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Assessing Breast Cancer Screening Among Cameroonian Women in the United States of America

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2019

Abstract

Assessing Breast Cancer Screening Among Cameroonian Women in the United States of

America

by

Jacqueline A. Batcha

MPH, Walden University, 2010

BSN, Wilmington University, 2004

B.A Law, University of Yaoundé, 1992

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

November 2019

Abstract

Breast cancer is the second leading cause of cancer death among women in the United States. Nonadherence to recommended screening guidelines and lack of screening contribute to late stage diagnosis and increased morbidity and mortality among racial and ethnic women in the United States. The purpose of this study was to assess breast cancer screening practices, knowledge, and beliefs among Cameroonian immigrant women who were 40 years and older living in the metropolitan Washington, D.C. region. This quantitative cross-sectional study was guided by the health belief model and used the revised version of Champion's health belief model scale. A convenience sample (N=267) responded to a 60-item self-administered online survey that assessed knowledge of breast cancer screening, demographic variables, constructs of the health belief model and adherence (defined as obtaining a mammogram within two years). Data analyses performed included descriptive analysis, correlational and multiple linear regression. Results of this study revealed that increased level of education and self-efficacy were associated with greater knowledge of the benefits of mammography. Additionally, women who had more self-efficacy in obtaining a mammogram, perceived less cultural barriers, lived longer in the United States, and who had a regular healthcare provider were more likely to be adherent. Study findings suggest that positive social change can be achieved by empowering women to take control of their health. Efforts promoting awareness of breast cancer screening guidelines and facilitating access to a regular healthcare provider could significantly increase uptake of screening services and lead to better health outcomes and reduced mortality.

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Dedication

This dissertation is dedicated to three parts of me.

My father Pa Joshua Malaban- Your spirit continues to guide us. Thank you for your sacrifices and for setting high goals for me. Though you are not physically present, I feel your spirit every day and I know you are proud of me.

My mother Mama Grace Batcha- Thank you for being our Rock and for your unconditional love. Thank you for always empowering me. Love you Ma.

My son Karl Ndang Batcha-You bring meaning to my life; You are my inspiration. Thank you for always supporting me.

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Chapter 1: Introduction to the Study

Introduction

Breast cancer remains the most common nonskin cancer and the second leading cause of cancer death among all races of women in the United States (National Cancer Institute (NCI, 2013). According to data from the Centers for Disease Control and Prevention (CDC, 2018), in 2015, the latest year for which incidence data are available, there were 242,476 new cases of female breast cancer reported, and 41,523 women died from this disease in the United States. These data revealed that for every 100,000 women, there were 125 new female breast cancer cases and 20 deaths, with lifetime risk of developing breast cancer being 1 in 8 women. The National Cancer Institute (NCI, 2014) has indicated that though breast cancer incidence is highest among White women, mortality rates are higher among African American women more than any other racial group, and incidence rates are higher among this group for women under 40 years of age.

Early detection and screening are recommendations that are encouraged for women to decrease morbidity and mortality from this disease. This can be achieved through women having knowledge of breast cancer management and positive attitudes and behaviors towards early detection and screening practices. Disparities in knowledge, attitude, and behavior have been identified among African American women and some studies that have focused on immigrant populations such as Chinese, Asians, and Latinas (Saddler et al., 2012; Su, Ma, Seals, Tan, & Hausman, 2006; Williams et al., 2011). These disparities highlight the need for more defined studies that address specific immigrant population groups to develop targeted population interventions that will

increase knowledge among the specific population and increase the uptake of screening behaviors. This researcher could not find any published studies that have addressed breast cancer screening practices of Cameroonian immigrant women living in the United States. Hence, in this study, I assess knowledge, attitude, and behavior among immigrant women aged 40 years and older living in the Washington, DC, metro region to determine the level of breast cancer awareness and identify strategies that could assist this population enhance or increase the uptake of breast cancer screening (see Harcout, Ghebre, Whembolua, Zhang, Warfa & Okuyemi, 2014).

Background of the Study

When most age groups are compared, African American women under 40 years of age have a higher incidence of breast cancer than any racial or ethnic group and have higher mortality rates in the United States (NCI, 2014). Additionally, though breast cancer mortality and incidence rates have dropped in the last 20 years, the mortality gap is wider between African American women and White women than it was in 1990s, with more African American women dying from the disease than White women (NCI, 2014). Howlader et al. (2014) reported statistics collected by the Surveillance Epidemiology and End Result Program based on 2007 to 2011 cases and 2006 to 2010 deaths and revealed that there were 124.6 per 100,000 women new cases of breast cancer and 22.6 per 100,000 deaths per year, as well as a 12.3% lifetime risk of developing breast cancer. In 2010, the most recent year where data are available, there were 206,966 women diagnosed with breast cancer and 40,996 deaths from breast cancer in the United States (NCI, 2014).

Surviving breast cancer highly depends on the stage of cancer at diagnosis and the extent of the cancer on the body (American Cancer Society [ACS], 2013). The sooner breast cancer is identified, the better the chances of surviving and treatment effectiveness. Currently, there are 3.1 million breast cancer survivors in the United States (ACS, 2015). In the United States, 60.8% of breast cancers are diagnosed at an early stage where it is confined to the breast alone; hence, the 5-year survival rate for this stage of cancer is 98.5% (ACS, 2013). NCI (2018) has indicated that 5-year survival rates for breast cancer from 2004 to 2010 was 88.6%, with the highest deaths among women 55 to 64 years of age and with a median death age of 68. Additionally, these data reveal that although more White women are diagnosed with cancer, Black women have higher death rates from breast cancer with 30.8 per 100,000 deaths per year (NCI, 2013).

The ACS (2014) has revealed that early detection screening for breast cancer can save lives and encourages women to use these tests to improve the chances for early diagnosis and potentially successful treatment with the overall goal of decreasing mortality from breast cancer. Furthermore, the ACS (2015) has recommended that women with no breast cancer symptoms should get a mammogram every year continuously if they are in good health from age 40 and older. It is worth noting that the U.S. Preventive Services Task Force recommends in the most recent guidelines (Siu, 2016) for breast cancer screening that women between 40 and 44 have the choice if they so desire to start annual screening mammograms; those 45 to 54 should get annual mammograms, and those 55 and older should get mammograms every 2 years or annually based on their personal preference. Additional recommendations stipulate that women in

their 20s and 30s should have a clinical breast exam (CBE) performed by a healthcare professional every 3 years, then annually starting at age 40. A breast self-exam (BSE) is recommended for women starting in their 20s to facilitate familiarization with their normal breast presentation to be able to identify changes early and to seek prompt medical advice. Multiple studies have shown that immigrant women are not getting screened for breast cancer when compared to nonimmigrant women (Consedine, Tuck, Ragin & Spencer 2015; Seay et al. 2015). A comprehensive literature search did not reveal any studies that have addressed screening behavior among Cameroonian immigrant women living in the Washington, DC metro area. This study was the first to the best of my knowledge, and it could lead to better interventions and educational programs tailored for this population.

Problem Statement

Globally, there are 14.1 million new cancer cases and 8.2 million cancer deaths, projected to increase to 21.7 million new cases and 13 million deaths by 2030 (Globocan, 2012.) Overall, according to data retrieved from Globocan (2012), there were 32.1 million people living with cancer globally in 2012. Breast cancer is among the most common chronic diseases and is the 5th leading cause for mortality among women globally, despite favorable outcomes when it is diagnosed and treated in a timely fashion (Anderson & Jakes, 2008). According to global statistics, it is the most common type of cancer, with 1.7 million new cases noted in 2012, the most recent year for which statistics are available, with these numbers representing 12% of new cancer cases and 25% of all cancers in women (Globocan, 2012). In 2015, there were 231,840 new cases of invasive

breast cancer, 60,290 cases of localized breast cancer, and 40,290 breast cancer deaths, making it the second leading cause of death in the United States. (ACS, 2015). Additionally, about 1 in 8 or 12% of women will develop invasive breast cancer during their lifetime, and about 1 in 36 or 3% of women will die of breast cancer in the United States (ACS, 2015). Researchers have identified disparities in breast cancer screening among minority women, with African American women increasingly being diagnosed at late stages (Garcia et al., 2012; Patel et al., 2014). Sunil et al. (2014) indicated that breast cancer screening continues to be low among minority women despite established recommendations guidelines for CBE and mammography when compared to non-Hispanics and White women (Sunil et al., 2014). Additionally, Sunil et al. indicated that many minority women are not adhering to established guidelines for screening despite documented advantages of screening and early-detection practices.

Multiple studies have shown that immigrant women are not using screening services. When compared to non-Hispanic Whites, low-income Hispanic women are less likely to have had CBE or mammography as recommended (Deavenport, Modeste, Marshak & Neish, 2011). Williams et al. (2011) identified racial and ethnic differences in knowledge of breast cancer screening among African American, Arab American, and Latina women. Harcourt et al. (2014) assessed cancer screening rates as well as examined factors affecting cancer screening behavior among African immigrant women in Minnesota using a cross-sectional survey derived from a community-based sample. This study indicated that only 61% of participants had ever been screened for breast cancer (Harcourt et al., 2014). Some of the reasons given for not screening included lack of

knowledge of screening guidelines on breast cancer, lack of insurance, feelings of low susceptibility to breast cancer, and low knowledge level of breast cancer management (Harcourt et al., 2014). Studies addressing screening behavior among African immigrants are limited in the literature. To date, no researcher has assessed the screening practices of Cameroonian immigrant women in the United States. It is important to ensure that African immigrants are using screening services, especially for diseases such as breast cancer where early detection could lead to decreased morbidity and mortality.

Purpose of the Study

The purpose of this quantitative study was to assess breast cancer knowledge, attitudes, and screening practices of Cameroonian immigrant women aged 40 and older living in the Washington, DC metro region. Understanding the screening behavior of this population can assist in developing suitable outreach strategies to increasing breast cancer screening among Cameroonian woman. It is necessary that Cameroonian immigrant women understand the importance of breast cancer screening to address their health seeking patterns. Also, this study could fill the void in the literature on breast cancer screening and knowledge in general among a population where little is known. Using a cross-sectional study design, I assessed mammography practices as recommended by the ACS (2015). Additionally, this study could lead to an understanding of breast cancer screening behavior and practices for Cameroonian immigrant women and identify any barriers to screening practices that could guide the development of programs to enhance screening rates among this population.

Research Questions and Null Hypothesis

In this study, I examined the following research questions:

Research Question 1: Is there an association between knowledge of breast cancer screening and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 1: There is not a statistically significant association or a negative association between the health belief model (HBM) construct of benefits of mammography and the dependent variable construct of adherence.

Alternative Hypothesis 1: There is a statistically significant positive association between the HBM construct of benefits of mammography and the dependent variable construct of adherence.

Research Question 2: Are perceived susceptibility of breast cancer, perceived severity of breast cancer, perceived barriers to mammography, and self-efficacy about breast cancer screening associated with mammography adherence of Cameroonian immigrant women?

Null Hypothesis 2a: There is not a statistically significant association or a negative association between the HBM construct of susceptibility and the dependent variable construct of adherence.

Alternative Hypothesis 2a: There is a statistically significant positive association between the HBM construct of susceptibility and the dependent variable construct of adherence.

Null Hypothesis 2b: There is not a statistically significant association or a negative association between the HBM construct of seriousness and the dependent variable construct of adherence.

Alternative Hypothesis 2b: There is a statistically significant positive association between the HBM construct of seriousness and the dependent variable construct of adherence.

Null Hypothesis 2c: There is not a statistically significant association or a positive association between the HBM construct of barriers to mammography and the dependent variable construct of adherence.

Alternative Hypothesis 2c: There is a statistically significant negative association between the HBM construct of barriers to mammography and the dependent variable construct of adherence.

Null Hypothesis 2d: There is not a statistically significant association or a negative association between the HBM construct of self-efficacy and the dependent variable construct of adherence.

Alternative Hypothesis 2d: There is a statistically significant positive association between the HBM construct of self-efficacy and the dependent variable construct of adherence.

Research Question 3: Are there associations between age, marital status, level of education, number of years lived in the United States, having a healthcare provider, and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 3: None of the demographic variables of (a) age, (b) marital status, (c) level of education, (d) number of years lived in the United States, or (e) having a healthcare provider have a statistically significant association with the dependent variable construct of adherence.

Alternative Hypothesis 3: At least one of the demographic variables of (a) age, (b) marital status, (c) level of education, (d) number of years lived in the United States, and/or (e) having a healthcare provider have a statistically significant association with the dependent variable construct of adherence.

Research Question 4: Are there associations between cultural beliefs about modesty, attitudes towards preventive health care, and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 4a: There is not a statistically significant association or a positive association between the HBM construct of cultural barriers to screening and the dependent variable construct of adherence.

Alternative Hypothesis 4a: There is a statistically significant negative association between the HBM construct of cultural barriers to screening and the dependent variable construct of adherence.

Null Hypothesis 4b: There is not a statistically significant association or a negative association between the HBM construct of cues to action and the dependent variable construct of adherence.

Alternative Hypothesis 4b: There is a statistically significant positive association between the HBM construct of cues to action and the dependent variable construct of *adherence*.

Research Question 5: Are there demographic and theoretical variables that best predict adherence to mammography screening guidelines?

Null Hypothesis 5: There are no demographic or theoretical variables that best predict adherence to mammography screening guidelines.

Alternative Hypothesis 5: There are demographic or theoretical variables that best predict adherence to mammography screening guidelines.

Theoretical Framework of the Study

This study was guided by the health belief model (HBM), which was developed during the 1950s. Its general premise was to assist researchers to predict populations' attitudes as well as actions surrounding health issues and behaviors, with the overall goal to change the mindset towards positive action (Glanz, Rimer & Viswanath, 2008). Glanz et al. (2008) stated that rational people were more likely to make the best health decision if there was a possibility that the negative health issue would be addressed and a positive outcome would be reached. According to Kline and Huff (2008), this model contains variables that might indicate people's desire to participate in healthy behaviors when "accurately measured and multiplicatively correlated" (p. 68). According to Kline and Huff, the psychological basis of the model sets a premise on the control a person's inner world has on his or her action; hence, knowledge on breast cancer and breast cancer early detection interventions might positively affect compliance with an uptake of screening

recommendations for immigrant women. Based on the theory, use of health services depends on six factors: susceptibility, severity, benefits, barriers, cues to action, and self-efficacy (Champion, 1999). Using this model for the current study, perceived susceptibility of getting breast cancer, perceived severity of breast cancer, perceived benefits of early detection strategies, and perceived barrier on breast cancer awareness and screening and self-efficacy (competency) promote uptake of early detection measures (see Kline & Huff, 2008).

Researchers have used the HBM to explore attitudes, knowledge, and behaviors of populations regarding screening compliance and reaction to treatment. Lee, Stange, and Ahluwalia (2014) indicated that previous studies have used the HBM to explain and predict breast cancer screening behaviors as well as explain cancer screening compliance. Similarly, Lee, Kim, and Han's (2009) study of Korean American women using the HBM revealed a significant correlation between perceived breast cancer susceptibility, perceived benefits, and mammogram use. Other authors also found that differences in health beliefs and behaviors relating to breast cancer screening exist among immigrant women due to the uniqueness of each group, which may pose different barriers or facilitators in the use of screening strategies (Lee et al., 2009). Hence, use of this theory provided guidance on ways of developing breast cancer awareness programs that are tailored to the specific needs of this group of women and guide public policy on breast cancer awareness. Lee et al. (2014) found that those women who perceived themselves as susceptible to breast cancer were more likely to have undergone a CBE. Additionally,

Lee et al. (2014) found that those women who had fewer barriers to screenings and more confidence were more likely to get a mammogram.

Nature of the Study

Knowledge, perception, barriers, breast cancer awareness, and breast cancer early detection practices of Cameroonian immigrant women aged 40 years and older living in the Washington, DC metro area were assessed using a cross-sectional study design. A cross-sectional study design allowed for data collection at a single point in time, providing a snapshot of breast cancer screening behaviors and assisting in the assessment of breast cancer screening needs of Cameroonian women (Hennekens & Buring, 1987). Using a cross-sectional study design, I assessed mammography uptake practices as recommended by the ACS (2015). To explain why Cameroonian women are or are not adherent, demographic characteristics (age, marital status, income level, educational level, years lived in the United States, having health insurance, having a primary care physician), knowledge, and attitude data were also collected. Additionally, constructs from the HBM were also examined to help explain breast cancer screening practices of Cameroonian immigrant women. Collected data were used to analyze the relationship between knowledge of breast cancer early detection practices and compliance with screening recommendations.

Study Definitions

For this study, the following terms were used in this context:

Action: Champion (1999) defined action as having "had a mammogram within the last 15 months" (p. 342). This involves obtaining information regarding breast cancer

screening and early detection practices with the goal of active involvement in screening

practices and providing counseling to patients on breast cancer early detection practices

(Champion, 1999).

BRCA 1, BRCA 2: Gene mutations that increase a woman's risk of developing

breast cancer (ACS, 2015).

Breast self-awareness: Familiarity with the feel and appearance of the breast to be

able to detect any deviation from normal (ACS, 2013).

Breast self-exam (BSE): This involves a systematic step-by-step approach for

breast examination to determine the look and feel of the breast. The ACS (2013) does not

recommend this as a method for breast cancer screening in the United States.

Clinical breast exam (CBE): This is an exam by a healthcare provider and

involves looking for breast abnormalities in size or shape or changes in the skin of the

breasts or nipple following with gentle feeling of breast tissue for lumps using the pads of

the fingers (ACS, 2013).

Cultural beliefs: Common norms, values, habits, and standards of a group of

people. Schiavo (2007) explained that religious beliefs and spiritual factors influence

attitudes towards illness in general and should be taken into consideration.

Health belief model (HBM): Model that is used to assess health behavior through

identification of certain elements on personal beliefs that could influence such behavior

(Champion, 1999).

Health literacy: Defined as "the degree to which individuals have the capacity to

obtain, process and understand basic health information and services needed to make

appropriate health decisions" (U.S. Department of Health and Human Services, 2005,

p.1). Zagaria (2004) indicated that those who are unable to "read, understand and act on

health information" are considered to have a low health literacy level, which significantly

impairs the understanding of the health condition and hence the ability to make positive

change.

Magnetic resonance imaging: A screening exam for women with higher-than-

average risk of developing breast cancer.

Mammogram: A mammogram is an x-ray of the breast. There are two types of

mammograms. A diagnostic mammogram is used to diagnose breast disease in women

who have breast symptoms or an abnormal result on a screening mammogram. Screening

mammograms are used to look for breast disease in women who appear to have no breast

problems. Screening mammograms usually involve taking x-rays of two different angles

of the breast, while diagnostic mammograms may involve multiple views of the breast

(ACS, 2013).

Metastatic disease: A disease that spreads into surrounding tissue or body organs

(ACS, 2013).

Perceived barriers: This refers to an "individual's perceptions of the costs of and

obstacles to adopting recommended action" (Schiavo, 2007, p. 37).

Perceived benefits: Champion (1999) indicated the hope that the outcome

resulting from behavior change in this case BSE, CBE, or mammography will be

positive.

Perceived severity: Perceptions of seriousness of breast cancer, such as eminent disability or death (Champion, 1999).

*Perceived susceptibility: "*Perceived beliefs of personal threat or harm related to breast cancer" (Champion, 1999, p. 342).

Self-efficacy: "An individual's confidence in his or her ability to perform and sustain the recommended behavior with little or no help from others" (Schiavo, 2007, p. 38).

Tumor: Abnormal mass or tissue that may or may not be cancer (ACS, 2013).

Study Assumptions

The following assumptions guided the data collection process for this study. The first assumption was that the survey instrument was valid and the most appropriate method of collecting data from this target group. Secondly, this researcher assumed that all data that were collected for this study were the most current and the most accurate information on the target population. Also, I assumed that all Cameroonian immigrant women providing data for this study completed the survey instrument voluntarily and honestly. Additionally, I assumed that participants would be immigrant women from Cameroon living in the Washington, DC metro area who were 40 years and older.

Study Scope and Delimitations

The scope of this study involved assessing knowledge and attitudes about breast cancer screening as well as breast cancer screening behavior among Cameroonian immigrant women who are 40 years and above living in the Washington, DC metro area. The study was limited to this target population, which might not necessarily be a

representation of the entire immigrant female population from Cameroon living in the United States. Only women 40 years and over were selected because current guidelines for screening mammograms from the ACS (2015) recommend annual mammograms and CBC for women beginning at age 40 if that is the woman's preference.

Study Limitations

This study was limited by several factors that could decrease the validity of the study findings. Use of self-report with the absence of valid and reliable methods to check for the accuracy of the information provided and whether respondents satisfied the stipulated criteria needed to complete the survey questionnaire could have posed major threats. Recall bias may have occurred through the use of the survey questionnaire format for data collection. Immigrant women completing the survey could have concealed the true nature of their knowledge for fear of exposure of such a gap. Also, though the study measures had been validated in other populations, this was the first time that these measures were used in this population to the best of my knowledge. Use of a cross-sectional study design allowed only for a snapshot of the population to be examined at a point in time, which might not necessarily allow for the determination of causality. There were no data indicating the total number of the Cameroonian female population in the Washington, DC metro area or the United States, and no previous studies could be found on this particular population. Such a limitation could affect generalizability of study results.

Study Significance

Research on breast cancer screening behaviors of Cameroonian immigrant women living in the United States has not been published in the literature. This was the first study to date that assessed knowledge, attitudes, and breast cancer screening practices among Cameroonian immigrant women living in the United States to the best of my knowledge. Studies on other immigrant populations have identified that immigrant women screen less even though they experience greater morbidity and mortality from breast cancer (Lee et al., 2009; Lee et al., 2014). This study could assist to provide a better understanding of breast cancer screening practices of this group. Further, this study was guided by the HBM and provided evidence that could guide future interventions to increase screening practices and adherence to recommended screening guidelines. To decrease mortality and morbidity from breast cancer, women have to play an active role in their own health by placing emphasis on prevention and early detection of breast cancer through knowledge empowerment. Such an approach could assist to decrease overall morbidity and mortality from this disease.

Finally, in this study, I investigated if Cameroonian immigrant women , 40 years and older, living in the Washington DC metro region are receiving preventive care, identified barriers to screening and early detection measures, and hopefully identified strategies to curb these barriers as well as ways to increase adherence to the recommended guidelines for screening. Further, it is my hope that this study could increase knowledge and awareness on breast cancer, which can lead to early detection and better chances of survival and decrease overall mortality from breast cancer.

Summary

The purpose of this study was to assess breast cancer knowledge, attitude about screening, and breast cancer screening practices among Cameroonian immigrant women living in the Washington, DC metro area. This study was guided by the HBM. Previous researchers have identified breast cancer screening disparities among different immigrant populations. Studies have also proven that early detection of breast cancer through use of mammography significantly decreases morbidity and mortality rates for this disease (ACS 2013). Guidelines for screening for breast cancer based on different age groups and risk factor classification have been established. It is important to understand the breast cancer behavior of Cameroon immigrant women to determine the best approach to improve or enhance breast health. Another benefit could be development of targeted health campaigns geared towards educating and empowering masses to understand the importance of early detection in breast cancer care and management with overall goal of decreasing mortality from the disease.

In this chapter, I have provided an overall introduction to the study. Chapter 2 addresses the literature review of selected and available literature on different immigrant populations that have been studied in relation to breast cancer screening. In Chapter 3, I present aspects of design, sampling, and data analysis protocol. Chapter 4 provides results of study analysis while in chapter 5 interpretation of results and recommendations for future actions are presented.

Chapter 2: Literature Review

Introduction

In this study, I assessed breast cancer knowledge, attitude about screening, and breast cancer screening practices among Cameroonian immigrant women living in the Washington, DC metro area. In this chapter, I review literature on breast cancer knowledge and screening behaviors of immigrant women living in the United States. Observational and epidemiological studies revealed that when compared to Whites and African Americans, immigrant women are less likely to undertake breast cancer screening((NCI,2013). Additional observational studies have indicated that immigrant women who possess knowledge on breast cancer care and management are more likely to get screened than those who possesses limited knowledge (CDC,2014). Little is known about screening behaviors of Cameroonian immigrant women living in the United States. With no available literature about this population, I focus on available literature on other immigrant women populations in this chapter.

Search Strategy

To conduct this review, the following databases were queried for the article search: Academic Search Premier, Google Scholar, PubMed, Sage Online Journals, and CINAHL. In a review of related literature, I focused on articles from 2010 through 2015 for content information on research findings and recommendations on breast cancer screening, knowledge, beliefs, risk factors, and practices among immigrant women. The computer-generated search was performed using several key words*: breast cancer early detection; breast self-examination; clinical breast exam; mammography; knowledge of*

breast cancer screening; attitude, perceptions, towards breast cancer; minority population; and *Cameroon immigrant women.* Articles retrieved and reviewed that pertain to immigrant women were selected.

Breast Cancer Epidemiology

When age groups are compared, African American women under than 40 years of age have a higher incidence and mortality of breast cancer as compared to other racial and ethnic groups in the United States (NCI, 2014). Although breast cancer incidence and mortality rates have decreased in the last 20 years, a more substantial mortality gap exists between African American women and White women than it did in the 1990s (Copeland et al., 2013; Howlader et al., 2013). Howlader et al. (2014) reported incidence and mortality data from the Surveillance Epidemiology and End Result Program from 2007 to 2011 cases and 2006 to 2010 deaths. Data revealed that there were 124.6 per 100,000 women new cases of breast cancer and 22.6 per 100,000 deaths per year, with a 12.3% lifetime risk of developing breast cancer (NCI, 2014). When compared to Whites, Black women have lower rates of cancer diagnosis with higher mortality rates (Copeland et al., 2013). Also, based on this report, breast cancer data for 2014 estimated 232,670 new cases with 40,000 deaths, translating to 14% of all new cancer cases and 6.8% of all cancer deaths respectively in the United States (Howlader et al., 2014). Surviving breast cancer highly depends on the stage of cancer at diagnosis and the extent of the cancer on the body. As far as survival is concerned, when compared to White women, 5-year survival rates for Black women is lower than for White women at 79% and 90% respectively (Copeland et al., 2013).

The sooner breast cancer is identified, the better the chances of surviving or treatment efficacy. Data on the United States indicate that there are more than 3.1 million breast cancer survivors (ACS, 2015). In the United States, 60.8% of breast cancers are diagnosed at an early stage where it is confined to the breast alone; hence, 5-year survival rates for this stage of cancer is 98.5% (ACS, 2013). According to NCI (2015) the relative 5-year survival rate is much lower for Black women when compared to Whites at 92% and 80% respectively.

Screening Guidelines for Breast Cancer

World Health Organization, (WHO, 2014), emphasizes that people should increase their awareness of warning signs of cancer. The overall goal of screening is to identify the disease before there are any symptom manifestations, such as a lump that can be identified through touching. There is a higher potential for effective treatment and higher chances of survival if breast cancer is identified at an earlier stage. Guidelines for breast cancer screening and early detection stipulated by the ACS (2015) recommend varying degrees of screening for women with different risk levels. Smith et al. (2015) explained that the current guidelines for average risk women "consist of a combination of regular clinical breast examination (CBE) and counseling to raise awareness of breast symptoms for women in their 20s and 30s, and annual mammography beginning at age 40 years" (p. 32). According to these guidelines, women with an average risk of developing breast cancer should be able to have annual mammograms at ages 40 to 44 years if they so desire, screen annually at 45 to 54 years of age, and continue screening every 2 years after age 55 as long as health conditions permit and life expectancy is 10 or

more years longer. Recommendations are for annual magnetic resonance imaging and mammogram for women who have a higher than average risk for breast cancer, preferably beginning at age 30 and continuing for as long as they are healthy. The ACS (2015) current guidelines make no recommendations regarding CBE and BSE for women with average risk and who are 40 and above, based on a lack of research, reflecting a clear benefit of these methods of screening. They, however, stress the importance of women knowing the usual look and feel of their breasts to be able to promptly identify any changes and seek prompt medical attention (ACS, 2015). These guidelines stipulate that women with average risk who are between 20 and 39 years of age should undergo CBE every 3 years and then proceed to an annual mammogram at age 40 (Smith et al., 2015). Smith et al. (2015) stressed that clinicians should emphasize the importance of early detection to women during screening visits and pay close attention to collect information on family history of breast cancer, as this plays an important part in determining what type of screening the individual should obtain. It is worth noting that recent screening guidelines recommend screening mammograms every 2 years for women 50 to 74 years of age with average risk while those who are 40 to 49 years old are directed to consult with their physician as to when to begin screening mammograms (Siu, 2016). Also, as recommended by the U.S. Preventive Services Task Force (2016) on breast cancer screening and the ACS (2016), women in their 40s should determine their preference and weigh the risk and benefits of screening mammograms to determine when they should initiate this process (Siu, 2016).

Mammography

The ACS (2013) defined a mammogram as an x-ray of the breast tissue. There two types of mammograms. One type is used to diagnose breast disease in women who have breast symptoms or an abnormal result on a previous mammogram while the other type known as a screening mammogram identifies breast disease in women who do not typically present with any type of breast problems. The ACS (2015) has recommended that women with a higher than average risk of breast cancer should have a mammogram beginning at age 30 annually and continue this practice if they are healthy. Additionally, they recommend that women with an average risk who are 40 to 44 years of age to get a mammogram annually if they so choose (ACS, 2015). Regular use of mammogram has been recommended as the most accepted method for early diagnosis of breast cancer because it can assist to detect breast cancer at an early stage when treatment can be less aggressive and most effective. Research has indicated that using mammograms has the potential of reducing breast cancer mortality by 20% to 25% over a 10-year period among women who are 40 years and over (U.S. Preventive Services Task Force, 2002).

Health Belief Model

The HBM was developed in the early 1950s by a group of social psychologists working with the United States Public Health Service to explain the failure of an individual's participation in disease prevention and detection programs (Hochbaum, 1958; Rosenstock, 1960, 1974). The model was later extended to study people's responses to symptoms (Kirscht, 1974) and their behaviors in response to an illness as well as compliance with medical regimens (Becker, 1974). Hochbaum (1958) indicated that the foundation of the model as health behavior relates to a combination of personal

perceptions or beliefs regarding a disease and available tools to prevent occurrence or decrease reoccurrence. According to Champion and Scott (1997), the psychological attributes of the HBM portray health behaviors through the identification of individual belief factors accountable for influencing behavior.

The HBM model is composed of six theoretical constructs: (a) perceived susceptibility, (b) perceived seriousness that together form perceived threat, (c) perceived benefits, (d) perceived barriers, and (e) cues to action (Kline & Huff, 2004). A sixth construct, self-efficacy, was added in later years (Champion, 2002).

Perceived susceptibility refers to an individual's "view of the likelihood of experiencing a potentially harmful condition" (Champion, 1984, p. 74). In the case of this study, it refers to the likelihood of getting breast cancer among the target population. Kline and Huff (2004) explained that this construct is considered one of the most important in prompting positive behavioral change. Chen, Fox, Centrell, Stockdale& Kagawa-Singer (2010) asserted that where perceived risk is greater, there is a greater likelihood of adapting the required behavior to mitigate the threat.

Perceived severity is concerned with the extent of the seriousness of the condition in the individual's opinion (Becker & Janz, 1985). In relation to this study, perceived severity is the seriousness of getting breast cancer. According to Glanz, Rimer, and Lewis (2002), the perception of seriousness could stem from medical information or negative effects on overall life created by the disease condition.

Perceived benefits are personal beliefs regarding the benefits of taking action to address the issue (Champion, 1984). In the context of this study, the term refers to how a

woman evaluates the value of performing BSE, obtaining CBE, or obtaining mammogram in reducing the threat of getting breast cancer or getting an early diagnosis that could result in better treatment options and decreased morbidity and mortality.

Becker and Janz (1985) indicated that perceived barriers is the most influential in determining behavioral change as it refers to an individual's assessment of impediments obstructing the adoption of a new or positive behavior. Individuals need to believe that the benefits of this new or positive behavior are greater than continuing the old habits in order to enable themselves to overcome barriers and adopt positive change (CDC, 2014).

Cues to action refers to circumstances that provoke behavior change. Graham (2002) explained that cues to action could be events, people, or things such as illness of a family member, media reports, mass media campaigns, physicians' recommendations, and health reminders.

Bandura and Schunk (1977) defined self-efficacy as the "belief in one's own ability to do something," that is, the confidence that is associated with the ability to successfully perform a task or action. People must believe that they can adapt a new behavior or lifestyle to be able to make a positive impact on the condition.

The table below presents a definition of the various health belief model concepts and how this can be applied to different population groups to address different health conditions or behaviors.

Table 1

Health Belief Model Concept Definition and Application

Concept	Definition	Application
Perceived susceptibility	One's opinion of chances of getting a condition	Define population(s) at risk, risk levels; personalize risk based on a person's features or behavior; heighten perceived susceptibility if too low.
Perceived severity	One's opinion of how serious a condition and its consequences are	Specify consequences of the risk and the condition
Perceived benefits	One's belief in the efficacy of the advised action to reduce risk or seriousness of impact	Define action to take; how, where, when; clarify the positive effects to be expected.
Perceived barriers	One's opinion of the tangible and psychological costs of the advised action	Identify and reduce barriers through reassurance, incentives, assistance.
Cues to action	Strategies to activate "readiness"	Provide how-to information, promote awareness, reminders.
Self-efficacy	Confidence in one's ability to take action	Provide training, guidance in performing action.

Note. Glanz, K., & Rimer, B. K. (1997). *Theory at a glance: a guide for health promotion practice.* [Bethesda, Md.]: U.S. Dept. of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute.

 Figure 1 below presents a graphic representation of the HBM. The basis of this theory is

that a person's beliefs/perceptions as to whether they are or are not susceptible to a

disease, as well as their perceptions of the benefits of attempting to avoid the disease,

influences readiness to act towards preventing the disease (Rosenstock, Strecher &

Becker, 1988). Champion and Skinner (2008) explained that constructs contained in the

HBM could detect individual intent to follow screening guidelines for disease prevention

or treatment recommendations. According to Becker (1988) the premise of this concept is

that if an individual believes that they are susceptible to getting breast cancer, they will

be more likely to adhere to screening guidelines and recommendations. Champion and

Skinner (2008) also recommended examining other variables, termed as modifying

variables, that may influence people's health-related behavior, such as socio-

demographic factors of age, ethnicity, income level, and educational level.
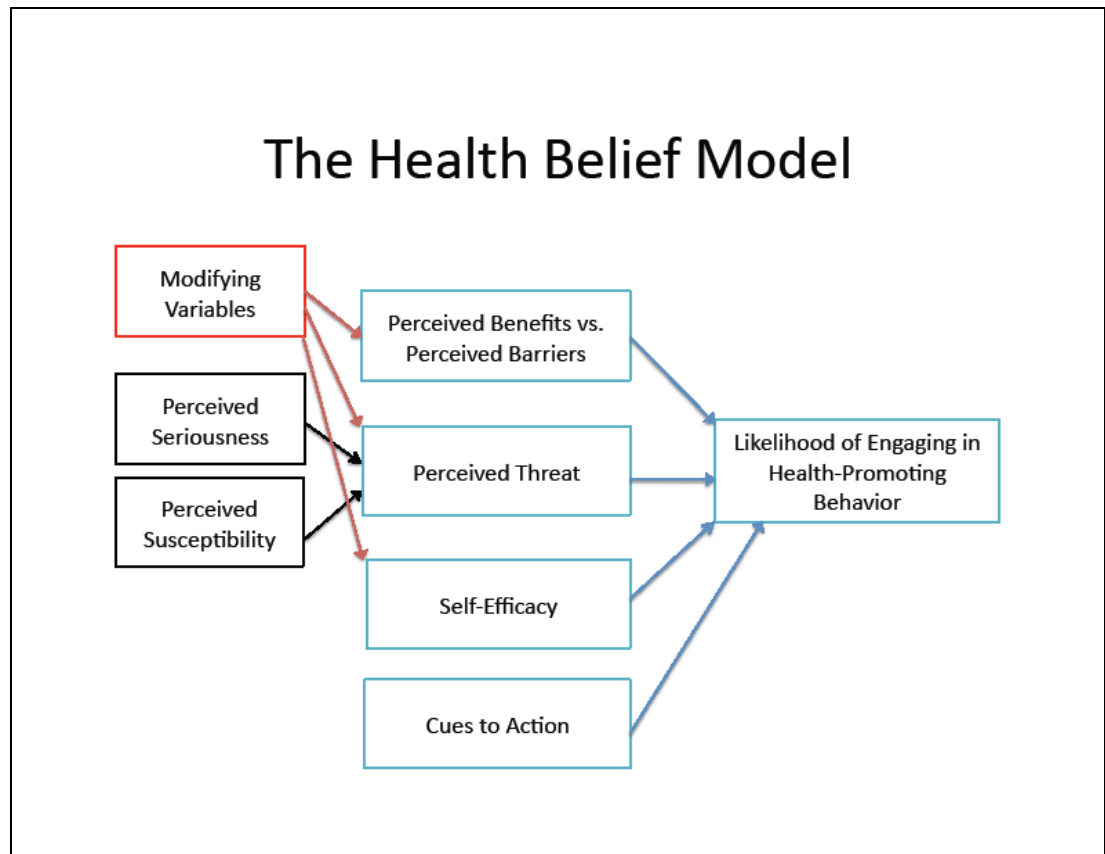
Figure 1. Graphic description of the health belief model. Adopted from Wikipedia at

https://en.wikipedia.org/wiki/File:The_Health_Belief_Model.pdf

A literature search did not identify any studies that have used the HBM to assess knowledge, attitude, and practice of breast cancer screening among Cameroonian immigrant women living in the Washington, DC metro area. Previous studies have used this model to determine knowledge, perception and practice related to breast cancer screening among different immigrant population (Lee, Stange & Ahluwalia 2014; Lee, Kim & Han, 2009).

The HBM has been widely used to assess level of breast cancer knowledge and screening behavior among different population groups. Lee, Stange and Ahluwalia (2014) examined a sample of 202 Korean American immigrant women to determine level of utilization of CBE and mammograms. The two-group sample was made up of 101 women 60 years and older, who were interviewed by bilingual interviewers, and 101 women between the ages of 20 to 59 years old, who completed a self-administered questionnaire. The authors used hierarchical logistic regression analysis to determine associations between constructs of HBM and obtaining CBE and mammography. The results indicated that women who were married and perceived themselves as susceptible to breast cancer were twice as likely to obtain CBE. As far as mammography utilization was concerned, women who had lived longer in the United States, had a primary care physician, and were employed were more likely to have had a mammogram (Lee, Stange, & Aluwalia, 2014). The authors of this study indicated that "the odds of having a mammogram were increasingly greater as confidence to carry out the necessary screening behaviors increased and barriers to conducting screening decreased" (p.5).

Sadler et al. (2007) carried out a study in San Diego, California to assess knowledge about breast cancer screening among a sample of 1,055 African American women as part of a health promotion program among Black cosmetologists. These women, whose ages range from 20 to 94, took part in a beauty salon-based self-administered survey responding to questions derived from the HBM constructs of *perceived susceptibility, perceived benefits, cues to action,* and *self- efficacy* to determine their knowledge, attitudes, behaviors, and perception of support regarding breast cancer screening as a whole (Sadler et al., 2007). This study found out that only 31% of the participants performed monthly BSE, while 57% reported having CBE and 43% indicated having a mammogram in the previous year. According to this study, breast cancer knowledge was associated with screening guidelines adherence. Additionally, 70% of the participants in the study reported that they felt less informed about the disease. This study recommended increased education on breast cancer that targets this population (Sadler et al., 2007).

In a related study, Poonawalla, Goyal, Mehrotra, Allicock and Balasubramanian (2014) carried out a cross-sectional study to assess breast health and screening behavior among a sample of 124 South Asian immigrant women living in New Jersey and Chicago. According to these investigators, they used HMB constructs to study health motivation, confidence in BSE, mammography benefits, barriers, breast cancer fear, and breast cancer susceptibility. These researchers indicated that more than 50% of the participants in their study were aware of the benefits of mammography but perceived themselves as having lower susceptibility, which decreased screening participation.

Understanding risk for breast cancer and benefits of screening could increase uptake of screening. Screening should be emphasized even in women who perceive themselves as having low susceptibility to breast cancer as this could lead to an early diagnosis and potential for better outcomes(CDC,2015).

Boxwala, Bridgemohan, Griffith, and Soliman (2010) examined 160 Asian Indian women living in metropolitan Detroit, Michigan, for breast cancer screening behaviors using constructs from the HBM. Using a cross-sectional survey, participants self-reported breast cancer screening attitudes and practices regarding BSE, CBE and mammography use. This study showed that women who were higher educated, had lived more years in the United States, and had increased perception of benefits of screening, as well as recommendations from a practitioner, were more likely to obtain screening (Champion,1999). This study highlighted the need to know the level of education and length of stay of in the United States, as it relates to breast cancer screening, to encourage women who may not normally perceive themselves as susceptible to undergo screening.

The HBM has been successfully used in other populations to explain health-related perceptions and non-adherence to screening recommendations or guidelines (Champion,1999). Hence, it provided a good intervention framework to assess knowledge and behavior related to breast cancer screening among the target population of this study. Using the components of the model have helped to identify health beliefs related to personal perceptions about dangers of breast cancer, impact of early detection, as well as knowledge related to diagnosis and treatment. Based on the concepts of the HBM, those women who understand the severity of breast cancer and feel they are at risk

of getting breast cancer will be more likely to change their health-related behavior to get

screening and follow screening recommendations. According to Champion (1999),

perceived susceptibility refers to a woman's thinking that there is likelihood for her to

develop breast cancer in the near future, while perceived beliefs is the understanding that

receiving a mammogram is beneficial in preventing breast cancer or increases the

chances of finding the cancer early when it can be treated and increases the likelihood of

survival.

<div align="center">**Studies on Knowledge of Breast Cancer and Screening**</div>

Studies on breast cancer knowledge, attitudes, and screening practices among

Cameroonian women living in the United States are minimal. There were no published

studies that have assessed breast cancer knowledge among immigrant women from

Cameroon living in the Washington, DC, metro area. Hence, the true extent or level of

knowledge and awareness regarding breast cancer among Cameroonian women living in

the United States is unknown.

In the one study that was found, Ndikum-Moffor, Faseru, Filippi, Wei and

Engelman (2015) conducted a health assessment status of black African-born women

living in Kansas City. The study assessed overall preventive health and access to

healthcare among immigrant and refugee women to determine healthcare utilization for

screening services and knowledge awareness on breast cancer. Women in the study were

20 years and older and mostly from West, Central, and East Africa, with 10 out of the 29-

sample size being from Cameroon (Ndikum-Moffor et al., 2015). Based on the study

results, 30% of the women 40 years and older reported compliance with

recommendations for screening mammogram, 60% reported not having had a mammogram within 2 years, which was higher than the United States average of 24% for noncompliance, while 40% of women over 40 years of age reported having had a mammogram within the previous 2 years (Ndikum-Moffor et al., 2015). Regarding breast cancer knowledge and risk perception, low level of knowledge and misconceptions were depicted, with only 20% of the women in the sample perceiving any risk for breast cancer and 53.5% of participants strongly agreeing or agreeing that use of prayer could cause breast cancer to disappear (Ndikum-Moffor et al., 2015). Though the sample size was small, this study indicates low breast cancer risk perception, low levels of breast cancer screening utilization, and low levels of knowledge regarding overall breast cancer among African immigrant women living in a metropolitan city.

Sheppard, Hurtado-de-Mendoza, Song, Hirpa and Nwabukwu (2015) used a cross sectional study design to examine factors associated with cancer screening endorsement among a sample of 200 women mostly of West African origin in Washington, DC. Through self-report of the participants, the researchers collected information to determine cancer screening endorsement using variables of cancer knowledge, proficiency in English, access, cancer related beliefs, and previous behaviors related to breast cancer screening. (Sheppard et al., 2015). The researchers reported that on score ranging from 0-100, the mean score was lower than 60%, indicating low overall cancer knowledge, and 45% of women had knowledge scores less than 50% (Sheppard et al., 2015). The authors also report that among their study sample for women 40 years old and greater, those with more knowledge on cancer screening and health insurance had a higher likelihood of

endorsing screening when compared with those with lower knowledge. (Sheppard et al. 2015). Additionally, there were misconceptions on potential breast cancer causes, with 29% of sample population attributing breast cancer to environmental factors and 4% to nonconventional causes such as witchcraft or a curse. (Sheppard et al. 2015). This study finding underscores the importance of increasing knowledge among this population as this could in turn increase screening endorsement and compliance with screening recommendations.

In a qualitative study, Shepperd, Christopher and Nwabukwu (2010) conducted focus groups with 20 African born women aged 21 to 60 years old to explore their knowledge and attitudes regarding breast cancer. Overall, the women in the sample displayed low knowledge of breast cancer etiology, with some describing it as a boil, while some indicated that it occurred because of punishment from God. (Shepperd et al., 2010). None of the sample participants 40 years and above had ever had a mammogram or heard of breast cancer screening prior to immigrating to the United States. Such lack of knowledge could significantly affect screening behavior and utilization of preventive services among this population. Findings in this study are similar to that of a study conducted among Nigerian women living in Benin City. Okobia, Bunker, Okonofua and Osime (2006) used a cross-sectional study design to assess breast cancer knowledge, attitudes, and practice using interviewer-administered questionnaire for data collection. The questionnaire was designed to obtain information on risks factors for breast cancer and signs and symptoms, as well as practice of BSE (Okobia et al., 2006). The researchers indicate that knowledge of breast cancer was poor, with mean knowledge

score of 42.3% and more than 75% of study participants scoring less than 50%. Sixty-five

percent of study participants stated they did not practice BSE and 90% did not have CBE,

while 50% and 62.5% of the women reported low susceptibility to breast cancer and

advanced that as a reason for not participating in BSE and CBE, respectively (Okobia et

al., 2006). Similar with the previous study, 40% of the participants in this study believed

that breast cancer could result from evil spirits while 26% aligned breast with an infection

(Okobia et al., 2006). Increased focused education on immigrant women is important to

dispel such myths on breast cancer in order to encourage increased screening practices

that could enhance early detection and potential better treatment outcomes.

A study among Iranian immigrant women living in Toronto, Ontario, identified

similar findings. Vahabi (2011) assessed a sample of 50 adult women aged 29 through 66

to identify breast cancer knowledge, breast health practices, and barriers to such

practices. Data was collected using 2 questionnaires designed to gather information on

views related to BSE, CBE, and mammography (Vahabi, 2011). The study results

indicate that 70% of the participants had low knowledge scores, providing correct

responses to 5-10 questions out of a total of 19 questions, not knowing when to start

performing BSE or the frequency. Seventy-two percent of participants associated breast

pain with early breast cancer, 42% were unaware of CBE as an early detection method

for breast cancer, 22% were unaware that breast cancer increases with age, and 30% were

unaware that routine breast cancer screening could significantly affect outcome of the

disease (Vahabi, 2011). Low levels of screenings were also identified with only 16% of

women practicing BSE monthly, 28% had CBE once a year, and 18% of eligible study participants having a mammogram (Vahabi, 2011).

Among the studies available, Suh, Atashili, Fuh and Eta (2012) conducted a descriptive cross-sectional survey of a volunteer sample of 120 women in Buea, South West Region of Cameroon. The study assessed knowledge of BSE, and women's impression on practicing BSE, as well as to identify their overall knowledge of breast cancer early detection practices and management. The authors used a standardized questionnaire composed of three sections to collect their data. Data was collected by self-administered question and obtained from a convenience sample. The questionnaire asked for demographic information and participants' knowledge and impression of BSE and breast cancer. The study authors found that women who were knowledgeable about breast cancer risk and BSE performed this practice correctly, while those with misconceptions or who had no knowledge of breast cancer risk factors and BSE were less likely to adhere to this practice as recommended. This study demonstrated that 75% of the women were aware of breast cancer, while 25% had misconceptions regarding risk factors, prevention and treatment of breast cancer. This study demonstrates the need to assess women's' knowledge of breast cancer risk and BSE so as to determine initiatives that could encourage practice of BSE and adherence to screening guidelines.

McCarey et al. (2011) employed a cross-sectional design to assess cervical cancer prevention knowledge and awareness among Cameroonian healthcare workers. The self-administered questionnaire used was divided in five parts containing 46 multiple choice questions on etiology and prevention of cervical cancer. The study involved healthcare

workers in six hospitals from Yaoundé, Cameroon. The responses were anonymous, and

the survey targeted general practitioners, nurses, midwives, pediatricians, gynecologists,

and obstetricians. Information solicited covered topics on knowledge of epidemiology of

cervical cancer, risk factors, screening methods/practices, demographics, and professional

questions.

McCarey et al. (2011) results showed that healthcare professionals underutilized

screening resources available to them. It also showed the need for improvement in

knowledge level and understanding of cervical cancer for frontline hospital personnel and

midwives whose role involves education of patients, as well as the general public. The

authors indicated that this study was the first that assessed cervical cancer screening

knowledge among healthcare workers identifying misconceptions and knowledge gaps.

These authors recommended continuing education programs for healthcare workers with

an emphasis on training to encourage current screening recommendations and risk factors

awareness.

McDonald and Neilly (2011) investigated the likelihood of any recent cancer

diagnosis and factors that could assist to explain any identified differences among

immigrant women residing in the United States. The authors used self-reported

information from the U.S. National Health Interview Survey of 1998-2007 and

multivariate logistic regression to identify possible determinants of breast cancer and

cervical cancer diagnosis, as well as utilization of cancer screening within three years of

any cancer diagnosis. Their aim was to determine "whether the incidence of cancer

among adult women as approximated by a diagnosis of cancer within the previous 3 years

was lower among immigrant than non-immigrants" (p.28), if there were any variations by ethnicity, and/or timeframe spent in the United States. Additionally, the authors wanted to identify other factors that could help explain the differences that emerged. Among their total sample size of 128,966 women, 13.2% were immigrant women without cancer, while 7.9% of the women were diagnosed with breast cancer. Some of the findings indicated that immigrant women in most of the ethnic groups who were diagnosed with breast cancer had less than high school education, had less likelihood of having been screened for breast cancer, and less likely to have seen to a doctor or specialist in the last 12 months. According to these authors, delay in diagnosis cancer could have been as a result of low utilization of screening services. These findings could be typical of the target population of this study hence the need to assess this population in order to determine their needs and propose possible solutions to address this need.

Ogunsiji, Wilkes, Peters and Jackson (2013) sought to explore knowledge, attitudes, and usage of breast cancer screening among West African migrant women in Australia. They conducted interviews with their study sample made up of 21 women mostly from Ghana and Nigeria. Findings from their investigation revealed the overall lack of cancer screening knowledge among a population of migrant women from West Africa. These investigators explained that irrespective of birthplace in Africa, most of the women in their sample indicated that they had "no knowledge of cancer screening prior to migration" and were not favorable towards cancer screening. Their study also revealed that post-menopausal women who had not gone to the hospital were unaware of any kind of cancer screening, while those who had given birth post-migration had been screened

for cervical cancer. These authors recommended increased health promotion to this

population regarding cancer screening to increase uptake of screening among this

population.

       To assess breast cancer awareness among a group of migrant women from Nigeria

living in London, Moorley, Corcoran, and Sanya (2014) used a cross sectional study to

collect data on knowledge, cultural beliefs, and their attitudes regarding breast cancer

screening. The study authors used a 30-question survey to elicit information from their

sample of 70 Nigerian women to reflect their health, cultural beliefs, values, and practices

on breast cancer and screening practices.Majority of the participants, 91%, indicated that

they had heard about breast cancer, with those with more education having better

knowledge. According to the authors, women with higher levels of education were more

likely to perform BSE than those with lower level of education, indicating that

knowledge is predictor of screening. This study revealed that those women who were at

higher risk of developing breast cancer did not have adequate knowledge on risks factors

and symptoms of the disease. Additionally, more than 75% of the participants in the

study were not aware of the number of times for performing BSE. Additionally, the study

noted a deficit in knowledge regarding symptoms, as well as risk factors for breast

cancer. The authors of this study also advanced that cultural implications, such as stigma

associated with being diagnosed with breast cancer, could impede desire to getting

screened or seeking medical help, which may result in late stage presentation at time of

diagnosis. Moorley et al. (2014) suggest that breast cancer education programs should be

culturally competent and take level of education into consideration to be effective.

A study conducted using Afghan immigrant women living in Northern California identified lack of knowledge among this population as a barrier surrounding breast cancer screening. Shirazi, Bloom, Shirazi, and Popal (2013) conducted a community-based participatory research study to provide a foundational understanding of these women since the authors could not find any statistics of incidence and prevalence of breast cancer among this population. The authors conducted semi-structured in-depth interviews with 53 non-English speaking first-generation immigrant Muslim Afghan women who were 40 years and older. These interviews were designed to assess attitudes, knowledge, perceptions, influence of religion, and cultural beliefs regarding breast cancer care, screening, and health. Among the barriers identified in receiving breast health care, culture and family structure were identified by 90% of the participants as an impediment since they have to depend on a husband or other family member to assist in scheduling appointments, decision making, transportation, and interpretation of information presented. Seventy-five percent of the women reported low health literacy as a barrier to access, cultural competency of healthcare providers, mammography experience, and lack of knowledge about screening guidelines were some of the themes that resulted from data analysis (Shirazi et al., 2013). Regarding breast cancer screening, the researchers indicated that only 28.3% had CBE, while 41% never had one, with 35% having a mammogram, while 34% reported that they never had one. The authors of this study note that significant low levels of knowledge, lack of awareness of symptoms, risk factors, and screening guideline recommendations were displayed by the study participants with some

women referring to breast cancer as "an infection that enters the body and cancer be washed away" (p. 1708).

In a similar study, Su et al. (2006) sought to describe breast cancer awareness, attitudes, and knowledge among a group of Chinese women living in Philadelphia. These authors wanted to describe facilitators, barriers, and predictors of early detection practices among this population. They used a convenience sample of 111 Chinese women between the ages of 24 and 70 years old and a 69-item translated cross-sectional survey to collect data from their target audience. Overall, results from this study indicated that more than 50% of the women had participated in some form of screening behavior; 53.2% had performed BSE, 53.6% of those who were 40 years and above had CBE, while 71.1% had mammograms (Su et al., 2006). According to the authors, women whose posed breast cancer knowledge and self-efficacy were more likely to perform BSE, while those who had a permanent source of health information were more likely to obtain a mammogram. The authors of this study indicated that their study highlighted the need for developing culturally sensitive education on breast cancer screening that will address the specific needs of their target population in order to increase screening rates.

Saddler et al. (2007) noted low rates of adherence to screening guidelines, as well as lack of knowledge regarding breast cancer among their sample population of 1,055 African American women from San Diego. The researchers reported that only 31% of the participants reported that they perform monthly BSE, while 57% and 43% of participants acknowledged having had CBE and mammogram, respectively. The authors noted that knowledge of breast cancer increased adherence to screening guidelines.

Based on review of the literature, immigrant women have low levels of screening knowledge regarding breast cancer screening guidelines and breast cancer as a whole. Minimal studies have assessed breast cancer knowledge and use of screening services among immigrant women from African living in the United States. The few studies identified used significantly small sample sizes that could affect generalizability of study results. No studies were found to have used the health belief model to assess knowledge of screening among this population. Additionally, studies that have been conducted among immigrant women consistently lump all participants in one category, failing to take into consideration the distinct cultural, social, and ethical differences that could influence health seeking behaviors and attitude towards preventive health services such as breast cancer screening services. Kobeissi, Samara, Telesca, Esfandian and Galal (2014) recommend studying the distinct characteristics of each group to truly understand their health knowledge and behaviors. Hence, it was essential to assess the Cameroonian population independently to proper understand their knowledge and behavior towards breast cancer. This study attempted to determine screening behavior pattern of the target population and made recommendations based on the findings to enhance or increase adherence to breast cancer screening guidelines with an overall goal to promote early detections and improved outcomes of treatment.

Benefits of Breast Cancer Screening

Breast cancer screening provides an opportunity for the likelihood of the disease to be identified early at a point when treatment might be less aggressive and lives saved. A woman has a better chance of surviving when breast cancer is discovered before any

symptom manifestations because such cancers may still be confined only to the breast, smaller, and easily removed (NCI, 2014). Additionally, screening and early detection for breast cancer saves lives if people take advantage of the available resources. Women, especially in the immigrant population, should be knowledgeable about early detection recommended guidelines in their regions and take advantage of these resources for themselves, as such measures could decrease mortality, as well as morbidity from breast cancers.

Risk Factors for Breast Cancer Development

There are several factors that predispose a woman to develop breast cancer. Factors that will be discussed here are those that can be easily identified by any woman so that prompt action to seek medical help can be taken. Women should be at the forefront of their health by knowing their personal risk factors and knowing when to seek medical advice.

Gender

According to the ACS (2013), being female predisposes one to breast cancer even though incidence of breast cancer is becoming common in men. Females are 100 times more likely to get breast cancer than males (Siegel, Miller & Jemal, 2015). This has been linked to the increase presence of female hormones of progesterone and estrogen known to promote growth of breast cancer cells, inherited genetic alterations such as BRCA1 and BRCA2, which account for more than 10% of all breast cancers, and having dense breast tissue, as well as early initial menstrual period before age 12 or late initial menopause after age 55 (Howlander, et al. 2012; DeSantis, et al. 2015)

Age

Age increases the risk of developing breast cancer with most diagnosis occurring in middle and older age women and 61 being median age at diagnosis (Howlader et al., 2015). The older one gets, the likelihood of getting breast cancer or any other disease increases. Healthcare professionals and the general population should be aware of this risk factor so preventive measures can be put in place to decrease morbidity and mortality. In the case of breast cancer, the ACS (2015) indicates that approximately 1 out of 8 types of invasive breast cancers occur in women who are younger than 45, whereas almost 2 of 3 invasive breast cancers occurs in those who are 55 or older. Howlader et al. (2012) used a 10-year age interval to estimate a woman's risk of developing breast cancer. According to their estimate, starting at age 30, an average woman has 0.44% (or 1 in 227) chance of being diagnosed with breast cancer, at age 40 this increases to 1.47% (or 1 in 68); at 50 years of age, 2.38% (or 1 in 42); at 60 years, 3.56% (or 1 in 28) and at age 70, 3.82% (or 1 in 26) (Howlader et al.2012).

Genetic Risk Factors

Some inherited genes and changes in these genes could increase risk for breast cancer. According to NCI (2015), 5% to 10% of cancers are deemed hereditary, resulting from defects in genes inherited from parents. Tung et al. (2015) indicate up to 50% of all heritable mutations in breast cancer could be associated to mutations in BRCA1 and BRCA2. Literature indicates that people with BRCA1 mutations could have as high as an 80% chance of getting breast cancer, while those with BRCA2 gene changes have a lower risk of about 45% (Movaddat et al., 2013). These researchers also noted that risk

for developing breast ovarian and contralateral breast cancer were higher in women who had BRCA 1 and BRCA 2 genes when compared to those without these genes. The authors of this study noted that average risk by 70 years of age for their cohort participants were as follows: For those with BRCA 1 genes, there was a 44% risk of breast cancer and 83% for contralateral cancer, while those with BRCA 2 had a of 55% and 62% increased risk of developing breast cancer and contralateral cancer, respectively. It was also noted that those with BRCA gene mutations who are younger could have breast cancer affecting bilateral breast. It is worth noting that other types of changes in other genes increases risk for breast cancer as well as other types of cancers. Knowing genetic predisposition could increase screening compliance, as well as awareness, for breast cancer and also increase motivation to take steps to either reduce this risk or monitor changes in breasts to identify cancer earlier at a stage where treatment will be more beneficial (NCI, 2015).

Family History

Women whose family member or close blood relative has had breast cancer could have a higher risk of getting the disease. Literature from the ACS (2015) indicates that about 15% of women who are diagnosed with breast cancer have a family history of breast cancer. Additionally, they stipulate that having either a mother, sister, or daughter with breast cancer can double the risk for getting breast cancer, while having 2 first-degree relatives (i.e. mother and sister) with breast cancer triples a woman's risk to get breast cancer (Nelson et al., 2012). Women who have a previous history of breast cancer have a higher risk of getting the disease again. Literature from the ACS (2015) holds that

a woman with breast cancer in one breast has a more than triple risk of developing breast cancer in the other breast or a different section of the same breast. Also, having a daughter, sister, or mother who is diagnosed breast cancer, especially before 50 years of age, as well as a close male relative, increases a woman's chance of developing breast cancer (Nelson et al. 2012). Colditz, Kaphingst, Hankinson, Rosner (2012) noted higher prevalence of benign breast disease at 47% for women with a family history of breast cancer as compared to 37.9% for those with no history. These researchers also noted an adjusted relative risk of 1.7 for those whose mother or sister was diagnosed before age 50 and a relative risk of 1.3 for having a mother or sister diagnosed after age 50 (Colditz et al., 2012). It is important that immigrant women know their family history and the risk that it poses to their health. Knowledge of this information could increase awareness for breast cancer and compliance with screening recommendations, especially for those with positive family history.

Race and Ethnicity

According to data from the CDC (2015), breast cancer is more common among African American women who are less than 45 years of age. Ooi, Martinez and Li (2011) assert that even though White women are more likely to get breast cancer, African American women are more likely to die of breast cancer. Ooi et al (2011) noted a 1.3- to 7.1-fold higher odds of presenting with stage 4 breast cancer and a 1.5 to 1.8 increased risk of breast cancer specific mortality for Black, Hawaiian, Puerto Rican, Samoan women when compared with non-Hispanic White women. According to Howlader et al. (2015), higher death rates from breast cancer have been associated with Black females

when compared with Whites at 30.2 and 21.3 per 100,000, respectively. Literature also suggests lower usage of mammography, longer intervals between screening mammogram, and lack of timeliness in following up with care after an abnormal screen (Smith et al. 2015). This increases the need for education sensitization among this group on breast screening, early detection, and management in general. It also increases the need for more individualized research studies that target specific groups currently all lumped under the African American category in order to identify the specific impact of ethnicity as it relates to breast cancer and how to appropriately assist this group to use preventive measures available.

Dense Breast Tissue

Checka, Chun, Schnabel, Lee and Toth (2012) indicate that women with denser breast tissue have a higher risk of breast cancer when compared to women with less dense breast, especially due to the fact that such breast tissue can conceal the problem, a factor that has a 4- to 6-fold potential to increase a woman's malignancy risk. Helping women become aware with their normal breast tissue fosters increased breast awareness to assist in detecting any abnormalities and to seek medical attention promptly (NCI, 2014).

<div align="center">

Potential Barriers to Breast Cancer Screening

</div>

This review has identified several barriers to breast cancer screening among the general population. In addition to knowledge, factors such as cultural beliefs, perceptions related to breast cancer, access to healthcare, socioeconomic issues, and access to

healthcare are important variables that could affect breast cancer early detection and

screening among immigrant population from Cameroonians living in the United States.

Cultural Beliefs

Cultural beliefs may affect people's response to disease and health-seeking

behaviors, which can cause delay in seeking treatment. Ngowa et al. (2011) indicated in

their study of 531 breast cancer patients from Yaoundé General Hospital Cameroon that

there was a mean delay of 10.35 months after detection of a lump before seeking

treatment. Ngowa et al. (2011) indicated that 54.94% of their study participants sought

treatment from a traditional doctor before seeking medical evaluation. Additionally,

Ibrahim and Odunsanya (2009) in their study of female healthcare professionals in Lagos,

Nigeria revealed that most of the participants, 65%, believed that herbal remedies could

cure cancer and 53.5 % of nurses felt that breast cancer could disappear following

prayers. These authors found that some African cultures believe certain diseases such as

breast cancer are because of punishment for a sin or witchcraft. It is important that

immigrant populations understand breast cancer management in order to avoid

misconceptions that could delay early diagnosis and better prognosis. It is also important

for healthcare providers to understand the culture/beliefs of the populations that they

serve to provide targeted health information that will benefit these populations.

Perception

Kemfack Ngowah et al. (2011) conducted a descriptive retrospective study using

medical records of patients to identify the profile those who got treatment at a radiation

therapy unit in Yaoundé General Hospital. The authors reviewed the records of 531

breast cancer patients among which 344 files contained complete patient information. The authors stated that they reviewed information on epidemiological details, diagnostic, therapeutic, and histopathological data. This study noted an increase in the number of breast cancer patients with majority of the patients (95.34%) discovering that they had breast cancer. Additionally, there was a long delay before hospital consultation with most of the patients, waiting between 6 months to 1 year, and more than half (54.94%) of the patients consulting a traditional doctor prior to seeking medical treatment. Most of the patients in this study had advance stage cancer on presentation at the hospital. Several reasons were advanced by the study authors as contributing to this, such as "lack of awareness on breast cancer, cultural beliefs, ignorance, the fear of mastectomy as a treatment modality in the hospital, and the inability to pay for medical care in the absence of an adequate health insurance (Kemfack et al. (2011) " To enhance early diagnosis and promote less aggressive treatment of breast cancer, these authors suggest increasing breast health awareness, healthcare provider training on CBE, and population training on BSE. According to these authors, such measures would afford the possibility of breast conservation and better outcomes.

Socioeconomic Dimension

Immigration comes with socioeconomic challenges that could cause barriers to screening for most women. Garcia et al. (2013) indicated in their study of Mexican American and African American women that nearly one third of the women in their study stated that they delayed seeking medical care or screening due to lack of health insurance, with Spanish-speaking Mexican American women having longer delay periods than

others in the sample. Additionally, length of stay in the United States has an impact on

screening. Harcourt et al. (2014) identified that duration of residence was a significant

determinant associated with non-screening among the target population of their study

assessing screening behavior for breast and cervical cancer. According to the CDC

(2012), only 46.6% of immigrants who had been in the United States less than 10 years

reported being screened for breast cancer in the past 2 years.

Access to Healthcare

Access to healthcare could significantly impact adherence to screenings. Ndukwe,

Williams and Sheppard (2013) suggested limited access to healthcare as one of the

barriers to breast cancer screening practices among female African immigrants in the

United States. Similarly, Oh, Zhou, Kreps, and Ryu's (2012) study of Asian Americans

and Pacific Islanders showed that having healthcare coverage, access to a consistent

healthcare provider, and routine checkups were predictors of compliance with screening

mammograms. Data from the ACS (2015) reveals that in the United States in 2013, for

women 40 years and above, only 38% of those with no insurance had a mammogram as

compared to 70% of those with insurance. Other factors such as low income, lack of

screening recommendation from a healthcare provider, and lack of transportation to a

mammogram center were found to affect compliance with screening guidelines and

timeliness of follow-up care after a positive screening (Harcourt et al., 2014). Such

factors could lead to late-stage diagnosis of breast cancer with poor prognosis that could

increase morbidity and mortality.

Summary

Based on the review of literature, early breast cancer diagnosis decreases mortality from the disease. Most immigrant women in the United States have insufficient knowledge and awareness of early diagnosis initiatives and resources available in their region of practice, and majorities do not understand or comply with guidelines set forth by the ACS (2015) for breast cancer screening. This literature review identified that no published studies have assessed breast cancer knowledge among female Cameroonian immigrants living in the Washington, DC, metro area. It is the hope that this study will serve as a starting point in assessing breast cancer screening health habits of this target population and guide health care policy towards targeted health interventions to increase breast health awareness among this population. Chapter 3 will focus on the research methodology. Information on the type of instrument used for the study, as well as sampling size delineation and data analysis, will be explained.

Chapter 3: Research Method

Introduction

The purpose of this quantitative study was to assess breast cancer knowledge, attitudes, and screening practices of Cameroonian immigrant women aged 40 and older living in the Washington, DC, metro area. This chapter includes the research design and rationale as well as the overall methodology incorporated in this study. A description of the survey instrument, data collection, and analysis plan are provided. I close the chapter with a discussion of threats to validity of the cross-sectional study and ethical considerations of participants of the study.

Research Design and Rationale

A quantitative study using a descriptive cross-sectional study design was used to assess the knowledge, perception, barriers, breast cancer awareness, and breast cancer early detection practices of immigrant women from Cameroon who were 40 years and older living in the Washington, DC, metro area. Ellis (2014) indicated that cross-sectional studies depict activity at a "single point in time" of a population sample and are quicker, cheaper, and easier to conduct. Further, Ellis (2014) remarked that this study design is frequently used in healthcare research because it is simple to undertake and "produces immediate useful results which may be used to support practice or in the development of policy or procedures" (p. 108). Babbie (2007) explained that this research design provides a snapshot of the population at a given time. Hence, it may be the best type of study design to identify knowledge and practices of health screening, specifically breast cancer screening among the immigrant population from Cameroon because this

population is hard to reach. Singleton and Strait (2004) claimed that cross-sectional studies are frequently used to describe population characteristics. With little known about the Cameroonian immigrant population, this study type was the most appropriate to shed more light on the women's knowledge and practice of breast cancer screening and early detection strategies. The dependent variable for this study was adherence to the practices of breast self-exam and obtaining a mammogram as outlined by the ACS (2015). Independent variables for this study included demographic variables, knowledge about screening, perceived susceptibility for breast cancer, perceived seriousness for getting breast cancer, perceived benefits, perceived barriers, perceived threat, self-efficacy, and cues to action. The variables were assessed to determine how they influenced adherence to cancer screening behavior among Cameroonian immigrant women.

Study Population

In this study, I focused on immigrant women from Cameroon who were 40 years and older living in the Washington, DC, metro area. Only women who migrated from Cameroon and were 40 years and above and currently lived within the Washington, DC metro area were included in this study. Cameroonian women who did not migrate to the United States, who were less than 40 years old, and who did not speak or write English were excluded from the study. Women were contacted through churches, social group affiliations, and alumni associations. A high percentage of members of these groups were from Cameroon. In fact, there were an estimated 750 Cameroonian women living in this region who meet the criteria for the study.

Sampling Procedure and Sample Size

This research included a convenience sample because it provides for easy access and is suitable for studies with a limited budget and time constraints. Using a convenience sampling design helped me to easily gather data and information from the target population that was scattered across the metro region. Though convenience samples could lead to under- or over-representation and limit generalization of study findings, the ease of sample selection and the less expensive nature of a cross-sectional design made it the best choice for this study.

Using an online sample size calculator for prevalence studies (see Naing, Winn & Rusli, 2006), a sufficient sample size based on a 95% confidence level and confidence interval of 5% on a population of 750 was calculated to be 323. The assumption was that the minimum required sample size would be obtained with a 40% to 45% response rate expected for the online survey. A total of 329 records were collected, and the number of usable records included in the tests of hypotheses was $N = 267$, which was approximately 36% of the 750 women asked to participate in the study.

Recruitment and Data Collection Procedures

Cameroon immigrant women who were 40 years and above living in the Washington, DC metro area were recruited through churches, alumina, and social groups. Research flyers were posted at local churches, social gathering locations, and hand delivered when possible, inviting participants to the study and directing them to the survey link via survey monkey (see Appendix A). I also sent cover letters explaining the purpose of the study and participants' rights to the different group websites. This cover

letter also included the survey link that contained more instructions and criteria for

inclusion in the study. Those participants who expressed interest were directed to the

survey link and were notified that activating the link was considered informed consent for

participating in the study. All participants were notified that results of the study would be

made available to them if they so desired.

Instrumentation

The amended version of the Champion survey instrument (Champion,1999) was

used for data collection. Huff and Kline (1999) indicated that the HBM has been used in

studies to demonstrate an increase in women's participation in breast cancer early

detection screening measures. Rosenstock, Stretcher and Becker (1988) reported the

effectiveness of HBM in intervention programs to explain behavioral changes. This

instrument is a 53-item questionnaire that assessed scale scores for nine domains of

perceived susceptibility, perceived seriousness, perceived benefits of BSE, perceived

barriers of BSE, confidence, health motivation, benefits of mammogram, and barriers of

mammograms derived from Champion's revised susceptibility, benefits, and barriers

scale for mammography screening (Champion, 1999). Two of the nine domains,

perceived benefits of BSE and perceived barriers of BSE, were not included for analysis

in this study. Previous testing of this scale for validity and reliability has been completed

and confirmed using mostly African American and Caucasian women. Using factor and

confirmatory analysis, Champion (1999) the author of the instrument tested the subscales

of perceived susceptibility, benefits, and barriers to mammography screening for

reliability and internal consistency. The result revealed internal consistency reliability

greater than was previously reported. To determine construct validity, Champion (1999)

used "exploratory and confirmatory factor analysis" (p. 346), revealing high correlations

among individual items consistent with previous work. Champion indicated that "all

items reflected strong internal consistency reliability and test retest reliability" (p. 347)

with the susceptibility scale insignificantly decreasing slightly from .93 on previous work

to .87, and a test-retest reliability of .62, which could be attributed to either a change in

attitude or inconsistency within the scale and was considered acceptable. Champion

revealed that internal consistency reliability was higher for barriers scale from .73 to .88,

while test-retest reliability for benefits, as well as barrier, increased respectively as

follows from .61 to .71 and .38 to .60

The domains of perceived benefits of BSE and perceived barriers of BSE were

not used in this research. Seven questions were added to the scale to assess cultural

beliefs influence on breast cancer screening. Ofori (2013) used these questions as part of

a questionnaire to assess the influence of cultural beliefs on intention to screen among a

population of Ghanaian women. Cultural beliefs referred to modesty, sexual health, and

use of preventive health, all developed because of an extensive literature review of

studies that addressed the use of preventive services among low income women (Ofori

Dei, 2013). According to Ofori Dei, a Cronbach's alpha of 0.68 was obtained for internal

consistency and reliability of items for cultural belief after being tested through a pilot

study and making minor adjustments.

Measures

The amended version of Champion's instrument (Champion, 1999) was used for

data collection. The practice of mammography was used to define the dependent variable

(adherence) for this study. The ACS (2015) recommended obtaining an annual

mammography for women 40 years and above, an early diagnosis initiative that, if

implemented and encouraged, will decrease mortality from breast cancer through

providing a wide range of treatment options, less surgical intervention, and better

outcomes. The independent variables included demographic variables and the nine scale

score constructs derived from the HBM through use of the revised version of the

Champion Health Belief Model Scale (Champion 1999). Permission to use this survey

instrument was requested from Dr. Champion via email on October 8th, 2013**.** Such

permission was granted on October 13th, 2013 to adjust as needed, instructions to cite the

relevant literature, and a request to forward a copy of the study abstract to Dr. Champion

on completion of the study. To facilitate the tabulation of responses, *yes* responses of

dichotomous variables were set equal to 1 and *no* responses were set equal to 0 The

information obtained from the responses are be displayed in frequency tables. This

determined the participant's knowledge level of cancer screening modalities and risk

factors for breast cancer. Computation of each of the nine scale score responses was

derived as the mean of the scale items. The 5-point Likert scale was used to assess all the

nine scale score items. To facilitate tabulation and data analysis, the responses of the

seven scale score items were categorized as follows: 1--*strongly disagree*, 2--*disagree*, 3-

-*neutra*l, 4--*agree*, and 5--*strongly agree*.

Perceived Susceptibility and Seriousness

Perceived susceptibility as defined by Champion (1999) refers to "perceived belief of personal threat or harm related to breast cancer" (p. 342), while severity refers to any serious impact of the disease. This section was made up of a total of 12 questions on the survey instrument to determine if immigrant women in the sample felt they may get breast cancer at some point in their lives, any threat of harm or seriousness from breast cancer, and how that may affect their overall response to the disease. The responses to each of the 12 questions were categorized to facilitate data analysis as follows: 1--*strongly disagree*, 2--*disagree*, 3--*neutral*, 4--*agree*, and 5--*strongly agree*. Of the 12 questions, five pertained to the scale score of susceptibility and seven pertained to the scale score of seriousness. The scores for the individual questions of each of the two scale scores were averaged to derive an overall scale score, with a possible range of 1 to 5. A low mean score indicated that the participant perceived less seriousness or susceptibility to getting breast cancer and, therefore, may not comply with screening recommendations. A high score reflected high levels of susceptibility and seriousness from breast cancer, as well as high likelihood to get screened according to guidelines.

Perceived Benefit of Mammogram

Six questions in the survey instrument were used to measure perceived benefits of mammography using a 5-point Likert scale response. According to Champion (1999), a perceived benefit of a mammogram refers to any positive outcome from obtaining a mammogram. Questions were designed to elicit responses that determined an individual's response towards breast cancer screening. The six items comprising the benefits of BSE

scale score were scored: 1--*strongly disagree*; 2--*disagree*; 3--*neutral*; 4--*agree*; 5--*strongly agree*. The scores for the individual questions of each of the two scale scores were averaged to derive an overall scale score, with a possible range of 1 to 5. Lower scale scores in the ranges of 1 and 2 indicate that the participant did not perceive any benefits from obtaining mammograms and, hence, may not comply with screening recommendations, while higher scale scores in the ranges of 4 and 5 indicate that the participants perceived a strong benefit from obtaining a mammogram and may be more likely to comply with screening recommendations.

Perceived Barriers of Mammogram

A section of five questions was used to assist in identifying perceived barriers of mammography, i.e. any type of obstacle that could hinder an individual from obtaining a mammogram. The responses to each of the five questions were categorized to facilitate data analysis as follows: 1--*strongly disagree*; 2--*disagree*; 3--*neutral*; 4--*agree*; 5--*strongly agree*. The scores for the individual questions were averaged to derive an overall scale score, with a possible range of 1 to 5. A participant with a low score indicated that they perceived fewer barriers to obtaining a mammogram and may likely get one, while a higher score indicated the participant perceived several obstacles to obtaining a mammogram and may not likely get one.

Confidence (Self-Efficacy)

A total of 11 questions were used to assess self-efficacy in performing BSE. These questions were constructed to elicit responses regarding the practice of breast self-exam. The ACS (2015) recommend that all women should know the normal look and feel

of their breast to be able to detect a change and to report this change immediately to their healthcare provider. The responses to each of the 11 questions were categorized to facilitate data analysis as follows: 1--*strongly disagree*; 2--*disagree*; 3--*neutral*; 4--*agree*; 5--*strongly agree*. The scores for the 11 individual questions were averaged to derive an overall scale score, with a possible range of 1 to 5. A low score for may indicate low level of self-efficacy on BSE techniques and low compliance with practice recommendations

Health Motivation (Cues to Action)

Seven questions on the questionnaire assessed cues to action for health motivation, i.e. the level of emphasis placed on health promotion activities by the survey participants. The responses to each of the seven questions were categorized to facilitate data analysis as follows: 1--*strongly disagree*; 2--*disagree*; 3--*neutral*; 4--*agree*; 5--*strongly agree*. The scores for the seven individual questions were averaged to derive an overall scale score, with a possible range of 1 to 5. Low scores indicated that the participant placed low emphasis on activities to promote health and there may be a high likelihood that the participant may not follow screening guidelines.

Cultural Beliefs

Seven questions on the questionnaire assessed issues related to the influence of cultural beliefs about modesty, breast cancer screening, and attitudes towards preventive health care. The responses to each of the seven questions were categorized to facilitate data analysis as follows: 1--*strongly disagree;* 2--*disagree*; 3--*neutral*; 4--*agree*; 5--*strongly agree*. The scores for the seven individual questions were averaged to derive an

overall scale score, with a possible range of 1 to 5. For this category, higher scores for cultural beliefs about modesty indicated that a participant would generally not use screening activities, while higher scores for breast cancer screening and attitudes towards preventive health translated to positive adherence to screening guidelines.

Demographic Variables

Demographic items assessed participants' age group, level of education, years in the United States, marital status, and if the participants have a regular healthcare provider. All these variables have been shown to affect screening recommendations and health guidelines compliance, either negatively or positively, based on participant's perception of the effect of the variable on their life. The following demographic variables were collected as continuous variables and analyzed for this study:

Age

This study focused on immigrant women from Cameroon who are 40 years and above. The questionnaire will require participants to indicate their age with a range from 40 years and above in this format: *40-49*, *50-59*, *60-69*, *70-79*, *80 and over*. Frequency counts and percentages for each age group were presented in a table. The variable of age group was used as an ordinal variable in the correlation and regression analyses.

Marital Status

Participants were asked to indicate their marital status. The categories of the marital status variable were classified as follows: *married*, *single*, *divorced*, *widow*, *does not wish to answer*. Frequency counts and percentages for each of the marital status

groups were presented in a table. The variable of marital status was aggregated into two dichotomous groups for inferential analysis as 1 = married and 0 = not currently married.

Place of Birth

Participants were asked to answer using *yes* or *no* format if they were born in Cameroon. It is important for participants to answer this question to ensure that only women who fit the immigrant criteria are included in the study. All women who were not born in Cameroon were excluded from the study. Place of birth was used only as a screening variable for study inclusion and was not used in any analyses.

Level of Education

Level of education has been associated with increase knowledge on cancer screening and compliance with screening recommendations. Participants were asked to indicate their highest level of education from selections of *no schooling*, *high school*, *some college*, *four-year college* and *graduate level*. Frequency counts and percentages for each educational level were presented in a table. The variable of level of education was used as an ordinal variable in the correlation and regression analyses.

Years in the United States

Years in the United States have been associated with increased screening knowledge and compliance. Participants in this study were asked how long they have lived in the United States. Participants were required to indicate within the following range: *0-4*, *5-9*, *10-14*, *15-19*, *20 and over*. Frequency counts and percentages for each grouping of years in U.S. residency were presented in a table. The variable of years in the U.S. age group was used as an ordinal variable in the correlation and regression analyses.

Health Care Provider

Having a regular healthcare provider could increase knowledge on breast cancer screening, as well as screening for other diseases. Participants were required to indicate using a *yes* or *no* response if they had a healthcare provider. Frequency counts and percentages for each of the healthcare provider groups were presented in a table. The variable of health care provider was aggregated into two dichotomous groups for inferential analysis as 1 = has a regular healthcare provider and 0 = does not currently have a regular healthcare provider.

Knowledge

Participants were asked which screening method is best and given five choices of *(a) BSE, (b) clinical breast exam, (c) mammogram, (d) all the above*, or *(e) none of the above*. Frequency counts and percentages for each of the five responses were presented in a table. The variable of knowledge was used only as a descriptive measure and was not included in hypothesis testing.

Dependent Variable (Adherence)

The variable of adherence to mammography screening guidelines (adherence) was used as the dependent variable of the multiple logistic regression model. Adherence was dichotomously coded as adherence = 1 and non-adherence = 0. Adherence included women who answered *yes* to item G on the survey ("Have you ever had a mammogram?") AND answer question H ("When was your last mammogram?") as *1 = This year, 2 = Last year*, or *3 = Two years ago*. Thus, women who had a mammogram within the last 2 years or less were coded as 1 = adherence. Women who hadn't had a

mammogram or had their last mammogram more than 2 years ago were coded as 0 =

non-adherence.

Data Analysis Plan

Data were analyzed using SPSS v.22. To prepare data for analysis, all completed

surveys were reviewed for missing information and completeness. Any incomplete

questionnaires that could not be salvaged via averaging of responses on the nine scale

scores, or that were missing information on the demographic variables used for analysis,

were excluded from the study. Descriptive statistics including means, standard

deviations, medians, and ranges for continuous variables, or frequency counts and

percentages for nominal variables were presented in tables. A series of bi-variate

Spearman's rank order correlations and one multiple logistic regression model were

tested to see if there were associations between the dependent variable of adherence, the

nine scale scores, and the demographic variables of age group, marital status, level of

education, length of time in United States, and regular healthcare provider. The statistical

tests addressed the following five research questions and associated statistical

hypotheses:

Research Question 1: Is there an association between knowledge of breast cancer

screening and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 1: There is not a statistically significant association, or a negative

association, between the HBM construct of benefits of mammography and the dependent

variable construct of adherence.

Alternative Hypothesis 1: There is a statistically significant positive association between the HBM construct of benefits of mammography and the dependent variable construct of adherence.

Research Question 2: Are perceived susceptibility of breast cancer, perceived severity of breast cancer, perceived barriers to mammography, and self-efficacy about breast cancer screening associated with mammography adherence of Cameroonian immigrant women?

Null Hypothesis 2a: There is not a statistically significant association, or a negative association, between the HBM construct of susceptibility and the dependent variable construct of adherence.

Alternative Hypothesis 2a: There is a statistically significant positive association between the HBM construct of susceptibility and the dependent variable construct of adherence.

Null Hypothesis 2b: There is not a statistically significant association, or a negative association, between the HBM construct of seriousness and the dependent variable construct of adherence.

Alternative Hypothesis 2b: There is a statistically significant positive association between the HBM construct of seriousness and the dependent variable construct of adherence.

Null Hypothesis 2c: There is not a statistically significant association, or a positive association, between the HBM construct of barriers to mammography and the dependent variable construct of adherence.

Alternative Hypothesis 2c: There is a statistically significant negative association between the HBM construct of barriers to mammography and the dependent variable construct of adherence.

Null Hypothesis 2d: There is not a statistically significant association, or a negative association, between the HBM construct of self-efficacy and the dependent variable construct of adherence.

Alternative Hypothesis 2d: There is a statistically significant positive association between the HBM construct of self-efficacy and the dependent variable construct of adherence.

Research Question 3: Are there associations between age, marital status, level of education, number of years lived in the United States, having a healthcare provider, and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 3: None of the demographic variables of (a) age, (b) marital status, (c) level of education, (d) number of years lived in the United States, or (e) having a healthcare provider, have a statistically significant association with the dependent variable construct of adherence.

Alternative Hypothesis 3: At least one of the demographic variables of (a) age, (b) marital status, (c) level of education, (d) number of years lived in the United States, and/or (e) having a healthcare provider, have a statistically significant association with the dependent variable construct of adherence.

Research Question 4: Are there associations between cultural beliefs about modesty, attitudes towards preventive health care, and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 4a: There is not a statistically significant association, or a positive association, between the HBM construct of cultural barriers to screening and the dependent variable construct of adherence.

Alternative Hypothesis 4a: There is a statistically significant negative association between the HBM construct of cultural barriers to screening and the dependent variable construct of adherence.

Null Hypothesis 4b: There is not a statistically significant association, or a negative association, between the HBM construct of cues to action and the dependent variable construct of adherence.

Alternative Hypothesis 4b: There is a statistically significant positive association between the HBM construct of cues to action and the dependent variable construct of adherence.

Research Question 5: Are there demographic and theoretical variables that best predict adherence to mammography screening guidelines?

Null Hypothesis 5: There are no demographic or theoretical variable that best predicts adherence to mammography screening guidelines.

Alternative Hypothesis 5: There are demographic or theoretical variable that best predicts adherence to mammography screening guidelines.

Threats to Validity

With cross-sectional study designs, there is the potential for recall bias whereby participants may want to report desirable behaviors or conceal undesirable behaviors. Additionally, participants may forget or be selective in their memory and report societal desirable outcomes because the study will be using self-administered questionnaire for data collection. Hopefully the participants in this study answered the survey questionnaire to the best of their recollection. Selection bias could pose a threat to internal validity based on the use of a convenience sample where the researcher conveniently chooses which locations to administer the survey. I selected participants in the conveniently chosen locations to participate in the study. I was unable to find any published document indicating the total number of immigrant women from Cameroon living in the Washington, DC, metro area and coupled with use of convenient sample this could lead to sampling error and false population generalization.

Ethical Considerations

The survey data and descriptions were anonymous. Participants were not required to indicate their names or any other information that could reveal their identity. I employed diligence to ensure that any information provided by the participants was locked, remained as confidential as possible, and adhered to Walden University's Institutional Review Board guidelines to ensure confidentiality of participants' information, as well protection of individual rights. All information was stored securely under a double-lock system accessible only to me. In accordance with ethical principles of respect for persons, participants were reminded in writing that participation in the

study was voluntary, and they had the right to withdraw at any time. In line with the principle of beneficence, this study posed the minimal harm to the participants. I was aware of the public concern regarding justice towards study participants and ensured participants that they would not be taken advantage of in any way. Hence, there was no monetary compensation or gift of any kind for participating in the study. Additionally, each participant was provided my contact information for questions and clarifications, and an implied informed consent form prior to any data collection. The Walden IRB approval number for this study was # 02-13-17-0144775

Summary

The purpose of this chapter was to provide information related to procedures for administering the survey questionnaire to determine breast cancer screening behavior among a sample of 267 immigrant women from Cameroon living in the Washington, DC, metro area. This chapter provided information on sample and data collection procedures. Also, information on the different statistical analysis that were performed to describe this population's breast cancer screening behaviors was presented. Data collected and analyzed assisted in identifying level of breast cancer early detection knowledge and awareness and helped identify specific needs of this population related to screening. Chapter 4 will present the findings of statistical analysis conducted, followed by a chapter including a discussion of the results.

Chapter 4: Results

Introduction

The purpose of this quantitative, cross-sectional study was to assess breast cancer knowledge, attitudes, and screening practices of Cameroonian immigrant women aged 40 and older living in the Washington, DC, metro area. The following research questions and hypotheses were examined:

Research Question 1: Is there an association between knowledge of breast cancer screening and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 1: There is not a statistically significant association, or a negative association, between the HBM construct of benefits of mammography and the dependent variable construct of adherence.

Alternative Hypothesis 1: There is a statistically significant positive association between the HBM construct of benefits of mammography and the dependent variable construct of adherence.

Research Question 2: Are perceived susceptibility of breast cancer, perceived severity of breast cancer, perceived barriers to mammography, and self-efficacy about breast cancer screening associated with mammography adherence of Cameroonian immigrant women?

Null Hypothesis 2a: There is not a statistically significant association, or a negative association, between the HBM construct of susceptibility and the dependent variable construct of adherence.

Alternative Hypothesis 2a: There is a statistically significant positive association between the HBM construct of susceptibility and the dependent variable construct of adherence.

Null Hypothesis 2b: There is not a statistically significant association, or a negative association, between the HBM construct of seriousness and the dependent variable construct of adherence.

Alternative Hypothesis 2b: There is a statistically significant positive association between the HBM construct of seriousness and the dependent variable construct of adherence.

Null Hypothesis 2c: There is not a statistically significant association, or a positive association, between the HBM construct of barriers to mammography and the dependent variable construct of adherence.

Alternative Hypothesis 2c: There is a statistically significant negative association between the HBM construct of barriers to mammography and the dependent variable construct of adherence.

Null Hypothesis 2d: There is not a statistically significant association, or a negative association, between the HBM construct of self-efficacy and the dependent variable construct of adherence.

Alternative Hypothesis 2d: There is a statistically significant positive association between the HBM construct of self-efficacy and the dependent variable construct of adherence.

Research Question 3: Are there associations between age, marital status, level of education, number of years lived in the United States, having a healthcare provider and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 3: None of the demographic variables of (a) age, (b) marital status, (c) level of education, (d) number of years lived in the United States, or (e) having a healthcare provider, have a statistically significant association with the dependent variable construct of adherence.

Alternative Hypothesis 3: At least one of the demographic variables of (a) age, (b) marital status, (c) level of education, (d) number of years lived in the United States, and/or (e) having a healthcare provider, have a statistically significant association with the dependent variable construct of adherence.

Research Question 4: Are there associations between cultural beliefs about modesty, attitudes towards preventive health care, and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 4a: There is not a statistically significant association, or a positive association, between the HBM construct of cultural barriers to screening and the dependent variable construct of adherence.

Alternative Hypothesis 4a: There is a statistically significant negative association between the HBM construct of cultural barriers to screening and the dependent variable construct of adherence.

Null Hypothesis 4b: There is not a statistically significant association, or a negative association, between the HBM construct of cues to action and the dependent variable construct of adherence.

Alternative Hypothesis 4b: There is a statistically significant positive association between the HBM construct of cues to action and the dependent variable construct of adherence.

Research Question 5: Are there demographic and theoretical variables that best predict adherence to mammography screening guidelines?

Null Hypothesis 5a: There are no demographic or theoretical variable that best predicts adherence to mammography screening guidelines.

Alternative Hypothesis 5b: There are demographic or theoretical variable that best predicts adherence to mammography screening guidelines.

In Chapter 4, I present descriptive and inferential analyses. Results of Chapter 4 are divided into three sections: (a) descriptive and demographic findings, (b) investigation of assumptions as related to inferential analysis, and (c) tests of hypotheses. I conclude the chapter with a summary of the results.

Population and Demographics of Study

The population of the study included immigrant women from Cameroon who were 40 years and older living in the Washington, DC, metro area. Only women who migrated from Cameroon were included in this study. Cameroonian women who did not migrate to the United States, who were less than 40 years old, and who did not speak or write English were excluded from the study. A convenience sample of women who met

the inclusion criteria were recruited through churches, social group affiliations, and alumni associations. The respondents completed the survey online. A total of $N = 267$ respondents were included in this study.

Table 2 includes the frequency counts and percentages of the women's responses to the demographic and breast cancer screening information for the $N = 267$ study participants. Almost two-thirds of the women ($n = 218$ women, 81.7% of the women) had lived in the United States for 10 years or more. Two hundred and eighteen women (81.7% of the women) were 40 to 59 years of age. Over 40% ($n = 113$ women, 42.7% of the women) were married. And over 80% of the women had an education of at least "some college" ($n = 232$ women, 86.9% of the women).

Table 3 includes the frequency counts and percentages of the women's responses to the four breast-cancer screening questions. Most women had a regular health care provider ($n = 220$ women, 82.4% of the women). When asked if they had ever had a mammogram, 92.5% of the women ($n = 247$ women) answered affirmatively. However, half of the women ($n = 135$ women, 50.6% of the women) had not had a mammogram within the previous 2 years. When asked which breast cancer screening method was best, $n = 192$ women (71.2% of the women) answered that all three options of (a) BSE, (b) CBE, and (c) mammogram were the best (i.e., the women responded "all of the above").

Table 2

Frequency Counts and Percentages of Responses to Demographic Questions for the Participants of Study (N = 267)

Variable	Frequency	Percentage
What is your age range?		
40-49 years	91	34.1
50-59 years	127	47.6
60-69 years	45	16.9
70-79 years	4	1.5
What is your marital status?		
Do not wish to answer	28	10.5
Widow	37	13.9
Divorced	43	16.1
Single	46	17.2
Married	113	42.3
What is your level of education?		
No formal education	15	5.6
Completed high school	20	7.5
Some college	90	33.7
Four-year college degree	80	30.0
Graduate degree	62	23.2
How long have you lived in the United States?		
0-4 years	22	8.2
5-9 years	47	17.6
10-14 years	81	30.3
15-19 years	54	20.2
20+ years	63	23.6

Table 3

Frequency Counts and Percentages of Responses to Breast Cancer Screening Questions for the Participants of Study (N = 267)

Variable	Frequency	Percentage
Do you have a regular healthcare provider?		
Yes	220	82.4
No	47	17.6
Have you ever had a mammogram?		
Yes	247	92.5
No	20	7.5
When was your last mammogram?		
This year	17	6.4
Last year	38	14.2
Two years ago	62	23.2
Three years ago	63	23.6
More than three years ago	72	27.0
Which one is the best screening method?		
Breast self-exam	5	1.9
Clinical breast exam	15	5.6
Mammogram	49	18.4
All of the above	190	71.2
None of the above	7	2.6
No response	1	0.4

Instrumentation

In addition to the demographic and breast cancer screening questions, the study participants completed the revised version of the Champion Health Belief Model Scale (Champion 1999). The survey included a total of 59 items. Each item was scored on a 5-point Likert scale as follows: 1--*strongly disagree*, 2--*disagree*, 3--*neutral*, 4--*agree*, and 5--*strongly agree*. The item scores can be compiled into nine scale scores. However, only

seven scale scores were used in this study. Each of the seven scale scores was computed according to the criteria in Chapter 3 by taking the average of items comprising each of the seven scales. These seven scale scores and the demographic and descriptive variables of age, marital status, education level, length of time in the United States, and healthcare provided status were used as independent variables in the multiple logistic regression model.

Table 4 includes the measures of central tendency and variability of the seven scale scores derived from the Champion survey (1999), as well as the Cronbach's alpha coefficients for internal consistency reliability of the seven instrumentation scale scores with the collected sample. The scale score of susceptibility was the lowest ($M = 1.73$, $SD = 0.74$) indicating that the women tended to disagree that they were susceptible to getting breast cancer in the future. The scale score with the highest mean scale score was Cues to action ($M = 3.94$, $SD = 0.51$). The mean score indicated that the women tended to agree with the items relating to overall health improvement and maintenance.

Internal Consistency Reliability

Cronbach's Coefficient Alpha was used to check the internal consistency reliability of the seven scale scores of the revised Champion survey (1999). A Cronbach's alpha value of 0.70 or above is considered acceptable (Pallant, 2013). All the alpha coefficients were above the 0.70 cut-off (see Table 3). Therefore, all of the scale scores were reliable for the dataset used in this study.

Table 4

Measures of Central Tendency, Variability, and Cronbach's Alpha Coefficients for the Seven Scale Scores of the Revised Champion's Survey for the Study Sample (N = 267)

Scale score	*M*	*SD*	*Mdn*	Sample Range	α
Susceptibility	1.73	0.74	2.00	1.00 – 4.60	.971
Seriousness	3.04	1.08	3.00	1.00 – 5.00	.941
Self-efficacy (confidence)	3.08	0.82	3.09	1.09 – 5.00	.942
Cues to action (health motivation)	3.94	0.51	4.00	2.57 – 5.00	.828
Benefits of mammography	3.35	0.56	3.00	2.00 – 5.00	.881
Barriers to mammography	2.89	0.65	3.00	1.00 – 5.00	.845
Cultural barriers to screening	3.22	0.65	3.14	1.57 – 5.00	.808

Note. M = Mean; *SD* = Standard Deviation; Mdn = Median; Possible range of all scale scores is 1 to 5.

Assumptions for Inferential Tests

Hypothesis tests included Spearman's rank order correlations and multiple logistic regression. The dataset was investigated for the inferential analysis assumptions of no missing data, absence of outliers on both the independent and dependent variables, and absence of multicollinearity for the independent variables of the study. None of the records were missing data for the variables used in correlational and multiple logistic regression analyses. Outliers in a dataset have the potential to distort results of an inferential analysis. A check of boxplots for the seven scale scores of the Champion survey (1999) indicated five outliers for the susceptibility scale, four outliers for the cues

to action scale, ten outliers for the barriers to mammography scale, and two outliers for the cultural barriers scale. Although there were some outliers, all of the values were within acceptable ranges of the scale scores (scale score values were between 1 and 5). Additionally, the mean and median scores for each of the variable constructs were close in value, indicating that outliers were not impacting the dataset by pulling the distribution from normal. Additionally, normality is not a requirement of either Spearman's correlations or multiple logistic regression analyses. Removal of records with outlying values would have resulted in a lower-powered study. I determined that since all outlying values were not anomalous, and since normality was not necessary for use of the planned inferential tests, that the outlier assumption was tenably met.

Variable Coding for Inferential Analyses

The variable of adherence to mammography screening guidelines (adherence) was used as the dependent variable of the multiple logistic regression model. Adherence was dichotomously coded as adherence = 1 and non-adherence = 0. Adherence included women who answered *yes* to item G on the survey ("Have you ever had a mammogram") AND answer question H ("When was your last mammogram?") as 1 = This year, 2 = Last year, or 3 = Two years ago. Thus, women who had a mammogram within the last 2 years or less were coded as 1 = adherence. Women who had not had a mammogram or had their last mammogram more than 2 years ago were coded as 0 = non-adherence.

The independent demographic variable of age group included only four women who were 70-79 years of age (see Table 1). Therefore, age group was aggregated into three ordinal categories of (a) 40-49 years ($n = 91$), (b) 50-59 years ($n = 127$, and (c) 60-

79 years ($n = 49$). The independent demographic variable of marital status was

aggregated into two groups for analysis as (a) married = 1 ($n = 113$) and (b) not currently

married = 0 ($n = 154$). The independent demographic variables of level of education and

length of time in the United States were retained as specified in Table 1. The descriptive

variable of (regular) healthcare provider was dichotomously coded as 1 = has a regular

healthcare provider or 0 = does not have a regular healthcare provider.

The items comprising each of the seven scale scores of the Champion (1999)

survey were averaged for each participant to obtain scores with a possible range of 1 to 5

(see Table 4). Higher values of each scale score were indicative of greater agreement

with each scale's concept.

Correlational Analyses

Table 5 presents the findings of the Spearman's rank order correlational analyses.

Cohen (1988) suggests that the measured effects of correlation coefficients with absolute

values between 0.10 to 0.29 are weak, between 0.30 to 0.49 are moderate, and between

0.50 to 1.0 are strong. An indirect (negative) correlation indicates that the relationship

between two variables is contrary—their respective scores move in opposite directions. A

direct (positive) correlation coefficient indicates that the two variables' values or scores

are moving in a like manner. Due to the larger sample size of $N = 267$ participants, many

statistically significant correlations were found between the variables of study, even when

the correlational effect was weak. Therefore, only the significantly moderate to strong

correlational effects 0.30 – 1.0 are reported to preserve parsimony.

Adherence was moderately and directly correlated with benefits of mammography ($r = .415$, $p < .0005$), indicating that women who were classified as adhering to breast cancer screening guidelines were in greater agreement with the benefits of mammography. Adherence was moderately and indirectly correlated with barriers to mammography ($r = .415$, $p < .0005$), and cultural barriers to screening ($r = -.324$, $p < .0005$). The indirect relationships suggested that women who were adherent to breast cancer screening guidelines had lesser barriers to mammography and felt less constrained by cultural barriers to breast cancer screening.

Level of education was moderately and directly correlated with a woman's length of time in the U.S. ($r = .438$, $p < .0005$) and having a healthcare provider ($r = .319$, $p < .0005$). Level of education was also moderately and directly correlated with the Champion survey (1999) scale scores of self-efficacy ($r = .362$, $p < .0005$), and benefits of mammography ($r = .415$, $p < .0005$). The positive correlation coefficients indicate that increasing levels of education are associated with greater knowledge of the benefits of breast cancer screening and mammography. Higher education levels were associated with greater self-efficacy of women in performing breast self-exams. Level of education was moderately and indirectly correlated with cultural barriers to screening ($r = -.398$, $p < .0005$), which indicated that higher levels of education were associated with lower levels of perceived cultural barriers to mammography.

Length of time in U.S. was moderately and directly correlated with having a healthcare provider ($r = .340$, $p < .0005$), and self-efficacy ($r = .319$, $p < .0005$). The positive direction of the correlation suggested that women were more likely to have a

regular healthcare provider the longer they had lived in the United States, and that women who have lived for a longer amount of time in the United States had more self-efficacy in performing obtaining a mammogram. Women who had a regular healthcare provider were also associated with higher self-efficacy in obtaining a mammogram ($r = .311$, $p < .0005$).

Statistically significant correlations were found between some of the seven scale scores of the Champion survey. Seriousness was moderately and directly correlated with benefits of mammography ($r = .317$, $p < .0005$). The positive relationship suggested that greater perceived seriousness of having breast cancer was associated with greater perceived benefits of obtaining mammograms.

The self-efficacy scale score was moderately and directly correlated with cues to action ($r = .407$, $p < .0005$) and moderately and negatively correlated with cultural barriers to screening ($r = -.419$, $p < .0005$). The direction of the correlational effects indicated that women who have more self-efficacy in obtaining a mammogram are motivated towards greater self-care and experience less perceived cultural barriers.

The cues to action scale score was moderately and directly correlated with benefits of mammography ($r = .321$, $p < .0005$) and moderately and negatively correlated with cultural barriers to screening ($r = -.326$, $p < .0005$). The direction of the correlational effects indicated that women who are motivated towards greater self-care see more benefits of mammography and perceive less cultural barriers to mammography.

Benefits to mammography was moderately and indirectly correlated with both barriers to mammography ($r = -.314$, $p < .0005$) and cultural barriers to screening ($r =$

.355, $p < .0005$), thus suggesting that women who perceived barriers to mammography or cultural barriers to mammography tended to see lesser benefits to mammography.

Cultural barriers to screening was strongly and directly associated with barriers to mammography ($r = .603$, $p < .0005$), indicating that women who perceived greater cultural barriers to mammography also perceived greater barriers to mammography.

Table 5

Spearman's Rank Order Correlations for Bi-Variate Relationships (N = 267)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Adherence = yes												
2. Age group	-.201**											
3. Marital status = married	.145*	-.272**										
4. Level of education	.242**	-.218**	.277**									
5. Length of time in U.S.	-.002	.089	.160**	.438**								
6. Healthcare provider = yes	.170**	-.102	.217**	.319**	.340**							
7. Susceptibility	.149*	.013	-.073	-.036	-.189**	-.065						
8. Seriousness	.067	-.172**	.182**	.124*	.070	.033	-.008					
9. Self-efficacy	.215**	-.097	.287**	.362**	.319**	.311**	.021	.161**				
10. Cues to action	.235**	-.070	.135*	.279**	.247**	.188**	-.032	.232**	.407**			
11. Benefits of mammography	.415**	-.190**	.197**	.319**	-.003	.016	.072	.317**	.287**	.321**		
12. Barriers to mammography	-.306**	.070	-.084	-.276**	-.056	-.115	-.022	.163**	-.188**	-.187**	-.314**	
13. Cultural barriers to screening	-.324**	.213**	.164**	-.398**	-.287**	-.230**	-.145*	-.007	-.419**	-.326**	-.355**	.603**

Note. * p < .05 **p < .01

Tests of Hypotheses

Spearman's rank order correlations and one multiple logistic regression analysis were performed to test the null hypotheses of this study. All inferential analyses were performed with SPSS v.22. A 95% level of significance was set for all tests. The analysis and results of the testing are presented according to each research question and associated statistical hypotheses.

Research Question 1: Is there an association between knowledge of breast cancer screening and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 1: There is not a statistically significant association, or a negative association, between the HBM construct of benefits of mammography and the dependent variable construct of adherence.

Alternative Hypothesis 1: There is a statistically significant positive association between the HBM construct of benefits of mammography and the dependent variable construct of adherence.

Conclusion as Relates to Null Hypothesis 1

The variable of benefits of mammography was statistically significant as relates to the variable of adherence in the correlation analysis ($r = .415$, $p < .0005$), indicating that women who were classified as adhering to breast cancer screening guidelines were in greater agreement with the benefits of mammography. The variable of benefits of mammography was also statistically significant for the dependent variable of adherence in the regression model ($OR = 4.47$, $p < .0005$). The odds ratio of 4.47 indicated that for

each 1 unit increase in the Benefits to Mammography scale score, women were about

347% more likely to be adherent, controlling for other predictors in the model.

Therefore, reject Null Hypothesis 1. There is sufficient evidence to indicate that

there is a statistically significant positive association between the HBM construct of

benefits of mammography and the dependent variable construct of adherence.

Research Question 2: Are perceived susceptibility of breast cancer, perceived

severity of breast cancer, perceived barriers to mammography and self-efficacy about

breast cancer screening associated with mammography adherence of Cameroonian

immigrant women?

Null Hypothesis 2a: There is not a statistically significant association, or a

negative association, between the HBM construct of susceptibility and the dependent

variable construct of adherence.

Alternative Hypothesis 2a: There is a statistically significant positive association

between the HBM construct of susceptibility and the dependent variable construct of

adherence.

Conclusion as Relates to Null Hypothesis 2a

The variable of susceptibility was statistically significant with the variable of

adherence in the correlational analysis ($r = .149$, $p = .015$). Additionally, susceptibility

was significant for the dependent variable of Adherence in the logistic regression model

($OR = 1.58$, $p = .029$). The odds ratio of 1.58 indicated that for each 1 unit increase in the

Susceptibility scale score, women were about 58% more likely to be adherent, controlling

for other predictors in the model.

Therefore, reject Null Hypothesis 2a. There is sufficient evidence to suggest that there is a statistically significant positive association between the HBM construct of susceptibility and the dependent variable construct of adherence.

Null Hypothesis 2b: There is not a statistically significant association, or a negative association, between the HBM construct of seriousness and the dependent variable construct of adherence.

Alternative Hypothesis 2b: There is a statistically significant positive association between the HBM construct of seriousness and the dependent variable construct of adherence.

Conclusion as Relates to Null Hypothesis 2b

The variable of seriousness was not statistically significant as relates to the variable of adherence in either the correlational or regression analysis. Therefore, do not reject Null Hypothesis 2b. There is not sufficient evidence to indicate that there is a statistically significant positive association between the HBM construct of seriousness and the dependent variable construct of adherence.

Null Hypothesis 2c: There is not a statistically significant association, or a positive association, between the HBM construct of barriers to mammography and the dependent variable construct of adherence.

Alternative Hypothesis 2c: There is a statistically significant negative association between the HBM construct of barriers to mammography and the dependent variable construct of adherence.

Conclusion as Relates to Null Hypothesis 2c

The variable of barriers to mammography was statistically significant as relates to the variable of adherence in the correlation analysis ($r = -.306$, $p < .0005$), indicating that women who were classified as adhering to breast cancer screening guidelines had lesser barriers to mammography. The relationship was not statistically significant in the regression analysis.

Therefore, reject Null Hypothesis 2c. There is sufficient evidence to indicate that there is a statistically significant negative association between the HBM construct of barriers to mammography and the dependent variable construct of adherence.

Null Hypothesis 2d: There is not a statistically significant association, or a negative association, between the HBM construct of self-efficacy (Breast Cancer Survey section E, questions A – K, average of all items) and the dependent variable construct of adherence.

Alternative Hypothesis 2d: There is a statistically significant positive association between the HBM construct of self-efficacy and the dependent variable construct of adherence.

Conclusion as Relates to Null Hypothesis 2d

The variable of self-efficacy was statistically significant as relates to the variable of adherence in the correlation analysis ($r = .215$, $p < .0005$), indicating that greater self-efficacy in performing BSE was associated with greater adherence to BSE guidelines. The relationship was not statistically significant in the regression analysis.

Therefore, reject Null Hypothesis 2d. There is sufficient evidence to indicate that there is a statistically significant positive association between the HBM construct of self-efficacy and the dependent variable construct of adherence.

Research Question 3: Are there associations between age, marital status, level of education, number of years lived in the United States, having a healthcare provider, and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 3: None of the demographic variables of (a) age, (b) marital status, (c) level of education, (d) number of years lived in the United States, or (e) having a healthcare provider, have a statistically significant association with the dependent variable construct of adherence.

Alternative Hypothesis 3: At least one of the demographic variables of (a) age, (b) marital status, (c) level of education, (d) number of years lived in the United States, and/or (e) having a healthcare provider, have a statistically significant association with the dependent variable construct of adherence.

Conclusion as Relates to Null Hypothesis 3

Statistically significant correlational findings were noted for the variable of adherence and the demographic variables of age group ($r = -.201$, $p = 001$), marital status ($r = .145$, $p = .018$), level of education ($r = .242$, $p < .0005$), and regular healthcare provider ($r = .170$, $p = .005$). Only the variable of regular healthcare provider was statistically significant in the regression model (OR $= 2.49$, $p = .041$). The odds ratio of 2.49 indicated that women with access to a regular healthcare provider were about 149% more likely to be adherent than women without a regular healthcare provider, controlling

for other predictors in the model. The significant findings suggest that decreases in age groups are associated with greater adherence to BSE, and that being married, higher levels of education, having a regular healthcare provider, and longer time in the United States are associated with increases in adherence to mammography guidelines.

Therefore, reject Null Hypothesis 3. There is sufficient evidence to indicate that At least one of the demographic variables of (a) age, (b) marital status, (c) level of education, (d) number of years lived in the United States, and/or (e) having a healthcare provider, have a statistically significant association with the dependent variable construct of adherence.

Research Question 4: Are there associations between cultural beliefs about modesty, attitudes towards preventive health care, and mammography adherence among Cameroonian immigrant women?

Null Hypothesis 4a: There is not a statistically significant association, or a positive association, between the HBM construct of cultural barriers to screening and the dependent variable construct of adherence.

Alternative Hypothesis 4a: There is a statistically significant negative association between the HBM construct of cultural barriers to screening and the dependent variable construct of adherence.

Conclusion as Relates to Null Hypothesis 4a

The variable of cultural barriers to screening was statistically significant as relates to the variable of adherence in the correlation analysis ($r = -.324$, $p < .0005$), but not in the regression analysis. The negative correlation suggested a negative association

between the women's perceived cultural barriers to BSE and adherence to BSE guidelines, such that lower perceived cultural barrier to BSE were associated with greater adherence.

Therefore, reject Null Hypothesis 4a. There is sufficient evidence to indicate that there is a statistically significant negative association between the HBM construct of cultural barriers to and the dependent variable construct of adherence.

Null Hypothesis 4b: There is not a statistically significant association, or a negative association, between the HBM construct of cues to action and the dependent variable construct of adherence.

Alternative Hypothesis 4b: There is a statistically significant positive association between the HBM construct of cues to action and the dependent variable construct of adherence.

Conclusion as Relates to Null Hypothesis 4b

The variable of cues to action was statistically significant as relates to the variable of adherence in the correlation analysis ($r = .235$, $p < .0005$), indicating that greater self-care for health was associated with greater adherence to BSE guidelines. The relationship was not statistically significant in the regression analysis.

Therefore, reject Null Hypothesis 4b. There is sufficient evidence to indicate that there is a statistically significant positive association between the HBM construct of cues to action and the dependent variable construct of adherence.

Research Question 5: Are there demographic and theoretical variables that best predict adherence to mammography screening guidelines?

Null Hypothesis 5a: There are no demographic or theoretical variable that best predicts adherence to mammography screening guidelines.

Alternative Hypothesis 5b: There are demographic or theoretical variable that best predicts adherence to mammography screening guidelines.

Multiple Logistic Regression Analysis

The variable of adherence to mammography screening guidelines (Adherence) was used as the dependent variable of the multiple logistic regression model. Adherence was dichotomously coded as adherence = 1 and non-adherence = 0. Adherence included women who answered *yes* to item G on the survey ("Have you ever had a mammogram") AND answer question H, "When was your last mammogram?" as 1 = This year, 2 = Last Year, or 3 = Two years ago. Thus, women who had a mammogram within the last 2 years or less were coded as 1 = adherence. Women who had not had a mammogram or had their last mammogram more than 2 years ago, were coded as 0 = non-adherence.

The independent demographic variable of age group included only four women who were 70-79 years of age (see Table 2). Therefore, this age group was aggregated into three ordinal categories of (a) 40-49 years (*n* = 91), (b) 50-59 years (*n* = 127, and (c) 60-79 years (*n* = 49). The independent demographic variable of marital status was aggregated into two groups for analysis as (a) married = 1 (*n* = 113) and (b) not currently married = 0 (*n* = 154). The independent demographic variables of level of education and length of time in the United States were retained as specified in Table 1. The descriptive variable of Regular healthcare provider was dichotomously coded as 1 = has a regular healthcare provider or 0 = does not have a regular healthcare provider. The items

comprising each of the seven scale scores of the Champion (1999) survey were averaged

for each participant to obtain scores with a possible range of 1 to 5 (see Table 4). Higher

values of each scale score were indicative of greater agreement with each scale's concept.

A test of the full regression model with all independent predictors against a

constant only model (no predictors, and assuming that none of the cases were

seropositive) was statistically significant, [Hosmer and Lemeshow Test, χ2 (8) = 5.95, p

= .653]. Non-significance for the Hosmer and Lemeshow Test indicates that the model is

a good fit for reliably differentiating between women who were classified as being

adherent and women who were not. The Omnibus Tests of Model Coefficients table

indicated statistical significance, χ^2 (12) = 82.22, p < .0005, also indicating that the model

with all predictors added was better fit for reliably differentiating between those who

were classified as adherent versus those who were not. A summary of the results of the

logistic regression model is presented in Table 6. Percentage accuracy in classification

(PAC) of the correct outcome category of adherence with the predictors added was

75.3%, which was an improvement over the baseline model of constant only (no

predictors) percentage correct of 56.2%.

Wald statistics indicated that two of the predictors were statistically significant for

the dependent variable of Adherence. Regular healthcare provider was significant for the

dependent variable of Adherence (OR = 2.49, p = .041). The odds ratio of 2.49 indicated

that women with access to a regular healthcare provider were about 149% more likely to

be adherent than women without a regular healthcare provider, controlling for other

predictors in the model. Susceptibility was significant for the dependent variable of

Adherence (OR = 1.58, p = .029). The odds ratio of 1.58 indicated that for each 1 unit

increase in the susceptibility scale score, women were about 58% more likely to be

adherent, controlling for other predictors in the model. Benefits of mammography was

significant for the dependent variable of adherence (OR = 4.47, p < .0005). The odds

ratio of 4.47 indicated that for each 1 unit increase in the benefits to mammography scale

score, women were about 347% more likely to be adherent, controlling for other

predictors in the model.

Table 6

Results of Multiple Logistic Regression of Adherence as a Function of Independent Variable Demographics, Descriptive, and the Seven Scale Scores of the Champions Survey (N = 267)

Variable	B	SE_B	Wald χ^2	p	Odds Ratio
Age group	-0.39	0.24	2.72	.099	0.68
Marital status = married	0.11	0.32	0.12	.735	1.12
Level of education	-0.02	0.17	0.01	.914	0.98
Length of time in U.S.	-0.12	0.15	0.56	.453	0.89
Healthcare provider = yes	0.91	0.45	4.17	.041	2.49
Susceptibility	0.46	0.21	4.76	.029	1.58
Seriousness	-0.16	0.16	1.03	.310	0.86
Self-efficacy	0.01	0.22	0.01	.975	1.01
Cues to action	0.50	0.34	2.11	.147	1.64
Benefits of mammography	1.50	0.35	18.63	<.0005	4.47
Barriers to mammography	-0.58	0.34	2.96	.085	0.56
Cultural barriers to screening	-0.21	0.36	0.33	.569	0.81
Constant	-4.87	2.24	4.70	---	---

Summary

Chapter 4 began with a description of the demographics and BSE descriptive information of the participants in the study. Following the report of demographics and descriptive findings, inferential analysis variable constructs were briefly defined. Information pertaining to required assumptions for the inferential analysis was presented and discussed. Reliability information was reported for the continuous variable constructs (scale scores) used for inferential analysis.

Hypothesis testing was then performed with a series of Spearman's rank order correlations and a multiple logistic regression. Significant results were found on many bi-variate correlations and a description and tables of the results were presented (see Table 5). Access to a regular healthcare provider, and the scale scores of susceptibility and benefits of mammography, were statistically significant in the multiple logistic regression model. Statistically significant findings supported most of the research hypotheses, and only Null Hypothesis 2b was *not* rejected.

Chapter 5 will present a discussion of the Results presented in this chapter as relates to the theory and literature review of the study.

Chapter 5: Discussion, Conclusions, and Recommendations

Overview

The purpose of this study was to assess breast cancer knowledge, attitudes, and screening practices of Cameroonian immigrant women aged 40 years and older living in the Washington, DC metro area. Understanding the screening behavior of this population can assist in developing suitable outreach strategies to increasing breast cancer screening among Cameroonian woman who have immigrated to the United States. Cameroonian immigrant women need to understand the importance of breast cancer screening to address their health-seeking patterns. Also, in this study, I attempted to fill the void in the literature on breast cancer screening and knowledge in general among a population where little has been reported. To answer gaps, I assessed the influence of demographic variables (age, marital status, level of education, years lived in the United States, and having a regular healthcare provider) on obtaining a mammogram. Knowledge of breast cancer screening recommendation guidelines established by the ACS (2015) and influence of the constructs of HBM on performing BSE and obtaining a mammogram were assessed. I employed a cross-sectional study design using a questionnaire to gather data. Most of the women reported obtaining a mammogram within the last year; however, knowledge on breast cancer screening was low, with most women not knowing the best screening method. With low knowledge on the best screening method, immigrant women are at higher risk for late-stage diagnosis where treatment outcomes may not be beneficial, leading to increased morbidity and mortality. More studies are needed to explore low knowledge level regarding the best breast cancer screening method as well as

the best strategies to increase mammography uptake among this population.

Understanding factors that affect knowledge of screening and individuals' response to

constructs of the HBM may contribute to the development of targeted approaches to

improve both knowledge of screening and increase rates of mammography uptake, which

could contribute to decrease in morbidity and mortality and contribute to overall

improvement in quality of life.

Interpretation of Findings

This study addressed an important health issue that affects all women in general.

According to the ACS (2014), breast cancer is the most common cancer among women

and the second leading cause of cancer death with the highest death rates among AA

women when compared to all other racial groups. Oeffinger et al. (2015) indicated that

early detection has been shown to be associated with decreased morbidity and mortality.

These authors also stated that screening mammography was associated with a reduction

in breast cancer deaths among women aged 40 to 69 years of age across a range of

studies (Oeffinger et al.2015). Despite varying propositions on when women should start

screening, there is overall agreement that women can decide to begin screening

mammograms in their 40s, if they so choose to. Studies on immigrant women indicated

that most immigrant women do not screen (Lee et al., 2015; Shirazi et al., 2015).

However, the findings of this study revealed that the majority of these women (92.5%)

have had a mammogram at some point in their life. Also, less than half (45.8%) of the

sample population was adherent to recommended screening guidelines as defined by

having a mammogram within 2 years. The results of this study may contribute to the

development of effective strategies at engaging Cameroonian immigrant women to increase knowledge on breast cancer screening and uptake of mammography.

Adherence to recommended screening guidelines for mammography has been associated with better treatment outcomes, as well as decreased morbidity and mortality from breast cancer (NCI, 2014). Knowledge of risk factors for breast cancer and screening has been shown to increase adherence to screening and mammography uptake (Kwoh et al., 2010). From the results of this study, even though 92.5% of the women answered affirmatively when asked if they had ever had a mammogram, 50.6% were nonadherent with recommended screening guidelines, as their last mammogram was more than 2 years ago. Additionally, 71.2% of the sample population was not knowledgeable regarding the best screening method for breast cancer, as their responses indicated that breast self-exam, CBE, and mammography were best screening methods instead of mammogram. Scale scores for susceptibility was low ($M = 1.73$, $SD = 0.74$), indicating that the women tended to disagree that they were susceptible to getting breast cancer in the future. Scale scores for cues to action was high ($M = 3.94$, $SD = 0.51$), indicating that the women tended to agree with the items relating to overall health improvement and maintenance, and such could impact adherence to screening guidelines.

Descriptive and Demographic Findings from Research Questions

In this study, I focused on immigrant women from Cameroon who were 40 years and above living in the Washington, DC metro area. The total sample ($N = 267$) women was recruited through a convenience sample and responded to an online survey.

Research Question 1 addressed the relationship between knowledge of breast cancer screening and mammography adherence among Cameroonian immigrant women. I found that most of the women had obtained screening, yet most of the women were not adherent to recommended screening guidelines. Similar findings related to immigrant women not screening or adhering to screening guidelines was noted in a previous study. Ndikum-Moffor et al. (2015) noted that only 60% of their sample population of immigrant women 40 years and older reported never having a mammogram and 30% reported adherence to screening guidelines. Additionally, most of the women in the current study lacked knowledge regarding the best screening method for breast cancer. Sheppard et al. (2015) noted similar findings, with the majority of the women in their study displaying low overall knowledge on breast cancer. These findings suggest that health education for immigrant women should focus on the importance of adhering to screening guidelines and the best screening method.

Research Question 2 addressed the relationship between HBM constructs of perceived susceptibility of breast cancer, perceived severity of breast cancer, perceived barriers to mammography, and self-efficacy about breast cancer screening with mammography adherence among Cameroonian immigrant women. I found that there was a positive association between susceptibility and adherence, as women who felt they were susceptible to getting breast cancer were more likely to adhere to recommended screening guidelines. Also, a positive association was observed between self-efficacy and adherence, while a negative association was observed between barriers to mammography and adherence. There was not sufficient evidence

to indicate a significant positive association between seriousness and adherence. This finding was in line with one of the earliest studies, Champion et al. (1994), who found that women who were adherent with mammography guidelines had significantly higher scores on benefits and significantly lower scores on barriers than those who were not adherent to screening guidelines. Findings from this study suggest that emphasis should be placed on addressing barriers to mammography and enhancing self-efficacy could increase adherence to screening guidelines, as I revealed positive associations between these two constructs and adherence.

Research Question 3 addressed the association between age, marital status, level of education, number of years lived in the United States, having a healthcare provider, and adherence to recommended screening guidelines. I discovered that women with access to a regular healthcare provider were 149% more likely to adhere to screening guidelines than those without. This finding is similar to a study that addressed screening practices among first-generation immigrant Muslim women. Hasnain, Menon, Ferrans& Szalacha (2014) found that only 52% of their sample population reported adherence to mammography by indicating that they had a mammogram within 2 years. Hasnain et al. also noted that self-efficacy and perceived importance of mammography were significant predictors of obtaining a mammogram. They identified that perceived importance of mammography, years in the United States, and having a healthcare provider were strong predictors of adherence (Hasnain et al., 2014). Additionally, decreasing age, being married, and higher levels of education were associated with increases in adherence to screening guidelines

(Hasnain et al., 2014). These findings indicate significant factors that affect adherence to screening for immigrant women and shed light to aspects that could be incorporated in outreach approaches to increase adherence to breast cancer screening.

Research Question 4 addressed the associations between cultural beliefs about modesty, attitudes towards preventive health care, and mammography adherence among Cameroonian immigrant women. I discovered that lower perceived cultural barriers to mammography was associated with increased adherence to screening. Additionally, there was a statistically significant positive association between cues to action and adherence. Other studies found similar results (see Hasnain et al., 2014; Lee et al., 2015; Shirazi et al., 2015). Kwong (2016) explored the beliefs of Chinese immigrant women and their attitudes towards cancer screening. The author of this research study found that participants had low knowledge level on cancer risks, susceptibility, and seriousness with their responses heavily impacted by cultural misconceptions. The participants also reported low usage of screening services (Kwong, 2016). His findings indicated that cultural beliefs influence screening behavior towards breast cancer heath in general (Kwong, 2016). These findings suggest that incorporating culturally appropriate interventions in breast cancer health programs could increase screening and adherence.

Research Question 5 addressed if there were demographic and theoretical variables that best predicted adherence to mammography screening guidelines. I found that having a regular healthcare provider, perceived susceptibility, and perceived benefits of mammography were best predictors of adherence, as any

increases in any of these measures resulted in a likelihood of increase in adherence.

Hasnain et al. (2014), in their study of first-generation immigrant Muslim women,

determined that significant predictors of adherence included perceived importance of

mammography and having a primary care provider. These findings shed light on

screening predictors that could enhance adherence. Knowledge of these predictors

could be incorporated into breast cancer promotion programs for immigrant women.

Knowledge and Attitude Towards Breast Cancer Screening

The results of this study revealed that increased level of education and self-

efficacy were associated with greater knowledge of the benefits of breast cancer

screening. Additionally, women who had more self-efficacy in obtaining a mammogram

were motivated toward greater self-care and experienced fewer perceived cultural

barriers. These findings were consistent with results from other studies that assessed

immigrant population in the United States (see Kobeissi et al., 2014; Shirazi et al., 2009).

Screening Behavior

Adherence to screening behavior was determined by answering *yes* to having a

mammogram within the last two years, as well as the responses provide to several items

of the HBM constructs. The study results indicate that women who were classified as

adherent to breast cancer screening guidelines were in greater agreement with benefits of

mammography and felt less constrained by cultural barriers to breast cancer screening.

Also, higher levels of education were associated with lower levels of perceived cultural

barriers. Women who had lived for a longer time in the United States, and had a regular

healthcare provider, were more likely to obtain a mammogram, findings which are

consistent with similar studies on immigrant women (Lee, Stange & Ahluwali, 2014).

Greater perceived seriousness of having breast cancer was associated with greater

perceived benefit of obtaining a mammogram, and women who felt susceptible in getting

breast cancer were 58% more likely to be adherent with recommended screening

guidelines. It is important to note that cultural barriers to screening tended to impact

mammography screening in a negative way. Breast cancer screening sensitization

targeted towards this population should take into consideration length of stay in the

United States and incorporate aspects of personal risks, as well as culture, to increase

awareness to screening and uptake of screening.

Limitation of the Study

I obtained valuable information on breast cancer knowledge attitude and

screening practices of Cameroonian immigrant women living in the Washington, DC,

metro area despite the use of a convenience sample. Inability to use a randomly selected

sample could have introduced selection bias that could exclude potential survey

participants. Additionally, there could be poor recall due to the cross-sectional nature of

the study and use of a self-report questionnaire poses the potential of participants

responding in a socially and culturally acceptable manner. The study was also limited to

women living in the Washington, DC, metro area. This geographical restriction could

limit potential participants to the study. Expanding the study to women across the United

States and other immigrant women from other countries across sub-Saharan Africa, as

they share similar demographic variables with Cameroonian immigrant women, could

provide further insight knowledge, attitudes, and screening practices that impact this

population. According to Champion, (2008), the HBM provides a descriptive approach

rather than explanation, does not provide any strategy for changing health-related actions

and does not consider habitual behavior that may inform health decision making.

Champion (2008) explains that the HBM   assumes all people have access to the same

amount of health-related information and that health actions are the driving force in

making health related decision. Studies have showed that perceived susceptibility,

benefits, and barriers were consistently associated with the desired health behavior while

perceived severity was less often associated with the desired health behavior. This

limitation was observed in this study as perceived seriousness of having breast cancer did

not have a positive association with adherence to mammography. The constructs are

useful individually or in combination, depending on the health outcome of interest, but

probably using the model in combination with another model that takes into account

environmental factors and provide suggestions for changing the undesired behavior could

prove more effective. This study utilized the constructs of the HBM to assess breast

cancer screening adherence among Cameroonian immigrant women living in the

Washington DC Metro region. It is worth noting that this model does not account for all

factors that could affect screening adherence. Yao and Hillemeier (2014) indicate that

factors such as income level, access to healthcare and availability of health insurance

have been known to affect health behavior and screening among immigrant population.

Future studies on this population should consider examining these factors given evidence

suggesting that they could have a significant effect on the uptake of screening services.

Recommendation for Action and Further Study

To ensure that cancer knowledge and awareness among immigrant women living in the United States, public health practitioners and educators must assess and understand specific characteristics that could affect health behavior pertinent to the target populations, such as level of education, culture, marital status, availability of healthcare provider, knowledge of screening guidelines, self-efficacy, and susceptibility. Vast amounts of literature exist on multiple immigrant populations with sparse literature available on Cameroon immigrant population. I found that even though most women reported having a mammogram at some point in their life, a majority of the women were not adherent to screening guidelines and were not knowledgeable on breast cancer screening recommendations. Additionally, I identified significant factors that could either facilitate or hinder adherence to screening. Hence, this study can serve as the foundation through which in-depth studies can be conducted to determine specific health attributes of the target population and ways to continue to empower women to take control of their health. There have been suggestions that when it comes to health education, assessing the health literacy level of the target population enables public health practitioners to develop strategies that are tailored towards the specific population. Further studies could look at immigrant women from a specific region in Cameroon, as there are differences in health perceptions, as well as language, among the regions, which could affect overall health awareness.

Implications

Cameroonian immigrant women in the United States represent a unique population whose healthcare behavior is not well known. Considering that preventive health and screenings are not part of the public health practice in their home country raising awareness for routine screening and adherence to screening guideline is very important when designing breast health awareness programs for this immigrant population. The findings of this study suggest that emphasis be placed on education regarding knowledge of best screening methods, as well as incorporating aspects of HBM constructs of perceived susceptibility, self-efficacy, and strategies to facilitate access to a healthcare provider**.**

Social Change

Populations awareness of breast cancer screening, education and prevention modalities have been recognized locally and globally as important areas to focus on to decrease morbidity and mortality from breast cancer (CDC, 2018). Multiple health organizations and public health departments offer a broad range of initiatives geared towards breast health promotion awareness. Empowering women to take control of their health by increasing awareness to breast cancer prevention leads to early detection with potentially better outcomes and lesser disease burden overall (CDC, 2018). The results of this study may serve as foundational basis to promote development of strategies targeted towards immigrant populations to improve overall health by increasing education on breast cancer, as well as uptake of other preventive health screening services.

Theoretical Implications

The HBM has been used in multiple breast cancer related studies (Lee, Stange & Alhuwali, 2014; Shirazi et al., 2009) to assess diverse populations' knowledge and behavior regarding breast health and uptake of screening services. This study was guided by the HBM. The model proposes that people may likely engage in positive health behavior if they believe that they are susceptible to the condition and serious consequences can occur should they become affected by the condition. Other components include the existence of behavioral interventions to help mitigate the susceptible and serious condition, as well as perceived benefits of taking action that outweighs any existing barriers (Champion, 2008). Specifically, I examined perceived susceptibility of breast cancer, perceived severity of breast cancer, perceived barriers to mammography, and self-efficacy about breast cancer screening from the HBM and the dependent variable of adherence to screening. For perceived susceptibility, I found that those with higher levels of perceived susceptibility, self-efficacy, and saw less barriers to mammography were more likely to adhere to screening guidelines. Other HBM research has also obtained similar findings (Shirazi et al, 2015; Hasnain et al., 2014; Lee et al., 2015). I did not find a significant relationship between perceived seriousness and adherence to mammography, which is like other studies (Sadler et al., 2007; Poonawalla et al., 2014; Sheppard et.al., 2015). Overall, the findings of this study showed similarities with other studies and indicated that the HBM may be an important theory that can guide research and outreach practices among immigrant women.

Practice Implications

Based on the findings of this study, future research should expand this study to assess immigrant women from Cameroon across the United States so that findings can be more generalizable. Also, an in-depth examination of attitudes towards preventive care and access to health care may shed more light on factors that could be incorporated in strategies for education to improve knowledge and uptake preventive health services given the notion that routine screenings are not provided as part of the healthcare delivery system from country of origin. Expanding this study to immigrant men could prove fruitful in raising awareness on breast cancer incidence among men and could assist in increasing uptake of preventive services, which could lead to decrease morbidity and mortality among this group also. Also, further research could explore using components of the HBM in conjunction with other behavioral models, such as the theory of planned behavior, in order to better understand immigrant women beliefs and behavior as it is related to breast cancer screening and other preventive screenings.

Concluding Statement

In this study, I addressed important public health issues. Breast cancer remains the most common cancer among women and the second cause of death from cancer in the United States (CDC, 2018). Early detection through screening and diagnostic test remains the best way of addressing breast cancer to decrease invasive treatment and increase chances of survival. Educating women on screening guidelines and the importance of adherence to recommended screening guidelines should remain a priority. This study supports that notion, and the results suggests educational materials that incorporates

aspects of HBM theoretical constructs of benefits of mammography, susceptibility, and

self-efficacy could significantly increase adherence to mammography guidelines,

fostering the goal of early detection and subsequent decrease in morbidity and mortality

from breast cancer.

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Appendix A: Cover Letter

Dear Participant,

My name is Jacqueline Batcha. I am a doctoral student in public health at Walden University. I am conducting a survey to assess breast cancer screening behavior among immigrant women from Cameroon living in the Washington, DC metro area who are 40 years and above. I will greatly appreciate it if you can offer a few minutes of your time to complete this questionnaire. The purpose of this survey is solely for collection and analysis of data. Be assured that the information provided will not be used for any other purpose other than academic and to foster knowledge of breast cancer screening behavior among Cameroonian women living in the United States.

Attached to this letter is a 53-item questionnaire that I would like for you to complete. It should take about 20 minutes. The information that you provide will be kept confidential and private. There are no wrong answers to the questions. Please take your time to provide the information to the best of your ability so the information obtained can be as accurate as possible. There are no risks associated with completing or not completing the survey.

It is the hope that the results of this study will provide published data on Cameroonian women and be a foundation for future studies on health behavior of this population as well as assist health care professionals in designing programs that are tailored for immigrant women from Cameroon and other African countries with similar demographic and characteristics.

Your participation in this survey is completely voluntary. You have the right to decline to participate even after initial acceptance. Completing the survey will be considered that you have provided informed consent for the information provided to be used for this study. Results of the survey will be included in manuscripts that will be submitted to public health journals and professional organizations for the purposes of publishing to advance knowledge in the field of breast cancer screening among immigrant population. The final dissertation will be published by *ProQuest UMI Dissertation Publishing*, and you will be provided the information on how to access the link to read the dissertation if you so desire.

Please feel free to contact me at any time with any questions or concerns regarding the survey. My contact information is listed below.

Jacqueline Batcha

Appendix B: Breast Cancer Survey

Please answer the following demographic questions to the best of your ability. These questions are solely for data collection and analysis and to help describe the overall sample population of the survey. No one will be able to identify your specific responses.

Please select your best answer by circling the number that corresponds to your response.

A. Where you born in Cameroon?
  1. Yes
  2. No

B. What is your age range?
  1. 40-49 year
  2. 50-59 years
  3. 60-69 years
  4. 70-79 years
  5. 80 years and above

C. What is your marital Status?
  1. Do not wish to answer
  2. Widow
  3. Divorced
  4. Single
  5. Married

D. What is your level of education?
  1. No formal education
  2. Completed high school
  3. Some college
  4. 4 years college degree
  5. Graduate degree

E. How long have you lived in the United States?
  1. 0-4 years
  2. 5-9 years
  3. 10-14 years
  4. 15-19 years
  5. 20 years plus

F. Do you have a regular healthcare provider?
1. Yes
2. No.

G. Have you ever had a mammogram?
1. Yes
2. No

H. When was your last mammogram?
1. This year
2. Last year
3. Two years ago
4. Three years ago
5. More than three years ago

I. Which one is the best screening method?
1 Breast self-exam
2. Clinical breast exam
3. Mammogram
4. All of the above
5. None of the above

The next set of questions below are meant to understand your feelings and thoughts regarding chances of getting breast cancer and screening for breast cancer. Please circle one answer for each question from 1 for "strongly disagree" through 5 "strongly agree." that best describes your feelings or understanding.

Section A: **Susceptibility**

A. It is extremely likely that I will get breast cancer in the future.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

B. I feel I will get breast cancer in the future.
1. Strongly disagree
2. Disagree
3. Neutral

4. Agree
5. Strongly agree

C. There is a good possibility I will get breast cancer in the next 10 years.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

D. My chances of getting breast cancer are great.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

E. I am more likely than the average woman to get breast cancer.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

Section B: Seriousness

A. The thought of breast cancer scares me.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

B. When I think about breast cancer, my heart beats faster.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

C. I am afraid to think about breast cancer.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

D. Problems I would experience with breast cancer would last a long time.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

E. Breast cancer would threaten a relationship with my boyfriend, husband, or partner.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

F. If I had breast cancer my whole life would change.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

G. If I developed breast cancer, I would not live longer than 5 years.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

Section C: Benefits of BSE

A. When I do breast self –examination I feel good about myself
1. Strongly disagree
2. Disagree

3. Neutral
4. Agree
5. Strongly agree

B. When I complete monthly breast self-examination, I don't worry as much about breast cancer.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

C. Completing breast self-examination each month will allow me find lumps early.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

D. If I complete breast self-examination monthly during the next year, I will decrease my chance of dying from breast cancer.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

E. If I complete breast self-examination monthly, I will decrease my chances of requiring radical or disfiguring surgery if breast cancer occurs.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

F. If I complete monthly breast self –examination, it will help me to find a lump which might be cancer before it is detected by a doctor or nurse.
1. Strongly disagree
2. Disagree
3. Neutral

4. Agree
5. Strongly agree

Section D: Barriers to BSE

A. I feel funny doing breast self-examination
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

B. Doing breast self-examination during the next year will make me worry about breast cancer.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

C. Breast self -examination will be embarrassing to me.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

D. Doing breast self-examination will take too much time.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

E. Doing breast self-examination will be unpleasant.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

F. I don't have enough privacy to do breast self-examination.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

Section E: Confidence

A. I know how to perform breast self-examination.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

B. I am confident I can perform breast self-examination correctly.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

C. If I were to develop breast cancer I would be able to find a lump by performing breast self-examination.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

D. I am able to find a breast lump if I practice breast self-examination alone.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

E. I am able to find a breast lump which is the size of a quarter.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

F. I am able to find a breast lump which is the size of a dime.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

G. I am able to find a breast lump which is the size of a pea.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

H. I am sure of the steps to follow for doing breast self-examination.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

I. I am able to identify normal and abnormal breast tissue when I do breast self-examination.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

J. When looking in the mirror, I can recognize abnormal changes in my breast.
1. Strongly disagree
2. Disagree
3. Neutral

    4. Agree

    5. Strongly agree

K. I can use the correct part of my fingers when I examine my breasts.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

Section F: Health Motivation

A. I want to discover health problems early.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

B. Maintaining good health is extremely important to me.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

C. I search for new information to improve my health.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

D. I feel it is important to carry out activities which will improve my health.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

E. I eat well balanced meals.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

F. I exercise at least 3 times a week.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

G. I have regular health check-ups even when I am not sick.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

Section G: Benefits-Mammogram

A. When I get a recommended mammogram, I feel good about myself
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

B. When I get a mammogram, I don't worry as much about breast cancer.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

C. Having a mammogram or x-ray of the breast will help me find lumps early.
1. Strongly disagree
2. Disagree

3. Neutral
4. Agree
5. Strongly agree

D. Having a mammogram or x-ray of the breast will decrease my chances of dying from breast cancer.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

E. Having a mammogram or x-ray of the breast will decrease my chances of requiring radical or disfiguring surgery if breast cancer occurs.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

F. Having a mammogram will help me find a lump before it can be felt by myself or a health professional.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

Section H: Barriers to Mammogram

A. Having a routine mammogram or x-ray of the breast would make me worry about breast cancer.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

B. Having a mammogram or x-ray of the breast would be embarrassing.
   1. Strongly disagree

2. Disagree
3. Neutral
4. Agree
5. Strongly agree

C. Having a mammogram or x-ray of the breast would take too much time.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

D. Having a mammogram or x-ray of the breast would be painful.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

E. Having a mammogram or x-ray of the breast would cost too much money.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

Section I: Cultural Barriers to Screening Scale

A. I feel uncomfortable talking about my body or breast with a doctor or nurse.
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

B. I would feel embarrassed with a doctor examining my breast as part of medical exam.
1. Strongly disagree
2. Disagree

3. Neutral
4. Agree
5. Strongly agree

C. I am modest about my body even if it involves a health examination.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

D. I would feel embarrassed examining my own breast for lumps.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

E. I only see a doctor when I am having a health problem.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

F. I don't think preventive health care is useful.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

G. I believe that breast cancer screening is important.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly agree

The above scale is divided into the following sections:
Section A. Questions A-E relate to the HBM construct of susceptibility
Section B. Questions A-G relate to the HBM construct of seriousness
Section C. Questions A-F relate to the HBM construct of benefits of BSE
Section D. Questions A-F relate to the HBM construct of barriers to BSE
Section E. Questions A-K relate to the HBM construct of self-efficacy (confidence)
Section F. Questions A-G relate to the HBM construct of cues to action (health motivation)
Section G. Questions A-F relate to the HBM construct of benefits of mammography
Section H. Questions A-E relate to the HBM construct of barriers to mammography
Section I. Questions A-G relate to cultural barriers to screening

Appendix C: Invitation to Participate

Hello, would you like to participate in a research study on breast cancer screening?

Please visit the following link at Survey Monkey for more details.

https://www.surveymonkey.com/r/healthscreeningsurvey

You must be 40 years and older to participate