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Predictors of Mastectomy in Male Breast Cancer

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This is to certify that the doctoral dissertation by

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Walden University
2017

Abstract

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by

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MBA/HCM, University of Phoenix, 2005

BS, University of Texas Medical Branch, 1997

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Public Health Epidemiology

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Abstract

Male breast cancer (MBC) is rare, and research on the predictors of MBC has been limited because of inadequate funding in and outside of the United States. One goal of this study was to eradicate the stereotyping of breast cancer as a female disease. The emergence of medical technology and education to benefit the public will help to ensure greater health awareness at the individual, community, and global levels. The purpose of this study was to understand the influence of the predictors of age; race (Black, White, and Other); and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. The study was guided by the social determinants of health model. A quantitative approach was used to analyze archival data from 2011 to 2013 in the Surveillance Epidemiology and End Results (SEER) database using SPSS v.23. Data from 427 MBC patients ages 18 years and older from the United States comprised the sample. The SEER data were analyzed using logistic regression analysis. Results showed that of the 427 cases of MBC that were analyzed, 55 had a diagnosis of Grade I, 190 had a diagnosis of Grade II, and 182 had a diagnosis of Grade III. For 3 years, 116 men had undergone mastectomy. Grade I cancer, Grade II cancer, and Grade III cancer were statistically insignificant predictors of mastectomy; however, age, race was a statistically significant predictor of mastectomy among White men with MBC. The results will contribute to social change initiatives by educating the public about the predictors of mastectomy in MBC patients. The results also will increase the current knowledge base by informing the public, clinical professionals, and patients about the relationship of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC.

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Dedication

This dissertation is dedicated to my beloved husband, Douglas Eke, for his many sacrifices, strengths, love, and constant support. He is the motivation behind the successful completion of this study. I thank my five children, Destinee, Millicent, Jiuba, Douglas Jr., and Golden, for supporting me throughout the rough times by being good and allowing me to fulfill my academic dream. In particular, I want to thank my mother, Eunice Opara, for taking care of my children while I completed my dissertation.

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Chapter 1: Introduction to the Study

Introduction

Male breast cancer (MBC) occurs infrequently, and research focusing on MBC has been limited because of inadequate funding within and outside the United States (Chavez-MacGregor, Clarke, Lichtensztajn, Hortobagyi, & Giordano, 2013; Kornegoor et al., 2012). The incidence of MBC is rising, and men across the globe are continuing to die from MBC. Chapter 1 introduces the topic, provides background information about MBC, and includes a statement of the problem. The purpose of the study and the theoretical/conceptual framework and nature of the study are defined, and the limitations and delimitations of the study are examined. In addition, the chapter includes the assumptions, scope, and significance of the study. The research questions (RQs) are provided, and a summary concludes the chapter. The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. The results will contribute to the literature and will support social change initiatives by educating the public about the predictors of mastectomy in MBC patients.

Background

MBC is an uncommon disease whose occurrence often is overlooked, thus leading to more advanced stages (American Cancer Society [ACS], 2012). Because of the late diagnosis and known rarity of MBC, one could argue that exploring the predictors of it is not crucial, despite the number of men dying from MBC (Sandhu et al., 2012). A man's risk of developing breast cancer in his lifetime is about one in 1,000 (ACS, 2012).

According to the National Cancer Institute (NCI, 2016a), approximately 249,260 new cases of female breast cancer and 2,600 new cases of MBC occur annually in the United States. The NCI (2016b) estimated that in 2016, 440 men would die from the disease in the United States and that in Texas alone, 132 men would be diagnosed with MBC in that same year, with 28 of them dying from the disease. In the United Kingdom, about 240 men are diagnosed with MBC annually (Kipling, Ralph, & Callanan, 2014). Globally, research has shown that the incidence of MBC is higher in several regions of Africa; for example, Zambia has a rate of 15%, and Egypt and Tanzania have rates of 6%, respectively ("Male Breast Cancer Numbers Rising Most Fail to Spot It Until It Has Spread to Lymph Nodes," 2004).

Role of Society and Acceptance of MBC

Social change plays a vital role in encouraging men to undergo the same annual mammogram screening that women have been supporting for years. Like women, men need to be screened, diagnosed, and treated to reduce the morbidity and mortality rates of the disease (Centers for Disease Control and Prevention [CDC], 2012b); Fentiman, Fourquet, & Hortobagyi, 2006; National Institutes of Health [NIH], 2013; NCI, 2013). According to Robinson, Metoyer, and Bhayani (2008), breast cancer has always been seen as a disease of women in general. Most cases of MBC occur among men between the ages of 60 and 70 years (Cutuli, 2009); however, younger men are now being diagnosed with MBC (Fentiman et al., 2006; NIH, 2013; Rachid, Yacouba, & Hassane, 2009). Robinson et al. stated that serious issues remain because of the lack of studies

focusing on MBC. They asserted that the gap in knowledge about MBC highlights the need for further studies on the impact of this disease on men.

Brain, Williams, Iredale, France, and Gray (2006) stated that acceptance of the disease by men is impeded by the stigma of coping with the disease, altered body image, and the unavailability of supportive needs. Robinson et al. (2008) added anxiety and depression symptoms to the list. The most significant factor upsetting self-esteem is body image (Brain et al., 2006; Burson et al., 2009; Hiatt & Breen, 2008; Rosenbaum et al., 2004). Individuals in marital relationships might experience distress manifesting as decreased satisfaction in terms of intimacy, sexual function, and appreciation of spouse or partner (Brain et al., 2006).

Ahmed, Ukwenya, Abdullahi, and Muhammad (2012) stated that MBC might be an exceptional condition representing about 1% of all breast cancers. Ahmed et al. evaluated male patients who had a histological diagnosis of breast cancer from 2001 to 2010. Modified radical mastectomies were performed on those patients after the evaluations (Ahmed et al., 2012).

Mathew, Perkins, Stephens, Middleton, and Yang (2008) explained that MBC appears on a mammogram often as a spiculated margin, a noncalcified high-thickness mass with an asymmetrical figure located in a subareolar area. It is characterized on a sonogram as a hard hypoechoic group and a microlobulated border (Mathew et al., 2008). The earliest stages of cancer are referred to as carcinoma in situ (Mathew et al., 2008). The finding of this particular cancer in the breast milk duct is called ductal carcinoma in

situ, or DCIS, typical in men because of the lack of early screening or early detection (Doyle, Steel, & Porter, 2011).

Staging of MBC

Members of the health care team initiate staging to determine disease progression once there is evidence of a malignant tumor or a diagnosis of breast cancer (NCI, 2013). Staging of breast cancer depends on the size of the tumor, the number and location of any lymph nodes involved, and whether there has been an effect on other organs, and according to the NCI (2013), cancer can be categorized as one of four stages:

- Stage 0-I: Early detection; cancer cells are confined to a limited area.
- Stage II: Cancer cells begin to spread around the breast area.
- Stage III: Cancer cells invade neighboring tissues near the breast.
- Stage IV: Cancer cells have metastasized to other organs of the body and are usually invasive.

Universally, tumors are graded as I, II, III, or IV, depending on the rate of abnormality. The NCI (2013) described the stages as the following:

- GX: Grade cannot be assessed (undetermined grade).
- GI: Well differentiated (low grade); appears close to normal.
- GII: Moderately differentiated (intermediate grade); abnormal cells spread slowly.
- GIII: Poorly differentiated (high grade); abnormal cells grow rapidly with less aggressive spread.

- GIV: Undifferentiated (high grade); grow rapidly and spread faster (NCI, 2013).

Staging of MBC is crucial because proper assessment of the disease can facilitate its early diagnosis and detection, and slow its progress from Stage 0 to more advanced stages (CDC, 2012b; Chavez-MacGregor et al., 2013; Ginossar, 2008; National Breast Cancer Awareness Month, 2010; NCI, 2013). Kanthan, Fried, Rueckl, Senger, and Kanthan (2010) stated that MBC can impact all segments of the male population, regardless of socioeconomic (SES) class and age. MBC is a rare yet potentially destructive disease with little known risk factors (Kanthan et al., 2010).

Proper assessment and staging, along with early diagnosis and detection, can slow the progress of MBC to later stages of the disease (Ginossar, 2008). MBC usually presents with a palpable, unilateral, and painless subareolar mass (Fentiman et al., 2006) that often is located away from the nipple (Doyle et al., 2011; Fentiman et al., 2006; NIH, 2013). Twenty-nine percent of MBC patients diagnosed with invasive ductal cancer undergo surgery ("Breast," 2013). Seventeen percent of other MBC patients discovered with tumors, particularly unadulterated DCIS, have surgery (Vetto, 2010). The causes of MBC are still being investigated, but awareness continues to evolve, and diagnoses have become much more rapid (Brain et al., 2006).

Role of Different Factors in Breast Cancer Development

Both biological influences and genetic (inherited) factors play a significant role in the development of breast cancer (Mathew et al., 2008). Certain inherited gene mutations might be passed from parents to their children. BRCA1 and BRCA2 are the best known

genes associated with breast cancer (Rossman, Libjegren, & Bergh, 2007). Most MBC cases can be traced back to relatives who carried BRCA2 gene mutations (Kreiter, Richardson, Potter, & Yasui, 2014; Mathew et al., 2008). However, Carter et al. (1998) reported that 54 MBC participants in their study were lacking BRCA gene mutations; two participants had the BRCA2 mutation not related to family, and five had BRCA2 mutations pointing to first-degree relatives with breast cancer. Carter et al. showed that exposure to electromagnetic fields also might have been a contributing factor to MBC. Another high risk associated with MBC is hyperestrogenization resulting from Klinefelter's, gonadal dysfunction, obesity, drinking alcohol, and exposure to radiation, whereas gynecomastia remains inconclusive (Carter et al., 1998; Fentiman et al., 2006).

Detection of MBC

Through tertiary means, men are detected at a later stage of breast cancer than women are (Robinson et al., 2008). Almost 2,000 new cases are diagnosed each year, and as many as 450 deaths are attributed in contrast to women with breast cancer (ACS, 2016). Brain et al. (2006) studied the distress associated with MBC and reported that 161 men with breast cancer who completed a questionnaire shared the same symptoms with women in terms of anxiety, depression, cancer-specific distress, and body image. Because of the gap in knowledge of MBC, I conducted this study to increase awareness about the predictors of mastectomy in MBC patients.

Problem Statement

The ACS (2016) stated that cancer places a heavy burden on the public health care system. Cancer comprises various categories of diseases affecting different parts of

the body (Fentiman et al., 2006; NCI, 2013; NIH, 2013). The incidence of MBC in the United States over the past 30 years has risen from 0.86% to 1.2% per 1 in 100,000 men and constantly continues to be discovered (Fentiman et al., 2006; Grenader, Goldberg, & Shavit 2008; Klein, Ji, Rea, & Stoodt, 2011; Spiers & Shaaban, 2008). MBC often results in mastectomy, but there has been minimal research on MBC and the predictors of mastectomy. I undertook this quantitative study using secondary data from 2011 to 2013 in the Surveillance Epidemiology and End Result (SEER) database to broaden knowledge of the predictors of mastectomy in MBC.

Men diagnosed with breast cancer often are in an advanced stage of the disease because of the lack of awareness, timely detection, and management strategies (Contractor, Kaur, Rodrigues, Kulkarni, & Singhal, 2008; Fentiman et al., 2006; Klein et al., 2011). Cancer is the second leading cause of death in men in the United States (Fentiman et al., 2006; Field, Campbell, & DeBoer, 2008; Hiatt & Breen, 2008; NCI, 2013; NIH, 2013). Unlike cancer of the female breast, MBC is not yet fully understood (Brain et al., 2006). Knowledge and technology continue to evolve to find a cure, and diagnostics make it easier to discover abnormalities; however, ecological influences and genetic (inherited) factors play a role in the development of cancer (Brain et al., 2006). Most breast lumps in men usually are the result of gynecomastia, the noncancerous growth of breast tissue (Brain et al., 2006).

Purpose of the Study

The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. Vast

research has been conducted on breast cancer in general, but the majority of investigative work has focused on the female population, with minimal attention directed toward MBC. This quantitative study helps to expand knowledge of MBC, particularly the influence of specific predictors of mastectomy.

Research Questions and Hypotheses

The analysis of secondary data required the application of theoretical understandings and conceptual skills to address the three RQs that guided this study:

RQ1: How will age impact knowledge related to mastectomy in MBC?

H_{01}: Age will not relate to mastectomy in MBC.

H_{a1}: Age will relate to mastectomy in MBC.

RQ2: How will race account for MBC in relation to mastectomy?

H_{02}: Race does not account for MBC in relation to mastectomy.

H_{a2}: Race does account for MBC in relation to mastectomy.

RQ3: Is there a predictive relationship between mastectomy and Grade I, II, or III cancer in MBC?

H_{03}: There is no predictive relationship between mastectomy and Grade I, II, or III cancer in MBC.

H_{a3}: There is predictive relationship with mastectomy and Grade I, II, or III cancer in MBC.

The RQs were analyzed using simple binary logistic regression analysis. Modeling included all risk factors listed above in addition to all demographic variables.

The independent variables (IVs) were age; race; and grade of cancer (I, II, or III). The dependent variable (DV) was mastectomy.

Theoretical Framework

Social determinants of health refer to the conditions in which people are born, grow, live, work, and age (World Health Organization [WHO], 2013). These social determinants are shaped by the distribution of money, power, and resources at global, national, and local levels. The social determinants framework (see Figure 1) was designed to aid in understanding how these factors interact with other factors in the causation of MBC (NCI, 2013; NIH, 2013). The framework began from the perspective of a disease-free state through preclinical and early cancer detection to Grades I, II, and III; diagnosis; survivorship; and death (NCI, 2013). Social conditions and policies, access to health care, social/psychological predictor factors, and the biological mechanism of carcinogenesis are all part of the social determinants framework (Hiatt & Breen, 2008). Policies and legislation pertaining health care coverage in terms of care of illness shaped individual behaviors and the use of clinical services regarding the early detection of disease (NCI, 2013). Investigators working in all areas of cancer investigation have faced difficulties navigating the constructs in the framework (Hiatt & Breen, 2008; NCI, 2013).

Social determinants of health are explained to showcase improvements in the standard of living and sanitary reform during the 19th and 20th centuries (Scambler, 2003). The health of a population is closely tied to physical, social, and economic environments; psychophysiology and emotional states are related to physiological change and disease (Scambler, 2003). Understanding the causes of health is part of public health thinking;

Pioneers in public health recognized the importance of the social determinants in achieving better population health (Scambler, 2003).

I used the social determinants of health framework to understand how social determinants interact with other factors to investigate MBC and to acknowledge changes that occur in its discovery (NCI, 2013; NIH, 2013). The framework starts with the cancer series and adds levels of analysis and then considers the impact of interventions in the management of MBC (Hiatt & Breen, 2008; NCI, 2013; NIH, 2013). The social aspects of the disease resulting from the complex interactions of the risk factors of economic support; psychosocial risks; social, environmental, and behavioral causation; genetic factors; and health services are implicated in more than the disease. Modification of these risk factors could prevent MBC.

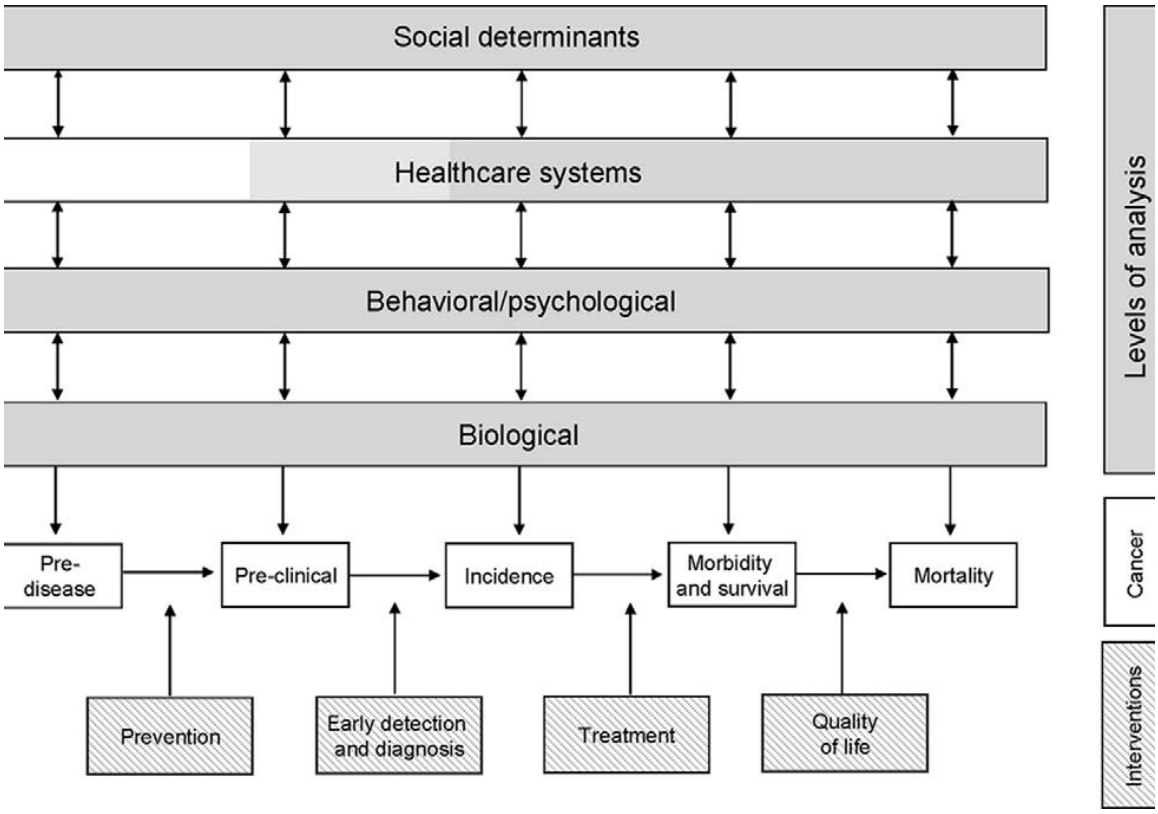

Figure 1. Social determinants of health framework.
Adapted from WHO (2013). Social determinants of health. Retrieved from http://www.who.int/

Health Care Systems

The health care system is one social determinant of health that is responsible for health disparities in health status (WHO, 2013). In the social determinants of health framework, achieving health equity is possible "when everyone has the opportunity to 'attain their full health potential' and no one is 'disadvantaged from achieving this potential because of their social position or other socially determined circumstance" (CDC, 2012a). Access to health care has been restricted because of poverty, lack of education, stigma, and racism, all of which are factors contributing to health inequities

(CDC, 2012a). The CDC (2012a) argued that Whites have better access to the health care system than Blacks and members of other races do because they have health insurance.

Access to health care. The social determinants of health framework views cancer from a disease-free status through the preclinical early grades (Grades I, II and III; survivorship; and death (NCI, 2013). Restricted access to health care, high medical costs, and lack of insurance coverage have led to unmet health care needs, one of which is early screening to prevent development of the later stages of MBC. All of these conditions have impacted the decision of men to receive treatment or mastectomy (Healthy People 2020, 2016). The framework also affects social conditions and policies that can shape individual behaviors and the use of clinical services for early detection of disease (NCI, 2013).

Health inequities can be reduced in several ways: They can (a) provide programs for disadvantaged populations; (b) bridge the gap between underserved and better served populations; (c) provide access to health care in rural areas without discrimination in terms of gender for MBC oncology clinics (WHO, 2013); and (d) ensure equal treatment or care for underinsured populations, particularly MBC patients.

Behavioral and Psychological Risk Factors

Psychosocial risk factors. A social network is a strong communication strategy in reaching communities. Social and family support systems were linked to the framework of this research. Psychosocial predictor variables that served as risk factors caused by Grade I, Grade II, or Grade III MBC led me to consider mastectomy the DV in

the study. The latter resulted in the following social determinant constructs of anxiety, depressive symptoms, distress, body image, coping mechanisms, and emotional support.

These factors encourage healthy choices and lifestyles that are the main influences on the health, knowledge, behaviors, and skills that people use to cope with demanding life issues and circumstances (Healthy People 2020, 2016). Social support includes practical assistance; financial help; and the availability of information, advice, and psychological support (Locker, 1994). The effects of practical and emotional support also have been studied. According to Lyyra and Heikkinen (2006), men lacking emotional support were 2.5 times higher than those who had emotional support to not agree to undergoing mastectomy. Ostberg and Lennartson (2007) reported that individuals who have diverse source of support have better health outcomes.

Social, environmental, and behavioral causation. Social and physical environments, such as those that carry chemical toxins and pollutants associated with industrial development, influence health. Risk conditions are integral to those environments, and they can damage health directly. Improving environmental health requires political intervention and personal behavioral change**s** (Healthy People 2020, 2016). Behavioral factors that can determine health status include proper nutrition, sufficient physical activity, and reductions in habits such as tobacco and alcohol usage (Locker, 1994).

Biological and Genetic Factors

Biological and genetic factors impact health and well-being, and they are linked to the health system (WHO, 2013). People whose parents have illnesses such as diabetes,

cancer, and high blood pressure are predisposed to also having to deal with these conditions. Biology plays a dominant role in the health and well-being of everyone. However, psychological, environmental, and cultural factors are other key areas relevant to any illness (Marks, Murray, Evans, & Estacio, 2011). The biological mechanisms of carcinogenesis, such as inheritance of the BRCA1 or BRCA2 gene, are all part of the social determinants framework (Healthy People 2020, 2016; Hiatt & Breen, 2008).

Social Determinants of Health Constructs

Constructs in the social determinants of health framework that I identified as risk factors in this study were the predictor variables of age; race; and grade of cancer (I, II, and III) in terms of health status. Age, for example, is linked to the level of social support that MBC patients receive (Hiatt & Breen, 2008). Sources of income also are limited for this age group because of the loss of work as the disease progresses (WHO, 2013). This period is a significant time when MBC patients need social and family support systems. The older that MBC patients are, the more likely it becomes that the disease will worsen. These situations can cause anxiety and potentially increase depressive symptoms. MBC patients need additional emotional support at this age to reduce distress.

Isolation, lack of social support, low self-esteem, body image, self-blame, and hopelessness affect mostly younger MBC patients, whereas middle-aged patients struggle more to cope with and deal with the diagnosis (Ostberg & Lennartson, 2007). As mentioned previously, the effects of practical and emotional support have been studied. According to Lyyra and Heikkinen (2006), MBC patients who lacked emotional support were 2.5 times more likely not to have mastectomy. Ostberg and Lennartson (2007)

reported that individuals who had more diverse sources of support had better health outcomes.

Race plays a major role in MBC. Whites, for example, are more likely to have more economic power than Blacks or members of other races (WHO, 2013). This situation makes it difficult for the latter two groups to manage the outcomes of MBC. The social determinants of health are shaped by the distribution of money, power, and resources at the global, national, and local levels. The unequal balance of this distribution has an impact on health disparities, the unfair and avoidable differences in health status seen within and between countries (WHO, 2013).

Recent studies on social support and health have focused on the relationship between social support and well-being. Individuals who are single, widowed, or divorced have increased cancer mortality rates when compared to married or partnered individuals. Jingzhi and Lambert (2007) studied women and men with breast cancer and found that single men had a mortality rate of 1.96% in comparison to widowed men at 2.64% and divorced men at 3.39%. The differences were much larger for men than for women with breast cancer. Research has shown that social support predicts the survival rates of patients with breast cancer (Kroenke, Kubzansky, Schernhammer, Holmes, & Kawachi, 2006).

Nature of the Study

I conducted this quantitative study using archival SEER data from 2011 to 2013. The analysis required the same basic research principles and steps as studies using primary data. This paper contributes to the discussion of secondary data analysis as a

research method for MBC and psychosocial information in a study of MBC in the United States.

Secondary Data Analysis

Johnston (2014) defined secondary analysis as "any further analysis of an existing dataset which presents interpretations, conclusions or knowledge, either adding towards the original investigator or a little different from those presented in the first reported results" (p. 620). Most research begins with the desire to learn what has been studied and what remains to be learned about a topic (Katsirikou, 2013). Secondary data analysis takes this step further by reviewing and analyzing previously collected data on the topic of interest (Katsirikou, 2013). Although secondary data analysis is flexible and can be used in several ways, it also an experiential exercise with procedural and evaluative phases, just as when collecting and evaluating primary data (Doolan & Froelicher, 2008). Secondary data analysis remains an underused research technique in many fields, including breast cancer.

Process of Secondary Analysis

When conducting research, the topic of interest and the RQs determine the ways in which the researcher collects, analyzes, and interprets the data (Creswell, 2009). I conducted this study using a quantitative research design that began with the development of the RQs, identification of the data set, and thorough evaluation of the data set. Ethical issues regarding this study were addressed by the original investigators, who also ensured that all protocols had been explained and consent forms signed. The objective of my study was to collect archival data on age; race; and grade of cancer (I, II,

or III) from the SEER database to determine their relationship to men's willingness to undergo mastectomy.

Definitions of Terms

Adjuvant therapy: The use of another form of treatment such as chemotherapy or radiation in addition to surgery (NCI, 2013).

Body image: The feelings and perceptions that individuals have about their bodies (Brain et al., 2006).

Breast cancer: An abnormal formation of breast tissue that has grown and infiltrated the surrounding healthy tissue of the breast (NIH, 2013).

Depression: Negative thoughts, emotions, or feelings of hopelessness that lead to not wanting to perform normal activities (Brain et al., 2006).

In situ: The original, natural, or existing place or position (NCI, 2013).

Mastectomy: The elimination of breast tissue (NIH, 2013).

Metastatic disease: Manifestation of malignancy as a second growth arising from the primary growth but in a new location; can be spread by lymphatic system, blood, or bone marrow (CDC, 2013).

Perception: A personal representation of reality or experience (Larson, 2009; WHO, 2013)

Staging: A method of classifying cancer according to the full extent of the disease in the body. It helps in determining appropriate treatment and estimating the chances of long-term treatment or surgery (NCI, 2013).

Assumptions

I made the following assumptions when conducting this study:

- The MBC secondary data in the SEER database were adequate to reach the number needed for the study.
- The MBC secondary data in the SEER database were valid.
- Informed consent was signed by participants in the study conducted by the original investigators.
- My being a female investigator working with the NCI SEER and Behavioral Risk Factor Surveillance System (BRFSS) registrar on a daily basis would not affect any of the organization's willingness to provide me with the secondary data in a timely manner.

Scope and Delimitations

The scope of this study was limited to U.S. archival data because of the cost. The study was limited to men 18 years of age and older because of the small target population of men in the United States who have had breast cancer. The sample size was limited by the scant published data in United States available for retrieval to investigate the associative risk factors relating to MBC, namely, the psychosocial variables of age, race; and grade of cancer (I, II, or III) to the outcome of mastectomy in the United States.

As a social change implication, the scope of the study covered only data for men who had not yet had received a recommended yearly mammogram screening. According to the ACS (2011), men are yet to be included in the guidelines for baseline mammogram

for women at age 40. Because the data were archival, there was no opportunity to contact any of the men who were in the initial study.

Limitations

One limitation of the study was that no previous researchers had specifically focused on grading MBC. Looking for archival data took SEER personnel months to finish. In addition, SEER personnel raised numerous objections and tried to discourage the retrieval of the required archival data. Another limitation was the fact that the data had been collected by other researchers, which meant no contact with the participants, no follow-up questions, and no confirmation of the appropriateness of the original procedures.

Significance

MBC has been diagnosed in one of every 1,000 men in the U.S. population (ACS, 2016; Fentiman et al., 2006; NCI, 2016a; NIH, 2013). The CDC (2012a) and Doornbos, Zandee, DeGroot, and De Maagd-Rodriguez (2013) stated that many men with MBC have yet to be diagnosed and treated. Therefore, the goal of this study was to support positive social change in helping men to accept that they also can become the victims of breast cancer and that they can receive the same timely treatment as women. This study was significant for being the first study of MBC investigating the impact of the variables of age; race; and grade of cancer (I, II, or III) on mastectomy outcome. Other researchers have studied the stages of cancer, but not the grades of cancer.

Implications for Social Change

Public health has many disciplines whose core principles are to improve population health and well-being (Walden, 2014). The significance of this study is to eliminate hindrances and the lack of information. There has been little research on the emergence and prevention of MBC. Public knowledge might lead to more awareness and use of mastectomy by patients at either Stage II or Stage III of MBC.

Screening and daily life changes are vital to early detection (CDC, 2012a). Clinical professionals need to be well informed about of the reasons for not including men in their dissemination of information about breast cancer. I hope that the results of this study will help to eliminate the risk of MBC by educating the population. One goal of this study was to eradicate the stereotyping of breast cancer as a female disease. The ongoing emergence of medical technology and continued education to benefit the public will help to ensure greater health awareness at the individual, community, and global levels. Disparities in breast cancer mortality among men are apparent. Results will add to the current knowledge base by informing the public, clinical professionals, and patients about the relationship between the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC.

Summary

Chapter 1 introduced the problem, nature of the study, significance of the study, and the RQs. Also included was information about the assumptions, scope and delimitations, and the limitations of the study. In Chapter 2, I present the literature

review, rationale for conducting the study, theoretical foundation, and conceptual framework.

Chapter 2: Literature Review

Introduction

MBC occurs infrequently, and there has been a gap in knowledge about the disease because of limited research and inadequate funding inside and outside of the United States (Chavez-MacGregor et al., 2013; Kornegoor et al., 2012). The incidence of MBC is increasing globally. The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC.

Literature Review Strategy

I searched the Medline and ProQuest databases to obtain relevant literature on the topic of MBC. The key search terms under the medical subject heading MeSh were *breast in men*; *cancer*; *Grades I, II & III*; *male*; *social support*; *altered body image*; *coping with breast cancer*; *depressive symptoms*; *breast cancer*; and *family support*. The search for relevant literature spanned 2001 to 2014, but the archival data used in the study were from 2011 to 2013.

Rationale for the Study

The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. This quantitative investigation focused on archival data from 2011 to 2013 obtained from the SEER database. The data were for men 18 years of age and older who had been diagnosed with breast cancer and who considered mastectomy as part of treatment. Only a few studies have sought to identify the influence of the variables of age, race, and grade

of cancer in relation to mastectomy in men, making this study even more important in filling the gap in the research.

Social Predictors of MBC

Age; race; and grade of cancer (I, II and III) were the IVs determining mastectomy for patients with MBC. Brain et al. (2006) reported a prevalence of psychosocial variables in 161 men using a cross-sectional questionnaire to determine whether age of diagnosis resulted in mastectomy. The questionnaire contained the variables of anxiety, depressive symptoms, cancer-specific distress, body image, and coping and support needs, as well as demographic variables (Brain et al., 2006). Results indicated that anxiety was not reported because depressive symptoms associated with altered body image was at 35% of the variance ($p < .001$). The clinical level of the anxiety reported was 6%, while 23% of those reported a rise in cancer-specific distress (Brain et al., 2006). Body image, avoidance of coping, and emotional support was at 51% ($p < .001$; Brain et al., 2006). Brain et al. stated that the largest impediment to accommodating the disease was the inability to cope with the disease, the altered body image, and the lack of support needs. Brain et al. concluded that age affected MBC patients in terms of their body image and psychological needs.

Merletti, Galassi, and Spadea (2009) asserted that timely access to health care is essential to diagnose and treat breast cancer, and reduce the mortality and morbidity rates, adding to the gap identified in Chapter 1 (Burson et al., 2009; Munn, 2001; Rachid et al., 2009). Breast cancer is 100 times more prevalent in women than in men, and even though most cases of MBC are diagnosed in men between the ages of 60 and 70 years,

men of any age can become MBC patients (Rachid et al., 2009). Several researchers (e.g., Brain et al., 2006; Burson et al., 2009; Hiatt & Breen, 2008; Robinson et al., 2008; Rosenbaum et al., 2004) have stated that among unmarried men, anxiety, depressive symptoms, altered body image, and the lack of coping mechanisms and emotional support have an impact on their self-esteem, with altered body image having the greatest impact. Among married men, distress has been related to decreased satisfaction in terms of intimacy in the relationship, lowered sexual function, and less appreciation of spouse or partner (Brain et al., 2006). Additional problems encountered among older men include decreased physiological arousal, decreased sexual arousal, decreased interest in sexual attractiveness, and no hope of achieving orgasm (Brain et al., 2006).

MBC accounts for only 1% of all breast cancers (NCI, 2016a). Researchers have reported on the evaluation, treatment, and results of male patients with MBC (Ahmed et al., 2012; Gómez-Raposo, Tévar, Moyano, López Gómez, & Casado, 2010). Male patients with a histological diagnosis of breast cancer from 2001 to 2010 who had been evaluated previously (Ahmed et al., 2012; Fentiman et al., 2006; NCI, 2013; NIH, 2013) have been given the recommendation to undergo modified radical mastectomy as a treatment option.

A diagnosis of DCIS among men is rare because of the lack of screening detection methods, so MBC usually presents as a profound mass (Doyle et al., 2011 Fentiman et al., 2006; NCI, 2013; NIH, 2013). Typically, MBC presents with a unilateral, painless, subareolar mass that often is located away from the nipple (Doyle et al., 2011; Fentiman et al., 2006; NCI, 2013; NIH, 2013). Twenty-nine percent of MBC patients with invasive

ductal cancer have surgery; 17% have surgery for tumors, particularly unadulterated DCIS (Vetto, 2010).

Researchers have found that MBC cases are much more common in relatives with the BRCA2 gene than in those with the BRCA1 gene (Fentiman et al., 2006; Mathew et al., 2008; NCI, 2013; NIH, 2013). Fentiman et al. (2006) studied 54 participants with MBC who lacked BRCA1 mutations, but a BRCA2 transfiguration was found in two participants. The same researchers confirmed that five patients had BRCA2 mutations inherited from first-degree relatives with breast cancer.

Work-related risks associated with a diagnosis of MBC include environments with elevated temperatures and exhaust fumes; however, electromagnetic fields have not yet been implicated (Gómez-Raposo et al., 2010). Patients who have experienced hyperestrogenization resulting from Klinefelter's, gonadal dysfunction, obesity, and high alcohol consumption, along with exposure to radiation, have an increased risk of developing MBC (Fentiman et al., 2006; Gómez-Raposo et al., 2010). Nipple inversion usually presents when a lump is discovered, but in 40% of men, this discovery often does not come until Stage III or Stage IV of the disease. Most MBC tumors are ductal; 10% are DCIS. Surgery performed on patients with this condition usually involves mastectomy with axillary clearance or sentinel node biopsy. The decision to undergo radiotherapy is indicated by the stage of MBC and is similar to female breast cancer (Fentiman et al., 2006; Gómez-Raposo et al., 2010). Hormone therapy is the core treatment for metastatic disease, according to Fentiman et al. (2006), but chemotherapeutic agents also can be used to provide palliation. There is a need for

national initiatives to improve information about and support for treatment of MBC. This study will aid in filling the gap.

Theoretical Foundation

Much research has been conducted on cancer in general, but the majority of studies have focused primarily on female breast cancer and have excluded MBC. The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. The social determinants of health play an essential role in enhancing the psychological well-being of these patients in terms of social support.

Ruddy and Winer (2013) stated that more research is needed to explore the relationship between coping strategies and emotions experienced by individuals dealing with MBC. Brain et al. (2006) stressed that further study will help to capture information relevant to the pattern of anxiety, depressive symptoms, distress, body image issues, coping mechanisms, and emotional support from initial diagnosis through various treatment regimens.

Conceptual Framework

The study was guided by the social determinants of health framework, which was designed to aid in conceptualizing how social determinants and sociological factors interact with other factors in the etiology of MBC and to realize changes over time. The framework begins with the cancer series, added levels of analysis, and considered the impact of interventions in the management of MBC (Hiatt & Breen, 2008). As mentioned in Chapter 1, the social determinants of health are the conditions relevant to how people

grow, live, work, and age. These conditions are impacted by the distribution of money, power, and resources at the global, national, and local levels. Following are details about the constructs in the social determinants of health framework.

Social Support

Social support, one construct in the social determinants of health framework and the main construct of this study, was defined by Rab (2012) as "availability of support which refers to the degree to which interpersonal relationships serve a particular function" (p. 2). Social support is an important predictor in the ability of individuals to cope with difficult circumstance and adjust to psychological and social demands. Several studies, according to Rab, have indicated that men's perceptions of close supportive relationships with their spouses and close friends are positively correlated with their ability to cope with MBC.

Age

Age is a sociological predicator variable. As a construct in the social determinants of health framework, age determines how well MBC patients handle anxiety in terms of worry and fear whenever the symptoms become more severe or when undergoing testing to determine whether the cancer has progressed (Rab, 2012). Some of the most common fears are painful procedures associated with the disease and side effects such as hair loss, nausea, fatigue, and pain (Rab, 2012). MBC patients worry about disruptions to their daily lives that can lead to fear and anxiety because of their inability to work. Older MBC patients who have already reached retirement worry less.

The factors predicting anxiety include personal history of depression, personal history of anxiety, painful treatment protocols, and difficulty controlling bladder during therapy (Brain et al., 2006, Rab, 2012). This last factor is of particular relevance to men age 65 years and older. During remission, MBC patients are required to have follow-up visits with their oncologists to manage MBC. Anxiety and worry intensify at this stage because of the fear of negative updates.

Race

Race is another construct in the social determinants of health framework. Racial disparities exist in the management of MBC in terms early diagnosis and access to health care. Whites, more so than Blacks, are mostly insured (WHO, 2013). Blacks are underinsured because of the lack of social support, poor employment prospects, and lack of resources. Having insufficient resources can cause distress that manifests as depression, anxiety, insomnia, anorexia, poor concentration, and the inability to function in daily chores.

Cancer Grade I

Adding to the social determinants of health framework, the grade of cancer refers to the aggressiveness of its management. Grade I is a low grade; in Grade II, cells become differentiated and require treatment; and in Grade III, the cells grow and spread rapidly (NCI, 2013). MBC patients at this latter stage have an inability to cope, and they can experience frustration and emotional distress. Grade I denial in breast cancer leads to deregulation of the immune system and results in long-term physical and emotional

problems that cause distress. Many patients with Grade 1 cancer who are waiting for MBC test results experience tremendous distress.

Cancer Grade II

Grade II is another construct of the social determinants of health framework. MBC patients who seek a mastectomy during Grade II should report body image issues to their partners or caregivers to seek emotional help in order to deal with the disease (Rab, 2012). Caregivers or partners might offer advice regarding the treatment to follow in terms of breast-conserving surgery, or reconstructive surgery, to enhance body image (Rab, 2012).

Cancer Grade III

Grade III is another construct in the social determinants of health framework. Patients with this grade of cancer need help coping with the effects of chemotherapy on MBC (NCI, 2013). MBC patients report very poor physical and emotional qualities of life when coping with the treatment regimen. The side effects of antiestrogen during treatment can lead to weight gain, fatigue, and depression (Rudy & Winer, 2013). Because of the side effects of treatment at any stage of cancer, men with MBC need emotional support (Brain et al., 2006).

Psychosocial comorbidities also can have a negative effect on MBC patients' emotions (Brain et al., 2006). Feelings of uncertainty give rise to feelings of hopelessness. The absence of social networks can lead to decreased survival rates and rapidly increase the course of the disease.

Supportive Care

Nursing staff, paramedics, ancillary staff, and social support staff have a role in alleviating the symptoms and managing the welfare of MBC patients in terms of chemotherapy and pain management. This role can result in a positive relationship with MBC patients. The social determinants of health framework offered a sound theoretical foundation for this study. The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC.

Epidemiology

The yearly report incidence of MBC in Europe is one in 100,000, and less than 1% of all breast cancer patients are men, statistics that are similar to those in the United States (Fentiman et al., 2006). According to Weiss, Moysich, and Swede (2005), the epidemiology of MBC resembles that of female breast cancer. Major genetic factors connected with an increased risk of breast cancer for men include BRCA2 mutations, which are believed to account for most cases of inherited breast cancer (Weiss et al., 2005). Klinefelter's syndrome is another risk factor, as is a positive family BRCA I or II history (Weiss et al., 2005). Alleged genetic factors include AR gene mutations, CYP17 polymorphism, Cowden syndrome, and CHEK2 (Weiss et al., 2005).

Epidemiologic risk factors for MBC include disorders relating to hormonal imbalances such as obesity and testicular disorders (e.g., cryptorchidism, mumps orchitis, and orchiectomy), as well radiation exposure (Peschos, 2008). Other epidemiologic risk factors include prostate cancer as a secondary causation, prostate cancer treatment,

gynecomastia, and occupational exposure (Peschos, 2008), such as working in areas that contain polycyclic aromatic hydrocarbons, electromagnetic fields, or high temperatures. Another factor is dietary intake. Suggested examples could be “meat intake, fruit, and vegetable consumption, and alcohol intake” (Weiss et al., 2005, p. 2).

Race

Race accounts for the increased risk of developing a type of cancer that is genetically inclined or inherited. For example, the triple negative breast cancer gene was seen mostly in men of Black ancestry having receptors for estrogen and progesterone. This Black ancestry origin inhibits the response to medications that block estrogen production, making chemotherapy the treatment of choice for this group of men (ACS, 2011). Ashkenazi Jewish men have a higher risk than men from other ethnic groups of carrying the BRCA gene. According to Chavez-MacGregor et al. (2013), White men have of the highest incidence of breast cancer, followed by Blacks and Hispanic Americans. They also found that Black men are more likely to die from MBC because of the advanced stage of the disease at diagnosis**.**

Pavinato (2008) conducted a retrospective study of 146 men who were diagnosed with MBC between 1990 and 2007. Results showed that by the time the men found out that they had breast cancer, it was already at a later stage and had spread to the lymph nodes and then had metastasized to other organs. Reynolds (2007) analyzed race and other “predictors of treatment and survival among 510 men over 65 yrs. diagnosed with stage I-III breast cancer between 1991 and 2002” (p. 1), noting that in regard to 5-year

survival rates, approximately 456 (90%) of survivors were White men, and 34 (6.6%) were Black men.

Ethnic Factors

Sandhu et al. (2012) stated that African and Ashkenazi Jewish heritages have been associated with an increased risk of MBC. Sandhu et al. remarked that MBC accounted for between 7% and 14% of all breast cancers in sub-Saharan Africa at the time of the study. Black men have the highest occurrence in the United States (Sandhu et al., 2012). Specific factors responsible for the increased incidence in these ethnic groups are not known. The increased risk in Ashkenazi Jewish populations is the result of a high prevalence of BRCA mutations, also known as founder mutations, that are specific to that population (Sandhu et al., 2012). Ethnicity was not a factor in my study because of the limited number of men diagnosed with MBC.

Age

MBC is usually diagnosed at an older age than cancer is diagnosed in women. Men who are diagnosed often are not treated because of the advanced spread of the disease. The standard age for men at diagnosis is > 65 years (Chavez-MacGregor et al., 2013). However, the current study was limited to men 18 years of age and older. Table 1 shows the age-adjusted SEER incidence rates by year and race for MBC (NCI, 2014) in nine areas of the country (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, and Atlanta). Rates were per 100,000 and were age-adjusted based on the 2000 standard population in the United States.

Table 1

Age-Adjusted SEER Incidence Rates by Year and Race

Year of diagnosis	Other	White	Black
2000	1.16	1.14	2.86
2001	1.22	1.22	1.66
2002	1.15	1.13	1.95
2003	1.33	1.34	1.85
2004	1.21	1.23	1.61
2005	1.06	1.15	0
2006	1.16	1.19	1.54
2007	1.11	1.14	1.82
2008	1.18	1.2	1.43
2009	1.19	1.25	0
2010	1.24	1.13	2.93
2011	1.42	1.37	2.74
2012	1.35	1.34	2.1

Gender

Although breast cancer cases are usually diagnosed in women, men make up 1% of breast cancer cases (ACS, 2011). In fact, the rates for women and men as well as different ethnicity groups and age groups in the United States vary. However, because my study focused on men only, so gender was not an issue.

Mortality Rate in United States

An estimated new cases of female breast cancer in the United States are 249,260 reported in 2016 and only 2,600 new cases of MBC (NCI, 2016a). In the United States, 440 men were estimated to die from the disease. Table 2 shows invasive MBC incidence rates in six major regions of the United States, with the highest incidence from 2008 to 2012.

Table 2

Invasive MBC Incidence Rates in Six Major U.S. States 2008-2012

Region	Population at risk	cases	Crude rate	Age-adjusted rate	95% CI
Pennsylvania	30,951,263	567	1.83	1.64	[1.50, 1.78]
Florida	46,172,326	885	1.92	1.58	[1.48, 1.69]
New York	46,968,042	707	1.51	1.50	[1.39, 1.62]
Illinois	31,450,263	400	1.27	1.34	[1.21, 1.48]
California	92,764,862	953	1.03	1.16	[1.08, 1.24]
Texas	62,557,960	568	0.91	1.10	[1.01, 1.20]
Combined	310,864,716	4,080	1.31	1.35	[1.31, 1.39]

Global Rates of MBC

In England, 300 men and 41,000 women are diagnosed with breast cancer annually (NCI, 2014). Even though most of prevention campaigns are aimed at women rather than men, research carried out at Texas University indicated that MBC cases are rising and that most of the men are detecting it at a very late stage. The study stated that male cases increased from 0.86 to 1.08 per 100,000 men in 20 years ("Male Breast Cancer Numbers Rising Most Fail to Spot It Until It Has Spread to Lymph Nodes," 2004). The percentage globally is higher, with breast cancer being diagnosed in Zambia at a rate of 15% and 6% in Egypt and Tanzania ("Male Breast Cancer Numbers Rising Most Fail to Spot It Until It Has Spread to Lymph Nodes," 2004).

Grading

Grade of MBC is a rating that tells physicians how the cancer is behaving microscopically. Looking into a microscope, one can see that MBC cells are differentiated into an alarming appearance and pattern that is unlike normal cells. There also are other ways of determining the grade of MBC. Two grading and scoring systems

are the Nottingham Histologic Score System and the Elston-Ellis Modification of Scarff-Bloom-Richardson Grading System. Using these systems, pathologists take into account three factors: (a) gland formation number, or differentiation, meaning how well it will replicate a normal cell; (b) pleomorphism, or nuclear features, meaning how bad the cell looks under a microscope; and (c) mitotic pattern or division activity, meaning creating family.

Histologic Grade and Score

To determine glandular (acinar)/tubular differentiation, the following rating system is used:

Score 1**: i**ndicates tumor > 75% forming glandular/tubular structures.

Score 2**:** indicates tumor is 10% to 75% forming glandular/tubular structures

Score 3: indicates when tumor is < 10% and is forming glandular/tubular structures.

To grade nuclear pleomorphism of MBC, the following scoring system is used:

Score 1: Small nuclei with a slightly increase in size in comparison to normal male breast epithelial cells will be visible under a microscope, Uniform nuclear chromatin appears regular and uniform, and has slight variations in size.

Score 2: Under a microscope, these cells appear usually larger than normal cells, with nucleoli medium in size and shape.

Score 3: During this stage, the cells exhibit remarkable enlarged size with prominent nucleoli, and they look so bizarre in shape.

Mitotic Characteristics of MBC Grade

This technique requires use of a high-definition microscope. BC cells are manually counted on a slide to see the mitotic ability on a 10X high power fields using a high power field 0.55 mm condenser. Following is the scoring system:

Score 1: ≤ 7 mitoses MBC cells per 10X high-power fields.

Score 2: 8 to 14 mitoses MBC cells per 10X high-power fields.

Score 3: ≥ 15 mitoses MBC cells per 10X high-power fields. Once the pathologist looks at all of the cells, then an overall grade is determined as Grade 1, Grade II, or Grade III cancer**.** Grade 1 tumors have a score of 3 to 5, Grade 2 tumors have a score of 6 or 7, and Grade 3 tumors have a score of 8 or 9.

Staging

The NCI (2014) accepted the following tests to define the extent of cancer in the body:

- Radionuclide: This is a radioactive substance that uses a blue dye injected near the tumor that flows through the lymph ducts to the nodes. The first lymph node to receive the dye is extracted and viewed under the microscope for cancer cells (Macmillan Cancer Support, 2013; NCI, 2014).
- CT scan (CAT scan): This is a scan that contains dye contrast that takes a series of pictures of the affected area inside the body from different views (Macmillan Cancer Support, 2013; NCI, 2014).
- Bone scan: A bone scan usually is done to check for rapidly dividing cancer cells. It is performed by injecting a radioactive material into the vein that

travels through the bloodstream to lodge in the bone. It is detected by the scanner (Macmillan Cancer Support, 2013; NCI, 2014).

- Positron Emission Tomography Scan (PET): This scan is used to find malignant or tumor cells in the body. It is done by injecting a radioactive glucose sugar into the vein; the PET scanner rotates around the body, taking pictures of cells aided by illumination of glucose that helps the cancer cells to appear brighter on the cancer cells, which occurs because cancer cells take up more glucose than normal cells do. (NCI, 2014)

The medium allows oncologists to detect the stage of breast cancer in order to describe the size of the tumor and determine whether it has spread to other organs (Macmillan Cancer Support, 2013; NCI, 2014). The initial step in assessing a suspicious breast lump in a man is to perform a mammogram (Fentiman et al., 2006; Giordano, 2005). The sensitivity and specificity rates of a mammogram to diagnose MBC are about 92% and 90%, respectively (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). Usually, a mammogram can differentiate between a malignancy and gynecomastia. The radiological features indicative of malignancy include, but are not limited to, proximity away from the nipple, spiculated margins, and microcalcifications that are less common in men than in women who have breast cancer (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010).

Risk Factors

Gómez-Raposo et al. (2010) conducted a prospective study using NIH-AARP Diet, a health study of 324,920 men, of which 121 developed breast cancer. A notable

risk was seen in the men who had first-degree relatives with breast cancer (RR 1.92), a history of bone fracture after age 45 (RR 2.2), obesity (RR.1.79), and decreased levels of physical activity (Gómez-Raposo et al., 2010). Most of the men in the study had no identifiable risk factors; however, several risk factors had been identified in their study, including genetics (BRCA1, BRCA2 mutations); Klinefelter's syndrome, ethnic factors, family history of breast cancer, and Ashkenazi Jewish heritage. Endocrine risks included estrogen excess, which has to do with liver disease; exogenous estrogens; lifestyle; and environmental and occupational exposure (Gómez-Raposo et al., 2010).

Klinefelter's syndrome is the worst threat for emergent MBC that occurs in approximately one in 1,000 men (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). "Klinefelter's syndrome is characterized by the addition of at least one X chromosome to the normal XY karyotype which is usually 47XXY" (Gómez-Raposo et al., 2010, p. 451). It is characterized by enlarged testes, gynecomastia, high serum gonadotropins, and low serum testosterone levels (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010).

Ruddy and Winer (2013) conducted a systematic review of literature relevant to MBC risk factors, biological characteristics, presentation, prognosis, treatment, and survivorship between 1987 and 2012 and included 20 patients. Results showed that a BRCA2 mutation, age, conditions, estrogen/androgen ratio, and radiation were proven risk factors. Ruddy and Winer concluded that even though the disease biology is very distinct in men, the diagnostic approaches and treatment protocols for men are generally extrapolated from those used with women who have cancer. Reasons include inadequate

research with male participants and that survivorship might include sexual and hormonal side effects of endocrine therapies as well as the psychosocial impact of breast cancer.

The risk of breast cancer in genetically affected individuals is 20 to 50 times higher than in 46XY men (Gómez-Raposo et al., 2010). The risk increases with inherited BRCA2 rather than BRCA1 mutations (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). An example would be the genetically susceptible mother in a family who has been diagnosed with breast cancer. If she had given birth to only male children, then the chances of one of them inheriting the BRCA2 gene would be great (Gómez-Raposo et al., 2010). Testicular conditions are another risk factor associated with MBC. They include enlarged or undescended testes, congenital inguinal hernia, orchiectomy, orchitis, and infertility (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010).

Diagnosis

MBC usually presents as a palpable mass with a unilateral, painless subareolar mass that often is located away from the nipple (Doyle et al., 2011; Fentiman et al., 2006; NIH, 2013). MBC is different from gynecomastia, which often is painful, and although frequently asymmetrical or unilateral, it is subareolar and central in position (Doyle et al., 2011; Fentiman et al., 2006; NIH, 2013). Ultrasound can be an effective diagnostic tool to identify possible node attachment in male patients. MBC on an ultrasound image can be invasive and can typically appear as a solid lesion that requires a biopsy (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010) to confirm the diagnosis. Estrogen receptor, progesterone receptor, and Her2-neu status should be assessed in male

patients (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). A core biopsy is chosen for later stages of cancer so that a definitive diagnosis can be made (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010).

The diagnostic assessment and staging systems for MBC patients are the same as for women with breast cancer (Fentiman et al., 2006; Giordano, 2005). The scope of the cancer is recognized by laboratory tests, radiography, and bone and CT scans (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). The tumor stage is determined using the American Joint Committee on Cancer's classification system, which considers tumor size, nodal involvement, and distant metastases (as cited in Gómez-Raposo et al., 2010). Only 48% of MBC cases are diagnosed at Stage I or Stage II; most men tend to be diagnosed at later stages of the disease (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010).

Prognosis

The most significant prognostic pointers are stage of cancer at diagnosis and position of the lymph node (Fentiman et al., 2006). The normal estimated survivor rate for MBC in comparison to other breast cancers is about 40% to 65%, with a 5-year average, but when clustered by appearance in MBC, the 5-year survival rate is 75% to 100% for a Grade I diagnosis. The percentage decreases to 50% to 80% for a Grade II diagnosis and then declines even further to 30% to 60% for a Grade III diagnosis (Fazel & Pitsinis, 2013; Fentiman et al., 2006).

Grading

Grade of MBC is a rating that tells physicians how the cancer is behaving microscopically. Looking into a microscope, one can see that MBC cells are differentiated into an alarming appearance and pattern unlike normal cells. A laboratory scientist with oncology experience rates the cancer on a scale ranging from 1 to 3 pending pathology confirmation. When the grade is at the tumor level, the cells look different from normal cells. A low-grade breast cancer grows at a slower rate than a Grade II or a Grade III cancer, both of which are high-dividing cells that are likely to spread rapidly and are indicative of a poor prognosis and a poor survival rate because of their resistance to chemotherapy and radiation (NCI, 2012).

MBC Grade and Treatments

MBC treatment oncologists take into account the tumor grade and other critical factors such as the stage of MBC, age of the patient with MBC, and the patient's overall health. This is the first step in determining the most appropriate regimen for the MBC client after grading and staging (NCI, 2012).

Treatment of Early Stage I and Stage II Breast Cancer

Management of localized, invasive early MBC follows the same general treatment protocols as for female breast cancer (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). The treatments, according to Omene and Tiersten (2010), are customary modified radical mastectomy with axillary lymph node dissection, as well as lymph node biopsy. Breast-conserving therapy is not an option for men with early Stage I

and Stage II MBC because men lack breast tissue; however, it remains an option for women (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010).

Another treatment for early Stage I and Stage II of MBC is adjuvant radiotherapy. Men tend to be treated less often than women for postmastectomy radiation because they usually have more nipple or skin involvement. The deciding factor in selecting adjuvant therapy is when men have positive lymph nodes or tumors larger than 2 inches (Gómez-Raposo et al., 2010).

An additional treatment for early Stage I and Stage II of MBC is adjuvant hormonal therapy. Tamoxifen in MBC is frequently used because of the reduced risk associated with reappearance and death. Adjuvant tamoxifen is traditionally used in patients with Stage II and Stage III cancer (Gómez-Raposo et al., 2010). Adjuvant chemotherapy such as cyclophosphamide, methotrexate, and fluorouracil also is widely used in MBC. These choices are based on performance benefits from the perspective of clinical trials; a 5-year survival rate has been noted in some studies at > 80% significance (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). It is recommended for men with an intermediate or a high risk of primary breast cancer (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010).

Treatment of Stage III or Stage IV Cancer

Men who have Stage III or Stage IV breast cancer (Gómez-Raposo et al., 2010; Leong, 2005) undergo treatment that is similar to that for women. Chemotherapy is usually started initially, and surgery might be an option if tumors can be removed surgically (Fentiman et al., 2006; Giordano, 2005). Patients usually are given radiation

therapy and adjuvant tamoxifen for HR-positive disease after mastectomy (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). Induction hormone therapy represents an interesting option for most patients and is preferred to chemotherapy (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010; Sousa, Moser, & Cardoso, 2013). Gómez-Raposo et al. (2010) reported that 24 male participants in their study who had Stage II breast cancer were treated at the NCI with adjuvant cyclophosphamide, methotrexate, and fluorouracil.

Surgery

Fields, Devitt, Fisher, and Rabinovitch (2013) sought to determine the stage-specific management of MBC using either surgery or radiation. A total of 4,276 cases of MBC were obtained from the SEER database in their study. Results indicated that 87.4% used mastectomy and 12.6% used breast-conserving surgery (Fields et al., 2013). Fields et al. concluded that the outcomes for MBC improve with therapy use in unscreened populations.

Jablon (2014) conducted a study with a sample of 1,951 men who had localized breast cancer and found that 70% of the participants had had a lumpectomy with radiation. Results highlighted the need for men to be offered mastectomy instead of lumpectomy. The justification for this procedure is that men often have central tumors around the nipple area, meaning that surgery can be performed without sacrificing the nipple. Nipple reconstruction also might be done surgically, and some patients would rather tattoo in order to restore body image (Fentiman et al., 2006).

Deciding on the treatment to follow is customized to the stage at presentation. A sentinel lymph node biopsy is an option for patients with MBC, but limited data have been available to prove the effectiveness of this option (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). Most research has found support for adjuvant hormonal therapy, radiotherapy, and chemotherapy for MBC, as is the case for women with breast cancer (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). Tamoxifen is one of the most recommended adjuvant hormonal therapies, even though data relevant to MBC patients have been scant (Fentiman et al., 2006; Giordano, 2005; Gómez-Raposo et al., 2010). More research is needed to better understand MBC and improve its management and prognosis (Constantinou & Fentiman, 2012; Gómez-Raposo et al., 2010).

Literature Review Related to Key Variables and/or Concepts

Social networking is a strong medium of communication that reaches communities, provides social and family support, and is linked to the framework of the research. The constructs of the social determinants of health framework include psychosocial predictor variables such as anxiety, depressive symptoms, distress, body image, coping mechanism, and emotional support. These predictors can encourage healthy choices and lifestyles, both of which have a strong influence on health and the ways in which people cope with demanding life issues and circumstances. Social support includes practical assistance; financial help; and the availability of information, advice, and psychological support.

Anxiety, a construct in the social determinants of health framework. is tied to the emotional support available to MBC patients. Lack of economic resources, such as loss of work as the disease progresses, will mean a reduction in income. This is a significant time when MBC patients need social and family support. Anxiety can lead to a potential increase in depressive symptoms, the second construct in the framework. MBC patients need additional emotional support during this phase of the disease to reduce distress, the third construct. Isolation; lack of social support; low self-esteem, which is part of body image; self-blame; and hopelessness can affect their ability to cope with a diagnosis of MBC.

The effects of practical and emotional support have been studied. According to Lyyra and Heikkinen (2006), MBC patients lacking emotional support were 2.5 times higher than those who had emotional support in terms of the decision to have a mastectomy. Ostberg and Lennartson (2007) reported that individuals with diverse sources of support have better health outcomes.

In conclusion, the social determinants of health framework was a sound foundation for this study. The framework supported and reinforced the basic constructs of this study, which was centered on the social support construct of the framework. The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC.

Summary and Conclusions

Chapter 2 summarized the major literature related to the predictors of mastectomy in Grade II or Grade III of MBC; diagnosis; staging; and treatment options. I reviewed

the variables and discussed the social determinants of health framework as it was used in the current study. This research will fill gaps in the literature relevant to the topic of MBC. In Chapter 3, I describe the methodology, my role as the researcher, instrument used, informed consents, sample and target population, and the recruitment and approval processes necessary to conduct the research.

Chapter 3: Research Method

Introduction

The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. This chapter explains the study design, sample, and procedures. Although the analysis of secondary analysis data is flexible and can be used in several ways, it also is an empirical exercise and an efficient method with procedural and evaluative stages, just as in collecting and evaluating primary data (Katsirikou, 2013). This study confirmed that secondary data analysis is a viable process of inquiry when a systematic procedure is followed and presents an illustrative research application using a quantitative analysis (Katsirikou, 2013). I used this medium to test the RQs and provide an explanation of the answers to the RQs using what Creswell (2009) described as a quantitative research design. "Quantitative analysis should contain the quantifiable variable by observation performed retrospectively, which varies on institution or organization" (Creswell, 2009, p. 50). I followed a quantitative research design to compute the contributory relationship obtained during the MBC survey with the numeric data through a secondary data approach (Creswell, 2009).

Study Design and Rationale

The purpose of this cross-sectional survey was to generalize the results from the target population of MBC patients so that inferences can be made about the influence of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC.

Research Design and Approach

This quantitative study followed a retrospective design. Secondary data collected between 2011 and 2013 were retrieved from the SEER database of the NCI. Secondary data were suitable for use in this study based on the limited data available across the United States and Europe on BRFSS and quality of life on survivorship data. I conducted this retrospective study to review the differences in MBC stage at diagnosis, demographic data, tumor size, and sociological variables from 2011 to 2013 previously surveyed in order to address the RQs. The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. The results highlighted the issue of health care availability, health care practices, and the need for education and information about MBC.

Research Questions and Hypotheses

RQ1: How will age impact knowledge related to mastectomy in MBC?

H_{01}: Age will not relate to mastectomy in MBC.

H_{a1}: Age will relate to mastectomy in MBC.

RQ2: How will race account for MBC in relation to mastectomy?

H_{02}: Race does not account for MBC in relation to mastectomy.

H_{a2}: Race does account for MBC in relation to mastectomy.

RQ3: Is there a predictive relationship between mastectomy and Grade I, II, or III cancer in MBC?

H_{03}: There is no predictive relationship between mastectomy and Grade I, II, or III cancer in MBC.

H_{a3}: There is predictive relationship with mastectomy and Grade I, II, or III cancer in MBC.

All RQs were analyzed using logistic regression. Modeling included all risk factors mentioned earlier, in addition to all demographic variables. I also included data from more than 427 patients after inclusion of my variables; data from the SEER database on other cancer stages were excluded.

The sample size calculation formula was as follows:

$$ss = \frac{Z^2 * (p) * (1-p)}{c^2}$$

Where:

Z = Z value (e.g. 1.96 to 95% confidence level)

p = percentage picking a choice, expressed as decimal

(.5 used for sample size needed) due to the number of mastectomies was hoped to be at 50% of MBC

c = confidence interval (CI), expressed as decimal (e.g., .04 = ±4)

Sample size 427; 95% confidence using a U.S. standard population of 100,000, at a 50% MBC the CI (4.73), at 99% sample size 427 confidence using the same 100,000 pop at 50% MBC the CI (6.23; Capasso et al., 2013).

$$\text{Prevalence} = \frac{\text{persons with a given health indicator during a specified time period}}{\text{population during the same time period}} \times 100$$

$$\text{Prevalence} = \frac{125}{100{,}000} \times 100 = 0.12\%$$

Per 100,000 standard population

Methodology

Knowing that there were inadequate resources regarding time, money, and the number of MBC cases available prompted the use of a retrospective cohort study as a suitable design. The IVs in this study were age; race; and grade (I, II, or III) of cancer; the DV was outcome of mastectomy. The purpose of this study was to understand the influence of the IVs on the DV.

Setting and Sample

Data on male patients of all racial and ethnic groups reported from the 17 registries that provide information to the SEER database who had been diagnosed with breast cancer between 2011 and 2013 served as the target population. The sample comprised data on men diagnosed with breast cancer based on the following criteria: (a) 18 years of age and older, (b) residing in the United States, (c) year of diagnosis: 2011 to 2013 inclusive; (d) tumor size, (e) race/ethnicity: all races/ethnicities reported; (f) grade of cancer at diagnosis; and (g) mastectomy. Stratification of Grades II and III from the secondary data commenced once approval was received and the confidentiality agreement was signed.

Informed Consent

I assumed that informed consent had been given by the men whose data were reported to the SEER database to the original investigators. Using archival data meant

that I did not have to obtain any further consent from any of the original participants and that I could conduct a secondary analysis freely (Grinyer, 2009).

The 17 registries obtained information about the participants' ages; race; and grade of cancer (I, II, or II), along with mastectomy status, by using an interview protocol. I assumed that they had conducted these interviews following confidentiality and HIPPA compliance protocols. All documents related to the study are stored in a secured and fireproof cabinet under key and lock. They will remain there for 5 years after publication of the data, after which time all data will be shredded or electronically destroyed.

Instrumentation and Materials

I obtained archival data from the NCI's SEER database. SEER, since its inception in 1973, has collected information on cancer incidence and survival rates from 17 population-based registries in geographic areas that make up 26% of the U.S. population (Klein et al., 2011; SEER, n.d.a). The SEER registry database is a wide-ranging source of U.S. population-based information and includes data on stage of cancer at diagnosis and patient survival rates. SEER collects and stores demographic data on patients, primary tumor site, morphology, and stage at diagnosis (Klein et al., 2011). Participating registries are required to provide data collected on primary tumor site, tumor morphology, type of treatment, and follow-up for survival status (Klein et al., 2011).

NCI staff work directly with registries that are part of the North American Association of Central Cancer Registries (NAACCR) to support them in confirming that the data are of high quality and the data can be pooled to obtain national estimates (Klein

et al., 2011). The NCI personnel accountable for supervising the SEER database also act as liaisons with registries and other organizations involved with cancer surveillance (Klein et al., 2011).

In the early part of 1973, the SEER database began collecting statistics on cancer cases in Connecticut, Hawaii, Iowa, New Mexico, and Utah, along with the metropolitan areas of Detroit and San Francisco-Oakland (Klein et al., 2011). The metropolitan area of Atlanta and the 13 counties in the Seattle-Puget Sound areas were added to the database from 1974 to 1975 (Klein et al., 2011). In 1978, 10 predominantly African American counties in Georgia were added, and American Indians residing in Arizona were added in 1980. According to SEER, the following three geographical areas participated in the SEER program prior to 1990: New Orleans, Louisiana (1974-1977, rejoined 2001); New Jersey (1979-1989, rejoined 2001); and Puerto Rico (1973-1989).

The NCI receives financial support from the government, allowing it to collect information on cancer cases, including Alaska Native populations (Klein et al., 2011). In 1992, expansion of the SEER database saw the inclusion of minority populations, particularly Hispanic Americans, through the addition of Los Angeles County and four counties in the San Jose-Monterey area south of San Francisco (Klein et al., 2011). In 2001, thanks to the availability of funding, SEER database coverage was expanded to Kentucky, the remaining counties in California (Greater California), New Jersey, and Louisiana (Klein et al., 2011). The SEER database identifies the 17 national registries that their case data originate.

Cancer data at the state level are confidential and protected by legislative efforts (Klein et al., 2011). These efforts are very specific as to whom cancer information is reported to, how it is reported, and the procedure for accessing it (Klein et al., 2011; SEER, n.d.b). There is no identifying information on any SEER data, and permission is required before access to the data can be obtained.

Data Collection and Analysis

I used archival data from 2011 to 2013 obtained from the SEER database. The data were extracted manually with the help of SEER professionals and analyzed using SPSS v.23. The benefit of using the SEER data set is that it is a comparatively inexpensive way to obtain national data specifically on cancer. One benefit of using SPSS v.23 is its huge data set capacity and capability to analyze the data statistically. MBC cases were dichotomized to the United States based on place of residence identified at time of diagnosis. The study focused on three components (i.e., grade of cancer at diagnosis, age, and mastectomy) to better define regional differences.

Inclusion criteria were all MBC cases and all ages reported to the SEER database between 2011 and 2013. The stage at diagnosis has been provided to or recorded by SEER since 1975. Information about tumor size has been available only since 1988. Hence, the SEER database was examined for all MC cases diagnosed from 2011 to 2013 so that data on stage and tumor size could be captured for all cases. Lymph node involvement was not included as a variable in the stage of disease definition because it could have complicated the statistical analysis (Rosenbaum et al., 2004).

Quality Control and Quality Assurance

The SEER database is recognized as the gold standard for data quality worldwide (Klein et al., 2011). To ensure the safety and confidentiality of the retrieved data, all digital information was stored on a home office computer, and Internet access was protected by a firewall built into the DSL modem and one built into the Windows XP® operating system. Data and files were backed up daily, and backups were maintained on a network drive on a server encrypted or protected by the two firewalls. My personal computer is password secured, and only I have access to the records (Klein et al., 2011).

Threats to Validity

The most recognized limitation regarding the use of secondary data for analysis is that the data sometimes are collected for purposes that might not align with other researchers' investigations (Boslaugh, 2007). Another major disadvantage of using secondary data is that secondary researchers do not participate in the data collection process or know how it was conducted, nor do they know of any issues that might have arisen, such as low response rates or participants lacking an understanding of survey questions. Secondary researchers might have to find this information through other sources, such as documentation of the data collection procedures, technical reports, and publications (Boslaugh, 2007). It is difficult to calculate the approximate number of the men who were initially enrolled rather than the number reported.

Ethical Procedures

I received approval from Walden University's Institutional Review Board (IRB approval #09-15-15-0185323) to conduct this study. A letter of approval from the investigators to use their article for research is in the Appendix.

Possible Types and Sources of Information or Data

All RQs and hypotheses were analyzed using logistic regression. Modeling included all risk factors listed in Chapter 1 and 2, in addition to all demographic variables.

Protection of Human Subjects

Cancer registry professionals are obligated to protect the confidentiality of cancer patient information (Klein et al., 2011). Each cancer registry can impose additional policies regarding how files and documents are handled (Klein et al., 2011; SEER, n.d.d). Data retrieved from the SEER program are anonymous, so there is no way to extract additional personal demographic information about any participants, aside from broad information (such as sex and race) available on the database that can be used for research purposes (Klein et al., 2011). The data became available to me once I signed the SEER data use agreement (SEER, n.d.a).

Summary

Chapter 3 explained the methodology used in this quantitative study of secondary data. Included was information about the rationale for the research design and approach, the data source and sample, instrumentation, data collection and analysis, IV, DVs, and RQs. I also discussed quality assurance and the protection of human subjects.

Chapter 4: Results

Introduction

Chapter 4 briefly reviews the purpose of the study and presents the results of the analysis of the archival data obtained from the SEER database. The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. The management of MBC has been generalized more on disease epidemiology, genetics, and survivorship only; thus, there were insufficient data to support an investigation into psychosocial well-being.

Data Collection

Inadequate resources relevant to time, money, and the number of MBC cases available prompted the use of archival data from the SEER database to complete the study. The data were extracted and analyzed using SPSS v.23. To complicate the process, I could not compare data from 2010 and earlier to data from 2011 onward because of a change in the methodology of the BRFSS. Prior to 2011, cell phone data were not included in the BRFSS, making 2013 only the third year that cell phone data were included in the files. The official Center for Medicare and Medicaid Services (2012) weighting schematic was different prior to 2011, so I did not combine data from 2011 forward with data from 2010 and earlier. The estimates obtained from using the weights for landline and cellphone interviews were not comparable to 2010 and earlier and were not compared or added to current trend graphs.

I used the SEER database to obtain data from 2011 to 2013 about men diagnosed with breast cancer. SEER collects SES data such as education or family income on a

national level, but not on an individual level (SEER, 2016). The average reported age of MBC cases was 69 years of age. The IVs of this study were age; race; and grade of cancer (I, II, or III). The DV was mastectomy.

Setting and Sample

I analyzed SEER data from 2011 to 2013 on male patients diagnosed with breast cancer. These data comprised the sample. To be eligible to be in the study, the SEER data had to reflect the following criteria: (a) males 18 years of age and older with breast cancer, (b) United States as the country of residence, (c) age at diagnosis, (d) year of diagnosis: 2011-2013 inclusive, (e) tumor size, (f) all races/ethnicities reported in the SEER database, (g) stage of cancer at diagnosis, and (h) mastectomy.

Sample Characteristics

I obtained 2011-2013 SEER data from 427 MBC patients. The number of cases in parentheses was extracted from the database based on age group: 35-39 (*n* = 6), 40-49 (*n* = 18), 45-49 (*n* = 29), 50-54 (*n* = 26), 55-59 (*n* = 46), 60-64 (*n* = 62), 65-69 (*n* = 84), 70-74 (*n* = 59), 75-79 (*n* = 29), 80-84 (*n* = 33) and 85 and older (*n* = 35). The average reported age of the participant was 65 to 69 years. As seen in Table 3, data were retrieved for 73 Black men (17%), 335 White men (78%), and 16 Other (4%). I completed the analysis based on MBC patients, with the greatest reported number in terms of age was 84 men between 65 years and 69 years (19.6%). Table 4 further reports mastectomy by race, so the total number of Black mastectomy cases was 20 (17%), White was 89 (77%), Other was 6 (5%), and Unknown was 1 (0.9%), giving a total 116 cases of mastectomy for MBC.

Table 3

Sample Characteristics for Age and Race MBC SEER Data 2011-2013

Age	No. of cases extracted from data	Black	White	Other
35-39	6	1	5	0
40-44	18	3	14	1
45-49	29	6	21	2
50-54	26	5	20	1
55-59	46	8	36	2
60-64	62	14	47	1
65-69	84	17	65	2
70-74	59	7	49	3
75-79	29	4	24	1
80-84	33	4	28	3
85+	35	2	33	0
Total	427	73	335	16

Table 4

MBC Mastectomy Cases by Race 2011-2013

		Mastectomy				
Age	MBC	Mastectomy total	Black	White	Other	Unknown
35-39	6			2		
40-44	18		2	4		
45-49	29		2	5	1	
50-54	26		1	5	2	
55-59	46		2	11	1	
60-64	62		4	14		
65-69	84		5	17	1	
70-74	59		1	12		
75-79	29			4		
80-84	33		3	10	1	1
85+	35			5		
Total	427	116	20	89	6	1

Table 5 shows the increase in the number of MBC cases by year reported by the 17 cancer registries across all U.S. states except Texas. The number was 130 in 2011, 137 in 2012, and 159 in 2013. Of these 427 cases, 55 had a diagnosis of Grade I cancer, 190 had a diagnosis of Grade II cancer, and 182 had a diagnosis of Grade III cancer. Of the total for all 3 years, 116 men had undergone mastectomy.

Table 5

MBC Cases by Year: 2011-2013 SEER Data

2011	2012	2013	Grade I	Grade II	Grade III	Mastectomy
130	137	160	55	190	182	116

Note. One case had Grade IV cancer

The IVs of this study were age; race (Black, White, and Other); and grade of cancer (I, II, or III) in the United States. The DV was mastectomy. Logistic regression analyses were based on chi-square analyses conducted to test significance for all hypotheses; correlations to rule out multicollinearity were run among all IVs having a Pearson's $r \leq .000$. Most relationships were statistically insignificant because alpha was $\geq .05$).

Regression analysis was conducted on White MBC patients according to age group; the mean age was 65 years. Mastectomy information on White MBC patients is displayed in Table 6 by categorical group 35 to 85 years: 35 to 39 years (n = 2, 0.5%); 40 to 44 years (n = 6, 1.4%); 45 to 49 years (n = 8, 1.9%); 50 to 54 years (n = 8, 1.9%); 55 to 59 years (n = 14, 3.3%); 60 to 64 years (n = 19, 4.4%); 65 to 69 years (n = 23, 5.5%); 70 to 74 years (n = 13, 3.0%); 75 to 79 years (n = 4, 0.9%); 80 to 84 years (n = 14, 3.3%); and 85 and older (n = 6, 1.4%). For the current study, results showed that the prevalence of mastectomy among men with MBC increased significantly among White patients, less among Black patients, and the least for Other.

Table 6

White MBC Patients by Age Group

Valid N	*Missing*	%	*n*	%	*N*	%
AGE * 35-39	2	0.5%	425	99.5%	427	100.0%
AGE * 40-44	6	1.4%	421	98.6%	427	100.0%
AGE * 45-49	8	1.9%	419	98.1%	427	100.0%
AGE * 50-54	8	1.9%	419	98.1%	427	100.0%
AGE * 55-59	14	3.3%	413	96.7%	427	100.0%
AGE * 60-64	19	4.4%	408	95.6%	427	100.0%
AGE * 65-69	23	5.4%	404	94.6%	427	100.0%
AGE * 70-74	13	3.0%	414	97.0%	427	100.0%
AGE * 75-79	4	0.9%	423	99.1%	427	100.0%
AGE * 80-84	14	3.3%	413	96.7%	427	100.0%
AGE * 85+	6	1.4%	421	98.6%	427	100.0%

N = 427

Initially, I planned to conduct hierarchical multiple linear regression analyses only (see Tables 7, 8, 9, 10, 11, & 12). For multiple linear regression, *R*, or the coefficient of determination, is used as a measure of effect size, namely, the adjusted R^2. Although results for the multiple linear regression showed that the IVs of Age and White race were significant, the effect sizes (adj. R^2) for all models were undetectable, indicating no meaningful or practical significance. The data were then analyzed using hierarchical logistic regression, with the DVs being treated as dichotomous. I reported only logistic regression analysis results. Logistic regression, particularly binary logistic regression, is used when the DV is dichotomous.

Table 7

Logistic Regression Analysis for the IVs

Model	Unstandardized coefficients		Standardized coefficients	*t*	Sig	95% CI for B	
	B	*SE*	Beta			Lower bound	Upper bound
Age	0.873	0.076	0.780	11.438	0.000	0.723	1.022
Grade I	-7.47E-15	0.130	0.000	0.000	1.000	-.256	0.256
Grade II	4.79E-14	0.090	0.000	0.000	1.000	-.176	0.176
Grade III	-6.54E-14	0.097	0.000	0.000	1.000	-.191	0.191
Black	-4.04E-14	0.097	0.000	0.000	1.000	-.191	0.191
White	1.27E-01	0.031	0.118	4.052	0.000	-.066	0.189
Other	3.04E-15	0.109	0.000	0.000	1.000	-0.215	0.215

Note. DV was mastectomy

Table 8

Chi-Square Tests for Age

	Value	*df*	Asymptotic Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson chi-square	28.718[a]	1	.000		
Continuity correction[b]	27.153	1	.000		
Likelihood ratio	46.120	1	.000		
Fisher's exact test				.000	.000
Linear-by-linear association	28.651	1	.000		

[a.] DVs

[b.] Correlation

Table 9

Age and Mastectomy

		B	*SE*	Wald	*df*	Sig.	Exp(B)
Step 0	Constant	.986	.109	82.172	1	.000	2.681

Note. Variable in equation is age.

Table 10

Omnibus Tests of Model Coefficients Age

		Chi-square	*df*	Sig.
Step 1	Step	286.785	1	.000
	Block	286.785	1	.000
	Model	286.785	1	.000

Table 11

Logistic Regression: IV of Mastectomy and IV of White Race

		B	*SE*	Wald	*df*	Sig.	Exp(B)	95% CI for EXP(B)	
								Lower	Upper
Step 1[a]	WHITE (1)	-20.567	4190.415	.000	1	.996	.000	.000	
	Constant	21.203	4190.415	.000	1	.996	1615476258.503		

a. Variable(s) entered on Step 1: WHITE.

Table 12

Chi-Square

White		Chi-square	*df*	Sig.
Step 1	Step	67.288	1	.000
	Block	67.288	1	.000
	Model	67.288	1	.000

Independent Variables

Age. RQ1: How will age impact knowledge related to mastectomy in MBC? Null Hypothesis 1 is rejected because $p \leq .05$, meaning that it was statistically significant (β =.780, t = 11.438 [see Table 7]; ($p < .05$); chi-square test $p = .000$ [see Table 8 and Table 10])). Therefore, Alternative Hypothesis 1 is accepted.

Race. RQ2: How will race account for MBC in relation with mastectomy? Analysis was as follows: Black (β = 0.000, t = .000 [see Table 7]; p = 1.000 ($p > .05$); chi-square test [see Table 8]); White (β = 0.118, t = 4.052 [see Table 7; ($p = .000$) and ($p \leq .05$) therefore statistically significant; chi-square test [see Table 12]); and for Other race (β = 0.00; t = .000 [see Table 7]; ($p > .05$), Other race is statistically insignificant (p = 1.000; $p > .05$). Data for White were statistically significant ($p < .05$), so Null Hypothesis

2 is rejected, and Alternative Hypothesis 2 is accepted. The data for Black and Other cases were insignificant (p =1.000; $p > .05$), which was greater than ($p > .05$). Therefore, the null hypothesis is accepted, and the alternative hypothesis rejected for Black and Other race categories; the null hypothesis is rejected for White race only.

Grade. RQ3: Is there a predictive relationship between mastectomy and Grade I, II, or III cancer in MBC? Results shown on Table 7 were as follows: Grade I (β = 0.000, t = .000, p = 1.000); Grade II (β = 0.000, t = .000, $p > 1.000$); and Grade III (β = 0.000, t = .000, $p > 1.000$). All three grades were statistically insignificant ($p < .05$). Therefore, Null Hypothesis 3 is accepted, and Alternative Hypothesis 3 is rejected. Data from 116 of the 427 MBC patients (27.1%) reported having been treated with mastectomy at a later grade (II or III) of cancer; 311 (72.8%) reported receiving hormone therapy, but no surgery (see Table 7).

Dependent Variable of Mastectomy

As already mentioned, 116 (27.1%) of the 427 MBC cases reported having mastectomy at a later stage of cancer, whereas 311 (72.8%) reported receiving hormone therapy (see Table 13). In Table 9, mastectomy correlated at a significant level ($p \leq .000$) on age, and significant ($p < .05$; $p = .000$); chi-square test [see Table 12]) on race, thus displaying statistical significance and disproving the null hypotheses for all IVs.

Table 13

Mastectomy as the DV

Classification table

	Observed		Predicted		
			Mastectomy		% correct
			Yes	No	
Step 0	Mastectomy	Yes	0	116	.0
		No	0	311	100.0
	Overall percentage				72.8

a. Constant was included in the model.
b. Cut value was .500

Logistic Regression Analysis

Table 7 showed the logistic regression analysis that was conducted; the *p*-value of < .05 was considered statistically significant. Table 7 showed the logistic regression of IV and DV. Age β = .780, standard error of 0.076 with a *t* value of 11.438 and age statistical significance ($p < .05$; chi-square test $p = .000$), the 95% interval for B lower bound was 0.723 and upper bound was 1.022. For race, Black ($\beta = 0.000$, $t = .000$, statistical insignificance ($p > .05$; $p = 1.000$ chi-square test) $t = .000$, 95% lower -.191 and upper .191. White ($\beta = 0.118$ and $t = 4.052$, ($p < .05$; $p = .000$ chi-square) 95% interval lower -0.066 and upper 0.189. Grade I $t = 0.000$ sig 1.000, which was statistically insignificant $p \geq .05$; 95% interval lower -0.256 and upper 0.256. Grade II, $t = 0.000$ ($p = 1.000$ $p > .05$) statistically insignificant, 95% interval lower -.176 and upper .176. Grade III, $t = 0.000$, ($p = 1.000$ $p > .05$); 95% interval lower -.191 and upper .191.

Statistical Analysis

SPSS v.23 was used to compute the results. The first stage of the analysis involved descriptive statistics of the preliminary associations among age; race; and grade

of cancer (I, II, or III). However, the DV of mastectomy outcome was tested against the three IVs using independent *t* tests for the dichotomous variables and Pearson's product-moment correlations for the continuous variables. For independent *t* tests, all were significant ($p = .000$; $p < .05$). Levine's test for equality of variances was studied to account for the possibility of an unequal variance of samples. For example, Table 14 shows $F = 121.271$ and that the values were statistically significant ($p = .000$; $p < .05$). Separate variance estimates also were reported. Table 14 is a model summary of logistic regression, where *R* is .818a, $F = 121.271$, $df = 7$, and sig *F* change $p = .000$.

Table 14

Model Summary IV

Model summary									
Model	*R*	R^2	Adj. R^2	SE of the estimate	Change statistics				
					R^2 change	*F* change	*df*1	*df*2	Sig. *F* change
1	.818[a]	.670	.664	.258	.670	121.271	7	419	.000

a. Predictors: (Constant), OTHER, WHITE, AGE, GRADE I, GRADE II, GRADE III, BLACK

In conclusion, drawn from the MBC study, $p > .05$ because the output read *p* 1.00 statistically, insignificant predictors for Grade I, Grade II, Grade III used to test against mastectomy. However, measures of age and race were statistically significant in the White population of MBC, where $\beta = .118$, $t = 4.052$; ($p = .000$; $p < .05$) and age $\beta = .780$ $t = 11.438$ and ($p = .000$, showing is $p < .05$).

Summary

Chapter 4 presented the results of the analysis of archival data from 2011 to 2013 obtained from the SEER database to examine the prevalence of MBC in terms of age, race, and grade of cancer as the IVs and mastectomy outcome as the DV. A total of 427

cases from SEER archival data were examined. Results of the study will add to knowledge of MBC in United States. Chapter 5 summarizes and interprets the findings and offers recommendations for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. Logistic regression analyses were based on chi-square analyses conducted to test significance for all hypotheses, all IVs significantly predicted, and added to the predictive variables and were all related to mastectomy. Prior to logistic regression analyses, correlations to rule out multicollinearity were run among all IVs in the analysis, which successfully produced a Pearson's $r < .000$.

Interpretation of the Findings

I extracted archival data dating from 2011 to 2013 from the SEER database to study the relationship between the IVs of age, race, and grade of cancer, and the DV of mastectomy among men diagnosed with MBC. Breast cancer has a range of specific stressors that can threaten men's emotional well-being after mastectomy. Examples of these postsurgery stressors are concerns about masculinity and the sense of isolation associated with a lack of support and not knowing where to seek for information (Brain et al., 2006). A general lack of awareness and information can inhibit the support needed to deal with MBC. Sociopsychological factors affecting well-being that were not included in this study but might be considered in future studies are the use of avoidance coping strategies, fear and uncertainty about the future, altered body image, and unmet information needs in relation to breast cancer and mastectomy. A larger study might help to identify the impact of these variables on the psychosocial well-being of men

experiencing various grades of MBC as well as stages of MBC that have yet to be studied.

There have been many studies of age, race, grades of cancer, and coping in regard to women who have been diagnosed with breast cancer, but few studies have focused on male cancer patients. Although past results have confirmed that age and race can predict poor adjustment to breast cancer (Brain et al., 2006), further research is needed to explore the relationship of the IVs of age, race, and grade of cancer to the DV of mastectomy experienced over the course of breast cancer.

Limitations of the Study

Because I analyzed secondary data and had no involvement in the initial collection of primary data, I was unable to follow up with or reach out to the participants directly, making the generalizability of the findings unclear. Another disadvantage of using archival data was that I did not participate in the data collection process, making it difficult to calculate the approximate number of the men who were initially enrolled rather than the number who were reported in the SEER database. The archival data were limited because the questions were not evenly asked during the 2011-2013 period in most states.

Source of Bias

Sources of bias were very limited, but the initial questions did not indicate whether the MBC archived data were obtained only from men because there was no indication of transgender issues reported for MBC by the SEER submitters. Questions were not evenly asked in all states during the 2011-2013 data collection period. In

addition, the psychosocial unavailability in the database created a setback during the analysis, leading to challenges while extracting the data for this study.

Reliability and Validity

Responses to the questionnaire submitted by the original investigators to the SEER database through the BRFSS were checked for reliability and validity by double-checking the data source for accuracy and source confirmation. Internal validity also presented additional limitations because these were secondary data. Extraction was meticulously double-checked from the original data for errors, so the external validity was not a challenge because of the large sample size of the study from the SEER database.

Recommendations for Future Research

Future researchers should focus on assessing the specific educational and social needs of men with breast cancer, along with their experiences as patients in the medical community and as members of society. Cooperative groups could be formed throughout the United States and other countries to provide information about the impact of cultural diversity on the experience of MBC. This information could give counselors the opportunity to better tailor counseling sessions to meet the unique needs of men with breast cancer. It is important to recognize the individuality of each MBC patient, regardless of age and race, and the shared experiences that men with breast cancer experience. The challenge is to incorporate knowledge of these shared experiences with each man’s unique personality and life experience to devise health care plans that will

enable these men to make the best decision not only for their families but also for themselves.

Implications for Positive Social Change

This study emphasized the need for increased awareness and information about MBC. Having a disease that affects predominantly women can threaten a man's sense of masculinity and engender feelings of isolation. Men might benefit from receiving information early in the referral process about: treatment options, side effects, symptoms, survival rates, cancer reoccurrence, and the potential impact on quality of life and body image after undergoing mastectomy.

Health care professionals play an important role in providing information and support to men with breast cancer about the availability of formal support networks. Practical suggestions for improving information and awareness include disseminating leaflets with information on MBC and a photograph of a critical male mastectomy, supporting local matching schemes and telephone help-lines, and raising public awareness through the media. Insurance companies should provide men and women with annual mammograms. This preemptive measure could lead to more acceptance of men having mammograms and much earlier detection of MBC.

Men might be less likely than women to disclose distress and seek help, so it is possible that health care providers might be underestimating the psychosocial impact of breast cancer on men. Screening distress is essential so that men who might benefit from additional emotional support can be identified early in the referral process. General screening tools such as the Hospital Anxiety and Depression Scale, which asks about

anxiety and depression, might underestimate the prevalence of distress in men with breast cancer, so disease-specific measures such as the Impact of Event Scale, another questionnaire that asks distress questions, should be used in combination with the Hospital Anxiety and Depression Scale to give future researchers easy access to the data.

Conclusion

The present study adds knowledge to the literature by using archival data from the SEER database to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. However, future research is needed to expand the present findings. The lack of dedicated resources and research focusing on MBC patients in the United States highlights the need for psychosocial support such as counseling services for men who have breast cancer. The most critical social change is to ensure the timely dissemination of MBC to reach men, regardless of age or location.

Discussion

Much of the research on MBC has been extrapolated from research on the incidence of female breast cancer, likely because of the infrequent incidence of MBC. The purpose of this study was to understand the influence of the predictors of age; race; and grade of cancer (I, II, or III) on the outcome of mastectomy in MBC. Based on the theory of projection, a concern would be that these feelings could exacerbate the shame and confusion that men with MBC experience, particularly because breast cancer is considered a cancer specific to women. Men with MBC feel there has been a lack of educational aids dedicated to the needs of men. Typically, men present in the denial

stage, questioning their sexual orientation, masculinity, and belief in God regarding their diagnosis of breast cancer.

A mastectomy is considered as making significant alterations to the male self-image and having the potential to impact male sexuality. Mastectomy scars are concerning to men in that they feel that society will consider them as feminine. This study examined how age; race; and grade of cancer (I, II and III) influenced mastectomy following a diagnosis of MBC.

Age was a psychosociological predicator variable. As a construct in the social determinants of health framework, age was statistically significant in the White population of men diagnosed with MBC. Age also determined how well the MBC patients handled anxiety in terms of worry and fear whenever the symptoms became more severe or when undergoing testing to determine whether the cancer had progressed. The younger MBC patients were the most concerned about body image.

Some of the most common fears for all ages of MBC patients studied were the painful procedures associated with the disease and such side effects as hair loss, nausea, fatigue, and pain. Younger MBC patients worried about disruptions to their daily lives that led to fear and anxiety because of their inability to work. Older MBC patients who had already reached retirement worried less.

Race is another construct in the social determinants of health framework. Racial disparities existed in the management of MBC in terms early diagnosis and access to health care. Race also was statistically significant in the White population of MBC. Most

White patients were insured, but Black patients were underinsured because of the lack of social support, poor employment prospects, and lack of resources.

Adding to the social determinants of health framework, grade of cancer refers to the aggressiveness of its management. Grade I cancer is a low grade; in Grade II cancer, cells become differentiated and require treatment; and in Grade III cancer, the cells grow and spread rapidly. MBC patients in this study who were at this latter stage reported frustration, emotional distress, and the inability to cope. Grade I denial in breast cancer can lead to deregulation of the immune system and results in long-term physical and emotional problems that cause distress. Many patients with Grade 1 cancer who are waiting for MBC test results experience tremendous distress.

Grade II is another construct of the social determinants of health framework. MBC patients generally seek a mastectomy during Grade II, and depending on the relationships that they have with partners or caregivers, they report body image issues in an effort to seek emotional help to deal with the disease. Caregivers or partners might offer advice about treatment options such as breast-conserving surgery or reconstructive surgery, to enhance body image caused by mastectomy (Rab, 2012).

Grade III is another construct in the social determinants of health framework. MBC patients with this grade of cancer need help coping with the effects of chemotherapy on MBC. Most patients with Grade III MBC also seek mastectomy. The MBC patients in my study reported very poor physical and emotional QOL when coping with the treatment regimen. The side effects of antiestrogen during treatment can include weight gain, fatigue, and depression; mastectomy can lead to worry about body image

(Rudy & Winer, 2013). Because of the side effects of treatment, regardless of the grade of cancer, men with MBC need emotional support (Brain et al., 2006).

Psychosocial comorbidities also had a negative effect on the emotions of the patients with MBC in my study. Feelings of uncertainty gave rise to feelings of hopelessness, and the absence of social networks was noted as leading to decreased survival rates and a rapid increase in the course of the disease. The prediction of psychosocial variables needs to be tested in future research so that practitioners can help MBC patients to manage the disease. Researchers also might want to consider investigating the understudied general cancer-related distress, anxiety, and depressive symptoms and depression experienced by patients with MBC during chemotherapy. MBC patients who have Grade I, Grade II, or Grade III MBC who have undergone mastectomy also have body image issues. Unfortunately, none of this information was reported in the SEER database.

In addition, future researchers should encourage MBC patients to discuss the cancer experience with others in order to facilitate the cognitive processing required for positive reframing, a finding with important implications for psychosocial interventions. Finding literature related to MBC that focused on age; race; and grade of cancer (I, II, and III) was challenging. Men who are struggling with MBC are withdrawn and reluctant to participate in research. Therefore, I recommend that financial incentives be provided to men with MBC to encourage their participation in future MBC-focused research.

Summary

Finally, the interpretation of the findings requires caution because the study was conducted with archival data. Measurement issues pertaining to the validity and reliability of the instruments used were clarified by SEER personnel, who stated that the archival data were validated prior to submission. Evaluating age; race; and grade of cancer (I, II, or III) in relation to mastectomy in MBC continues to limit investigations within cross-sectional or longitudinal frameworks.

In addition, this study went through changes, as with any correlational research, primarily because of the rarity of MBC and difficulty finding data in the SEER database addressing the variables. Future investigators might consider giving more attention during the early stages to defining a construct in order to avert the same problems. Social change implications should include the provision of group counseling, emotional support, and financial support to benefit the psychosocial well-being of patients with MBC.

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Appendix: SEER Data-Use Agreement

Last Name: Opara
SEER ID: 11553-Nov2015
Request Type: Internet Access

SURVEILLANCE, EPIDEMIOLOGY, AND END RESULTS PROGRAM
Data-Use Agreement for the SEER 1973-2013 Research Data File

It is of utmost importance to protect the identities of cancer patients. Every effort has been made to exclude identifying information on individual patients from the computer files. Certain demographic information - such as sex, race, etc. - has been included for research purposes. All research results must be presented or published in a manner that ensures that no individual can be identified. In addition, there must be no attempt either to identify individuals from any computer file or to link with a computer file containing patient identifiers.

In order for the Surveillance, Epidemiology, and End Results Program to provide access to its Research Data File to you, it is necessary that you agree to the following provisions.

1. I will not use - or permit others to use - the data in any way other than for statistical reporting and analysis for research purposes. I must notify the SEER Program if I discover that there has been any other use of the data.
2. I will not present or publish data in which an individual patient can be identified. I will not publish any information on an individual patient, including any information generated on an individual case by the case listing session of SEER*Stat. In addition, I will avoid publication of statistics for very small groups.
3. I will not attempt either to link - or permit others to link - the data with individually identified records in another database.
4. I will not attempt to learn the identity of any patient whose cancer data is contained in the supplied file(s).
5. If I inadvertently discover the identity of any patient, then (a) I will make no use of this knowledge, (b) I will notify the SEER Program of the incident, and (c) I will inform no one else of the discovered identity.
6. I will not either release - or permit others to release - the data - in full or in part - to any person except with the written approval of the SEER Program. In particular, all members of a research team who have access to the data must sign this data-use agreement.
7. I will use appropriate safeguards to prevent use or disclosure of the information other than as provided for by this data-use agreement. If accessing the data from a centralized location on a time sharing computer system or LAN with SEER*Stat or another statistical package, I will not share my logon name or password with any other individuals. I will also not allow any other individuals to use my computer account after I have logged on with my logon name and password.
8. For all software provided by the SEER Program, I will not copy it, distribute it, reverse engineer it, profit from its sale or use, or incorporate it in any other software system.
9. I will cite the source of information in all publications. The appropriate citation is associated with the data file used. (Please see either Suggested Citations on the SEER*Stat Help menu or the Readme.txt associated with the ASCII text version of the SEER data.)

My signature indicates that I agree to comply with the above stated provisions.

Esther Opara
Signature

6/13/16
Date

Please print, sign, and date the agreement. Send the form to The SEER Program:

- **By fax to 301-680-9571**
- **Or, e-mail a scanned form to seerfax@imsweb.com**