide to the individual such as a loan of money, a ride to a medical facility, cooking, household chores and child care (Bloom, Stewart, & Johnson, 2001). Tangible support also included individuals who can assist with child care, household chores, meal preparation, and other daily activities. Informational support was characterized as the provision of knowledge that pertains to a particular situation that the individual was experiencing (Bloom et al., 2001). Religiosity was defined as faith in God, attending church and on-going prayer. The church was viewed as a source of social support for African Americans (Taylor, 1993).

**Data Analysis: Descriptive**

Descriptive statistics, including means and standard deviations, were calculated to represent the sample's socio-demographic data and other background information of the women, specifically years of survivorship and the age of their initial breast cancer diagnosis. Additional categorical data such as stage of breast cancer and treatment type were collected and analyzed using SPSS 18 Statistical software (SPSS Inc., 2009).

**Data Analysis: Qualitative**

Contemporary Narrative Inquiry (CNI) was used to analyze the two open-ended questions that explored the meaning of survivorship and the utilization of resources during their survivorship experience (Chase, 2005). CNI evolved from Narrative Inquiry which has a steep
tradition from the University of Chicago in the disciplines of sociology and anthropology. Essentially, CNI is characterized by a combination of interdisciplinary analytic lenses, diverse disciplinary approaches, and both traditional and innovative methods—all rotating around an interest in the biographical narrative by the one who lives and experiences them (Chase, 2005). CNI was a useful tool for capturing the "how" and "what" of their lived experiences (Chase, 2005).

This study was primarily interested in the "how and what" of the lived experiences of AABCS. Our first question addressed "how do you define survivorship?" Our second question asked AABCS, in looking back at that experience, "what" was helpful to them during the experience of becoming a cancer survivor. By framing our questions using "how and what", we were able to explore, gain insight and inquire into their "lived experiences" as AABCS. In addition, by asking the "how and what", we were able to determine the meaning as they shared their experiences (Chase, 2005). For the purpose of this study and to obtain an understanding, we made a point to organize the narratives to make a meaningful interpretation (Chase, 2005). We were interested in what thematically surfaced from their lived experience. Using a thematic approach, we coded and analyzed their narratives to make meaning of their lived experiences.

Results

For the primary study 169 individuals were screened. Five individuals were in currently receiving treatment and were ineligible. Three individuals had a different primary tumor (colon, ovarian, & renal) and one individual was an African American male breast cancer survivor. One hundred and sixty women were deemed eligible and scheduled to be interviewed and of those, two women chose not to participate and three women did not show up for their interview. This
resulted in the final sample of 155 AABCS who self-identified as African American/Black/Black Americans and who met all other eligibility criteria (see Table 1). Thirty-eight percent of the participants were married. Close to half identified as Christian (43.9%), 25.2% were Baptist, with a small percentage reported as Muslim (9.0%), and a few (5.8%) had no religious affiliation. Nearly half were college educated (over 26% had a bachelor's degree and 19.4% had a master's degree). A third of the participants had an annual income of less than $21,000, while over half (52.0%) had an income ranging from $21,000 to $69,000. Overall, the years of survivorship ranged from 1 to 27 years, with a mean of 9.7 years and a standard deviation of 6.8. Age at diagnosis ranged from 31-77 years, with a mean age of 51.7 years and a standard deviation of 10.0. The women reported various stages of breast cancer at diagnosis, with a small percentage (3.2%) diagnosed with carcinoma in situ. Roughly 80% of the women reporting stage 1, 2 or 3, with stages 2 and 3 representing 38.1% and 23.2% of the cancers respectively. Stage 4 cancer, which is indicative of advanced disease (with metastasis), represented 11% of the sample. (See Table 2 for the distribution of breast cancer stage).

**Meaning of survivorship**

Two open-ended questions explored the definition of survivorship, specifically, how would you define survivorship? The narrative responses to the question of "how" would you define survivorship provided insights to construct their lived experience as AABCS. Through the analytic lens and organizing their experiences into a meaningful whole, collectively their experiences were interpreted to represent the following: having an identity as a survivor, exuding a strong spirituality, having resilience, thriving, and helping others (altruism) (see Figure).

*Spirituality:* Historically, spirituality is a major part of the African American culture and is seen as an essential component assisting one to rise above and deal with adversity. "It IS what
pulls you through” (Rev. T. Denyse, personal communication, April 18, 2010). Spirituality can be loosely defined as the degree to which individuals maintain a relationship with God or a transcendental force that brings a meaning and purpose to their existence, which affects the way in which one operates in the world (Armstrong, 1996).

The significant role of spirituality in African American women's breast cancer experience has been extensively documented (Abrums, 2004; Ashing-Giwa, 1999). In this study, almost all of the participants discussed their spirituality as central and critical to their survivorship. Several participants described a multi-dimensional and holistic view of their lives from diagnosis, treatment and post treatment. A new survivor revealed that "survivorship involves being diagnosed, going through surgery, going through treatments, surviving, maintaining contact with your doctor, taking medications, believing in God.” This view was also expressed as "being thankful each day and praising God… staying alive.” Another survivor reported that "I made it through by the grace of God! I'm still here.” Another survivor revealed that "survivorship to me is a daily will to live and enjoy every moment that God has offered you.” Finally, a seven-year survivor (first breast), 8 month (second breast) survivor states that her faith is what kept her together. She indicated that "survivorship is getting through it, with God with you."

**Survivor Identity:** The construction of survivorship has many dominant meanings and some participants embraced those meanings. For example, a 16-year survivor stated that "I am a survivor and will be a survivor for the rest of my days and will live my life freely.” Another statement by a 10-year survivor declared that "I am still here!” Another survivor indicated that for her, "Survivorship is a mental attitude, understanding that life has just begun." Survivorship was defined by a study participant as “The ability to know that life is to be lived one day at a time. To have overcome the associated fears and myths associated with a disease such as cancer;
by grieving each loss and embracing the new me of priorities and relevance.” Another survivor defined survivorship as “restoration to life as usual with a positive attitude in spite of having one big and one small breast.”

While the majority of participants considered themselves’ to be survivors and fully immersed themselves in the identity, one participant did not consider herself to be a breast cancer survivor. Her identity as a survivor was not symbolic to breast cancer; it was seen more in alignment with her embodiment as an individual to whom the sum is greater than her parts. She stated, “It’s a word that is very unfamiliar to me. I don't use it, seems over used. Today, I'm a whole survivor on this planet.”

*Resilience:* Many study participants saw themselves as resilient – surviving the “battle” with cancer. Survivorship was seen as a battle, while showing bravery. “Beating cancer” was another term that was used by a survivor to describe the experience. Others view “the battle [as] going against the odds without falling and giving up.” Another participant considered, “Survivorship to me means a term that implies one has challenged an obstacle and overcame or lasted through a challenging situation.” Essentially, these women feel that not giving up or giving in is, thus, “dealing with adversity - meet it, greet it and defeat it.” Survivorship is “living life after breast cancer's attack, keeping a winning attitude for the future.”

Survivorship also meant “endurance and perseverance” to several women. One survivor stated, “There are challenging times and may be rough times, but keep on.” She stated, “Survivorship to me means one who overcomes life and death situation and could proudly say, ‘I'm still standing, also most of all, thank God, I survived that illness.’” A 21-year survivor stated that survivorship means “the ability to experience a situation; get through it physically or emotionally, to move beyond the situation, and begin a different life after the situation.”
Thriving: Several women indicated that despite their diagnosis, they viewed survivorship as “coping with, adopting life changes, and living joyously.” To some participants, survivorship meant "creating a new normal and living life, not just being alive” - in other words “thriving.” The underlying theme of survivorship was described as “being grateful for every single breathe, a commitment to live unto my joy.” Thriving transcends the number of years of survivorship. For example, the 9-year survivor revealed that “survivorship is walking through the experience of a dangerous illness with as much hope, faith, determination I can have while keeping fear at a minimum [and] experiencing each day with as much joy as I can.” One participant was very eloquent when she stated, “I define survivorship when my thoughts marked from one day at a time, to planning for the future.” For example, a survivor mused, “Wanting to do things, whereas I was thinking short term.” Spending time with family was also important, as another stated that “I get to see my children grow up.” A double survivor, right breast 4.8 years, left breast 1.3, stated survivorship is “Being alive!! Free of active cancer cells, feeling confident, ability to function and perform as I did prior to diagnosis and treatment. To have the stamina to spend time with grandchildren and participate in their activities, acknowledging the gifts of God and the support of family and friends... loving and being loved.” A long-term survivor stated, “Not being afraid of the word cancer and realizing that it's a word and not a 'sentence'.”

Many survivors viewed surviving cancer as an improvement in personal wellness that enables them to thrive and live abundantly. Women described survivorship as “waking up every morning and facing a new day, proper diet and exercise, positive mind-set.” Survivorship was seen as both a threat and as an opportunity to change and improve one’s life. Survivorship is “having been diagnosed with a life-threatening disease and then beginning the process of healing in every way, mind, body and spirit as well as coping with the challenges that the illness brings.”
Others stated that a life-style change and/or validation that of the need to “change some of my habits, eating more nutritious foods” is associated with survivorship, “Staying active” stated a 12-year survivor.

**Altruism:** Several participants mentioned that having breast cancer and surviving cancer have put a sense of urgency to extend themselves to help others. For example, a 23-year survivor indicated that survivorship includes the “ability to share my experience to help others out.” The need to help others by way of information or by caring was evident in the words of the survivors. Some survivors were very specific with their words and considered survivorship as doing cancer outreach with others “to get the word out.” Others defined survivorship as “being free of cancer and helping others.” Another survivor reported that “being around other survivors, talking and sharing” as essential for her survivorship, since “survivorship means helping others through their ‘crisis’.”

**Resource utilization during survivorship**

The second qualitative question in the survey investigated what the women thought helped them the most during the experience of becoming a cancer survivor. Participant responses reflected upon what helped them the most during their experience as a cancer survivor. The narrative responses to the question of “what” they thought helped the most during the experience provided insights to construct their lived experience as AABCS and collectively their experiences were interpreted to represent the following: emphasis on faith, support structures, positive attitude and education.

**Religiosity:** Unequivocally, the participants indicated that faith formed their primary support for their continued survivorship. Religiosity, described as faith in God, attending church, and on-going prayers, was seen as a primary resource during their survivorship experience. For
example, several survivors noted the importance of “the grace of God” and “my faith in God.” One survivor noted that the value of her prayer group at church was significant in her ability to cope and survive while another survivor found support by “putting God first in my life.”

Support structures: A majority of the participants indicated that their support came from family, friends, spouses and health care providers. One survivor indicated that “help from my twin brother, my niece and my two friends” was what helped her during this time. Another participant indicated that “music, support from her mother, girlfriends, and two support groups” were what provided support and were important to her. Many survivors indicated that they developed some new bonds with other survivors along the illness/wellness trajectory. One participant was thankful for the many different “surviving sisters and chemo friends whose path she would not have crossed were it not for breast cancer.” Another stated that it was “the support of individual members in my support group at various stages of the cancer journey” that provided resources that she was able to use. Participants also said that having healthcare providers (medical doctors and nurses) who were “caring before, during and after treatment was paramount” to their survivorship.

Positive Attitude: Having a positive attitude and maintaining a positive outlook during all phases of survivorship were resources that many women reported as being important and the most frequently used resource they had at their disposal. “Having a positive attitude” and “outlook” was what helped them during this survivorship journey and was described as “living stress-free and not allowing people to stress me.” Another double survivor (4.8 years right breast, 1.3 years left breast) reported that she was “being confident enough to reach out and walk with a person who had recently been diagnosed.” She understood the importance of attitude and outlook and felt that she was beyond the initial stage of survivorship and could reach out to others to
share with them the importance of maintaining a positive attitude and outlook. One survivor said that volunteering to “help with transportation, meeting other survivors and hearing their testimonies” gave her strength and she was sure that she helped others to utilize these resources.

**Education:** “Choosing doctors to do their best” and having “excellent medical care” helps the survivor to be in a position of knowing what to expect throughout her cancer care trajectory. “Having good doctors and nurses,” a survivor indicated, and “having a very understanding doctor” was important to her. The educational process of instructing the survivor as to what was important during medical visits, in treatment compliance, and during the survivorship experience helped the women during their daily lives. Knowing of the importance of “taking all of my medications,” helped a 5-year survivor during this time. Another revealed that “the care I received at the center where I received treatment” provided her with “knowing” or the education on how to survive. Gaining information was identified as a form of resource, such as the internet and other on-line media sources. For example, one survivor stated that “the American Cancer Society website information that I received from the American Cancer Society” was what helped her during her survivorship. Another stated that “talking to other women with the same situation” was instrumental in providing her with additional information. One survivor put it very bluntly stating “reading, reading, and more reading, getting educated” was most important and helpful.

**Discussion**

This study explored the survivorship perspectives of AABCS through narratives that identified the meaning of survivorship, their lived experiences and the types of resources they found valuable post-diagnosis as they navigated the landscape of survivorship. These findings were important as they revealed the importance of religion, resilience, support and obtaining information. The meaning of survivorship was more than added years to the survivors' lives—it
meant a continued and strong spirituality in maintaining a relationship with God, being resilient and thriving.

Several studies have documented that faith and religion are an important and significant component in the lives of many AABCS (Ashing-Giwa, 1999; Phillips, 2001) and act as a form of coping throughout their breast cancer experiences (Gregg, 2011; Tate, 2011). The survivors’ faith and spirituality were reported in this study to be a strong part of the daily living and formed a sense of strength and a sense that they “were not alone. “Moreover, the findings closely parallel those of Holt et al. (2009) who conducted a study of 23 AABCS and examined the role of religion in coping with breast cancer. The researchers uncovered several themes including the role that their faith played relative to their recovery and healing. The similarity of findings from this study and that of Holt et al. (2009) validates the premise that for AABCS, spirituality should be acknowledged and supported by health care providers throughout the cancer care trajectory. Furthermore, spirituality is an area of counseling and support that should be included in SCPs.

**Survivor Identity**

Although breast cancer survivors are quite often represented by others as triumphant, victorious, happy, healthy and feminine (King, 2006), these faces may not be the faces of African American women (Moore, 2001). In fact, several survivors voiced concern over the public images and discourse that breast cancer is perceived to be a disease that affects other women, specifically Caucasian women (Moore, 2001). However, with the media release of recent breast cancer diagnoses of several prominent African American women, specifically Robin Roberts and Wanda Sykes, these images of African American women may have changed the public face of breast cancer (Caslin, 2012), may help AABCS illuminate their new identity as a survivor, and help validate that breast cancer does affect African American women. In our
study, many AABCS identified themselves as survivors, fully embracing the identity. One survivor indicated that she was "a survivor and will be the rest of her days..." However, these findings differed from those of a qualitative study of middle class, Caucasian, breast cancer survivors who were 3-18 months after treatment who rejected the social identity as survivors (Kaiser, 2008). In our study, the majority of AABCS embraced the survivorship term. The acceptance as a "survivor" may, in fact, be due to the historical struggles of many Africans who were transported to the Americas as slaves (Berlin, 1980), and slavery may be viewed as a collective cultural experience. Acceptance of the survivor identity might be attributed to African Americans as a social group, as well as the faith and spirituality of AABCS (Gallia & Pines, 2009). AABCS might also accept this concept because of their extended length of survival post-treatment.

Resilience

In this study, we identified that the participants exude resilience, are able to be challenged, overcome adversity, to evidence strength and determination in overcoming cancer, to thrive and to show altruism. The findings were consistent with Woods-Giscombe's (2010) early formation of the Superwoman Schema, a multidimensional conceptual framework based on the personal or socio-historical contextual factors that may be apparent for African American women. Specifically, Woods-Giscombe (2010) posits that the African American women may exhibit tenacity, strength, and a willingness to help others. Thus in order to survive, African American women must demonstrate the wherewithal to cope with chronic stressors that may be manifested on a daily basis, coupled with being diagnosed, treated for breast cancer, and giving of themselves.

Altruism
Many AABCS revealed a personal "sense of agency" which was evident in their altruistic narratives. While they were engaged in the care and treatment of their disease, there was a clear conviction by a participant to "share my experience to help others out." Study findings were similar to the results of a qualitative study of 24 AABCS in which one of the major themes was "health activism" (Wilmoth & Sanders, 2001). The survivors felt that it was their duty to inform African American women about the risk of breast cancer (Wilmoth & Saunders, 2001). Thus, the crusade to share and inform other women about their breast cancer journey was very important for African American women.

**Resource utilization**

The value of resource identification for women's use was noted as an essential part of survivorship. Emotional support was an important need for women and identifying those resources was greatly desired and used by cancer survivors. In this study, more than one-third were married and thus reported the value of family support. A number of the women in the study noted “having a positive attitude and a good husband” as contributors to their survivorship. Our findings correlate with a previous study about posttraumatic growth (PTG), defined as personal growth in the aftermath of the struggle and challenges of breast cancer in married breast cancer survivors. Weiss (2004) reported that married breast cancer survivors who perceived their husbands as being supportive showed significant PTG despite their experience with breast cancer than women who were not married.

Findings from this study add new insight into understanding the meaning of survivorship for African American women as they recover from breast cancer. These meanings may guide the development and formation of SCPs that are relevant and culturally appropriate. Ashing-Giwa et al. (2013) recently determined that most survivorship templates lack adequate questions on past
medical history, specifically co-morbidities and functional status. While the history of patient treatment and health status is important, knowing that cancer is viewed as a "battle" requiring perseverance and strength to overcome, thrive, and help others in similar situations can improve SCPs, making them more culturally appropriate. Knowing that faith and a sense of resiliency while healing provides a support structure along with one's family is another important factor to consider and adds to the range of resources available to survivors. This study adds to the small but growing body of research on AABCS cancer survivorship. These voices of survivors may fill a void in understanding the process as it relates to these particular breast cancer survivors. Because these women are in the process of retooling their lives after being diagnosed with cancer, the process of building meanings around their illness trajectory is of critical importance because early conceptualizations attached to an experience can and indeed do shape subsequent actions (Swidler, 1986).

In addition, understanding the experiences of AABCS may promote a more culturally responsive patient-centric health care service delivery model that would inform the team of providers and may also provide valuable support for the survivor and other survivors. Thus exploring the meaning of survivorship through their lens is valuable to improving the efficacy of cancer SCPs for this population. Recommendations for improved SCPs include the following:

- Understand the needs of African Americans and respond to those needs by creating culturally relevant care plans.
- Embrace and encourage AABCS to utilize their spirituality as a means for survival and as a resource.
- Explore their quality of life and functional status as many AABCS plan to retool their lives as survivors.
• Understand that, historically, African Americans as a cultural group have shown resilience therefore it is important that health care providers adopt a winning attitude of "beating cancer".

• Include a resource listing of services, support groups, and other items that would help the cancer survivor throughout her cancer trajectory.

• Provide easy to read, yet comprehensive information on cancer and cancer symptom management that is valuable to educate the survivor and family members.

• Identify co-morbidities that disproportionately affect many AABCS such as hypertension, diabetes, obesity, coronary disease (Tammemagi, Nerenz, & Neslund-Dudas, 2005) and heart failure (Valina-Toth, Zavafnik, & Sinziana, 2013).

• Be aware that the stage of disease and aggressive treatment may put AABCS at an increased risk for treatment sequelae.

• Ensure comprehensive and adequate cancer care – offered to all groups – in a transparent manner to reduce perceptions of unequal cancer care.

Given the IOM report highlighting the various phases of survivorship, and the value of SCPs, the need continues to exist for attention to African American cancer survivors to ensure they are offered adequate and equal options for treatment and support services. As many African American women present cancers that are rapidly growing, that are difficult to diagnose and to treat, the need for adequate initial treatment and follow-up care during the cancer trajectory is essential for long-term survivorship.

Limitations

There are several limitations in this study that merit discussion. The sample was a convenient sample that exclusively focused on African American women in the state of
California with breast cancer. Thus, findings from the study cannot be generalized to the larger population of women with breast cancer. Recruitment efforts targeted AABCS who were residing in California. Breast cancer survivors from other geographical regions may have diverse views. In addition, there may also be limitations in using self-reported data as there is a risk that participants may have under- or over-reported (Manjer, Merlo, & Berglund, 2004). This sample reported a higher education, higher income and was mostly members of breast cancer support groups, which may have contributed to their positive views and attitudes.
Table 1. Demographic Characteristic of African American Women (N = 155)

<table>
<thead>
<tr>
<th>Marital Status</th>
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<th>%</th>
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<tbody>
<tr>
<td>Married</td>
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<tr>
<td>Widowed</td>
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<td>15.5</td>
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<tr>
<td>Divorced</td>
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<tr>
<td>Separated</td>
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<td>3.9</td>
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<tr>
<td>Never married</td>
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<td>14.2</td>
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<table>
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<tr>
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<th>%</th>
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<td>25.2</td>
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<tr>
<td>Christian</td>
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<tr>
<td>Catholic</td>
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<td>9.7</td>
</tr>
<tr>
<td>Muslim</td>
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<td>9.0</td>
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<tr>
<td>Methodist</td>
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</tr>
<tr>
<td>Episcopalian</td>
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<td>1.3</td>
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<tr>
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<td>5.8</td>
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<tr>
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<td>0.6</td>
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### Education

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<td>1.9</td>
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<tr>
<td>High school/GED</td>
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<td>9.0</td>
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<td>Some college</td>
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<tr>
<td>Vocational</td>
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<tr>
<td>Associate degree</td>
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<td>14.2</td>
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<tr>
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<tr>
<td>Doctorate/JD/MD</td>
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### Income

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<th>Income Range</th>
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<th>Percentage</th>
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<tr>
<td>$21,000-$69,000</td>
<td>85</td>
<td>54.8</td>
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<tr>
<td>$70,000-$149,000</td>
<td>27</td>
<td>17.4</td>
</tr>
<tr>
<td>Don’t care to respond</td>
<td>10</td>
<td>6.5</td>
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Table 2. Breast Cancer/Treatment Characteristic of African American Women (N = 155)

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<tr>
<th></th>
<th>N</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td><strong>Years of survivorship</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 year to 27 years (Mean = 9.7, S.D. = 6.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age of diagnosis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ages 31-77 (range) (Mean = 51.7, S.D. = 10.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stage of breast cancer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 0</td>
<td>5</td>
<td>3.2</td>
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<tr>
<td>Stage 1</td>
<td>29</td>
<td>18.7</td>
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<td>Stage 2</td>
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<td>Stage 3</td>
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<td>23.2</td>
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<tr>
<td>Stage 4</td>
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<tr>
<td>Don’t know</td>
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<td>3.9</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>1.9</td>
</tr>
</tbody>
</table>
Figure 1. Meaning of survivorship for AABCS

![AABCS Meaning of Survivorship Diagram]

Figure1. This model depicts the relationship between the survivors (identity) and four (4) salient characteristics (resilience, spirituality, altruism and thriving) that have shaped their lived experiences. The model posits that there is a direct, strong relationship between AABCS and their spirituality. Being resilient, thriving and having altruism was revealed as an important facet of their survivorship experience.
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Chapter II
Disentangling Ethnicity and Socioeconomic Position in Breast Cancer: An Integrative Review and Conceptual model

Abstract

There is compelling evidence that ethnicity is a significant independent risk factor for breast cancer mortality among racial groups. Along the breast cancer continuum, women of African ancestry carry a disproportionate burden of this disease. The purpose of this integrative review is to provide a summary of the evidence of factors that contributes to this disparity and to offer a conceptual framework that supports this racial/ethnic disparity. A comprehensive literature review was conducted of published empirical studies. We provide a summary of the evidence of ethnicity and the related disparities along the breast cancer trajectory with respect to epidemiology, diagnosis, treatment and survival among African American women. We offer an explanatory conceptual model that considers the relationships among age, biological, and psychosocial risk factors and the impact of this disease on their lives as moderated by the quality of health care and psychological resources in African American breast cancer survivors. Furthermore, we identify gaps in the literature and provide recommendations for future research to explore the role that socioeconomic position and biological factors may play as contributors to the ongoing breast cancer disparities among women of African descent.

Word Count: 188

Key Words: African American, African Ancestry, Black, Race, Socioeconomic Position, Socioeconomic Status, Breast Cancer, Health Disparities, Breast Cancer Disparities
Introduction

There is compelling evidence that race is a significant independent risk factor for breast cancer mortality (Newman et al., 2006). Along the breast cancer illness trajectory, the burden of breast cancer in African American women is characterized by several factors that are poorly understood, especially when compared to other ethnic groups. In women of African ancestry, the following characteristics are most prominent:

1. Low incidence rate of breast cancer at 119 per 100,000 for women of African American vs. 141 per 100,000 for European American women (High mortality rate at 35 per 100,000 for women of African ancestry vs. 26 per 100,000 for European American women) (Ries et al., 2005);

2. Young age at diagnosis, with the median age of diagnosis at 57 years for women of African ancestry vs. 62 years for European American women (Ries et al., 2005);

3. Among young African American women (younger than age 45 years) the incidence and mortality rate is higher than for European Americans women (Ries et al., 2005, American Cancer Society, 2008).

4. African American women are also more likely to be diagnosed with breast cancer at an advanced stage as compared to other ethnic groups (Crowe et al., 2005; Ries et al., 2005; Shavers, Harlan, & Steven, 2003).

5. An aggressive phenotype, high grade and estrogen negativity at the time of diagnosis is also more likely to be seen in women of African American than among other women (Furberg, Milikan, & Dressler, 2001; Joslyn, 2002; Porter, Lund, & Lin 2004; Ries et al., 2005).
6. Aggressive forms of breast cancer require extensive surgery and high doses of chemotherapy and radiation, all of which are associated with more severe side effects and other concerns than other types of cancer (Eversley et al. 2005; Taylor et al., 2002).

Persistent racial/ethnic breast cancer disparities can best be understood as the result of the relationships between race/ethnicity and the multiple factors that are at play. In our review, we disentangle ethnicity to determine if ethnicity confers risks for breast cancer. To illustrate, psycho-social risk factors such as chronic stress, significant life worries and additional emotional and physical burdens may be experienced especially among those with limited economic resources (Arozullah et al., 2004; Myers, Lewis, & Parker-Dominquez, 2003). If these risk factors continue unabated, we can expect an overall societal increase in health care costs and reduction in the quality of life for all citizens. Therefore, the challenge we face is to clearly identify the unique set of biological and psychosocial factors that contribute to these persistent health disparities, particularly among African American women across the breast cancer continuum.

Methodology

A comprehensive literature review of published empirical studies was conducted from Pub Med database. A combination of the Medical Subject Heading (MeSH) terms were used, including: “African American women,” “Black women,” “Ancestry,” “Breast Cancer,” “Socioeconomic Position,” “Adiposity,” “Parity,” “BRCA1/2,” “p53,” “Triple Negative Breast Cancer,” “SES,” “Psychosocial risks factors,” “Race,” “Age,” “Chronic stress,” “Ethnicity,” “Disparities,” “Anthropometric,” “Breast Cancer Treatment,” “Religiosity,” ”Spirituality,” and using African American and breast cancer as a constant. Identification of English language was
chosen. Abstracts were reviewed, and, if applicable, each article was downloaded, read and documented for relevancy. Relevant articles were included from 1996-2013.

The focus of this review of the literature was on the role of risk factors for breast cancer among African American women, including socioeconomic position (SEP), age, chronic stress burden, and biological factors that contribute to ethnic differences in cancer morbidity and mortality. This manuscript is organized into five sections. First, we present a hypothesized, multivariate conceptual model of the relative contributions of biological and psychosocial risk factors in predicting the impact of breast cancer moderated by the quality of health care received and the availability of psychological resources. Second, we discuss the contribution of ethnicity, especially the evidence on biological risk, and specifically histopathological grade, biomarkers, receptor status, gene mutations, age and adiposity. Third, we discuss the role of socioeconomic position (SEP), especially the contributions of chronic stress burden and discrimination as risk factors. Fourth, we review the evidence of breast cancer disparities in the type and quality of care received along the breast cancer continuum. Fifth, we discuss the role of psychological resources that may moderate both cancer risk as well as the severity of the disease trajectory. Finally, we discuss the implications of this review and recommend directions for future research on disparities in breast cancer morbidity and mortality (Flaskerud & Nyamathi, 2002).

In this model, which is depicted in Figure 1, we explore the following: (1) ethnicity and the relationships of biological risk factors [Estrogen Receptors/Progesterone Receptors (ER/PR), Triple Negative Breast Cancer (TNBC), BReastCAncer gene (BRCA1/2), Tumor Protein 53 gene (TP53, p53),Age, Adiposity] as predictors of developing breast cancer, and (2) psychosocial risk factors such as chronic stress, financial burden or exposure to discrimination couple these with differences in socioeconomic position (SEP), which are also likely to
contribute to disparities in breast cancer morbidity and mortality (Geronimus, Hicken, & Keene, 2006; McEwen, 1998). Taken as a whole, these biological and psychosocial vulnerabilities can be seen as contributing to a greater risk for developing more aggressive forms of breast cancer and other chronic diseases. In addition, (3) differences in quality of health care can also contribute to more severe disease trajectories, and, in turn, (4) contribute to greater breast cancer-related mortality. Conversely, we argue that (5) psychological resources, specifically cultural strength (psychological resilience and spirituality) are hypothesized to moderate the impact of breast cancer and subsequent outcome.

Figure 1. Biopsychosocial Explanatory Model for African American Breast Cancer

(Davis & Myers, 2008)
African Ancestry: Antecedent

It has been hypothesized that African ancestry might illuminate an ancestral genetic link that may provide answers to the aggressive subtypes of breast cancer (Huo et al., 2009; Newman et al., 2002). In an international study inclusive of two sites (Ghana, Africa, and the state of Michigan, USA), Stark and colleagues (2010) investigated and compared cancer biomarkers (specifically estrogen receptors (ER), progesterone receptors (PR), human epidermal growth factor receptor 2 (HER2), and Triple Negative Breast Cancer (TNBC), in Ghanaian, African American and European American women. Results of that study indicated that the percentage of ER negative tumors was highest in Ghanaian women at 76%, 36% in African American, and 22% in European American women. In addition, the prevalence of TNBC in this cohort was 82% in Ghanaian women, 32.8% in African American and 10.2% in European American women. In another international study, Huo and colleagues (2009) examined specimens from Senegalese and Nigerian women to determine the various subtypes of breast cancer in West African women. Among 507 women with a mean age of 44.8 years, the primary tumors were of a high grade, i.e. 24% ER+, 20% PR+ and 17% HER2+. In addition, 27% of the slides were TNBC positive and 28% were unclassified. Thus, the evidence of a high risk genome within the African ancestry warrants further investigation.

Phenotypic changes/Histopathological grade

While being diagnosed with breast cancer at a late stage is an important issue, there are other phenotypic changes that are prevalent in some breast cancer tumors. Biologically, African American women are more likely to be diagnosed with a more aggressive phenotype, which often leads to more unfavorable outcomes (Amend, Hicks, & Ambrosone, 2006; Joslyn, 2002; Shavers et al., 2003). While a well-differentiated tumor is equated with a good prognosis, a
poorly differentiated tumor is predictive of a poor prognosis. Several studies have reported that African American breast cancer patients more often present with poorly differentiated tumors compared to European Americans (Li, Malone, & Daling, 2002; Morris et al., 2007) and Hispanic women (Chlebowski et al., 2005; Watlington, Byers, & Mouchawar, 2007). For example, in a population-based study using Surveillance Epidemiology and End Results (SEER) data, Li and colleagues (2003) identified the differences in breast cancer stage, treatment and survival by race and ethnicity. They found that among 124,934 breast cancer patients, including 79,413 European American, 8,108 African American and 5,821 Hispanic breast cancer patients, the percentage of patients with well-differentiated tumors was 17.4%, 10.7% and 11.9%, respectively. The percentage of breast cancer patients with moderately well-differentiated tumors was 42.9%, 33.1% and 37.8%, respectively, and for poorly differentiated tumors, the resultant values were 39.7%, 56.2% and 50.4%, respectively. The authors reported that socioeconomic factors may account for these differences.

Similarly, The National Cancer Institute (NCI) collaborative Black/White Cancer Survival Study by Chen et al. (1994) found that with regards to stage, age, and geographic area, African American women were more likely to have an advanced grade (grade 3) than European American women (OR, 1.58: 95% CI 1.02-2.45) in the metropolitan areas of Atlanta, New Orleans and San Francisco-Oakland. In addition, Porter and colleagues (2004) confirmed that, after adjusting for age and disease stage, African American women were more likely to have higher grade tumors than European American women.

**Biological Predictors: Estrogen and Progesterone Receptor status/Biomarkers**

ER or PR status, i.e. positive (+) or negative (-) for breast neoplasm, are the biological markers that are commonly used to evaluate a patient's prognosis and/or response to endocrine
therapy (Thorpe, 1988). ER+PR status has more predictive power in combination than when used separately. Women whose breast cancer is ER + and PR + have a better disease prognosis and disease outcome because these women can be treated with antiestrogenic drugs (such as Tamoxifen and Raloxifene), which are first and second generation selective estrogen receptor modulators (SEMs). Women whose breast cancer is receptor ER negative and PR negative or have “negative receptor status” are indicative of an aggressive disease that generally has unfavorable outcomes (Dignam, 2000; Elledge, Clark, & Chamness, 1994). African American women who are diagnosed with breast cancer are reportedly less likely to be ER positive (see review by Rose and Royak-Schaler, 2001). Using the Surveillance, Epidemiology, and End Result (SEER), a large population database from nine geographical areas, Joslyn (2002) assessed the hormone receptor status in 12,303 African American women and 141,045 European American women. African American women accounted for 39% of the ER negative tumors compared to 23% of European American women.

Using data from over 13,000 cases from the Patient Care Evaluation Study of Breast Cancer, Gapstur and colleagues (1996) investigated the association between ethnicity and ER and PR receptor status on breast cancer patients while controlling for age and other tumor characteristics. They identified the receptor status of ER+/ PR+; ER+/PR-; ER-/ PR+; and ER-/PR- tumors and found that among European American women, the rates were 59%, 15%, 6%, and 20%, respectively; among Hispanic women they were 58%, 12%, 8% and 22%, respectively; and among African American women they were 44%, 14%, 7% and 35%, respectively. These data confirmed that ER-/PR- neoplasm occurred significantly more frequently in the African American women in the sample than among the women in the other two ethnic groups.
**Triple Negative Breast Cancer**

In addition to a greater likelihood of having ER-/PR- tumors, there is evidence suggesting that African American and Hispanic women are also more likely to be diagnosed with TNBC. TNBC is characterized by the lack of receptors for ER, PR and human epidermal growth factor receptor (HER-2), hence, the triple negative status (ER-, PR-, HER-2-). TNBC is an aggressive variant of breast cancer characterized by a high tumor grade, aggressive disease course, early relapse, metastasis, and short survival (Dent, Trudeau, Pritchard, et al., 2007). Several researchers have reported that African American women have a higher incidence of TNBC compared to other women (Bauer, Cress, & Parise, 2007; Lund et al., 2009). It appears that high rates of TNBC might also be found in other groups of women. For example, in a recent study of East Indian women in Bangalore and Karnataka, India, Krishnamurthy and co-workers (2012) identified that TNBC was found in 18.5% and 56% of the women were pre-menopausal with a mean age of 47 years.

**BRCA1/BRCA2 Mutations**

Another area for further investigation is the disparity in genetic testing and referral for the BRCA1/BRCA2 inherited mutation. Having a strong family history of the BRCA gene mutation is one of the strongest predictors of developing breast cancer (as well as ovarian cancer). The American Cancer Society (2012) estimates that between 5-10% of women in the United States are carriers of the BRCA1/BRCA2 inherited mutation. Robson and colleagues (2001), reported that women who are carriers of the BRCA1 mutation are more likely to be diagnosed with tumors at a young age, are also ER-negative and of a higher grade, and, thus, they are at significant risk for a more aggressive disease. In addition, the recent media release of an actress who is a carrier the BRCA1 gene and her preventative double mastectomy may promote further
discourse on this topic (Jolie, 2013). There were a limited number of studies that addressed BRCA mutations in African American women and, as such, may suggest a disparity in genetic testing and referral for BRCA mutation testing in this population.

Lee and colleagues (2005) recruited and counseled a sample (n = 72) of underserved, diverse women (European American, African American, Latina, Asian/other from a public hospital). Of these women, 71% tested negative for BRCA1/2, five were positive for BRCA 1 (2 European American, 1 African American, 1 Latina, and 1 Asian), and twelve were positive for BRCA 2 (4 African American, 3 European American, 3 Latina and 2 Asian). The authors reported that African American women with a family history of breast cancer who declined counseling had more perceived barriers and concern about associated stigma than those who did not decline counseling. Interestingly, in their sample (n = 217) Armstrong and colleagues (2005) reported that African American women with a strong history of breast and ovarian cancer were less likely to undergo genetic counseling than their counterparts even after controlling for socioeconomic status, cancer risk perceptions, concerns and attitudes about risks and benefits of BRCA1/2 testing.

Recently, in another small (n = 46) but important study, Pal and colleagues (2013) reported that of the 46 women who tested and met the national guidelines for BRCA mutation, only 14 were referred for testing by their physicians. Appropriate referrals for testing will encourage African American women to become more informed and thus make the right decision for their specific situation.

**TP53 Gene**

Another biological prognostic marker used to estimate breast cancer prognosis is the p53 gene (also known as TP53). The protein, TP53 that is normally found in very small levels in
cells, is responsible for regulating cell division and growth. An aberrant over-expression
mutation in this protein has been found to be indicative of a poor cancer prognosis (Carey, Perou
& Livasy, 2006; Silvestrini et al., 1993). Dookeran and colleagues (2010) determined that p53 is
an independent predictor of survival in a moderately large cohort (n = 331) of low
socioeconomic and medically uninsured African American women diagnosed with breast cancer.

Age of diagnosis

An intriguing and unique pattern of breast cancer in African American women was seen
in the initial age of diagnosis. While the overall lifetime breast cancer incidence rates for
European American women are higher than for African American women (American Cancer
Society, 2012), African American women under age 45 have a greater incidence and mortality
rate of breast cancer than their European American age counterparts (American Cancer Society,
2012). Using SEER data, Shavers et al., (2003) compared the age, clinical presentation, and
treatment of ethnic women with breast cancer. The authors determined that African American
women who were age 35 or younger and diagnosed with cancer had tumors that were of a higher
grade (54.8%) and were more likely to have advanced stage III or IV tumors (16.4%) than their
European American counterparts. Although the treatment (mastectomy) was equivalent for each
group, 53.2% and 53.7%, respectively, the 5-year survival rate was disparate at 76.5% and
66.6%, respectively. Several investigators have proposed plausible explanations for the young
age distribution among African American women. In the Black Women's Health Study, Palmer
and colleagues (2003) identified a dual effect of pregnancy and breast cancer risk: specifically,
multi-parity before age 45 increased breast cancer risk, but was a protective factor against breast
cancer risk after age 45. In order to test this hypothesis, studies need to include age and parity
into their risk models, especially for African American women.
Parity

The literature is robust that demonstrates the relationship of parity and breast cancer risk for all women. There are different patterns of childbearing among many racial/ethnic groups (Pathak, Osuch, & He, 2000; Redondo, Gago-Dominquez, & Ponte, 2012). However, since breast cancer incidence and mortality are higher among child-bearing aged African American women <45, the phenomenon begs the question of whether there is a relationship between parity, age at first child and trajectory of breast cancer. Palmer and colleagues (2011) explored the relationship of parity, biological markers and lactation in a cohort of African American women who were diagnosed with breast cancer. In their study of n = 457 (ER+/PR+) and n = 318 (ER-/PR-), the authors reported that higher parity (3 or more births) was associated with a higher risk of ER-/PR- breast cancer and that lactation promotes this effect. Conversely, the results for ER+/PR+ was quite different as higher parity was associated with a risk reduction for ER+/PR+ but had no effect on lactation.

An earlier study by Palmer and associates (2003) explored the effect of parity and breast cancer risk in African American women from the Black Women's Health Study. In their prospective study of case subjects (n = 349), the authors reported that among multi-parous women who were younger than age 45, there was an increased risk. Conversely, among women who were older than age 45, parity was associated with a decreased risk. These findings suggest a need for continued research in this area.

Anthropometric Factors

Anthropometric factors are defined as the measurement of various body sizes and proportions and have been associated with breast cancer risk due to elevations of circulating estradiol in post-menopausal women but decreases in younger pre-menopausal women (Ballard-
Barbash, 1994). There appears to be a proportional relationship with adiposity-driven estradiol and breast cancer risk in post-menopausal women (Sexton et al., 2011). Yet the literature appears to be unclear regarding the relative risk as it relates to different ethnic/racial groups. For example, in a cross-sectional study of n = 471 African American and Hispanic women with breast cancer. Sarkissyan, Wu, and Vadgama (2011) reported that obesity (Body Mass Index (BMI) > 30) was associated with breast patients in both racial groups. In addition, the authors reported a significant association (OR=4.8; p value = 0.01) between breast cancer and obesity in post-menopausal African American breast cancer patients. Conversely, this was the opposite case for Hispanic women. The authors did not find an association of BMI and breast cancer in Latinas.

In a noteworthy study, using SEER data from African American breast cancer patients (n=412) and European American breast cancer patients (n=416), Lu and associates (2011) revealed that obesity played a more important role in the mortality of European women ages 35-64 with breast cancer than in their African American counterparts. As previously mentioned, the relationship of obesity and breast cancer risk does not appear to be definitive and requires further attention.

**Psychosocial Risk Factors: Disentangling Socioeconomic Position and Ethnicity**

Socioeconomic position (SEP) can be defined as socially derived economic factors important to consider when determining the positions that individuals and/or groups hold within a stratified society (Krieger, Williams, & Moss, 1997). SEP was used primarily to isolate and describe health inequalities and can be used as an explanatory casual mechanism to account for these health disparities (Galobardes, Lynch, & Smith, 2007). Krieger and colleagues (2005) found differences in health status among monozygotic and dizygotic twins who were initially reared together as children but had different SEP as adults. Specifically, twins with lower SEP
had poorer health status than their higher SEP twin counterparts (Krieger, Chen, & Coull, 2005). Dalton and colleagues (2006) compared women of varying levels of SEP and found that post-menopausal women with breast cancer who had a low SEP and low education also had a high histological grade and lymph node involvement.

In an attempt to disentangle ethnicity and socioeconomic status, a meta-analysis of 14 studies was conducted by Newman and colleagues (2002) that included over 10,000 African American and 40,000 European American breast cancer patients. They reported that African American ethnicity was an independent predictor of poor breast cancer outcomes. However, Newman and colleagues (2002) could not account for the interaction of ethnicity and SES as most of the studies did not include an adequate number of affluent African American patients. Kreiger, Williams, and Moss (1997) reported that a lack of awareness of the broad canvas of race and socioeconomic status may obscure the heterogeneity that exists within groups as well as the differential effects that SEP can have on health in the different ethnic groups (Geronimus et al., 2006; Myers, 2009).

Another area of great concern is the economic burden of breast cancer, which may also affect quality of life and possibly also cancer-related mortality. Arozullah et al., (2004) noted that the economic burden of breast cancer varied across income levels. For example, breast cancer patients with income levels of less than $30,000 have a financial burden of 98% compared with their counterparts with income levels between $30,001 and $60,000 (41%) and those above $60,000 (26%). According to these data, individuals who had less income also tended to face greater financial hardship from their breast cancer treatment. Some researchers have suggested that the cause for this disparity is multi-faceted where breast cancer is concerned. For example, Schleinitz, DePalo, Blume, and Stein (2006) noted that socio-demographic characteristics might
have a significant impact on whether or not low income African American women would be less likely to receive adjuvant chemotherapy than their more affluent White counterparts.

**Psychosocial Risk Factors:**

**Chronic Stress/Discrimination**

Some African Americans are at a greater risk for experiencing distress and adversity in comparison to other racial/ethnic groups (McCord & Freeman, 1990). For example, researchers have reported that the neighborhood and surrounding community play a significant role in the predictors of health outcomes given the chronic stresses experienced by members of racial and ethnic groups (Diez Roux, 2001). In fact, for some African American women who reside in urban communities, life stressors such as financial, work and safety are associated with a significant burden of disease (Schultz, Parker, Israel, & Fisher, 2001). In addition, many female caregivers shoulder the burden of caring for spouses (Chang, Brecht, & Carter, 2001) as well as for other relatives, friends, grandchildren, and others in need (Kneipp, Castleman, & Gailor, 2004). A growing number of researchers have reported that the burgeoning health disparities between African American and other racial/ethnic groups in the United States is exacerbated by chronic exposure to subtle forms of racism and discrimination (Clark, Anderson, & Clark, 1999; Nazroo, 2003; Thompson, 2002; Williams, Neighbors & Jackson, 2003) and micro aggression (Hall & Fields, 2012; Sellers & Shelton, 2003). In addition, recent evidence suggests that African American women may be more vulnerable to stress due to the psychological effects of discrimination and racism than African American men (Greer, Laseter, & Asiamah, 2009). This phenomenon may be attributed to the intersection of race and gender (Crenshaw, 1991). Accordingly, for African American women, “Intersectionality” posits that the convergence of race, gender and social class is often used as a prism to view one’s social world (Crenshaw,
Some African American women may experience more interpersonal discrimination that may be based on their ethnicity, gender, and/or social class (Crenshaw, 1991) compared to women from other racial and ethnic groups. Thus, the cumulative lifetime effect of chronic stress exposure may account for the “Weathering” phenomenon which postulates that chronic stress exposure to social and economic adversities contributes to “premature aging” and, thus, may have a profound effect on the health of many African Americans (Geronimus et al., 2006).

**Stress and Breast Cancer**

As previously stated, the Weathering hypothesis posits that the premature deterioration of health can be traced to a variety of cumulative, repeated experiences based on social, economic or political position (Geronimus et al., 2006). Researchers have shown that exposure to chronic and severe stress can have deleterious effects on one's health through the mechanism of allostatic load (McEwen, 1998; McEwen & Seeman, 1999). This hypothesis posits that exposure to stress induces a sustained chemical overload in the autonomic nervous system, central nervous system, endocrine and immunological systems (McEwen, 1998). Accordingly, this physiologic "overload" results in greater “wear and tear” and the inability to maintain allostasis may lead to a host of illnesses in the cardiovascular, metabolic, immunological, and neurological systems (McEwen, 1998). In the immunological system, chronic inflammation as evidenced by elevated C-reactive protein (CRP) and serum amyloid A (SAA) has been associated with greater risk of breast cancer metastasis and greater mortality (Pierce et al., 2009). In that study with a racially diverse sample of breast cancer patients (n=735) that included African American, non-Hispanic White, and Hispanic participants, the authors determined that elevated concentration of CRP and SAA could be used as a prognostic marker for breast cancer recurrence (Pierce et al., 2009).
Using animal models, researchers have found that stress contributes to breast cancer metastasis. In a randomized study using mouse models, Sloan and colleagues (2010) identified that chronic stress exacerbated the metastasis of primary breast neoplasm to the lymph nodes and lungs by a 30-fold increase versus controls (p=.04). Given the above literature on psychosocial risk factors and, in particular, the burden of chronic stress exposure, there appears to be a link between chronic stress and differential risk of developing cancer in all women, and a greater risk among African American women for developing a more aggressive form of breast cancer.

**Moderators:**

**Quality of Healthcare along the breast cancer trajectory**

Disentangling the independent effects of ethnicity and breast cancer risks and outcomes in women is a challenge. One area in which this is confounded is access and quality of cancer care. A landmark study by Elmore and colleagues (2005) clearly indicates that African-American women often experience differences that were attributed to race at every step of the illness trajectory, including timeliness and identification of their first symptoms, the timing of diagnosis, and the initiation of breast cancer treatment. More importantly, even with the diagnosis, there was compelling evidence that African American women were less likely to get the recommended treatment for their breast cancer (Ballard-Barbash, Potosky, & Harlan, 1996; Bradley, Given, & Roberts, 2002; Breen, Wesley, & Merrill, 1999; Mandleblatt, Kerner, & Hadley, 2002). In addition, Bickell and colleagues (2006) reported on the under use of adjuvant chemotherapy and its subsequent effects on survival and noted that African American women were more likely to be undertreated with radiation therapy after breast conserving therapy than European American or Hispanic women. The authors noted that 34% of African American women and 23% of Hispanic women, but only 16% of European American women, were
undertreated. From these and other data, it is evident that the “breast cancer experience” for many African American women was very different than for other women, and that this unequal treatment likely contributes to the persistent disparity in breast cancer trajectories for these women.

With regards to access to care, it has been well documented that mammography screening saves lives. Yet, several studies have reported that African American women are less likely to get a screening mammography than women from other racial/ethnic groups (Burns et al., 1996; Rawl, Champion, & Menon, 2000). In addition, having a regular medical provider for ones’ health-care needs was a strong predictor of obtaining a screening mammography. However, several studies have reported that low income women were less likely to have medical insurance and a usual source of medical care (Coughlin, Uhler, & Bobo, 2004; Jones et al., 2005).

Physician behaviors also contribute to a difference in the receipt of cancer care among women. Several studies have identified a difference in recommendations for screening mammograms. For example, ascertaining if there is a family history of breast cancer is an important component of a medical history. Yet, it was interesting to note that European American women are more likely to be asked about their familial breast cancer history compared to non-White women even after adjusting for education, age, years of provider experience and initial breast complaint (Murff, Byrne, & Haas, 2005). Nonetheless, researchers have determined that when physicians follow guideline-based treatment protocols with breast cancer patients, the outcomes are equally favorable for African-American and White women (Dignam, 2001; Du & Simon, 2005). These results are of particular interest to African-American women and for all members of the African-American community, including local, state, and national policy makers.
Diagnoses at an advanced disease stage

Breast cancer tumors that are large in size with the presence of extensive lymph node involvement and a higher disease stage are all indicative of a poor prognosis. The National Cancer Institute’s SEER database revealed that African American women are more likely to be diagnosed at a later, more-advanced stage (IIIB and above) of the disease (Crowe et al., 2005; Hensley et al., 2009; Henson, Chu, & Levine, 2003) when compared to other racial and ethnic groups. In fact, African American women are more likely to exhibit these prognostic factors than breast cancer patients from any other ethnic group (Elledge, Clark, & Chamness, 1994; McBride et al., 2007). The inference from these studies is that an advanced disease stage may not be related simply to a lack of available and accessible healthcare, but may in fact be related to greater risk of having a breast cancer that is characterized as a more aggressive phenotype.

Disparities in the Quality of Health Care across the Breast Cancer Continuum

Although breast cancer is prevalent among African Americans, there are factors that appear to contribute to greater disparity in early detection. For example, several researchers have identified that African American women are less likely to obtain a screening mammogram than women from other racial and ethnic groups (Burns et al., 1996; Rawl et al., 2000). In addition, there is also compelling evidence that African American women are less likely to get the recommended treatment for their breast cancer (Ballard-Barbash et al., 1996; Bradley et al., 2002), all of which contribute to a more adverse disease trajectory and greater risk of mortality.

Disparities in breast cancer treatment

Unequal treatment for African American women has been well documented in the literature, yet obtaining quality of health care for all individuals is important (Lewis, Lewis, & Leake, 2002). In a landmark study, Li et al. (2003) reported that there were many differences in
the staging of breast cancer, and the provision of appropriate treatment and subsequent survival
ces across different ethnic groups including African American, non-Hispanic whites, American
Indians, Puerto Ricans, Hawaiians, Mexican, Central Americans, Indians and Pakistanis. They
reported that there was a 20%-50% chance that African American, Mexican American and
Puerto Rican women were more likely to obtain information or make a medical decision on the
required course of treatment that was not consistent with the National Comprehensive Cancer
Network. They explained that ethnic differences in the decision of the patients and the treatment
received are likely due to patient, provider, and health system factors, and all of these need to be
considered in addressing these differences. Breen and colleagues (1999) in the Black/White
Cancer Survival study found differences in the standards of care for African American patients.
They found that 21% of African American patients failed to receive the minimum standard of
care as recommended compared to 15% of European American patients. Depending on the
specific disease characteristic, women who receive initial treatment for breast cancer either
receive mastectomy or breast conserving surgery (BCS), chemotherapy, and/or radiation, either
singularly or in combination. Among women who receive BCS, radiation is the cornerstone of
the treatment as it decreases the likelihood of recurrence and thus increases survival (Clarke, et
al., 2005). Yet, African American women are less likely to receive radiation when compared to
other groups (Haggstrom, Quale, & Smith-Bindman, 2005), which may contribute to more
unfavorable disease outcomes. While the disparities across the breast cancer continuum have
been noted, there is also literature to support that African American women have a contributing
role in these disparities, in what is called patient factors.

Patient factors
Lack of insurance or a regular source of care, attitudes and belief systems, delay in seeking care or follow-up after an abnormal mammogram and unfavorable tumor characteristics can contribute to lower quality of care outcomes on the patient level (Corbie-Smith, Flagg, & Doyle, 2002; Dignam, 2000; Williams, Flocke, & Stange, 2001). Several studies show that African American women are more likely to delay seeking assessment and care for breast cancer symptoms and, thus, are diagnosed with breast cancer at later stages compared to their counterparts. This delay is associated with a later stage of the disease at diagnosis (Howard, Penchansky, & Brown, 1998). Caplan and colleagues (1996) investigated the reasons for delay in diagnosis and found that women who attribute the delay to themselves (internal forces) were more likely to have stage 3 or 4 breast cancer at diagnosis compared with women who attributed the delay to health system factors (external forces). The identified reasons for the patient-centered delays in seeking timely care included perceived lack of urgency (37.6%), out of town activities or celebrating a birthday (17.8%), competing health care concerns or other problems (14.0%), lack of time (12.7%) or fear of cancer (12.7%). Fear or high anxiety in African American women can also contribute to a delay in diagnostic evaluation as seen in the study by Kerner et al. (2003). These investigators determined that African American women who were highly anxious were 50% less likely to complete a diagnostic evaluation within 90 days compared to those with lower anxiety scores.

**Psychological Resources: Resilience/Spirituality**

In the face of lifetime adversity, stress, and economic hardship, there are factors that enable some African American women to cope and lead positive productive lives. Resilience denotes a combination of characteristics and abilities that allow an individual to cope successfully, to bounce back and function well despite significant burdens of stress and adversity (Rutter, 1993). Resilience
for African American women can be viewed as the ability to keep on going in the face of significant hardships or to face difficult times in life and still be “OK.” Resilience serves a moderating function in the face of adversity.

One important resource is spirituality. Spirituality plays a significant role in the lives of both African American breast cancer survivors (Bourjolly, 1998) as well as for many African Americans as a social group (Krause, 2004; Taylor, Chatters, & Jackson, 2007). By definition, the term Black church or African American church collectively refers to a Christian church of all denominations within the African American community (Foluke, 1999). Historically, the African American church has been the focal point for many members of the African American community (Foluke, 1999; Giger, Appel, & Davidhizer, 2008). The "church" has served historically not only as a place of worship but also for refuge, a wealth of resources, social gatherings and education (Foluke, 1999). For many African Americans, church and prayers provide an ability to cope with the stressors and stressful life experiences (Ellison & Taylor, 1996).

Strong supportive family ties, spirituality, “community connections” and kinship with individuals who are members of a social network, church, social group, and neighborhood (Heiney et al., 2011) all contribute to cultural strength. As such, cultural-strength may be viewed as a psychological resource that buffers racial and ethnic populations from the adverse effects of social adversity (Williams, 1997). These protective psychological factors may be hypothesized as serving as a moderator-buffer to improve overall well-being as well as alter the impact of breast cancer for those afflicted by cancer and other chronic medical conditions. In a study by Deimling and colleagues (2006), the authors examined if personal characteristics such as race and gender were associated with psychological distress in long-term (5+ years) cancer survivors. While controlling for the burden of treatment and current health stressors, they found that
African American cancer survivors had fewer cancer-related worries than European American cancer survivors.

**Outcomes:**

**Impact of disease**

Given the extant literature that was previously discussed such as the biological and psychological risk factors that increase one’s vulnerability to breast cancer, aggressive nature of the disease, chronic stress, difference in diagnosis, treatment and care along the breast cancer continuum, potentially buffered by the utilization of psychological resources, it is not surprising that the impact of breast cancer is quite different for African American women when compared to other racial and ethnic groups. Collectively, this impact can be experienced in many areas but, in particular, on the physiological and psychological realms. For example, previous investigators have reported a variety of physical symptoms experienced among African American and other racial ethnic groups and during and after treatment for breast cancer, such as pain (Eversley et al., 2005), fatigue, intimacy impediments (Ashing-Giwa et al., 2004), physical impediments (Giedzinska, Meyerowitz, & Ganz, 2004) and, most recently, neurological deficits.

Chemotherapy-related cognitive impairment (CRCI) also known as “chemo brain” is quite common. In fact, CRCI is reported to affect between 33%-50% of all patients who are undergoing chemotherapy treatment (Olin, 2001; Staat & Segatore, 2005). A recent study by Koppelmans and colleagues (2012) reported that breast cancer survivors may show cognitive impediments up to 20 years after receiving chemo therapy. Patients have reported mental fogginess, loss of concentration, difficulty processing information, and difficulty and/or loss of memory which impacts their daily functioning and job performance (Boykoff, Moieni, & Subramanian, 2009). In addition, the evidence is clear that cognitive impairment does, in fact,
have a significant impact on the life of breast cancer survivors as reported by Shilling and Jenkins (2007). In their study of 142 breast cancer survivors, Shilling and Jenkins (2007) investigated the relationship between self-reported and objective cognitive impairments in quality of life. The authors determined that 71% of the survivors reported memory problems at 6 months post chemotherapy and 60% after 18 months. With regards to concentration, 64% reported problems at 6 months and 42% at 18 months post adjuvant therapy (Shilling & Jenkins, 2007). Rust and Davis (2012) documented that stigma and variability of CRCI experiences were quite evident in African American breast cancer survivors. A decline in mental acumen for any women but in particular African American women may add an additional layer of stress, coupled with the many roles and responsibilities and the burden of chronic stress that they may experience. The exposure may be quite salient and, thus, add evidence that the impact of breast cancer on the lives of women of African ancestry may be very different than among other women and may subsequently affect disease survival unless there are targeted interventions, focused research and policy implementation to address the ongoing breast cancer disparity among many women but, in particular, women of African ancestry.

**Recommendations for future research and interventions**

A number of relationships between ethnicity and breast cancer disparities among African American women were illustrated in our integrative review and explanatory model. With the groundswell of evidence that clearly illuminated a significant breast cancer disparity, further attention is provided in the following areas: prevention, early detection and intervention. Additional discussion of the hypothesized relationships is addressed as a launching pad for future research.
It is interesting to note that although breast cancer has been around for about 5000 years (American Cancer Society, N.D.), the etiology of breast cancer remains unknown (American Cancer Society, 2012). Undoubtedly, an area for further advancement is identification of the etiology of breast cancer. Addressing the etiology of breast cancer is germane to the area of prevention. In addition, minimizing the bio-behavioral risk factors such as obesity and parity may mitigate an individual's chances of being diagnosed with this disease. Providing access to and utilization of digital mammography may lead to early detection of breast cancer. Researchers Mellado and colleagues (2013) have reported that digital mammography may be useful in early detection of micro-calculifications that can be found in breast tissue. While the aforementioned recommendations on early detection and prevention are provided, further scrutiny on the cellular level is needed.

African ancestry and the number of biological risk factors warrant further discussion on a very sensitive topic for many African Americans. From a historical perspective, the underpinnings of the Tuskegee syphilis study are often referred to as the genesis for mistrust because of its duration, deception and mistreatment of its human subject participants (Gamble, 1993; Gamble, 1997). In addition, the Institute of Medicine's (IOM) report on inequities in health care (Smedley, Stith & Nelson, 2003) coupled with the recent documentation of exploitation of Henrietta Lacks' (HeLa cells) (Skloot, 2011) may raise suspicion among some African Americans. Clearly, genetic testing has been viewed with scrutiny among many African Americans (Moorman et al. 2004; Armstrong et al. 2012). Interestingly, researchers Bussey-Jones and colleagues (2010) reported a statistically significant finding that African Americans were less likely to agree to give a blood sample when compared to European Americans (21%
vs 13%, p<0.05). After controlling for "trust" the results were statistically insignificant (17% vs. 13%, p=0.27).

The literature shows a recent trend of acceptance toward genetic testing. Kinney and colleagues (2006) reported that 86% of the participants in their study agreed to be tested for BRCA1. This is quite promising for burgeoning field of the Human Genome Project and the subsequent passage of the Genomic and Personalized Medicine Act in 2007. Targeted personalized genomic medicine and pharmacogenomics may be of benefit to African American women and may increase their breast cancer survival (Huo et al., 2012). In fact, a recent study by Adebowale and colleagues (2009) identifying the genome-wide association for essential hypertension in African Americans showed promising results. The authors identified two variant genes that were linked to blood pressure regulation that are also a specific target for calcium channel blockers.

Our explanatory model may be useful in guiding and informing interventions such as stress management and resilience training. Loprinzi and colleagues (2011) conducted a randomized clinical trial on stress management and resilience training (SMART) program to decrease stress and enhance resilience in breast cancer survivors. Breast cancer survivors were randomized to the SMART group or the control group. The intervention consisted of two 90-minute group training, individual session, and follow up phone calls. The findings revealed that there was a significant improvement in resilience and stress over a 3-month period from the baseline. The authors demonstrated that this intervention can enhance resilience and improve the management of stress as we have previously cited that stress leads to increased metastases of breast cancer in animal and human models.
The gaps in the literature that were identified in this review demonstrate the need for understanding the relationships between predictors, moderators and outcomes which, in turn, may increase survival outcomes by examining and testing the predictors, moderators and its effect on the outcomes for African American women. Future research in the area of ethnicity, biological and psychosocial risk factors beckons the following salient questions:

1) What is the relationship between ethnicity, biological and psychosocial risk factors mediated by psychosocial resources and its impact on the disease trajectory?

2) Is adiposity (measured by BMI) a valid predictor for breast cancer in African Americans as there may be a confounding influence due to high bone density (Aloia, Vaswani, & Ma, 1997) and skeletal muscle mass (Aloia, Vaswani, & Mikhail, 1999)?

3) What is the relationship of SEP across the disease trajectory, in particular, as most of the studies in this review did not account for SEP or SES? How does stress exacerbate breast cancer and can we target interventions to buffer the stress?

4) What is the role that ethnicity and chronic stress add to the vulnerability of developing an aggressive form of breast cancer?

In this review, an explanatory model was offered that depicts a number of relationships between biological and psychosocial risk factors as predictors of disease trajectory and factors hypothesized as moderating these relationships to account for breast cancer disparities among African American women. The impact of breast cancer is felt annually among many women and men who succumb to this disease as well as the loss to their families, communities and society. An interdisciplinary, targeted approach is sorely needed to increase survival outcomes among all
women and in particular African American women. It is our hope that the ideas shared here will stimulate more discussion of these issues and guide future studies to address the breast cancer disparities of African American women.
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Biological and Psychological Predictors of Psychological Functioning among African American Breast Cancer Survivors

Abstract

Among many racial/ethnic groups, some African American women are more likely to be diagnosed with an advanced stage of breast cancer. While there have been many hypothesized reasons for this disparity, this study examined the relationship between biological predictors, specifically Estrogen Receptor (ER), Progesterone Receptor (PR), triple negative breast cancer (TNBC), Breast Cancer gene (BRCA1/2), Tumor Protein 53 gene (TP53, p53), Age ≤ 45 at diagnosis, Age ≤ 30 at first pregnancy, Adiposity and psychosocial risk factors (socioeconomic position [SEP]), and chronic stress that may affect the psychological functioning (anxiety, depression). A general linear modeling approach was utilized to examine the relationships and from a modified conceptual model—Biopsychosocial Model of Breast Cancer Survivorship for African American women (Davis & Myers, 2008). Participants included 155 African American breast cancer survivors throughout California. Examination of the biological risk factors revealed that some biological risk factors were significant predictors for anxiety and depression. Psychosocial risk factors, specifically chronic burden was a significant predictor for anxiety (p<.001), while SEP was not significant. TNBC was a significant biological predictor for depression (p<.049). Chronic burden was a significant psychosocial predictor for depression (p<.005).

Word Count: 218
Keywords: African American, Breast Cancer Survivors, Depression, Anxiety, Stress, Chronic Burden, Biological Predictors, Psychosocial Predictors, Impact of Cancer, Socioeconomic Position, Biopsychosocial Model,
Introduction

Nationwide, over 232,340 women are diagnosed with breast cancer each year (American Cancer Society, 2013); yet the disease trajectory is quite different among women of various racial groups. There is compelling evidence that race is a significant independent risk factor for breast cancer mortality (Newman et al., 2006). While African American women have a lower incidence of breast cancer, they have an overall higher mortality rate compared with women of other racial groups (American Cancer Society, 2013). Furthermore, African American women are more likely to be diagnosed with breast cancer at an advanced stage when compared to other women (Crowe, Patrick, & Rybicki, 2005; Shavers, Harlan, & Steven, 2003). They are also more likely to have biomarkers that are estrogen and progesterone receptor negative (Dignam, 2000; Joslyn, 2002), and have a greater propensity to be diagnosed with tumors that are known as Triple Negative Breast Cancer (TNBC) compared with other women (Bauer, Cress & Parise 2007; Lund, Truers, & Porter, 2009).

The quality of cancer care may be quite different for racial and ethnic groups along the breast cancer trajectory. In fact, Elmore and colleagues (2005) reported that African American women often experience differences that were attributed to race at every step of the illness trajectory, including timeliness and identification of their first symptoms, the timing of diagnosis, and the initiation of breast cancer treatment. In the following sentinel studies, African American women were less likely to get the recommended treatment for their breast cancer (Bickell et al., 2006; Bradley, Given, & Roberts, 2002; Mandelblatt et al., 2002). Unequal treatment in the provision of care can also be attributed to breast cancer disparities. Li and colleagues (2003) reported that 21% of African American patients failed to receive the minimum
standard of care as recommended compared to 15% of European American patients. With breast conserving surgery (BCS), radiation is the cornerstone for treatment as it decreases the likelihood of recurrence and thus increases survival (Clarke, Collins, & Darby, 2005). Yet, African Americans women are less likely to receive radiation when compared to other groups (Haggstrom, Quale, & Smith-Bindman, 2005), which may contribute to more unfavorable disease outcomes and subsequent worry.

Coupled with the differential effects that socioeconomic status and stress may have on different ethnic groups (Myers, 2009; Geronimus, Hicken, & Keene, 2006), it is likely that chronic burden and episodic stress burden (Schultz, Parker, & Israel, 2001) may have a profound effect on the health of many African Americans (Geronimus et al., 2006). Interestingly, documentation that chronic stress induces a sustained “allostatic load” in a variety of biological processes, including the immune system, is well cited in the literature (McEwen, 1998; McEwen & Seeman, 1999) and among African American breast cancer survivors (Pierce et al., 2009). Given the empirical evidence on biological and psychosocial risk factors, and in particular, the burden of chronic stress exposure; one of the inherent overarching questions is how do these particular experiences affect the psychological functioning of African American breast cancer survivors?

While there is cursory evidence regarding the biological, psychosocial, and behavioral factors that African American women experience; to date, there has been a paucity of empirical evidence that have explored how all of these factors affect the psychological functioning among these women. To that end, the specific aim of this study was to examine the role of biological predictors specifically estrogen receptors (ER), progesterone receptors (PR), triple negative
breast cancer, BReaCancer gene (BRCA1/2), Tumor Protein 53 gene (TP53, p53), age of breast cancer diagnosis $\leq 45$, Basal Metabolic Index (BMI), age of first pregnancy $\leq 30$, and psychosocial risk factors (socioeconomic position [SEP]), and chronic stress as contributing factors to the psychological functioning (anxiety, depression) of African American breast cancer survivors (AABCS).

**Literature Review**

**Biological Risk Factors**

Biological risk factors are physical characteristics such as age and gender, which may increase the chances of procuring a specific type of cancer (National Cancer Institute, 2009). Based on the literature, seven biological risk factors are more likely to occur in all women, but in a higher percentage in women of African ancestry. These include the prevalence of ER, PR negative status (Dignam, 2000; Joslyn, 2002), TNBC (Bauer, Cress, & Parise, 2007; Lund et al., 2009), and the p53 gene (Dookeran et al., 2010). In addition, being of a young age at diagnosis (Palmer, Wise, & Horton, 2003; Shavers, Harlan, & Stevens, 2003), having an increased BMI (Lu, et al., 2011; Sarkissyan, Wu, & Vadgama, 2011); and of greater parity (Palmer et al., 2011; Palmer, Wise, & Horton 2003). Collectively these risk factors may increase the burden of chronic stress.

**Chronic Stress**

Many ethnic groups and in particular, African Americans are likely to carry a heavier burden of chronic stress compared to European Americans, primarily due to socio-economic disadvantage (Myers, Lewis, & Parker-Dominguez, 2003) and exposure to unfair treatment (Smedley, Stith & Nelson, 2003). Some African American and Hispanic women are more likely to experience food insecurities than other women (Kaiser, Baumrind, & Dumbald, 2007) which
may add another burden of stress for low income women. Neighborhoods and surrounding communities play a significant role in the predictors of health outcomes given the chronic stress experienced by members of racial and ethnic groups (Diez Roux, 2001). In fact, for some African American women who reside in urban communities, life stressors such as financial, work and safety are associated with a significant burden of disease (Schultz, Parker, & Israel, 2001). These stressors may add another layer of burden for women along the breast cancer trajectory.

Another area that is of great concern for all cancer survivors, but in particular for African American breast cancer survivors whose breast cancers are generally at an advanced stage of disease (Crowe et al., 2005; Ries et al., 2005) and more aggressive disease, (Furberg, Milikan, & Dresser, 2001; Porter, Lund & Lin, 2004) is the constant threat of fear of recurrence, which may create an additional source of stress. A recent study by Taylor and colleagues (2012) explored the fear of recurrence among 51 African American breast cancer survivors; findings revealed that fear about recurrence and death was rated low to moderate (M=2.65, SD=1.44) among these women.

**Socioeconomic Position**

There is strong and compelling evidence that there is a differential cancer burden in certain populations, especially the socio-economically disadvantaged, racial/ethnic groups, the medically underserved and older adults (McCord and Freeman 1990; Smedley, Stith, & Nelson, 2003). Socioeconomic position (SEP) is defined as socially derived economic factors that are important to consider when determining the positions that individuals and/or groups hold within a stratified society (Krieger, Williams, & Moss, 1997). An area of great concern for all women, regardless of race, but particularly for poor women and for women of color, is the economic
burden of breast cancer. Socio-demographic characteristics may have a significant impact on whether or not African-American women would be more likely to utilize adjuvant chemotherapy as compared to other racial groups (Schleinitz, DePalo, & Blume, 2006). Breast cancer patients with limited financial resources are likely to face this additional economic burden (Arozullah, et al., 2004).

African American women with breast cancer were more likely to experience inequities in the comprehensiveness of treatment (Breen, Wesley, & Merrill, 1999; Elmore, et al., 2005; Gwyn, et al., 2004). More recently, using Surveillance, Epidemiology and End Result (SEER)/Medicare data, Silber and colleagues (2013) conducted a longitudinal study of 7375 African American women with breast cancer and their matched controls (based on age, year of diagnosis and specific SEER data site). Silber et al., (2013) determined that the overall 5-year survival was not due to a difference in treatment, but rather due to the initial presentation of breast cancer among older African American women and their controls. While this longitudinal study validates the need to explore the aggressive nature of breast cancer and disease trajectory that may impact the psychological and physiological facets of the individuals' life; it is interesting to note that the authors did not account for completion of treatment regimen which can account for increased breast cancer survival rates (National Cancer Institute, 2013) and for women with TNBC, which has been shown to occur disproportionately in women of African descent (Lund, et. al., 2009; Stark, et al., 2010).

**Psychological functioning**

The diagnosis and treatment of breast cancer are stressful events that have a significant impact on both short and long term psychological functioning. In our study, psychological functioning is characterized as depression and anxiety. Depression and anxiety are
psychological reactions that are frequently experienced in breast cancer patients (Ell, Sanchez, & Vourleakis, 2005; Sollner, Maislinger, & Konig, 2004), and some studies suggest that African American women are especially likely to report high levels of cancer-specific distress (Hughes, Lerman, & Lustbader, 1996; McBride, Clipp, & Peterson, 2000).

**Anxiety**

In a meta-analysis, Mitchell and colleagues (2011) reported that the prevalence of anxiety was 16% and depression was 10% among cancer patients in general. Predictors of anxiety on cancer patients were severe pain (Galloway et al., 2012), functional limitations (Khan, Amatya, & Pallen, 2012) and history of traumatic experiences (Green, Krupnick, & Rowland, & 2000). Recently, Ploos van Amstel and colleagues (2013) determined that over one third of breast cancer survivors experienced emotional distress (anxiety, depression, etc.) and survivors may need to be screened for any signs and/or symptoms of duress. Ferrante and colleagues (2008) determined that anxiety levels were significantly higher in a control group versus the treatment group. While there has been significant research conducted on anxiety and breast cancer screening in African American women (Ferrante, Chen & Kim 2008; Padgett, Yedidia, & Kerner, 2001), there was a dearth of quantitative research on anxiety and African American breast cancer survivors.

**Depression**

Several studies have reported that African American women, especially those from lower SES, are more likely to exhibit symptoms of distress than other women (Myers, Lesser, & Rodriquez, et al., 2002). In fact, researchers have found that 57% of women with breast cancer report ‘significant’ depression that merit treatment (Badger, Braden, & Mishel, 2001; Morrasso, Constantini, & Viterbori, 2001). In a ground breaking study using structural equation modeling
(SEM), Porter and associates (2006) examined predictors of negative mood and personal growth in a sample of European (n=369) and African American (n=155) breast cancer survivors. These authors determined that for both groups, more symptoms (B = .023, t=2.981), increased religious participation (B = .184, t=5.761), higher education (B=.032, t=3.514) and younger age (B=-.013, t=-4.329) were directly associated with increased levels of personal growth.

In terms of a conceptual framework, the Biopsychosocial model of Breast Cancer Survivorship for African American Women (BBCS) (Davis & Myers, 2008) will serve as the guiding framework for this study. The BBCS model delineates relationships of biological and psychosocial risk factors that and psychological functioning among African American women breast cancer survivors (AABCS). The authors hypothesized that biological risk factors (ER, PR, BRCA, TNBC, p53, age of diagnosis ≤45, age of first pregnancy ≤30,) psychological risk factors (socioeconomic position, chronic stress) predicts psychological functioning (depression, anxiety) among AABCS. See Figure 1.
Figure 1. Biopsychosocial model of Breast Cancer Survivorship for African American women.

Methods

Study Design and Sample

One hundred and sixty-nine women were screened, 160 were deemed eligible and scheduled to be interviewed and of those, two women chose not to participate and three women did not show up for their interview. This resulted in the final sample of 155 who met the eligibility requirements.

Inclusion/Exclusion Criteria
Eligible participants were women who self-identified as African, African American, Black or Black American, aged 25 years or older, diagnosed with breast cancer, at least one year post-active cancer treatment, and capable of providing informed consent. Participants were excluded if they self-identified as being from any other race/ethnicity; if they were currently undergoing breast cancer treatment and incapable or unwilling to provide informed consent or were diagnosed with a different primary (cancer). The study was approved by the institutional review board and written informed consent was obtained from each participant.

**Recruitment**

All participants were residents of California and recruited through using 3 methods: (1) 12 African American breast cancer survivor groups, (2) word-of-mouth and (3) through flyers in key community locations, e.g., civic groups, non-profit organizations, local churches, hair salons, and unisex barber shops. Interested individuals who were identified by these methods were instructed by the flyer to contact the study Principal Investigator (PI) by calling a designated research telephone number. Upon calling the research telephone number, a telephone script (approved by IRB) was initiated. All potential participants were screened to determine if they met the eligibility criteria. Once eligibility was determined, the potential participants were informed that they were eligible to participate in the study. They were then asked how they heard about the study, if they belonged to a support group, and, if applicable, the name of their breast cancer support group. Women who were members of a support group met the PI in designated area provided at their monthly support group meeting. Women who were not members of a support group, and were recruited by word-of-mouth or via recruitment flyers, were assessed for eligibility by phone. Once determined to be eligible, arrangements were made
between the PI and the potential participants to meet at an agreed upon location within their community.

**Procedures**

Upon meeting with the PI, participants were informed about the purpose of the study, and all questions were addressed. All were informed that it would take approximately one hour to complete the surveys. All data were collected through either face-to-face interview or a self-administered battery of questionnaires. Assistance was provided to participants who preferred to have their surveys read to them; responses were hand-written, verbatim. For participants who were not members of a support group, the surveys were self-administered in a public or a private location, such as in public rooms in libraries, coffee houses, etc. Upon completion, all participants received a $10 Target gift card for expenses associated with gas and local travel.

**Instruments**

A Demographic Data Questionnaire (DDQ) was used to obtain general demographic information, such as age, ethnicity, marital status, education, family income, and household information. SEP was measured by education and income. Education was assessed as one of 9 categories, 1=less than high school diploma to 9=Professional Degree. For purposes of the analyses, the categories were collapsed to 4: 1=high school or below, 2=some college, vocational certificate/associate degree, 3 = Bachelor’s degree, 4 = advanced degrees. Household income was assessed as one of 13 categories from 1 = less than $5000 to 13 = greater than 150,000. For purposes of the analysis, income categories were collapsed to 1 = <$ 40,000, 2 = $ 40,000-$80,000 and 3 = $ 80,000 and beyond. Height and weight, co-morbidities, religious affiliation, stage of breast cancer and type of treatment was assessed.
**Risk Factors**

Information on biological risk factors was obtained with a series of questions on the DDQ that asked participants whether they knew or were informed that they had each of the following biological risk for breast cancer: ER, PR status, TNBC, BRCA1/2 gene, p53 gene, specific questions regarding age at diagnosis –less than or equal to age 45, age of when they were first pregnant-specifically less than or equal to age 30, and BMI were requested. Data on psychosocial risk factor (SEP-characterized as education and income) was obtained from the DDQ.

**Chronic Stress**

The burden of chronic stress was assessed with the 21-item Chronic Burden Scale (CBS) (Gurung, Taylor, Kemeny & Myers, 2004), as the accumulated burden of ongoing life stresses, including, but not limited to stresses from finance, housing, employment, medical problems, childcare, etc. The CBS measures the individual's experience of common stressors in the past 6 months, with a higher score indicating a greater chronic stress burden. This tool was used to measures the chronic burden that many women experience, particularly in the context of breast cancer and other diseases (Sasser, Rousculp, & Birnbaum, 2005).

The measure asked respondents to rate their responses on a 4 point Likert scale ranging from 0 (not a problem for me in the past 6 months) to 4 (this is a major problem for me in the past 6 months). A life stress score was calculated as the sum across the 21 items. The CBS was assessed on a cohort of 350 women who were sero-positive for human immunodeficiency virus (HIV). Cronbach’s Alpha for this study was 0.75 (Gurung, Taylor, & Kemeny, Myers 2004). Alpha coefficient for the CBS in our sample was .76.
OUTCOMES

Psychological Functioning

Depression

Psychological functioning, characterized as depression, an outcome of this study, was defined as an alteration in one’s mood, characterized by sadness, a feeling of hopelessness and loneliness. Severity of depression symptoms was measured using the Beck Depression Inventory-II (BDI-II) (Beck, Steer, & Brown, 1996). The BDI-II, an offshoot of from the original BDI (Beck, Ward, & Mendelson, 1961) is a widely used measure of depression in adults. A 21-item, self-report, measure of depression, each item is rated on a 4-point Likert-type scale ranging from 0 to 3, with higher scores indicating higher levels of depression. Respondents were asked to endorse statements characterizing how they have been feeling during the past 2 weeks. The measurement assessed feelings such as sadness, hopelessness, pessimism, sense of failure, dissatisfaction, guilt, social withdrawal, and others are symptoms of depression. The measure yields a maximum score of 63, with scores of 0 to 13 denote minimal depression, scores of 14 to 19 denote mild depression, scores of 20 to 28 denote moderate depression, and scores of 29 to 63 denote severe depression. In this instrument, reliability was found to be 0.93 while validity was 0.93 (Beck et al., 1961). Alpha coefficient for the BDI-II in our sample was .90.

Anxiety

Anxiety was defined as a feeling of uneasiness, characterized by tachycardia, tachypnea and sweating. Characteristics of anxiety are self-reported symptoms, such as numbness or tingling, feeling hot, wobbliness in legs, unable to relax, dizziness or lightheadedness, heart pounding, nervous, fear of dying, choking, scared and terrified (Beck, Epstein, & Brown, 1988). Anxiety was assessed using the Beck Anxiety Index (BAI) (Beck, Epstein, & Brown, 1988). The BAI is a 21-item scale that measures the severity of self-reported anxiety symptoms in
adults. It consists of descriptive statements of anxiety symptoms that are rated on a 4-point scale from “Not at all” (0); “Mildly; it did not bother me much” (1); “Moderately; it was very unpleasant, but I could stand it” (2); and 3) “Severely; I could barely stand it”. The measure yields a maximum score of 63, 0 to 7 reflecting “minimal level of anxiety”; scores of 8 to 15 indicate “mild anxiety”; scores of 16 to 25 reflect “moderate anxiety”; and scores of 26 to 63 indicate “severe anxiety”. The BAI has demonstrated high reliability alpha = .92 (Beck, et al., 1988), in a final sample (n=160) of male outpatient psychiatric patients. The racial/ethnic composition was not reported. Alpha coefficient for the BAI in our sample was .87.

Data Analysis

Data were screened prior to conducting statistical analysis for accuracy, outliers, and missing data. Using SPSS 18, descriptive statistics including frequencies, percentages, means, standard deviations, and ranges were used to describe the sample. Reliabilities were also determined for all instruments and significance was established at the .05 level for inferential analyses. Pearson correlations were utilized to examine relationships among all variables. A general linear model (GLM) approach was used to estimate and examine the regression parameters of the independent variables, specifically biological risk factors (ER, PR, TNBC, BRCA, p53, Age ≤ 45, Age of first pregnancy ≤ 30, and BMI), psychosocial risk factors (SEP, Chronic stress) as predictors of psychological functioning as characterized by anxiety and depression (outcomes) as depicted in the BBCS for African American breast cancer survivors (see Figure 1). Separate models were estimated for the two sets of predictors (biological and psychosocial). Main assumptions were also examined, including linearity, Independence of errors, Homoscedasticity, and Normality of error distribution. Results indicated that assumptions were not violated. For purposes of the analysis, sum scores were used for levels of anxiety and
depression. Education level was collapsed and categorized into 2 categories, 1 = less than college, 2 = Bachelor’s degree. Income was collapsed to 2 categories, 1 = less than $50,000 and 2 = greater than or equal to $50,000. Age of first pregnancy was \( \leq 30 \), and Age of breast cancer diagnosis \( \leq 45 \).

**RESULTS**

**Demographics**

Sample characteristics are shown in Table 1. The sample of 155 participants was relatively young when diagnosed. The mean age at diagnosis was 51.67 (SD = 10.03). Mean survivorship years was 9.7 with a range from 1-27 years. Most were married (38.0 %) or divorced (28.4%). Close to half identified as Christian (43.9%) and a few (5.8%) had no religious affiliation. The sample was generally well educated with almost half (48.4%) reported having a college degree or higher. Over 42.6 % of the survivors had an annual income ranged from $40,000 to $79,000 annually. Home ownership was quite prevalent as 66% were home owner and just above 25.8 % were renters. Over 33% were working full-time; over 34% were retired and close to 15% identified themselves as disabled.

**Biological Characteristics of Breast Cancer**

Table 2 represents the biological characteristic of breast cancer among the survivors. While close to 36% were ER+, 24% were ER- and over 38% did not know their ER status. In terms of PR status, over 18% were PR- while close to 21% were PR+, over 60% did not know their PR status. Above 7% had the BRCA gene and close to 2% of women were aware that they had a p53 gene mutation.
In terms of TNBC, over 11.6% of the sample indicated that were told that they had TNBC; more than two-thirds (67.1%) reported that they had not been told if they had TNBC and 20.0% did not know if they had TNBC. Less than one in five (18.7%) had stage 1 breast cancer while more than one third (38.1%) had stage 2 breast cancer and 23.2% had stage 3 breast cancer. Stage 4 was reported in 11.0% of the sample. Average BMI for this sample was 30.06. Thirty percent of the participants were diagnosed with breast cancer at age 45 or less. Over two thirds (72.2%) of the survivors had children at less than or at age 30.

**Predictors of Anxiety**

**Biological**

Table 3 represents the parameter estimates for the biological predictors, specifically ER status, PR status, BRCA, p53 gene, TNBC, age ≤ 45 at diagnosis, age of first pregnancy less than or at age 30, and BMI on reported anxiety symptoms (outcome). The biological predictor TNBC was significant for anxiety (p<.001). Specifically, those survivors who responded “no they had not been told that they had TNBC,” had higher levels of anxiety symptoms than those who responded “don’t know.” Also, survivors who knew that they had TNBC were also likely to report symptoms of anxiety (than those who responded “don’t know”), though this was not found to be statistically significant. In addition, BMI was found to be a significant biological predictor for anxiety (p<.001), with a higher BMI associated with greater levels of anxiety symptoms. The model summary yielded a value of \( F (8, 140) = 3.984 \ p < .001 \) an \( R^2 = .185 \), Adjusted \( R^2 = .139 \) accounting for a moderate proportion of variance on the dependent variable (anxiety).
Psychosocial

In Table 3, chronic stress was a significant predictor for anxiety (p<.001). Breast cancer survivors who reported higher levels of chronic stress were more likely to report increased symptoms of anxiety. Specifically, a one-unit increase in chronic stress is associated with a .52 unit increase in anxiety. Interestingly, SEP (inclusive of education and income) was not significant. The model summary yielded a value of (F (3,141) = 14.739, p < .001) with an $R^2 = .239$ and an Adjusted $R^2 = .223$, thus accounting for a moderate proportion of the variance on the dependent variable (anxiety).

Predictors of depression

Biological

In Table 3, our findings indicate that being diagnosed with TNBC was a significant predictor for depression. AABCS who were aware that they had TNBC were more likely to report symptoms of depression (p < .049) than women who were not aware that they had TNBC. ER, PR, BRCA, p53, age of diagnosis, age of first pregnancy, and BMI were not statistically significant predictors of depression in this model. The model summary yielded a value of an $R^2 = .150$ and an Adjusted $R^2 = .061$, thus accounting for a small proportion of the variance of the dependent variable (depression).

Psychosocial predictors

Table 3 depicts that chronic stress was a significant predictor for depression (p < .001) among AABCS. Specifically, as the survivors experienced chronic stress, they were more likely to report greater levels of chronic stress were associated with higher levels of depression symptoms. SEP (inclusive of education and income) was not significant. The model summary yielded a
value \( F (3, 141) = 9.702, p < .001 \) with an \( R^2 = .171 \) and an Adjusted \( R^2 = .153 \) thus accounting for a small proportion of the variance on the dependent variable (depression).

**Discussion**

Guided by the Biopsychosocial model of Breast Cancer Survivorship for African American women (Davis & Myers, 2008), the purpose of our study was to test a conceptual model and examine the relationships of biological and psychosocial risk factors on the psychological functioning (anxiety, depression) and quality of life among AABCS. The results of our study revealed that the biological predictors of ER, PR, p53, the woman’s age of first pregnancy <30 and age of less than 45 at diagnosis were not significant predictors of psychological functioning (anxiety and depression). Two biological predictors that were significant were TNBC and BMI. Additionally, our results revealed that chronic stress (psychosocial) was a significant predictor for anxiety and depression.

TNBC is a complex disease that lacks HER2/Neu expression and has negative ER, PR receptors that are often difficult to treat (Dent et al., 2007). TNBC affects many women of various ethnic and racial backgrounds but appears to be more aggressive in women of African descent (Lund, et al., 2009). The diagnosis of TNBC appeared to spark fear in this cohort of women, who were primarily members of a support group. While our study asked women if they were ever told that they had TNBC, our results did not reveal a significant difference in women who had been told of their TNBC status and those who had not been told of the TNBC status. Yet, it was clear that there was awareness the disease trajectory. To date, this is the first study to examine the relationship of biological predictors with anxiety. Further, while a small percentage of women (11.6%) indicated that they were informed of their TNBC status; over two thirds
indicated that they were not aware. However, this does not indicate that they may not have TNBC.

Our sample also had a high education level, was primarily part of support groups, and may have readily exchangeable information available about the complex nature and treatment outcomes that may have attributed to underlying experience of anxiety. In addition, media releases and discussion by African American celebrities (Oprah Winfrey) may have increased the awareness of TNBC (Fisher, 2007). Our findings provide foundational information about the relationships among biological, psychosocial predictors and its effect on the psychological functioning of AABCS.

Our findings also revealed that BMI was a predictor for anxiety among the survivors. To our knowledge, this is the first quantitative study that investigated the outcome of anxiety in an entire sample AABCS. Our findings were similar to Berger and colleagues (2012), who reported that BMI was predictive of psychological functioning among breast cancer survivors. A study by Kwan and colleagues (2011) reported that for breast cancer survivors, the degree of obesity confers a greater risk on survival. In our sample, while the overall sample BMI was 30.06, caution should be taken with the measurement of BMI in some individuals of African ancestry. Aloia and colleagues (1997; 1999) suggests that there may be confounding factors such as high bone density and skeletal muscle among African Americans women when compared to Caucasian women. However, we recognize that the literature does not appear to have a definitive answer on whether obesity confers breast cancer risk (Sarkissyan, Wu, & Vadgama, 2011) (Lu, et al., 2011) and thus warrants further scrutiny.
Our study revealed that chronic stress was a significant predictor of anxiety among AABCS. This is an interesting observation, given that most of our sample were educated, middle class and had a high SEP. Yet, they still experienced a moderate level of chronic burden and stress which gives credence to the findings of cumulative stressors (Geronimus, Hicks, & Keene, 2006; McEwen, 1998; Myers, 2009), that many African Americans experience. Chronic stress is a concern. Physiologically, African Americans who experienced chronic stress have a higher carotid vessel wall thickness, a pre-cursor for carotid artery disease and for those who experienced discrimination, had more plaque buildup when compared to other racial/ethnic groups (Troxel, Matthew, & Bromberger, 2003). In fact, analysis of data from the National Health and Nutrition Examination Survey (n = 4515) determined that a higher allostatic load in individuals of African descent was also attributed to a higher mortality rate individuals with cardiovascular and other medical conditions, while controlling for SES and behavioral factors (Duru, Harawa, & Kermath, 2012).

Our regression analysis revealed that TNBC was a significant biological predictor for depression. Specifically, AABCS who knew that they had TNBC reported higher symptoms of depression than among AABCS who did not know of their TNBC status. The results of our study were similar to the findings of Cukier and colleagues (2013) of 148 African American women who were at risk for BRCA mutation. The authors reported that almost half of the participants experienced psychological distress, specifically depression. While this is the first study to explore biological predictors and its relationship to depression in AABCS, our results revealed that depression was evident in our sample and was consistent with a study by Williams and colleagues (2007). In that study, Williams and colleagues (2007) reported that when African American women were diagnosed with depression, it was much more severe than their
counterparts who are also studied. Our finding were also consistent with a recent study by Sheppard and colleagues (2013), who reported African American women experienced greater depression symptomology when compared to other women.

The findings from our study revealed that chronic burden was a significant predictor for depression. Researchers have reported that the cumulative life time stress may affect the health of many African Americans (Geronimus et al., 2006; Myers, 2009). This is the first study to report that chronic burden was a significant predictor for depression among AABCS.

Demographically, 72.8 % our sample had children at or before age 30, which generally decreases the risk for breast cancer. In our sample, 30.3 % were diagnosed with breast cancer at or before age 45. While having children before age 30 generally lowers the risk of breast cancer, it appears that for some AABCS there may be some other factors that need further exploration.

Implications for research and practice

To gain a deeper understanding of the relationship between TNBC and psychological functioning is warranted for the following reason. First, most studies that investigated anxiety in breast cancer survivors imparted knowledge/findings that can be generalized to several specific racial/ethnic groups (Aerts, DeVries, & Van Der Steeg, 2011; Cheung, Lee, & Chan, 2013), but not to AABCS, indicating the paucity of research on this particular area. Additionally, there was a robust literature on the many facets of TNBC among African women, which is well–needed; however, there is a strong need to expand and build on the biobehavioral factors (for TNBC) among African American survivors, which is currently absent from the literature.

With regards to depression, given the high risk for depression in women who have been diagnosed with TNBC, and the fact that when AABCS are diagnosed with depression, it is much
more severe, there is a need for development of culturally-relevant screening tools that can be used at intervals to detect depression in this high risk population.

**Strengths of the Study**

This study had several unique strengths. First, this study provided data on a sample composed of entirely African American survivors, a relatively understudied cohort, with respect to the relationship of between biological and psychosocial processes and psychological functioning. Secondly, to date there has not been any research that has investigated the biological and psychological predictors, given the fact that breast cancer experience for many African American survivors may be uniquely different. Third, the development of the Biopsychosocial Model of Breast Cancer Survivorship (Davis & Myers, 2008) for African American women is well suited to address salient biological and psychosocial risk factors that were used as a conceptual framework to undergird this current study and future studies. Fourth, this study included women from age 25 and beyond who resided within Northern and Southern California, thereby including women from smaller bedroom communities, to large urban communities. Fifth, the sample size was a relatively credible size. Sixth, facilitates a deeper understand of the role of chronic stress among African American women. Seventh, the findings of this study, contributes to an overall body of knowledge that addresses the breast cancer disparities among African American women.

**Limitations of the Study**

Several limitations were noted. First, while the sample size was credible, a larger sample size may have allowed the elucidation of findings that may have been masked, such as biological predictors. Second, while the goal was to target African American breast cancer survivors, coupled with the entire sample self-identifying as African American, African, African ancestry;
the findings should not be generalized to other women of various ethnic or racial backgrounds. Third, recognizing that African American women are a heterogeneous population with various sub-populations (with their unique perspective and cultural nuances) is of importance. To that end, women from a particular subgroup may not typify the findings. Fourth, geographically our sample ranged from the west coast and may not be generalized to other geographic areas. Fifth, there may also be limitations in using self-reported data as there is a risk that participants may have under-or over-reported (Manjer, Merlo & Berglund, 2004). Sixth, future studies may also include testing for moderators (i.e., resilience) that may influence the outcomes. Despite the limitations, the strengths of this study outweigh the limitations.

Summary

Breast cancer is a global epidemic among all women (and some men), with increasing mortality rates for African American women and increasing incidence and mortality rates among African American women between ages 35-45 (American Cancer Society, 2008) despite the rich abundance of research on this subject matter. Our research has pointed to several factors, chiefly biological and psychosocial predictors and their roles in the psychological functioning of AAABC's. An understanding of the unique interplay of these roles could assist in addressing the numerous breast cancer disparities that exist among women of African descent.
Table 1

Demographic Characteristics of Participants (N = 155)

<table>
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<tr>
<th>Characteristic</th>
<th>X</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
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<tr>
<td>Age (age of diagnosis)</td>
<td>51.7</td>
<td>10.03</td>
<td>31-77</td>
</tr>
<tr>
<td>Years of survivorship</td>
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<td>6.80</td>
<td>1-27</td>
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<table>
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<th>Characteristic</th>
<th>N</th>
<th>Percent</th>
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<td>Marital Status</td>
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<td></td>
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<tr>
<td>Single</td>
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<td>14.8</td>
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<tr>
<td>Married</td>
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<td>43.2</td>
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<tr>
<td>Separated</td>
<td>13</td>
<td>8.4</td>
</tr>
<tr>
<td>Divorced</td>
<td>34</td>
<td>21.9</td>
</tr>
<tr>
<td>Living Together</td>
<td>8</td>
<td>5.2</td>
</tr>
<tr>
<td>Widowed</td>
<td>10</td>
<td>6.5</td>
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<table>
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<td>25.2</td>
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<td>Catholic</td>
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<td>9.7</td>
</tr>
<tr>
<td>Christian</td>
<td>68</td>
<td>43.9</td>
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<tr>
<td>Muslim</td>
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<td>9.0</td>
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<tr>
<td>Methodist</td>
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<td>2.6</td>
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<tr>
<td>Episcopalian</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Buddhist</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>No Religion</td>
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<td>5.8</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>0.6</td>
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</table>

113
Table 1 continued

Demographic Characteristics of Participants (N = 155)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
<th>Percent</th>
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</thead>
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<tr>
<td>Yearly Income ($)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 39K</td>
<td>59</td>
<td>38.1</td>
</tr>
<tr>
<td>40 – 79K</td>
<td>66</td>
<td>42.6</td>
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<tr>
<td>≥ 80K</td>
<td>20</td>
<td>12.9</td>
</tr>
<tr>
<td>Did not respond</td>
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<td>6.5</td>
</tr>
<tr>
<td>Work Status</td>
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<td></td>
</tr>
<tr>
<td>Working full time</td>
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<td>32.3</td>
</tr>
<tr>
<td>Part time</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Unemployed Laid off</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Looking for work</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Keeping house / raising children</td>
<td>10</td>
<td>6.5</td>
</tr>
<tr>
<td>Retired</td>
<td>52</td>
<td>33.5</td>
</tr>
<tr>
<td>Disabled</td>
<td>23</td>
<td>14.8</td>
</tr>
<tr>
<td>Education</td>
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<td></td>
</tr>
<tr>
<td>HS diploma, GED, or less than HS</td>
<td>17</td>
<td>11.0</td>
</tr>
<tr>
<td>Some college, vocational or Assoc</td>
<td>63</td>
<td>40.6</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>41</td>
<td>26.5</td>
</tr>
<tr>
<td>Graduate Degree and Professional Degree</td>
<td>34</td>
<td>21.9</td>
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Table 1 continued

Demographic Characteristics of Participants (N = 155)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
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<tr>
<td><strong>Home Type</strong></td>
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<td></td>
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<tr>
<td>Own</td>
<td>103</td>
<td>66.5</td>
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<tr>
<td>Rent</td>
<td>39</td>
<td>25.2</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>Age at first pregnancy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Kids</td>
<td>28</td>
<td>18.1</td>
</tr>
<tr>
<td>Under age 19</td>
<td>40</td>
<td>25.8</td>
</tr>
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<td>Ages 20-30</td>
<td>76</td>
<td>49.0</td>
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<td>Ages 31-40</td>
<td>10</td>
<td>6.5</td>
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<tr>
<td>Missing</td>
<td>1</td>
<td>0.6</td>
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</table>
Table 2

**Biological characteristic of breast cancer (N = 155)**

<table>
<thead>
<tr>
<th>Estrogen Status (ER)</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>37</td>
<td>23.9</td>
</tr>
<tr>
<td>Positive</td>
<td>55</td>
<td>35.5</td>
</tr>
<tr>
<td>Unknown</td>
<td>60</td>
<td>38.7</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Progesterone Status (PR)</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>28</td>
<td>18.1</td>
</tr>
<tr>
<td>Positive</td>
<td>32</td>
<td>20.6</td>
</tr>
<tr>
<td>Unknown</td>
<td>94</td>
<td>60.6</td>
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<tr>
<td>Missing</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
<td>100.0</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>BRCA (BReastCancer)</th>
<th>Frequency</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Yes</td>
<td>11</td>
<td>7.1</td>
</tr>
<tr>
<td>No</td>
<td>131</td>
<td>84.5</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>8</td>
<td>5.2</td>
</tr>
<tr>
<td>Missing</td>
<td>5</td>
<td>3.2</td>
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<tr>
<td>Total</td>
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</table>

<table>
<thead>
<tr>
<th>p53 Gene (Protein 53 Gene)</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>No</td>
<td>112</td>
<td>72.3</td>
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Table 2 continued

Biological characteristic of breast cancer (N = 155)

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
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<td>25.2</td>
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<td>Missing</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
<td>100.0</td>
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Triple Negative Breast Cancer (TNBC)

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>18</td>
<td>11.6</td>
</tr>
<tr>
<td>No</td>
<td>104</td>
<td>67.1</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>32</td>
<td>20.0</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Breast Cancer Stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 0</td>
<td>5</td>
<td>3.2</td>
</tr>
<tr>
<td>Stage 1</td>
<td>29</td>
<td>18.7</td>
</tr>
<tr>
<td>Stage 2</td>
<td>59</td>
<td>38.1</td>
</tr>
<tr>
<td>Stage 3</td>
<td>36</td>
<td>23.2</td>
</tr>
<tr>
<td>Stage 4</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Don't know</td>
<td>6</td>
<td>3.9</td>
</tr>
</tbody>
</table>
Table 3

Summary of Linear Regression Analysis for Biological & Psychosocial Predictors (N = 155)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 Anxiety</th>
<th></th>
<th>Model 2 Depression</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE</td>
<td>p</td>
<td>B</td>
</tr>
<tr>
<td>ER (Estrogen Receptor)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative 1</td>
<td>-1.547</td>
<td>1.546</td>
<td>.319</td>
<td>-1.374</td>
</tr>
<tr>
<td>Positive 2</td>
<td>-1.447</td>
<td>1.337</td>
<td>.281</td>
<td>-1.374</td>
</tr>
</tbody>
</table>
| Reference Category a   = Unknown
| PR (Progesterone Receptor) |      |        |                    |        |        |       |
| Negative 1             | 1.056           | 1.704  | .536               | -1.365 | 1.522  | .371  |
| Positive 2             | -1.242          | 1.345  | .358               | -1.415 | 1.201  | .241  |
| Reference Category a   = Unknown
| BRCA (BReastCancer gene) |      |        |                    |        |        |       |
| Yes 1                  | 3.650           | 2.998  | .226               | .649   | 2.677  | .809  |
| No 2                   | .491            | 2.284  | .830               | .457   | 2.040  | .823  |
| Reference Category a   = Do not know
| p53 (Tumor Protein 53 gene) |      |        |                    |        |        |       |
| Yes 1                  | -2.969          | 3.905  | .448               | -1.633 | 3.487  | .640  |
| No 2                   | -2.581          | 1.518  | .091               | -2.425 | 1.355  | .076  |
| Reference Category a   = Do not know
| TNBC (Triple Negative Breast Cancer) |      |        |                    |        |        |       |
| Yes 1                  | 4.549           | 2.505  | .072               | 4.445  | 2.237  | .049  |
| No 2                   | 7.465           | 1.649  | .000*              | -1.044 | 1.480  | .440  |
| Reference Category a   = Do not know

*p<.05
a = set at zero
Table 3 continued

Summary of Linear Regression Analysis for Biological & Psychosocial Predictors (N = 155)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE</td>
<td>p</td>
<td>B</td>
<td>SE</td>
<td>p</td>
</tr>
<tr>
<td>Age &lt;45 at diagnosis</td>
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<td></td>
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<td></td>
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<tr>
<td>0</td>
<td>.611</td>
<td>1.217</td>
<td>.616</td>
<td>.596</td>
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<td>.584</td>
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<td>Reference Category = &gt; Age 45</td>
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<td></td>
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<tr>
<td>Age &lt; 30 First Pregnancy</td>
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<td>2.251</td>
<td>.806</td>
<td>-1.383</td>
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<tr>
<td>BMI (Basal Metabolic Index (Kg/M²))</td>
<td>.379</td>
<td>.106</td>
<td>.001*</td>
<td>.151</td>
<td>.095</td>
<td>.114</td>
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*p<.05
Table 3 continued

Summary of Linear Regressions Analysis for Psychosocial Predictors (N = 155)

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<tr>
<th>Variables</th>
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<tbody>
<tr>
<td></td>
<td>Anxiety</td>
<td></td>
<td></td>
<td>Depression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>SE</td>
<td>P</td>
<td></td>
<td>B</td>
<td>SE</td>
<td>P</td>
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<tr>
<td>Chronic Burden</td>
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<td>.081</td>
<td>.001*</td>
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*P < .05
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Conclusion of the Dissertation

The overall purpose of this dissertation was to gain an understanding about African American breast cancer survivors. Specifically, the first manuscript, Breast Cancer and African American Women: Voices of Survivors was qualitative study that explored the meaning of survivorship and the utilization of resources by these women as along their journey of survivorship. The evidence is well documented that African American breast cancer survivors have a different experience along the breast cancer trajectory when compared to other racial/ethnic groups. The narrative from chapter one reveals that for these survivors the meaning of survivorship is personified in their identity as a survivor. Collectively, they exude resilience, have a strong spiritual faith (“survivorship is getting through it-with God with you”), willing to help other survivors who are in similar situations (“being around other survivors, talking and sharing”) and are thriving (“not being afraid of the word cancer and realizing that it's a word and not a sentence”). Their meaning of survivorship carries the connotation of conquering cancer, surviving the battle at hand-against the odds, and never giving up.

The second qualitative question examined the resources that were most beneficial to the survivors during their experience. Collectively, their shared narratives revealed that their faith pulled them through this process. The survivors revealed that having a positive attitude and outlook towards life, constantly being informed throughout the process-for example, reading, following physicians /nurse instructions were important. Seeking support from family, spouse, friends, and medical providers was also valuable to these survivors.

Understanding the narratives of African American breast cancer survivors is important as they may provide insight and guide the development of survivorship care plans (SCP) that are
culturally and personally relevant. In addition, the result of this qualitative study adds to the small but growing research on survivorship of African American breast cancer survivors.

In our efforts to gain an understanding of breast cancer, in particular as it affects African American women, we wanted to investigate the evidence of risk factors that contribute to breast cancer disparities among women of African descent. Specifically, we conducted a comprehensive literature review on the role of risk factors for breast cancer among African American women, including socioeconomic position (SEP), age, chronic stress burden, and biological factors that contribute to ethnic differences in cancer morbidity and mortality. We presented a hypothesized, multivariate conceptual model of the relative contributions of biological and psychosocial risk factors in predicting the impact of breast cancer moderated by the quality of health care received and the availability of psychological resources. Second, we discussed the contribution of ethnicity, especially the evidence on biological risk, and specifically histopathological grade, biomarkers, receptor status, gene mutations, age, and adiposity. Third, we discussed the role of socioeconomic position (SEP), especially the contributions of chronic stress burden and discrimination as risk factors. Fourth, we reviewed the evidence of breast cancer disparities in the type and quality of care received along the breast cancer continuum. Fifth, we discussed the role of psychological resources that may moderate both cancer risk as well as the severity of the disease trajectory. Finally, we discussed the implications of this review and recommend directions for future research to address breast cancer disparities.

In our integrative review of published empirical studies we articulate a Biopsychosocial model of Breast Cancer Survivorship for African American women as a conceptual framework to guide research on cancer survivorship in African American women. The relationships among
biological and psychosocial risk factors for breast cancer, as potentially moderated by quality of health care and psychological resources, and their subsequent impact on disease outcome was needed. Examination and future investigation of these emerging relationships are critical to help understand and address the perplexing problem of breast cancer disparities and its impact on the lives of AABCS, their families, and communities.

In the final manuscript, we investigated the role of biological predictors specifically, estrogen receptors (ER), progesterone receptors (PR), triple negative breast cancer, BRReastCancer gene (BRCA1/2), Tumor Protein 53 gene (TP53, p53), age \( \leq 45 \) at diagnosis, age \( \leq 30 \) at first pregnancy, Basal Metabolic Index (BMI), and psychosocial risk factors (socioeconomic position [SEP]), and chronic stress as contributing factors to the psychological functioning (anxiety, depression) of African American breast cancer survivors (AABCS).

A general linear modeling (GLM) approach was used to test a modified conceptual model and examine the relationships. Significance was established at \( p = .05 \) level for inferential analysis. Examination of the biological risk factors revealed that TNBC was a significant predictor for anxiety \( (p < .001) \) as was BMI \( (p < .001) \). Psychosocial risk factors, specifically chronic stress burden was a significant predictor for anxiety \( (p < .001) \) and depression \( (p < .005) \). Also TNBC was a significant biological predictor for depression \( (p < .049) \). However, and contrary to expectations, SEP was not statistically significant with anxiety or depression, which may be due to an overall higher education achievement and income for this particular sample.

Implications for future research specific from manuscript one, could be expanded to focus on SCPs’ as a mechanism for tailoring survivorship care that is relevant and pertinent to AABCS. Future research from manuscript two, could build on utilization of our
Biopsychosocial Explanatory Model can be used as a guide to inform interventions to enhance resilience. In addition, with the passage of the Genomic and Personalized Medicine act in 2007, future research in pharmacogenomics and the specific biomarkers that is common to women of African ancestry. From manuscript three, implications for future research and practice hinges on the expansion of bio-behavioral + psychosocial predictors and intervention studies. Collectively, these three manuscripts provided an opportunity to gain an understanding of the breast cancer trajectory as it pertains to African American women. We are hopeful that our contribution may expand the science in an attempt in increase the overall breast cancer survival rate among women of African descent.