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Dr. Kenneth Feldman, Committee Chairperson, Health Services Faculty

Dr. Kim Sanders, Committee Member, Health Services Faculty

Dr. Shingairai Feresu, University Reviewer, Health Services Faculty

The Office of the Provost

Walden University
2019

Abstract

Breast Cancer Screening Knowledge and Beliefs of Nigerian Women Living in the

United States

by

Enobong Clement Utin

MSN, University of Phoenix, 2010

BSN, University of Nigeria, 1990

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Community Health

Walden University

September 2019

Abstract

Breast cancer is one of the leading causes of death and disability globally. Although mammogram has been identified as a significant breast screening tool in the United States, researchers have indicated that African-born women in the United States are diagnosed with advanced stages of breast cancer because of underutilization of mammogram from diverse reasons. The purpose of this quantitative study was to determine the association of demographic factors, breast cancer knowledge, health beliefs, and the utilization of mammogram among Nigerian women, 40 years and older in the United States (N=200). The study was guided by the health belief model and questionnaire was the data collection instrument used. Logistic regression analysis revealed that demographic variables, specifically age and length of residency in the United States have statistically significant effect on the odds of utilization of mammogram among the Nigerian women in the U.S. at $p < 0.05$. Also, according to the study results, breast cancer knowledge has a statistically significant effect on the utilization of mammogram at $p < 0.05$. Additionally, health beliefs regarding breast cancer have significant effect on utilization of mammogram among Nigerian women 40 years and older in the U.S at $p < 0.05$. The study findings will help in developing breast health programs for immigrant women, especially Nigerians in the U.S. to make informed decisions about timely utilization of mammographic services. Furthermore, the outcome of this study could enhance research, enlighten the health providers, and policymakers to develop culture sensitive preventive breast health programs that are appropriate to diverse women populations in the United States.

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Dedication

This study is dedicated to my Lord and Savior, Jesus Christ who gave me the grace and strength to embark on and complete this academic pursuit. To Etebong, my best friend and husband, I dedicate this work to you for your unfailing love, dedication and support throughout the duration of this doctoral journey.

I also dedicate this project to the memory of my dear mother, Deaconess Jessie Essien who taught me early in life the importance of hard work, and never to give-up on my dreams.

Acknowledgments

I would like to express my sincere appreciation to my dissertation Chair, Dr. Kenneth Feldman and my committee member, Dr. Kim Sanders for their scholarly support, advise and encouragement even when I felt like giving up. I would also like to thank my University Research Reviewer, Dr. Shingairai Feresu for her timely review and insightful recommendations.

Special thanks to the love of my life, my husband, Etebong, who encouraged me to embark on this dissertation journey. Etebong, you have remained my biggest fan, my encourager when I felt like giving up, and you believed in me, prayed for me ceaselessly even when I doubted my capabilities. To my children, Mfonobong, Edidiong, Utibe and Idara, I thank you all for your encouragement, and motivation to stay focused.

Thanks to my sister, Deaconess Uduak for her prayers and words of encouragement during my dissertation journey. To all my friends who encouraged and believed in me, I sincerely express my heartfelt gratitude to them all.

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Chapter 1: Introduction to the Study

Background

Breast cancer remains a significant global cause of cancer death and disability, and one of the most commonly diagnosed cancers in women, irrespective of race and ethnicity (Hasnain, Menon, Ferrans, & Szalacha, 2013). Early breast cancer detection through screening has been proven to be the key to reducing mortality and morbidity rates caused by this disease (American Cancer Society [ACS], 2017). Although there has been an overall decrease in the mortality rate from breast cancer in the United States, the racial disparity gap continues to widen with a 39% higher breast cancer mortality rate recorded among the African American women than their Caucasian counterparts (ACS, 2017). Underutilization of mammography screening among immigrant women in the United States is reported to be associated with lower breast cancer knowledge, negative cultural beliefs, lower English proficiency, and lack of health insurance (Wallace, Torres, Beltran, & Cohen-Boyar, 2013). Disparities in health services translate into higher breast cancer burden among the African-born women with resultant underutilization of breast health services. Disparities impact access and use of care, socioeconomic status, knowledge, and development of positive attitudes towards preventive breast health services (Smith, Conway-Phillips, & Francois-Blue, 2015).

Furthermore, many U.S studies about breast health tend to lump both the African American and African born immigrant women together, ignoring the important cultural differences that ultimately affect their breast screening practices (Ndukwe, Williams, & Sheppard, 2014). Nigerian women are at risk of being diagnosed with late stages of breast

cancer because at baseline, they are more familiar with treating diseased condition than prevention; a practice that is common in their home country (Ogunsiji, Kwok, & Fan 2017). There is a dearth of studies about breast health among African-born immigrant women in the United States, specifically Nigerian women, even though Nigerians are among the fastest-growing populations in the United States (Migration Policy Institute, 2015). Without determining the underlying factors that impact early breast cancer screening utilization among Nigerian women in the United States, breast cancer will continue to be diagnosed in advanced stages with fatal outcomes.

The study employed quantitative inquiry to assess the knowledge level, demographic factors, and health beliefs of Nigerian women, 40 years and older in the United States towards the utilization of mammogram. The goal of this study was to advance a social change by creating awareness of the significance of preventive and timely mammogram screening behaviors among Nigerian communities and other minority women populations in the U.S. Additionally, the study outcome might enlighten health care providers and policy-makers in the U.S. about developing culturally sensitive health policies that would address the immigrant women populations' breast health needs.

Problem Statement

Most breast cancer mortality occurs in women diagnosed in late stages of the disease due to lack of knowledge, cultural and religious beliefs, and other barriers to regular breast cancer screening (World Health Organization [WHO], 2017). American Cancer Society (2016) estimated that 3.1 million U.S. women survived breast cancer in 2015. Most breast cancer survival was reported among the American born women than

the immigrant women populations (Harcourt et al., 2014). Low utilization of breast cancer screening services by African immigrant women in the United States stems from their migrating from countries with limited access to health care services. It is therefore natural for them to not giving priority to preventive breast health and early detection services (Harcourt et al., 2014).

Other barriers such as negative attitudes and cultural values, difficulty in navigating the seemingly complex U.S. health care system, lack of English proficiency, and fatalism have been reported as factors that lead to underutilization of mammographic screening services among the African born immigrants (Gondek et al., 2015; Kwok et al., 2016). It is pertinent to note that African-born immigrants represent one of the fast growing but the most vulnerable populations in the United States because of limited research studies about their health behaviors and breast health care needs (Pinder, Nelson, Eckardt, & Goodman, 2016). Most cancer-specific studies about health behaviors and interventions are generally combined with data from African American women, African born immigrant women, and Caribbean born women populations. Findings from such studies lead to data extrapolation and misleading outcomes that do not inform population specific interventional approaches (Hurtado-de-Mendoza et al., 2014).

Furthermore, the study by Pinder et al (2016) on women from various African regions living in the United States between 2008 to 2012 indicated that Nigerian women had the highest breast cancer incidence rate of 50.4 per 100,000 population due to delay in seeking preventive breast screening services. It was therefore projected by the researchers that by 2030, breast cancer incidence rate among Nigerian women in the

United States might double with high mortality rate. The researchers, therefore, recommended further studies and development of strategic interventions to reach out to this population. This present study was necessary to address the gap in the research literature about the underlying factors that drive the Nigerian women in the United States health behaviors about delayed utilization of breast screening services, specifically mammogram. An understanding of such factors could add relevance to research and practice of public health. It could also create awareness of breast cancer and timely screening measures among immigrant women, especially Nigerian women in the United States.

Purpose of the Study

The purpose of this descriptive quantitative study was to determine the knowledge level of breast cancer, demographic factors and health beliefs held by Nigerian women living in the United States towards the utilization of mammographic screening. Addressing the factors that impede optimal utilization of breast cancer screening services, specifically mammogram would inform public health services and primary health care providers on how to reach out to this population and other immigrant groups in the United States with culturally sensitive interventions. Also, the outcome of this study would add knowledge that may inform policymakers on how to develop health policies that promote comprehensive preventable breast health services with improved access for all women in the U.S. Furthermore, the outcome of the study might serve as a tool to enlighten both the Nigerian populace in diaspora and their home government on the

significance of preventive breast health care services for early detection of breast cancer. Finally, the knowledge gained from the study would empower and educate women, specifically immigrant women in the United States on how to take personal responsibilities in making informed health decisions that promote optimal health behaviors.

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Research Questions and Hypotheses

Research Question 1: What association exist between demographic factors (age, level of education, marital status, level of income, and length of stay in the U.S.) and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.?

$H_0$1: There is no statistically significant association between demographic factors of Nigerian women (40 years and older) in the U.S. and the use of mammographic services.

$H_1$1: There is a statistically significant relationship between demographic factors and the use of mammographic services among Nigerian women (40 years and older) in the U.S.

Research Question 2: What relationship exists between breast cancer knowledge and utilization of mammographic services among Nigerian women aged 40 years and older in the U.S.?

$H_0$2:.There is no statistically significant relationship between breast cancer knowledge and utilization of breast cancer screening services among Nigerian women (40 years and older) in the U.S.

H_a2:.There is a statistically significant relationship between breast cancer knowledge and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.

Research Question 3: What is the relationship between health beliefs held by Nigerian women (40 years and older) in the U.S. towards breast cancer and the utilization of mammographic service?

$H_0$3: There is no statistically significant relationship between beliefs held by Nigerian women in the U.S. (40 years and older) and the utilization of mammographic services.

H_a3: There is a statistically significant relationship between beliefs held by Nigerian women in the U.S. (40 years and older) and utilization of mammographic services.

Theoretical Framework

The theoretical framework for this study was based on the health belief model (HBM). This model is a psychosocial model which theorizes that people's likelihood of engaging in a specific health behavior is dependent upon their perception of susceptibility to the condition and its seriousness; the course of action to be taken; benefits of such action, and perceived efficacy (Glanz, Rimer, & Viswanath 2015). The constructs of this model have been used in many studies to predict breast cancer screening utilization

behaviors (Elias, Bou-Orm, & Adib, 2017). It is therefore believed that this theoretical

framework was appropriate in providing guidelines for the research questions and

facilitating understanding about the Nigerian women's perception and behavior towards

breast cancer screening utilization.

The six HBM constructs and how they relate to the adoption of a health behavior

was as follows: Perceived susceptibility, which refers to the fact that individuals would

likely engage in a health behavior if they perceived vulnerability (Koh, Choi, & Cho,

2016). Perceived severity: This refers to the belief about the seriousness of the diseased

condition if contracted (Glanz et al., 2015). The perceived threat is brought about by the

combination of perceived susceptibility and severity, which may cause the individual to

seek a solution. When relating this construct to breast cancer, the individual might seek

help if the possibility of breast cancer was deemed threatening. Perceived benefit refers to

the belief about having a positive outcome if the recommended health behavior is

engaged (Glanz et al. 2015). Perceived barriers refer to both tangible and intangible

obstacles such as cost, inconvenience, fear that could prevent the individual from

engaging in the recommended health behavior (Glanz et al. 2015). Cues to action

construct refer to those triggers that could instigate the individual's action. Cues could be

internal such as feeling a symptom (breast lump) that heightens the threat or external cues

such as having a recommendation by the health provider, listening to media publicity

about the seriousness of breast cancer or knowing someone with the diseased condition (a

family member diagnosed with breast cancer) (Glanz et al. 2015). Finally, self-efficacy

refers to the belief that an individual develops that the recommended health behavior can be taken with confidence (Glanz et al 2015).

Nature of Study

This study was a cross-sectional, descriptive design that used a quantitative methodology (Creswell, 2014). As a quantitative study, a statistical analysis method was utilized to answer the research questions and test the hypotheses. Also, using the quantitative methodology for this study allowed for the generalization of the study findings to the Nigerian women population living in the United States.

Definitions of Terms

For this study, the key terms were defined as follows:

Breast cancer: A malignant tumor that can occur in the lobules or milk-producing glands or in the ducts that connect the lobules to the nipple (ACS, 2017).

*Nigerian Women in the United States***:** Nigerian-born immigrant women living in the U.S aged 40 years and older.

Breast cancer screening: Searching for cancer cells before the symptoms are evident, so that it could be easier to treat cancer before spreading. It includes breast self-examination, clinical breast examination, and mammogram (NCI, 2017). The recommended screening by ACS is mammogram (ACS, 2017).

Mammographic utilization: In the context of this study, it means using breast cancer screening services, specifically mammogram (Kwok et al., 2016).

*Knowledge***:** Having the right information or having awareness about breast cancer screening, which may or may not influence the use of such services (Doumit, Fares & Arevian, 2017).

Mammogram: An x-ray of the breast to look for changes in the breast tissues, which may show early signs of breast cancer before it is palpated as a lump or spreading. The recommended age to begin mammogram is age 40 years (ACS, 2017).

Demographic variables refer to age (40 years and older), marital status, level of education, level of income, and length of stay of Nigerian women in the U.S.

Assumptions of the Study

The assumptions of the study were based on the following: Breast cancer would continue to be one of the leading causes of cancer deaths among minority women, especially Nigerian women in the U.S. unless appropriate awareness about breast cancer was made, and utilization of breast cancer screening services, specifically mammogram was promoted (Olajide et al., 2014). It is therefore assumed that the outcome of this inquiry could provide the necessary knowledge needed to facilitate the development of breast health programs that might promote participation in breast cancer screening utilization programs among the Nigerian women in the U.S. and other minority women populations. Furthermore, it is assumed that through this study, health providers and policymakers could be well informed to create culturally sensitive and sustainable preventive health programs that promote optimal breast health among minority and immigrant women in the U.S.

Scope of the Study

In this quantitative study, 200 Nigerian women, 40 years and older were conveniently selected from the 3 randomly selected cities from the 10 U.S. cities with the highest Nigerian population. These 3 cities were Baltimore, Atlanta and Houston. Questionnaire was the instrument used to gather data from the study participants on their breast cancer knowledge, demographic factors and health beliefs about breast cancer and utilization of mammographic screening.

Limitations

The study was limited to a sample population of Nigerian women (40 years and older) selected from 3 American cities. The use of convenience sampling technique in selecting the study participants might have had an impact on the external validity of the study, therefore, the generalization of the study findings on the Nigerian women population in the U.S. was done with some level of caution. Furthermore, this study relied on a self-report survey about demographic factors, knowledge and beliefs about breast cancer and mammogram utilization. There might have been the possibility of some women not giving an accurate report about their breast screening behaviors, specifically the use of mammogram.

Delimitations

The study centered only on Nigerian women living in the U.S. who were of the recommended age for mammogram, based on the ACS guidelines of 40 years of age and older. The focus of the study was to determine the demographic factors, breast cancer knowledge level, and health beliefs' impact on mammogram utilization. The study

participants were conveniently sampled from three randomly selected U.S. cities with the highest Nigerian population. The questionnaire was used as the instrument for data collection.

Significance of the Study

With public health emphasis on disease prevention and health promotion, this study was relevant to address this under-researched and under-represented population about the risks of delayed breast cancer screening, specifically mammogram and factors that impede proper utilization of such service. Findings from this study provided the needed insight into the necessary processes by which Nigerian women in the U.S. could be well informed about proper use of breast health services through community-based health campaigns. Such campaign effort would promote appropriate knowledge, and development of positive health beliefs toward utilization of preventive breast health services with sustainable positive change.

Significance to Social Change

The outcome of this study was to enlighten the public health workers and personal care providers to focus on developing breast health programs and strategies to educate immigrant women populations, especially Nigerians on the significance of making informed decisions about the utilization of regular mammographic services.

Summary and Transition

Chapter 1 presented the foundation of the study with focus on high breast cancer burden among the immigrant women, especially those from the African continent specifically Nigerians in the U.S. Research studies indicated that the African women's

participation in breast cancer screening remains poor both in their home countries and in developed countries that they reside due to several factors (Ogunsiji et al. 2017). Such factors that promote health disparities among Nigerian women in the U.S., with subsequent low utilization of breast cancer screening, specifically, mammogram and late detection of breast cancer become a cause of concern. This quantitative descriptive study was therefore intended to determine the demographic factors, breast cancer knowledge level, health beliefs towards breast cancer and how these factors impact the utilization of mammogram. The chapter presented an overview of the study and the theoretical framework that underpinned the conduct of the research study. Chapter 2 presented the relevant literature that buttressed the need for the study.

Chapter 2: Literature Review

Introduction

Breast cancer is one of the most frequently occurring cancers among women, affecting over 1.5 million women globally with a high fatality rate each year (ACS, 2017). As reported by WHO (2017), 570,000 women died from breast cancer in 2015. This figure translated to approximately 15% of cancer-related deaths caused by breast cancer alone.   Many factors influence the risk of developing breast cancer. According to CDC (2017), being a woman and growing older is a major risk factor for developing breast cancer. For this reason, many breast cancers are diagnosed after 50 years of age. Furthermore, regions with limited resources and weak health care system, especially in the developing countries, and among the minority women populations in developed countries suffering from health disparities are oftentimes diagnosed with late stages of breast cancer because of lack of awareness, and delay in early utilization of breast screening services (WHO, 2017).

It was estimated that before the end of 2017 in the U.S., 252,710 women would be diagnosed with breast cancer, and from this number, about 40,610 women would die from this condition (ACS, 2017). Furthermore, it is documented that African American women in the U.S. have a higher incidence rate in late stages of breast cancer, and high mortality rate when compared to other ethnic groups (ACS, 2017). Some of these studies combine the data from African born immigrant women and African American women, ignoring significant cultural differences between them, which ultimately lead to data extrapolation (Ndukwe et al., 2013). This chapter presented a review of relevant literature

that supports factors that impact the use of breast screening service. Emphasis was also laid on using various sources of literature to broaden the understanding of breast cancer, its risk factors, issues that impede the utilization of breast cancer screening services among different women populations, especially minority women populations all over the world.

Literature Search Strategy

The purpose of this study focused on determining how demographic factors, breast cancer knowledge, and beliefs impact utilization of breast cancer screening services (mammogram) among Nigerian women, aged 40 years and older living in the U.S. There is need to improve breast cancer screening utilization by increasing awareness of this disease among women, especially at-risk women, such as immigrant women populations who may suffer disparities in the utilization of such services (ACS, 2017). It is also needful to examine those beliefs (cultural and religious) held about breast cancer that could either promote or are detrimental to the utilization of breast cancer screening services.

The following keywords and phrases were used in the search engines of Google Scholar and its link to Walden University library, Pub Med, MEDLINE with Full Text, Proquest Nursing & Allied Health Source, Science Direct, Psyc Test, and Cumulative Index to Nursing & Allied Health Literature (CINAHL) to search for peer-reviewed journal articles under the following headings:" knowledge and perceptions of Nigerian women and breast cancer screening;" barriers of minority women and breast cancer screening"; "attitudes and cultural beliefs of African women living in western countries

towards breast cancer"; "breast cancer screening disparities among minority women demographics and mammogram.". Search articles were limited to those published within the last 5 years.

Etiology/Risk Factors for Breast Cancer

According to the National Breast Cancer Foundation (NBCF, 2015), the exact cause of breast cancer is unknown; however, there are some predisposing causes that could link to the development of breast cancer. About a third of postmenopausal breast cancers (above 50 years) are predisposed by modifiable behavioral factors such as obesity and physical inactivity, use of menopausal hormones like estrogen are believed to promote cell proliferation with resultant DNA damage, as well as promoting cancer cell growth. Alcohol consumption, early menarche, late menopause, family history of breast or any other form of cancer tend to predispose to breast cancer development (ACS, 2017). Research has shown that obese women, especially in their postmenopausal age have a 20-40% increase in the risk of developing breast cancer when compared to women of the same age with normal body weight (NCI, 2017).

Furthermore, genetic dispositions such as inherited mutations in BRCA1 and BRCA2 are known as the most susceptible breast cancer forming genes (ACS, 2017). Women who started their menstrual periods at a younger age before 12 years of age have about 20% higher breast cancer risk when compared to women who started their menstrual period after 14 years of age. Komen (2017) based this reason on the fact that early exposure to estrogen through early menstruation exposes the breast tissues to a greater lifetime of estrogen, which is known as a risk factor to the development of breast

cancer. Lack of breastfeeding increases the risk of breast cancer. Mothers who breastfeed their babies up to six months are therefore less likely to have breast cancer than their counterparts who never breastfed their children (Gonzalez-Jimenez, Garcia, Aguilar, Padilla, & Alvarez, 2013).

Palmer et al. (2014) reported that breastfeeding is effective in lowering the risk of estrogen receptor-negative breast cancers. When compared to Hispanic women, Caucasian and African American women tend to have a higher risk of developing breast cancer because Hispanic women are likely to have children at a younger age than their Caucasian and African-American counterparts (Gonzalez-Jimenez et al., 2013). Being pregnant after 30 years of age and starting menopause after 55 years of age leads to long exposure to estrogen later in life, which increases the risk of developing breast cancer (Komen, 2017). Among younger women under 40 years of age, African American and African born immigrant women have higher rates of breast cancer when compared to their Caucasian counterparts (Komen, 2017). The reason behind these differences is based on race/ethnicity, which could be related to reproductive and lifestyle factors. However, these are inconclusive findings that are under investigation (Komen, 2017).

Staging and Grading of Breast Cancer

Cancer staging during the time of diagnosis characterizes an important predictor of cancer morbidity, mortality, and long-term survival (Miller, Royalty, White, & Richardson, 2015). The staging and grading of breast cancer are relevant for the medical team to determine the best means to diagnose, and the best approach to treat the patients. To stage cancer, the medical provider assesses the size of the tumor to determine if it has

spread to other areas of the body by using a systematic measurement known as the tumor nodes metastasis system (Miller et al., 2015). The staging of breast cancer is therefore categorized from one to four based on the size of the cancer tumor, the number of lymph nodes affected and the extent of the cancer cells invading or metastasizing to other organs of the body (National Breast Cancer Foundation [NBCF], 2015).

At stage 0 to 1, the cancer cells are confined to a limited area of the affected breast. In the second stage, although the cancer cells are confined to the breast, there is an indication that the cancer cells have grown to affect both the local and regional lymph nodes (Miller et al., 2015). The third stage is deemed an advanced stage of breast cancer because there is evidence of cancer invading the surrounding tissues to the breast. The fourth or the final stage shows that the cancer cells have invaded or metastasized to other parts of the body (NBCF, 2015). As related to the grading of breast cancer, consideration is given to factors that indicate the aggressiveness of cancer. According to the Canadian Cancer Society [CCS] (2014), breast cancer can be graded into grade 1 (low grade), which indicates a well-differentiated cancer tumor that grows slowly and spread less quickly. In stage 2 (intermediate grade), the cancer cells are moderately differentiated and spread quicker than the first grade. Grade 3 (high grade) breast cancer cells are poorly differentiated cells that have the capability to grow faster and likely to spread quicker than other grades (NBCF, 2015).

Prevalence and Mortality Rates for Breast Cancer

A female living in the U.S. has a 1 in 8 lifetime likelihood of being diagnosed with breast cancer, compared to 1 in 11 risks that were experienced in the 1970s (ACS,

2017). The increase in the risk is likely related to longer life expectancy, changes in reproductive patterns, use of postmenopausal hormones, the rising rate of obesity, and increase rate of breast screening (ACS, 2017). As related to race and ethnicity in the U.S., mortality rate incidence from breast cancer is higher among Caucasians and African American women than Asian and Islander women (Komen, 2017). However, the Caucasian women have a higher breast cancer rate between ages 65 and 84 years of age; whereas the African American women have a higher incidence rate before 40 years, and so more likely to die at an early age (CDC, 2016).

Between 2010 to 2014 in the U.S., African American women overall had the highest mortality rate from breast cancer at 29.2 per 100,000 population; the Caucasian women at 21.2 per 100,000 population; Asians/Pacific Islander women at 11.3 per 100,000 population; American Indians/Alaskan Native women at 14.1 per 100,000 and Hispanic women at 14.4 per 100,000 population. The average mortality rate from all races in the U.S. stood at 21.2 per 100,000 population. It is significant to note that the highest breast cancer mortality rate is among women between 55 to 64 years of age. Men could also develop breast cancer (National Institute of Health [NIH], 2017). The rate of breast cancer occurrence in the U.S. varies according to race/ethnicity and other risk factors. Caucasian women have the highest incidence rate of breast cancer at 127.7 per 100,000 women population with a lifetime risk of 13%; followed by African American women at 125.1 per 100,000 women population with a lifetime risk of 11%, Asian and Islander women stands at 98.5 per 100,000 women population with a lifetime risk of 11%

Hispanic women at 93.1 per 100,000 women population with a lifetime risk of 10%, and American Indians/Alaska native at 82.2 per 100,000 population and a lifetime risk of 8%.

It is significant to reflect on the prevalence of breast cancer in Nigeria, which is the home country of the study participants. Nigerian breast cancer prevalence and mortality rates have been an increasing public health problem. According to Morounke et al. (2017), Nigeria recorded an estimated breast cancer prevalence rate of 116 per 100,000 population and estimated new cases of 27,840 annually. The estimated breast cancer data is likely inaccurate because the cancer statistical data is retrieved from cancer registers of some hospitals that keep such records (Morounke et al. 2017). Also, low level of breast cancer awareness, misconceptions about causes of breast cancer and treatment are major reasons that most women with breast cancer do not seek timely breast cancer screening/treatment until breast cancer advances to late stages (Morounke et al. 2017). The Nigerian women delay in seeking preventive breast health services is equally reflected in their record of the highest breast cancer incidence rate of 50.4 per 100,000 population among African immigrant women living in the U.S. (Pinder et al., 2016). Low level of breast cancer knowledge was identified as one of the major reasons they did not seek timely breast care services (Pinder et al., 2016).

The Effectiveness of Breast Cancer Screening

Early breast cancer screening of female breasts has been identified as the most effective means to identify precancerous changes in the breast before it becomes malignant (Miller et al. 2015). Delay with early breast screening results in high morbidity and mortality rate and high economic loss to the nation. Due to the devastating effects of

delayed breast and cervical cancer screening to women in the U.S., the government

enacted the National Breast and Cervical Cancer Early Detection Program (NBCCEDP)

in 1990 to provide access to timely breast and cervical cancer screening and diagnostic

services to low-income, uninsured and underserved women (CDC, 2017). The

NBCCEDP from its inception has supported about 12.7 million women in the U.S. to

screen for breast and cervical cancer. In 2016, the program provided breast cancer

screening and diagnostic services to 290,095 women. From this number, 2,639 women

were diagnosed with invasive breast cancer; while 829 women were detected with

premalignant breast lesions (CDC, 2017). Early breast cancer screening is an essential

and lifesaving service that could prevent avoidable death from breast cancer to all

women, especially among the at-risk women populations. As reported by CDC (2017),

most breast cancer death occurs disproportionately among women with no regular source

of health care, women without health insurance, and women who immigrated to the U.S.

The implementation of the Affordable Care Act was to expand health services

focus and increase access to preventive health care. Nevertheless, evidence shows that

many women in the U.S. are not receiving breast cancer screening services due to such

barriers as: geographic isolation, limited health literacy, lack of provider

recommendation, lack of health insurance coverage, lack of self-efficacy, inconvenient

times to access services, language barriers and low-income level (CDC, 2017; HHS,

2016). Breast cancer screening guidelines have been issued in the U.S. by ACS, U.S.

Preventive Services Task Force (USPSTF), and American College of Obstetricians and

Gynecologists (ACOG). Their guideline recommendations on the ages to commence

breast self-examination, clinical breast examination and mammography differ. However, as reported by Miller (2017), the three organizations recommend routine annual or biennial mammogram breast screening in asymptomatic, average-risk women from 40-49 years to 74 years of age.

This study used the American Cancer Society breast cancer screening recommendations that women between ages 40 to 54 years of age should have an annual mammogram; women from 55 years and older should have a biennial mammogram as the recommended guideline (ACS, 2017). The ACS breast cancer screening focus is on finding breast cancer early and getting a state-of-the-art-cancer treatment to prevent death from it. The importance of such focus lies on the fact that breast cancer that is diagnosed early when it is small and localized in the breast, is easier to treat successfully. For this reason, getting regular screening services is the most reliable way to diagnose breast cancer early for women with average and high risk of breast cancer (ACS, 2017). The goal of breast cancer screening is to detect breast cancer early when symptoms like breast lumps are not even palpated. By such screening and diagnosis of breast cancer, the prognosis of the treatment is likely to be positive than detecting the disease when the symptoms are palpable in the breast tissues. However, ACS supports clinical breast examination and breast self-examination even though they are not considered as evidence-based methods of diagnosing breast cancer early (ACS, 2017).

Breast Cancer Screening Modalities

Breast Self-Examination

The goal of BSE is for women to get familiar with how their breasts usually look and feel. According to CDC (2017) being familiar with the contour of the breasts, and how they feel can help the woman notice any symptoms, such as lumps, pain or change in the size of the breast. They should not hesitate to report any changes to their healthcare providers. Every woman is encouraged to start performing breast self-examination from the age of 20 years every month after the menstrual period when the breasts are less tender or swollen. Health care provider's advice could be sought on the proper technique of examining the breasts and what to look for. However, research showed that there is little evidence that supports that this test helps to find breast cancer early than a mammogram (ACS, 2017).

Clinical Breast Examination

Clinical breast examination (CBE) is a physical breast examination conducted by the health provider often during the woman's physical check-up. According to Komen (2017), the National Comprehensive Cancer Network (NCCN) has recommended that a trained provider should carefully feel the woman's breasts, the underarms and the areas below the clavicle for changes and such abnormalities like lumps. Different positions of sitting up and lying down by the woman are assumed during the visual and physical examination of the breasts. Women are encouraged to request for CBE if their healthcare providers do not routinely perform it during their annual physical examination. NCCN (2017) recommended annual CBE at the age of 25 years and to continue as an adjunct to

a mammogram. CBE may detect early palpable signs of breast cancer; which could lead to early therapy. An abnormal CBE or false positive result requires a follow-up with a mammogram for the presence of breast cancer (Komen, 2017). It is worth noting that American Cancer Society does not recommend CBE for breast cancer screening because there is insufficient scientific evidence to support it as being effective early breast cancer detection tool (ACS, 2017).

Mammogram

Mammogram is the x-ray of the breast tissues. It is considered the best and the most reliable recommended method of screening for breast cancer. It is recommended by the ACS that women with high risks for breast cancer, such as women with mothers or siblings who had breast cancer should start annual mammogram from age 40 to 54 years of age. From 55 years, women could choose to continue with the annual mammogram or switch to every other year (biennial). This test should continue if the woman is in good health and is expected to live 10 years or longer (ACS, 2017). Women with an average risk of breast cancer are recommended to start annual mammogram from 45 to age 54 years. They should continue biennially from 55 years of age. A regular mammogram is very helpful to identify breast cancer early before physical symptoms develop. It is evident that breast cancer found early with a mammogram is less likely to be treated aggressively with mastectomy and chemotherapy. Also, the possibility of cure is very high (ACS, 2017). However, the U.S. Preventive Services Task Force, an expert group that reviews research findings recommended that mammogram should start from age 50 years after the American College of Physicians recommendation, and to continue to 74

years of age. No evidence of benefit is found at 75 years and older (Zuckerman &

Mazzucco, 2016).

Theoretical Framework

HBM was the theoretical framework that provided the foundation for this study.

Its constructs underpin the independent variables that could impact the utilization of

mammogram. According to Glanz, Rimer, and Viswanath (2015), HBM has many

constructs that explain the engagement of the necessary health behaviors people could

adopt to prevent, detect or control disease conditions.

Origin of Health Belief Model

HBM is a psycho-social model and one of the most commonly used theories of

health education and health promotion, developed in the 1950s to explain and predict

health behaviors (Conner & Norman, 1996). HBM gave an understanding as the reason

people were not participating in the medical screening programs by the U.S. Public

Health Services, especially for tuberculosis. (Hochbaum, 1958). The HBM focuses on the

attitudes and beliefs of individuals with the underlying concept that people's health

behavior is determined by the individual personal beliefs or perceptions about the

diseased condition, and the strategies made available to decrease the occurrence of such

condition (Glanz et al. 2015). The components of the HBM are built on the premise that

people are likely to engage in an expected health behavior if the following constructs are

available:

- Perceived susceptibility

- Perceived severity

- Perceived benefits

- Perceived barriers

- Cues to action

- Self-efficacy

Perceived Susceptibility

Perceived susceptibility is a predictor of health and it is based on the belief that individuals should have in realizing that they are at risk of developing a diseased condition (Glanz et al, 2015). When relating the susceptibility construct to breast cancer, a woman should believe that she is at risk of developing breast cancer before she takes the necessary steps to get breast screening services (Glanz et al. 2015). The belief values about the causes of breast cancer and treatment outcomes have a significant influence on a woman's decision to participate in breast health services. Health beliefs, specifically among the immigrant women populations are influenced by culture, which is symbolized by norms, values, and attitudes that impact health behaviors (Gonzalez et al., 2015). Given that healthy behaviors contribute to cancer risk reduction and improvement in breast cancer survival rate, there is a need for better understanding of health beliefs and health behaviors of immigrant women populations in the U.S. (Gonzalez et al., 2015).

The relevance of the belief value on breast cancer screening among African women in Australia was reported in a study by Kwok et al (2016) that despite the African women's significant level of knowledge of breast cancer, and proficiency in English language, a significant number of the study participants under-utilized breast cancer screening services because of their belief in modesty, and embarrassment in exposing

their breasts to strangers during breast screening services. Developing culturally tailored

interventions that incorporate healthy beliefs into breast cancer screening intervention

goals by defining the population risk levels is crucial to enlightening at-risk women

populations about limited utilization and poor treatment outcomes that accompany late-

stage diagnosis of breast cancer (Guilford, Mckinley, & Turner, 2017; Ogunsiji et al,

2017).

Perceived Severity

Perceived severity is a construct that refers to the belief about the seriousness of

the diseased condition if contracting or facing complications with the possibility of death

if left untreated (Glanz et al. 2015). This construct is considered by measuring the

possibility of disruption caused by the risk of the disease. The interventional strategy

should focus on the concern about the personal consequences that come with developing

breast cancer, the financial burden, psychological distress and altered appearance (Sunil,

Hurd, Deem, Nevarez, Guidry, Rios, Guerra & Jones, 2014). The strategy should aim at

providing information to enhance knowledge about the debilitating outcomes of detecting

breast cancer in its late stages (Guilford et al., 2017).

Perceived Benefits

This construct refers to the belief about the advantage or gains in taking the

recommended action that prevents or reduces the threat to a diseased condition. Sunil et

al. (2014) related the perceived benefit construct in research to the decision taken for

health action. About breast cancer, perceived benefit is measured by the belief that early

and timely breast cancer detection through breast cancer screening would lead to early

detection and a positive prognosis. For this reason, the educational program should include information about the values of early detection, as well as the peace of mind that a woman may experience for not having breast cancer because of utilizing timely mammographic service (Guilford et al., 2017). Timely breast cancer detection through mammogram would lead to early detection and a positive prognosis. For this reason, educational program should include information about the values of early detection, as well as the peace of mind that a woman may experience for not having breast cancer because of utilizing timely breast screening service (Guilford et al., 2017).

Perceived Barriers

Perceived barriers are referred to the likely obstacles in taking positive action, which could result in negative consequences from such decisions. This construct is crucial in a research study of breast cancer screening behaviors. According to Sunil et al. (2014), perceived barriers could refer to fear of pain, embarrassment from exposing one's body to a health provider (considered a stranger) for CBE or mammogram; cost in time or in monetary terms for the breast screening services or even the lack of access to breast cancer screening utilization services. Barriers could also include the fear of exposure to X-ray from a mammogram, which some women could refuse. A higher score of a perceived barrier means less likelihood of compliance with preventive breast cancer screening. There is need to provide breast cancer awareness programs to cover such issues as an embarrassment and need for privacy, which many immigrant and minority women experience during breast cancer screening, especially mammographic service.

Cues for Action

Cues mean triggers that promote action. These cues could be internal in the form of perceived risk or susceptibility or external in the form of media publicity, a recommendation from a health provider or a close friend or relation being diagnosed (Glanz et al. 2015). The impetus of this construct in relation to breast cancer is operationalized in such variables as palpating a breast lump with a concerned reaction or having a health provider to conduct CBE (Sunil et al. 2014).

Self-Efficacy

This construct refers to the belief or conviction that the required health behavior can be successfully carried out (Glanz et al. 2015). For self-efficacy to become realistic, necessary training or guidance should be provided in the form of breast cancer screening information; providing reinforcement for the required behavior; using of progressive goal setting; modeling the desired behavior, reducing the anxiety about taking the required action through such strategies as showing video or pictures of women undergoing mammogram, BSE or CBE, and opportunities for demonstration of such skills to become competent (Glanz et al. 2015; Guilford et al., 2017).

Factors Impacting the Screening Rates of Breast Cancer

Many research studies on breast cancer and the utilization of breast cancer screening services have been undertaken globally based on HBM. A quantitative study by Olufemi, Omowumni, Oyediran & Ayandiran (2017) on knowledge and awareness of breast cancer and screening methods among female undergraduate students in Nigeria, based on Champion's health belief model, showed that the study participants' perception

of their susceptibility to breast cancer motivated their desire to participate in breast self-examination. In addition, Memnun, Akyuz, and Robertson (2015) conducted a study on the interventional education methods for increasing women's participation in breast cancer screening among Turkish women and used a modified Champion's HBM scale. The study findings showed that increasing the study participants' knowledge of breast cancer increased their awareness of breast cancer risk. Cues to action were influenced by education, which played a significant role in motivating them to utilize breast cancer screening services.

Other studies elucidated that many factors do impact the utilization of breast cancer screening in different women populations all over the world. Breast cancer remains one of the leading causes of cancer deaths worldwide. The economic implications, physical, emotional, social and spiritual effects on both the patients and their families are unquantifiable. Koladooz, Se Lim, Corriveau, Gotay, and Johnston (2014) in a study of ethnically diverse populations in different parts of the world found that the behavior towards breast cancer screening by the study participants indicated that 37% of Chamorro women, 69% of Alaskan native women, and 76% of Canadian women had performed at least one breast self-examination during their lifetime. The outcome of clinical breast examination showed that 29-56% of Samoan women, 64-93% of Chamorro women, 69% of Alaskan women practiced it. For the mammogram, Samoan women, Native Americans, Alaskan, Canadian women's utilization rate increased from 33% to 83%.

On the other hand, the Aboriginal women had lower participation in mammogram utilization and were likely to refuse breast cancer screening than Canadian Caucasian women, and American Caucasian women, Vietnamese and British women. The most common factors that affected the knowledge, attitude and behaviors toward breast cancer screening were access to breast cancer screening services, knowledge about cancer and screening, educational attainment and age. Koladooz et al. (2014) therefore advocated for the need to promote greater breast cancer awareness, positive attitudes and behavior towards cancer screening in different women populations by providing culturally appropriate cancer prevention information that can stimulate participation in preventative screening services.

In a cross-sectional descriptive study of breast cancer screening practices of African born immigrant women in Australia by Ogunsiji, Kwok & Fan (2017), the outcome of the study indicated that 76% of the study participants were aware of BSE and CBE; 85.2% had knowledge of mammogram; however, only 11% practiced BSE, while 3.3 % had CBE. The findings were consistent with a previous study by Vahabi, Lofters, Kumar & Glazier (2015) that African born immigrant women generally have negative attitudes discussing and touching reproductive organs. Also, the low breast cancer screening rate was more among immigrants from West and North African than South Africa. The difference was attributed to South African women being more familiar with breast screening services right from their home country because the health care system is more advanced and readily available to the people than their counterparts from other

regions of Africa. For this reason, there should not be an assumption that African immigrants are not a homogenous group.

Vahabi et al (2015) also found that the utilization of mammogram was higher among the employed; those who had a longer period of residence, highly educated and the older women than the younger ones. The difference was attributed possibly to easy access to breast screening facilities, which could influence the utilization of such services. The lack of utilization of breast cancer screening service was attributed to fear of breast cancer diagnosis. The researchers recommended reaching out to the immigrant women population with culturally sensitive health information to promote breast cancer screening, especially among the younger African born immigrant women population. Also, Binton, Figuroa, Yamey, Wiafe & Wood (2014) posited that significant breast cancer burden among African born immigrant women were related to low socio-economic condition, illegal immigration status, and fatalism. These factors have been identified as contributors to disparities in the utilization of breast cancer screening services among the African born immigrant women in the U.S. (Binton et al., 2014).

Monnat (2014) reported that Caucasian women in high socioeconomic status and a higher level of education in the U.S. experienced higher breast cancer screening utilization than African American women in the same socio-economic status, and level of education. The difference was attributed to African American women in high socio-economic status likely to perceive racial discrimination within the health care system, which could act as a restraining factor to physician visits, and subsequent early breast cancer screenings. Other factors that cause the unequal burden of breast cancer incidence

and mortality among the minority and immigrant women populations in the U.S. include perception of pain during screening, fear of cancer diagnosis, distrust of the screening process, challenges in navigating the complicated American health care system, limited English proficiency, and embarrassment of exposing self during screening procedures because of religious, and cultural beliefs (Wallace, Torres, Beltran, & Cohen-Boyar, 2013).

Furthermore, immigrant women in the U.S. are faced with various challenges that prevent optimal utilization of breast cancer screening services. Hasnain, Menon, Ferrans & Szalacha (2014) identified misperceptions of the importance of mammography, along with lack of primary physicians' recommendations, limited length of stay in the U.S. all serve as barriers to breast screening behaviors. Kalahdooz et al. (2014) reported that having the right knowledge about the risk for breast cancer does not always translate to having a favorable attitude towards screening utilization. Some people who receive information about screening services may develop a positive attitude about breast cancer screening as a life serving procedure. Others with limited knowledge of breast cancer may develop a negative attitude, and believe that early detection is ineffective and unnecessary, hence considering breast screening such as mammogram unimportant. Breast cancer screening utilization was reported to be affected by the proximity of the individual woman to the screening service center, availability of transportation to get the screening, perceived risk for breast cancer. Also, women who were 50 years and older utilized mammogram more than their younger counterparts (Kalahdooz et al. 2014).

A significant number of African born women immigrants, especially those from West Africa have a higher risk of being diagnosed with advanced stages of breast cancer. Sheppard, Hurtado-de-Mendoza, Song, Hirpa & Nwabukwu (2015) attributed barriers to early breast cancer screening among the African women population to lack of health insurance coverage, fatalism, low English language proficiency, illegal immigration status, and unfamiliarity with preventive health care services due to being more conversant with treating diseased condition, which is the norm in their native homelands. Although African born immigrant women are one of the fast growing racial/ethnic groups in the U.S., cancer-related research studies are limited than other immigrant populations in the U.S. (Ogunsiji, Kwok & Fan, 2017). Many research studies often lump African born, the Caribbean born, and the African-American women together, while some of the factors that impact their knowledge, attitude, and beliefs to breast cancer screening utilization are diverse.

The African born women are not a homogenous group but diverse with unique demographic and cultural characteristics, based upon the region of Africa they originate. As related to breast cancer screening practices, there is a significant contrast in screening behaviors, founded on their background in preventive health practices Ogunsiji, Kwok & Fan (2017). Nigeria, as a West African country, shares significantly in the high rate of breast cancer morbidity and mortality rates because of late stages of breast cancer diagnoses (Okoronkwo, Ejike-Okoye, Chinweuba & Nwanen, 2015). The study findings of Okoronkwo et al. (2015) related poor utilization of breast screening practices among Nigerian women to financial barriers from poverty, lack of knowledge on the importance

of early breast screening, negative attitudes, and cultural/ religious beliefs held of early breast screening, negative attitudes, and several cultural and religious beliefs held. The negative cultural belief was also identified in a study by Lee (2015) as a factor that was associated with breast cancer screening among American Korean women. Effect of such cultural belief was displayed as embarrassment, and fatalism, which impeded timely routine breast cancer screening.

Other factors associated with low utilization of breast cancer screening was reported in a study by Sheppard et al. (2015) on African born immigrant women at the Washington DC and Virginia areas of the U.S. that most African born immigrant women did not participate in breast cancer screening services due to lack of health insurance, limited English language proficiency and poor knowledge about breast cancer screening. The study, however, recommended that education on the importance of breast cancer screening among minority populations could improve knowledge and behavior towards utilization of breast screening services. This fact was buttressed by Gondek, Shogan, Saad-Harfouche, Erwin, Griswold & Mahoney (2015) to assess the impact of culturally and language-appropriate community-based educational program on breast cancer knowledge, and screening among refugee women populations in New York. The outcome of the study showed post educational 33% increase in the breast cancer knowledge base, and willingness to adhere to a mammogram.

The implications of religious and cultural beliefs were reported by (Ndukwe et al. 2013). The findings of the study identified fatalism, stigma, privacy issue as significant factors that negatively impact the decision of African born immigrant women in the U.S.

to seek preventative breast cancer screening services, even with appropriate knowledge of breast cancer and the danger of delaying utilization of such services. Furthermore, the low utilization of breast cancer screening among Bosnian, Iraqi and Somali women in the U.S. was attributed to lower than 5 years of living in the U.S., pain, fear of breast cancer diagnosis, modesty, inflexible work schedule, and family commitments, challenges in understanding the complex American health care system, and the impact of war in their home countries (Saadi, Bond & Percac-Lima, 2015). The authors, therefore, recommended community level awareness outreach programs to encourage health-seeking behaviors, appointment reminders and contact from health providers to promote use of breast cancer screening services (Ndukwe et al., 2015).

In a study by Jones (2015) to understand the knowledge, beliefs, and attitudes of breast cancer from young African American women and their biological mothers, the outcome revealed a wide variety of observations based on their previous encounters with health care services. Some expressed distrust of the health care system with fear of the medical providers wrongfully diagnosing breast cancer; while some reported their encounter with health care services as degrading, embarrassing and humiliating. Also, some reported knowledge deficit on conduct of self-breast examination. Others expressed breast cancer screening as a death sentence, hence the need to not know about it by avoiding breast cancer screening. The study, therefore recommended a culturally based education that is focused on African American women breast cancer survivors' experiences to convey encouragement, allay fears and provide words of wisdom, so that

at-risk women can find hope in early breast cancer screening and timely treatment

modalities with trust in the healthcare system.

To further broaden the understanding of the knowledge, practices, and attitudes of

women towards breast cancer screening services in Lebanon, Doumit, Fares & Arevian

(2017) findings indicated an unsatisfactory result, despite an intense breast cancer

awareness campaign by the Lebanese Ministry of Health. The low level of participation

in breast cancer screening practices was related to low breast cancer and screening

knowledge, anxiety and worry of possible breast cancer diagnosis, hence the use of

avoidance in engaging in breast cancer screening practices. The study recommended a

change in educational strategy by using an interactive approach to messages that are more

effective in addressing sensitive issues like breast cancer and its devastating outcomes.

In a similar study conducted by Azubuike & Okwuokei (2013) in Nigeria, the study

outcome showed that 90.5% of the study participants had the knowledge of breast cancer

but only 17.73% practiced regularly one of the 3 breast cancer screening procedures

(breast self-examination, clinical breast examination, and mammogram). The study

results indicated that women who were knowledgeable about the risk of breast cancer

were unable to translate the knowledge and attitude into the practice of breast cancer

screening. The researchers therefore recommended participants focused breast cancer

education campaign programs.

Disproportionate mammography rate was reported by Yao & Hillemeier (2014)

among immigrant women in the U.S. and American born women of 40 years and older in

2000 and 2008. The mammogram rate among immigrant women that was 60.2 % in

2000, rose to 65.5% in 2008, although improvement in the rate was still lagging. American born women's rate rose to 69%. Factors associated with low utilization of mammogram among the immigrant women included: a short length of residency in the U.S. (less than 10 years), and a lower level of education. Nonetheless, the increasing utilization of mammogram among immigrant women in 2008 was associated with the availability of public insurance through Medicaid, which was a significant strategy to improve access to breast health screening. Among the American born women, socio-economic factor such as the high -income level and high educational attainment contributed to a higher utilization rate of mammogram. Yao et al (2014) then recommended medical/cancer center immigrant health initiatives to reach out to recent immigrant women in partnership with community organizations to promote primary care.

Breast cancer is a serious and continuous public health problem, and the disparities in preventative health care services experienced by immigrant women increase the breast cancer burden, coupled with sparse research studies in this population, especially Nigerian women in the U.S. Although there is the availability of preventive breast cancer screening services in the U.S., low utilization of such services continues to be a significant concern among the African born immigrant women. Akuko, Armah, Sarpong, Quansah, Amankwaa & Boateng (2017) reporting on low utilization of breast cancer screening and barriers to early presentation and diagnosis among Sub-Saharan African women in the U.S. attributed the high incidence of breast cancer to low knowledge of breast cancer.

Lack of awareness for early detection and treatment; socio-cultural factors such as beliefs, traditions, and fear that impact health-seeking behaviors to breast cancer screening were identified. Pinder et al. (2016) reported that the African born immigrant women in the U.S. experience low utilization of preventive health care as their counterparts in their homeland because of low emphasis on preventative health programs. Ramathuba et al (2015) on their study on knowledge, attitudes, and practices towards breast cancer screening in the rural South African community reported 95% of the study participants reporting lack of knowledge of breast cancer by stating that they had never heard about breast cancer diagnostic methods. 50% of the participants' attitude towards early detection of breast cancer treatment was negative, and 94.7% indicated that they had never performed any type of breast cancer screening. Low socioeconomic status and poor educational level were linked to poor utilization of breast cancer screening services among the study participants. Community-based interventions in the form of education and governmental assistance through free breast health services were recommended.

In a study by Olufemi et al (2017) on knowledge and awareness of breast cancer and screening methods among female undergraduate students in Nigeria, the outcome of the study indicated that 62% of the study participants had good knowledge of breast cancer and screenings. 88% agreed to the benefit of self-breast examination (BSE). while only 52% reported confidence in performing BSE. However, 67% were unaware of mammogram as a breast cancer screening service. The low knowledge on the use of mammogram showed the need for education and awareness of various breast cancer

screening services; and the importance of utilizing them in a timely and regular manner for early detection of breast cancer.

Acculturation

According to Merriam-Webster dictionary (n.d), acculturation means the process of adopting the cultural traits or social patterns of another group of people. Many research studies have shown that there are disproportionately low mammography rates and higher breast cancer incidence burden among immigrant women than American born women in the U.S. (Harcourt et al. 2013). This assumption stems from the fact that the foreign-born women often times have an embedded low breast cancer screening behavior from their home countries because of the lack of emphasis on preventative health care. They tend to focus more on treatment when signs of breast cancer are eminent (Lee et al. (2015).

Acculturation and length of residency in the U.S. were some of the determinants of breast cancer screening behaviors among Asian-American women by Lee, Chen, Jung & Juon (2015). The outcome of the study showed that the Asian immigrant women who lived in the U.S. for more than 20 years were 2-4 times more likely than those who lived for less than 10 years to have breast cancer screening. This fact was supported by Harcourt et al (2014) in their study of breast and cervical cancer screening among African immigrant women in Minnesota. The outcome of their study showed that African immigrant women who resided in the U.S. for less than 5 years were less likely to have their mammogram or pap smear.

Duration of residence in the U.S. was therefore identified as a significant determinant of breast cancer screening. Immigrant women with a longer duration of residence in the U.S. are more likely to screen for breast cancer because of the possibility that they are more acquainted with and have better skills in navigating the seemingly complex U.S. healthcare system. Furthermore, they are likely to adopt a different cultural belief value that is less concerned about modesty in exposing their breasts during a mammogram. The length of residency of Nigerian immigrant women (40 years and older) is therefore, a significant variable in this study to determine its correlation with the utilization of mammography screening services.

The application of Health Belief Model (HBM) in determining breast cancer knowledge, beliefs and screening behaviors by Guilford et al (2017) showed a low level of breast cancer perceived susceptibility and breast self-examination. Breast cancer knowledge had a significant correlation with breast self- examination (BSE); positive self-efficacy and low perceived barrier equally correlated with BSE. The recommendation by the researchers focused on enhancing breast health intervention programs through the utilization of health behavior constructs that are focused on increased perceived susceptibility, enhanced self-efficacy for breast cancer screening and reduced barriers. The significance of this study had an important bearing on the HBM constructs. Perceived susceptibility and severity constructs measure the beliefs held about getting breast cancer, and mammogram by the study participants.

Considering the fast-growing African immigrant populations in the U.S., especially Nigerians, and the likely poor health-seeking behaviors, there is need to

redirect the traditional focus on infectious diseases such as tuberculosis, HIV to address breast cancer, a debilitating disease with high mortality rate, typically due to lack of knowledge, beliefs, attitudes, and disparities that negatively impact utilization of breast cancer screening services, especially mammogram (Pinder et al. 2016).

Summary and Conclusions

This chapter focused on the review of the scholarly literature about the research studies that had been conducted on breast cancer and breast cancer screening modalities among different populations worldwide. It also, identified the gap that exists in literature, and the need to study the demographic factors, breast cancer knowledge, health beliefs and their impact on the utilization of mammogram among Nigerian women 40 years and older in the U.S. The HBM, a psychosocial theoretical framework provides understanding on the factors that are perceived as underlying factors that impact utilization of breast cancer screening services. Participation in breast cancer screening is affected by the individual's perception of the susceptibility of the disease, and its risk severity, the perception of benefits derived from involvement in such health behavior, the perception of barriers, cues to action and self-efficacy that motivates action. Regular breast cancer screening, especially mammogram, as recommended by the ACS is the only evidence-based breast screening that is required from women who are 40 years and older (ACS, 2017).

Many factors are identified in the literature as causes of low breast cancer screening utilization among the immigrant populations, despite the existence of evidence that regular and timely screening identifies cancer cells in its pre-cancerous stages, hence,

it is a life-saving procedure. The evidence through literature showed that increased

knowledge, acquisition of positive health beliefs and reduction of other debilitating

factors that promote health disparities would lead to improved breast health among the

study population and other minority women populations in the U.S.

Chapter 3: Research Method

Introduction

The purpose of this study was to determine how demographic factors, the level of breast cancer knowledge, and health beliefs of Nigerian women (40 years and older) in the U.S. impact mammogram utilization. Having a good understanding of the predicting factors to the use of breast screening services, precisely mammogram by the study population could facilitate the development of appropriate breast health interventions that promote healthy screening behaviors. This chapter presented a description of the research design, sampling procedure, the population, and the data instrument used to collect the data for this study, and a brief synopsis of how the data collected was analyzed. It also described the ethical process involved in protecting the human study subjects through the approval of the Walden University Institute Review Board (IRB).

Research Design and Rationale

This study was a descriptive, cross-sectional quantitative research study that used a self-administered questionnaire as a data collection instrument. Cross-sectional quantitative study is commonly used in social sciences research studies (Frankfort-Nachmias & Nachmias, 2015). Furthermore, Rivers (n.d.) described a cross-sectional study as a research design that is used to capture information based on data gathered for a specific point in time from a pool of participants with specific characteristics and variables. The advantages of this type of study design include: using it to prove or disprove assumptions; it is less costly in terms of time and money, and the findings could be generalized (Rivers, n.d.). However, the disadvantages of the cross-sectional study are

that the findings could be skewed or flawed if there is a conflict of interest (Rivers, n.d).

Additionally, such study design may have a poor questionnaire return rate because of

poor follow-up of participants to retrieve the questionnaires. Overall, descriptive cross-

sectional studies are clear and possible to study a substantial proportion of variables with

standardized methods and distinctive definitions (Deen & Clemens, 2014).

Research Questions and Hypotheses

The research study was designed to answer the following research questions and

test the hypotheses:

Research Question 1: What association exist between demographic factors (age,

level of education, marital status, level of income, and length of stay in the U.S.) and

utilization of mammographic services among Nigerian women (40 years and older) in the

U.S.?

$H_0$1: There is no statistically significant association between demographic factors

of Nigerian women (40 years and older) in the U.S. and the utilization of mammographic

services.

$H_1$1: There is a statistically significant relationship between demographic factors

and utilization of mammographic services among Nigerian women (40 years and older)

in the U.S.

Research Question 2: What relationship exists between breast cancer knowledge

and utilization of mammographic services among Nigerian women aged 40 years and

older in the U.S.?

$H_0$2:. There is no statistically significant relationship between breast cancer knowledge and utilization of breast cancer screening services among Nigerian women (40 years and older) in the U.S.

H_a2:. There is a statistically significant relationship between breast cancer knowledge and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.

Research Question 3: What is the relationship between health beliefs held by Nigerian women (40 years and older) in the U.S. towards breast cancer and the utilization of mammographic service?

$H_0$3: There is no statistically significant relationship between beliefs held by Nigerian women in the U.S. (40 years and older) and the utilization of mammographic services.

H_a3: There is a statistically significant relationship between beliefs held by Nigerian women in the U.S. (40 years and older) and utilization of mammographic services.

Dependent Variables

The dependent variable for this study was the utilization of mammogram. According to ACS guidelines (2017), women could start mammogram from 40 years of age and continue as long as they are in good health, and at risk of breast cancer.

Independent Variables

The independent variables for this study were demographic factors: age, marital status, educational level, and employment status; length of stay in the U.S., knowledge of breast cancer, and health beliefs about breast cancer and mammogram.

Methodology

Target Population

The population for this study was made up of Nigerian-born women aged 40 years and older, residing in the U.S. Random sampling technique was used to select 3 cities from the 10 cities in the U.S. with the highest Nigerian population. These 10 cities are Baltimore, New York, Houston, Atlanta, Washington D.C., Chicago, Los Angeles, Columbus, Miami, and Philadelphia (Migration Policy Institute, 2015). From the 3 selected cities, namely: Baltimore, Atlanta and Houston, 3 equal number of study participants (33.3% from each city) were recruited using convenience sampling technique from Nigerian community centers, and churches with permission from the Community leaders and Pastors. Participation in this study was strictly voluntary.

Sampling and Sampling Procedure

Convenience sampling was chosen for this study because it was cost-effective, saved time, and it was an easy way to reach the study participants, since Nigerians generally are community-oriented people. Nigerians in diaspora generally utilize their community-based events to socialize, promote unity and connectedness (Ogunsiji et al., 2017). The study participants' selection was strictly focused on Nigerian women living in the U.S. from 40 years of age or older. The study participants who fit the criteria for the

study, by confirming their nationality as Nigerians, and age as 40 years or older, and willing to participate in the study were provided the consent form to read to give their consent to participate in the study. The consent met the Walden University IRB approval prior to the data collection process.

Calculation of Sample Size

The G*power analysis software was used to calculate the sample size of the study. The goal of power analysis and sample size estimation was to enable the researcher to decide on the size of the sample that was necessary to allow reliable and accurate statistical judgement. Furthermore, performing power analysis and sample size calculations prevented too high or too low sample sizes. Too small sample size could denote lack of precision to provide reliable answers to the research questions. On the other hand, too large sample size could lead to wasting of resources with no meaningful gain (McCrum-Gardner, 2010). To determine the sample size for this study, the G*power software was used to calculate a minimum sample size of 180 (G*power, 2017). However, to safeguard against the possibility of losing responses from an unreturned or incomplete questionnaire, the sample size was increased to 210 to provide an adequate data for the study.

The sample size was therefore calculated by selecting a medium effect size of 0.15, an alpha (p-level) of 0.05 with a power of 0.9, and was based on 7 predictors of the independent variables. Pertinent to note that this estimation was based on multiple regression F-test. The significance of F-test and multiple regression for this study was that it is a flexible statistical test that allows the assessment of all the variable coefficients

jointly (Frost, 2017). The study participants were recruited from Nigerian community centers and churches of Nka Uforo Iban (Nigerian women organization) in Baltimore; Soteria Church in Baltimore; AKISAN organization in Atlanta; Christian Pentecostal Mission International Church in Houston; AKISAN organization in Baltimore, and AKISAN organization in Houston. A total of 210 study questionnaires (100%) were returned from the study participants; however, 10 of the returned questionnaires were discarded because of errors in completion.

Instrumentation and Operationalization

The researcher used the African version of the Breast Cancer Screening Beliefs Questionnaire (BCSBQ) as the instrument for the data collection. This instrument was developed by Ogunsiji, Kwok, and Lee (2017) as a culturally sensitive instrument to assess African women's knowledge/beliefs of breast cancer, and demographic information effect on the utilization of breast cancer screening services in Australia. The original version of BCSBQ was translated and validated in studies among Chinese women, Korean women, Indian women and Arabic subgroup women populations in Australia. The decision to use this instrument for the study was based upon its wide usage in many studies among many minority women populations globally. Its publication in a peer-reviewed journal was retrieved from the Walden University library Proquest database, and a sample of the instrument reviewed in the PsycTest database of Walden University library. Written permission was provided and a copy of the instrument was then obtained from. Dr. Ogunsiji to use as the instrument for data collection in this study. The copy of the request and permission emails were included as appendices of this study.

The reliability and validity of this instrument were obtained from the author with a good reliability Cronbach's alpha for the subscales that ranged from 0.80 to 0.88.

Operational Variables/ Data Collection

The BCSBQ was considered an appropriate instrument for the data collection because of its relevance to the variables addressed in the study. The core subscales of the instrument covered the demographic factors such as age, marital status, educational level, level of income per year, and length of residency. Other variables addressed by the subscales of the instrument included: knowledge of breast cancer and mammogram and beliefs towards breast cancer and use of mammogram. (Ogunsiji et al., 2017). The questionnaire was distributed by email and direct contact to the study participants to answer the research questions. No physical incentives such as financial compensation was given to the study participants, except that the result of the study would be shared with them when the study is completed. The data collection phase took 8 weeks, and there were no research assistants required for the data collection process.

Data Analysis Plan

The first step in the data processing of the data collected involved data cleaning, which dealt with removing the incomplete surveys from those that were to be analyzed. The statistical analysis of the data to answer the research questions and hypotheses were imported into the IBM, version 25.0 of the Statistical Package for the Social Sciences (SPSS) software.

Descriptive Statistics

Demographic variables of age range, level of education, marital status, level of income per year, and length of stay in the U.S. were analyzed as ordinal categorical data with descriptive statistics. Also, breast cancer knowledge and mammogram were analyzed as ordinal categorical data with descriptive statistics. The belief variables were treated as continuous variables. The descriptive statistics for these variables were presented as frequencies. Cross-tabulations were also used to show how the independent variables related to the dependent variable.

Inferential Statistics/Hypothesis Testing

To answer the research questions, the researcher used logistic regression. The significance of logistic regression enabled the testing of each of the null hypotheses, and the control for the effects of potential confounders possible. The researcher used regression coefficient to assess the statistical significance of each of the fitted logistic regression. This method of assessing the statistical significance allowed the researcher to identify the independent variables of interest, namely: demographic factors, knowledge, and beliefs about breast cancer and mammogram that had statistically significant relationship with the dependent variable of interest (utilization of mammographic service). The results on the relationship between the independent variables and the dependent variable were presented in the form of odds ratios (OR) at 95% confidence intervals (CI) of the OR.

Threats to Validity

Validity is significant to solidify the accuracy of the research study. According to Frankfort-Nachmias & Nachmias (2015), the significance of validity in a research study is to provide evidence that the measuring instrument definitely measures the variables that it intends to measure. The validity of an instrument influences the validity of the study conclusions that are drawn from testing of the hypotheses (Frankfort-Nachmias et al. 2015). External validity is concerned not only with the effect of one variable on another in a study, but also its effect in their natural setting and its generalization on larger populations. For this study, the external validity was based on the African version of the BCSBQ developed by Ogunsiji et al (2017). This instrument subscales were developed specifically to measure the demographics, knowledge level, and beliefs on breast cancer and how they impact breast cancer screening utilization among African immigrant women populations living in Australia. The original version of the instrument had been used for over 10 years in minority women populations, such as Chinese, Koreans, Indians, Africans, and Arabic women in Australia. The instrument therefore provided variables that could be statistically analyzed to generalize findings to the larger population.

The internal validity of this study focused on ensuring the ruling out of confounding factors, and biases that could invalidate the association of the independent variables (demographics, breast cancer knowledge, beliefs) and the dependent variable (utilization of mammogram) of this study. Internal validity of this study therefore was included in the study design and the statistical analysis of the study. Construct validity

meant that the instrument of study was underpinned by the constructs of a theoretical framework. The BCSQS instrument demonstrated an excellent construct validity with the association of the 3 subscales of the instrument having an association with the Health Belief Model constructs. Individuals' knowledge and health beliefs about breast cancer, and the use of mammogram depend on their perception about their susceptibility to the disease, the severity of the disease, and barriers to use of mammogram. The BCSBQ instrument variables, which reflected the knowledge and health beliefs had an appropriate theoretical base.

Ethical Procedures

The African version of the Breast Cancer Screening Beliefs Questionnaire (BCSBQ) was the questionnaire instrument for data collection in this study, and was presented to the Walden University Institute of Review Board (IRB) with approval obtained prior to the data collection. The data collection process excluded personal information such as names, date of birth, address, and phone numbers that could identify the study participants. The returned copies of the questionnaires were stored in a locked cabinet in the researcher's bedroom, and the soft copy stored in the researcher's personal computer, backed-up with password protection for the duration of the study and up to 10 years.

Social Change Implications

Breast cancer is a significant public health problem and social justice issue to all women, especially African immigrant women in the U.S. who experience health disparities and marginalization (Komen, 2015). This study provided the scientific

evidence that could be used by health-care providers and public health workers to develop evidence-based interventional programs at the community-level to target African immigrant women, especially Nigerian women in the U.S. to educate and empower them to make informed decisions about their breast health. Furthermore, the outcome of this study would inform policy-makers in the U.S. about developing culturally sensitive policies that embrace women of all cultures about breast health care access for all women, so that the health disparity gap could be narrowed in the U.S.

Summary

Chapter 3 focused on the design and methodology of the study. The research was a descriptive, cross-sectional study, using the questionnaire as the survey instrument to measure the demographic variables, knowledge level of breast cancer, and health beliefs of Nigerian women in the U.S. aged 40 years and older towards mammogram utilization. The method of data collection was convenience sampling method after a simple random sampling of 3 U.S. cities among 10 cities with highest Nigerian population were selected. The approval by the Walden University IRB prior to data collection was obtained. The consent of the study participants was obtained and the purpose of the study explained to them. Study participants' information was obtained without their names. The data collected was handled with strict confidentiality, respect and high level of integrity. The social change implications of the study were also stated in this chapter. The next chapter described the data analysis process.

Chapter 4: Results

Introduction

Chapter 4 described the purpose of the study, and presented the result of the analysis of the data collected through questionnaires from Nigerian women, 40 years and older living in the United States. The purpose of this study was focused on determining how demographic factors, breast cancer knowledge, and beliefs impacted utilization of breast cancer screening services (mammogram) among Nigerian women, aged 40 years and older living in the U.S. The research questions and hypotheses were restated, and presented as descriptive statistics. Tables with inferential statistics also answered the research questions, and tested the hypotheses.

Research Question 1: What association exist between demographic factors (age, level of education, marital status, level of income, and length of stay in the U.S.) and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.?

$H_0$1: There is no statistically significant association between demographic factors of Nigerian women (40 years and older) in the U.S. and the utilization of mammographic services.

$H_1$1: There is a statistically significant relationship between demographic factors and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.

Research Question 2: What relationship exists between breast cancer knowledge and utilization of mammographic services among Nigerian women aged 40 years and older in the U.S.?

$H_0$2:. There is no statistically significant relationship between breast cancer knowledge and utilization of breast cancer screening services among Nigerian women (40 years and older) in the U.S.

H_a2:. There is a statistically significant relationship between breast cancer knowledge and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.

Research Question 3: What is the relationship between health beliefs held by Nigerian women (40 years and older) in the U.S. towards breast cancer and the utilization of mammographic service?

$H_0$3: There is no statistically significant relationship between beliefs held by Nigerian women in the U.S. (40 years and older) and the utilization of mammographic services.

H_a3: There is a statistically significant relationship between beliefs held by Nigerian women in the U.S. (40 years and older) and utilization of mammographic services.

Data Collection

The target population for this study was Nigerian women, 40 years or older in the U.S. This age group was of importance because according to American Cancer Society (2017) recommendation, women with the risk of breast cancer are advised to start

mammogram screening of their breast at the age of 40 years. There are documented evidences that immigrant and minority women, especially African born immigrant women are at a higher risk of being diagnosed with advanced stages of breast cancer due to delay in breast screening services, specifically mammogram for several factors, such as lack of breast cancer knowledge, and negative health beliefs (Ogunsiji et al. 2017; WHO, 2017).

Convenience sampling technique was used for data collection in this study following a random selection of 3 cities from the 10 U.S. cities with the highest Nigerian population. The 3 selected cities were Baltimore, Atlanta, and Houston. Six Nigerian organizations and churches from the 3 selected cities were the locations that the study participants were recruited to participate in the study. Questionnaire was the instrument for the data collection. The study participants who identified themselves as Nigerians, 40 years of age or older, and were willing to participate in the study were given the informed consent agreement to read to give their verbal consent. They were then given the questionnaire either by hard copy or through email to complete and return to the researcher. No financial compensation was given to the study participants. A total of 210 questionnaires were returned to the researcher but 200 were accepted, while 10 questionnaires were discarded because of errors in completion. The breast cancer screening beliefs questionnaire (BCSBQ), developed by Ogunsiji et al. (2017), which addressed the demographics, knowledge, beliefs on breast cancer and breast screening services utilization was the instrument for the data collection.

Study Results

Descriptive Statistics

Overall, 210 Nigerian women in the U.S. participated in the study, but 200

questionnaires were fully completed, while 10 were discarded for incompleteness. All the

participants were women who acknowledged themselves as Nigerians, 40 years or older

living in the U.S. The descriptive statistics of the analysis was used based on the

variables displayed in the tables.

Table 1 below shows the distribution of the demographic variables. Majority of

the study participants were 50 and 59 years of age. For marital status, 69% of the study

participants were married, and 74.5% of the study participants were fully employed. For

income per year, the highest level of participants' income per year was between $21,000

and $40,000 (20.5%). Study participants living in the U.S. for more than 20 years were

the majority with a record of 37%.

Table 1

Demographics of the Nigerian Women (40 years and older) who Participated in the Study

	Frequency	Percentage
Age of Participants (years)		
40-49	77	38.5
50-59	78	39.0
60-69	35	17.5
70 and above	10	5.0
Total	200	100.0
Highest Level of Education		
Primary education	9	4.5
High School, GED	22	11.0
Undergraduate	71	35.5
Graduate School	98	49.0
Total	200	100.0
Marital Status		

Table 1 cont'd

Married	138	69.0
Single	19	9.5
Divorced/separated	21	10.5
Widowed	19	9.5
In partnership	3	1.5
Total	200	100.0
Employment Status		
Unemployed, not seeking job	5	2.5
Unemployed, seeking job	8	4.0
Employed, part time	28	14.0
Employed, full time	149	74.5
Retired	10	5.0
Total	200	100.0
Income Per Year		
20,000 or below	29	14.5
21,000-40,000	41	20.5
41,000-60,000	38	19.0
61,000-80,000	40	20.0
81,000-100,000	29	14.5
101,000 and above	23	11.5
Total	200	100.0
Number of Years Participant Live in the United States		
5 years or less	20	10.0
6-10	28	14.0
11-15	31	15.5
16-20	47	23.5
More than 20 years	74	37.0
Total	200	100.0

Table 2 (below) shows the distribution of breast cancer knowledge of Nigerian women, 40 years and older in the U.S. Out of the 200 study participants in the study, 98% indicated that they heard about breast cancer. Ninety-five percent of the study participants responded that they had no history of breast cancer, while 89% indicated that

they had no immediate family member with breast cancer. However, out of the 7% that indicated that an immediate family member had breast cancer, the majority of them indicated that their mother had breast cancer. When asked if the study participants ever heard of mammogram, 86% indicated that they heard about mammogram.

Table 2

Distribution of Breast Cancer Related Knowledge of Nigerian Women Aged 40 Years and Older in the United States

	Frequency	Percentage
Ever Heard of Breast Cancer		
No	4	2.0
Yes	196	98.0
Total	200	100.0
Do you have History of Breast Cancer		
No	190	95.0
Yes	8	4.0
I don't know	2	1.0
Total	200	100.0
Immediate Family with Breast Cancer		
No	178	89.0
Yes, who	14	7.0
I don't know	8	4.0
Who among your immediate family has Breast Cancer		
Mother	7	3.5
Sister	5	2.5
Grandmother	2	1
None	187	93.5
Friend with breast cancer	200	100.0
No	115	57.5
Yes	68	34.0
I don't know	17	8.5
Total	200	100.0
Ever Heard of Mammogram		
No	28	14.0
Yes	172	86.0
Total	200	100.0

Table 3 (below) shows the overall distribution of breast cancer utilization by Nigerian women aged 40 years and older in the U.S. The distribution showed that 86% of the study participants indicated that they heard about mammogram; while 14% indicated that they had never heard about mammogram. On the frequency of performing mammogram, 51% indicated that they performed mammogram once a year, 17% indicated performing mammogram once every 2 years (biennially), 10% indicated that they performed mammogram once every 3 or more years; 22% indicated they had never performed mammogram.

Table 3

Distribution of Mammogram Utilization by Nigerian Women Aged 40 Years and Older in the United States

	Frequency	Percentage
Have you ever heard of mammogram?		
Yes	172	86.0
No	28	14.0
Total	200	100.0
How often do you have Mammogram		
Once a year	102	51.0
Once every 2 years	34	17.0
Once every 3 years or more	20	10.0
Never had one	44	22.0
Total	200	100.0

Table 4 (below) shows the distribution of mammogram utilization by Nigerian women in the U.S. across the studied age groups. The findings indicated that Nigerian women 60-69 years of age had the highest once in a year mammogram utilization by 62.9%. Under the same age group (60-69 years), 17.1% responded that they performed mammogram once every 2 years, while within the same range, 11.4% responded to

performing mammogram every 3 years or more, and 8.6% in the same age range

responded that they have never performed mammogram. 57.7% of study participants in

the 50-59 years age range responded to once a year mammogram, while 16.6% of the

same age range responded to once every 2 years mammogram. 15.4% within the 50-59

years age range responded to once in 3 years or more mammogram, while 10.3%

responded that they have never performed mammogram.

For participants between 40-49 years, 40.3% responded to once a year

mammogram, while 16.9% responded to once in 2 years mammogram. 5.2% within the

40-49 years age range responded to once in 3 years or more mammogram, while 37.7%

responded that they had never performed mammogram. Among the 70 years and older

study participants, 40% responded to once a year mammogram; 20.0% responded to once

in 2 years manually, while none responded to once in 3 or more years of mammogram;

however, 40% of the 70 years and older Nigerian women responded that they had never

performed mammogram.

Table 4

Distribution of Mammogram Utilization by Nigerian Women in the United States Across the Studied Age Groups

| | | Age (Percentage) | | | | |
		40-49	50-59	60-69	70 and above	Total
How often do you have Mammogram?	Once a year	31 (40.3%)	45 (57.7%)	22 (62.9%)	4 (40.0%)	102 (51.0%)
	Once every 2 years	13 (16.9%)	13 (16.6%)	6 (17.1%)	2 (20.0%)	34 (17.0%)
	Once every 3 years or more	4 (5.2%)	12 (15.4%)	4 (11.4%)	0 (0.0%)	20 (10.0%)
	Never had one	29 (37.7%)	8 (10.3%)	3 (8.6%)	4 (40.0%)	44 (22.0%)
	Total	77 (100%)	78 (100%)	35 (100%)	10 (100%)	200 (100%)

Table 5 (below) shows the distribution of the breast cancer related beliefs held by Nigerian women aged 40 years or older in the U.S. The belief variables were measured with the Likert type scales that ranged from strongly agree, agree, neutral, disagree and strongly disagree to indicate degree of responses. In response to the statement, "Having breast cancer is like a death sentence," 37.5% (highest responses) disagreed with that statement. In response to the statement that breast cancer cannot be cured, 46.5% (highest responses) disagreed with that statement; while 31.5% strongly disagreed with that statement.

In responding to the statement that "even if breast cancer is detected early, there is very little a woman can do to reduce the chances of dying from it," 40.5% (highest responses) strongly disagreed with that statement; while 39% disagreed with the same statement. The responses to the statement that "if a woman is destined to have breast cancer, she will surely have it" showed that 45.5% of the study participants disagreed with that statement; while 36% strongly disagreed with that statement. On the statement that "I am worried that mammogram will hurt my breasts," 40.5% of the study participants strongly disagreed with that statement; while 37.5% disagreed. On the statement that "it is difficult to arrange transportation to go for mammogram," 48% of the study participants strongly disagreed with that statement; while 37% disagreed. The statement that "I do not want to have mammogram because I want to avoid exposing my breasts," had 50.5% strongly disagreed responses; while 39.5% disagreed with that statement. The statement that "Having mammogram is embarrassing," received 54% of

study participants strongly disagreeing with the statement; while 34.5% disagreed. 2.0% strongly agreed to the statement, 5.0% agreed, while 4.5% responded neutral.

Agreeing to all the belief variables received minimal responses when compared to those who disagreed to the belief statements. These responses indicated that the majority of the study participants had positive health beliefs about breast cancer and mammogram. On gender preference of mammogram technicians, 61.5% of the study participants responded to female technician as their preference. 38% indicated no preference, while 0.5% preferred male mammogram technician. In response to the invitation for free mammogram, 77.5% of the study participants responded positively to such an invitation; 12% responded "no" to such invitation, while 10.5% indicated that they did not know if they would accept the invitation for free mammogram.

Table 5

Distribution of Breast Cancer Related Beliefs Held by Nigerian Women Aged 40 Years and Older in the United States

	Frequency	Percentage
Having Breast Cancer is like a Death Sentence		
Strongly Agree	13	6.5
Agree	30	15.0
Neutral	19	9.5
Disagree	75	37.5
Strongly Disagree	63	31.5
Total	200	100.0
Breast Cancer Cannot be Cured		
Strongly Agree	6	3.0
Agree	21	10.5
Neutral	17	8.5
Disagree	93	46.5
Strongly Disagree	63	31.5
Total	200	100.0

Table 5 Cont'd

Even if Breast Cancer is
Detected Early, there is
Very Little a Woman can
do to Reduce the Chances
of Dying from it

Strongly Agree	3	1.5
Agree	29	14.5
Neutral	9	4.5
Disagree	78	39.0
Strongly Disagree	81	40.5
Total	200	100.0

If a Woman is Destined to
Have Breast Cancer, she
will Surely have it

Strongly Agree	5	2.5
Agree	17	8.5
Neutral	15	7.5
Disagree	91	45.5
Strongly Disagree	72	36.0
Total	200	100.0

Strongly Agree	7	3.5
Agree	13	6.5
Neutral	24	12.0
Disagree	75	37.5
Strongly Disagree	81	40.5
Total	200	100.0

It is Difficult to Arrange
Transportation to go for
Mammogram

Strongly Agree	4	2.0
Agree	9	4.5
Neutral	17	8.5
Disagree	74	37.0
Strongly Disagree	96	48.0
Total	200	100.0

I do not want to have
Mammogram to Avoid
Exposing my Breasts

Strongly Agree	5	2.5
Agree	7	3.5

Neutral	8	4.0
Table 5 Cont'd		
Disagree	79	39.5
Strongly Disagree	101	50.5
Total	200	100.0
Having Mammogram is Embarrassing		
Strongly Agree	4	2.0
Agree	10	5.0
Neutral	9	4.5
Disagree	69	34.5
Strongly Disagree	108	54.0
Total	200	100.0
Gender Preference of Mammogram Technician		
Male	1	.5
Female	123	61.5
No preference	76	38.0
Total	200	100.0
Invitation for Free Mammogram		
No	24	12.0
Beliefs Distribution		
Yes	155	77.5
I don't know	21	10.5
Total	200	100.0

Inferential Statistics

Research Question 1: What association exist between demographic factors (age, level of education, marital status, level of income, and length of stay in the U.S.) and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.?

$H_0$1: There is no statistically significant association between demographic factors of Nigerian women (40 years and older) in the U.S. and the utilization of mammographic services.

$H_1$1: There is a statistically significant relationship between demographic factors and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.

The results obtained from testing the first null hypothesis showed that demographic factors (such as age and the number of years lived in the United States) had statistically significant ($p < 0.05$, Table 6) effect on the utilization of mammographic services among Nigerian women (who are 40 years or older) in the United States. Therefore, the null hypothesis was rejected and the alternative hypothesis that there is statistically significant relationship between demographic factors and utilization of mammographic services among Nigerian women (40 years and older) in the United States was accepted.

The logistic regression model (Table 6) indicates that Nigerian women in the United States who are between the ages of 50 and 59 years are about six times (Adjusted OR = 5.918, 95% C.I. of Adjusted OR = (1.534, 22.828), $p < 0.05$, Table 6; Crude OR = 5.286, 95% C.I. of Crude OR = (2.227, 12.551), $p < 0.001$, Table 6) more likely to use mammographic services than their counterparts who are between the ages of 40 and 49 years. Unlike the adjusted OR, the crude OR did not control for the effect of the other independent variables. Therefore, I presented most of the vital interpretations of the results using the adjusted OR. Similar to the Nigerian women in the United States who

are between the ages of 50 and 59 years, the Nigerian women who are between the ages

of 60 and 69 years are seventeen and a half times (Adjusted OR = 17.613, 95% C.I. of

Adjusted OR = (2.408, 128.857), $p < 0.05$; Crude OR = 6.444, 95% C.I. of Crude OR =

(1.810, 22.949), $p = 0.004$, Table 6) more likely to use mammographic services than their

counterparts who are between the ages of 40 and 49 years. On the other hand, the

Nigerian women who are 70 years and older are not statistically different from their

counterparts who are between the ages of 40 and 49 years in the odds of utilizing

mammographic services (Adjusted OR = 0.299, 95% C.I. of Adjusted OR = (0.006,

15.924), $p = 0.552$, Table 6; Crude OR = 0.906, 95% C.I. of Crude OR = (0.236, 3.484),

$p = 0.886$, Table 6).

Additionally, the logistic regression model (Table 6) indicates that Nigerian

women in the United States who have undergraduate degrees are about 250 times

(Adjusted OR = 0.004, 95% C.I. of Adjusted OR = (0.0, 0.276), $p < 0.05$, Table 6; Crude

OR = 0.982, 95% C.I. of Crude OR = (.185, 5.203), $p < .983$, Table 6) less likely to use

mammographic services than their counterparts who hold only primary education. On the

other hand, the Nigerian women in the United States who hold only high school

education (Adjusted OR = 0.023, 95% C.I. of Adjusted OR = (0.0, 1.128), $p = 0.058$,

Table 6; Crude OR = 0.612, 95% C.I. of Crude OR = (0.100, 3.739), $p = 0.595$, Table 6)

as well as the Nigerian women in the United States who hold graduate school degrees

(Adjusted OR = 0.016, 95% C.I. of Adjusted OR = (0.0, 1.131), $p = 0.057$, Table 6;

Crude OR = 1.188, 95% C.I. of Crude OR = (0.228, 6.182), $p = 0.838$, Table 6) are not

statistically different from their counterparts who completed only primary education in their utilization of mammographic services.

Furthermore, the logistic regression model (Table 6) indicates that Nigerian women who have stayed in the United States for 6 to 10 years are about 15 times (Adjusted OR = 14.816, 95% C.I. of Adjusted OR = (1.908, 115.015), $p < 0.05$, Table 4; Crude OR = 3.343, 95% C.I. of Crude OR = (1.006, 11.107), $p < 0.05$, Table 6) more likely to use mammographic services than their counterparts who have stayed in United States for 5 years or less. Similarly, Nigerian women who have stayed in United States for 11 to 15 years are about 34 times (Adjusted OR = 34.122, 95% C.I. of Adjusted OR = (3.786, 307.518), $p < 0.05$; Crude OR = 6.367, 95% C.I. of Crude OR = (1.831, 22.141), $p < 0.05$, Table 6) more likely to use mammographic services than their counterparts who have stayed in the United States for 5 years or less. The odds of utilizing mammographic services are even higher for those who have lived in the united states for a longer period of time.

The Nigerian women who have stayed in the United States for 16 to 20 years are about 54 times (Adjusted OR = 53.743, 95% C.I. of Adjusted OR = (5.534, 521.947), $p < 0.05$, Table 6; Crude OR = 10.612, 95% C.I. of Crude OR = (3.132, 35.956), $p < 0.001$, Table 6) more likely to use mammographic services when compared to those who have stayed in the United States for 5 years or less. In addition, the Nigerian women who have stayed in the United States for 20 or more years are about 92 times (Adjusted OR = 91.669, 95% C.I. of Adjusted OR = (9.705, 865.870), $p < 0.001$, Table 6; Crude OR = 17.776, 95% C.I. of Crude OR = (5.331, 59.272), $p < 0.001$, Table 6) more likely to use

mammographic services when compared to those who have stayed in the United States

for 5 years or less.

Table 6

*The Regression Coefficients for the Demographic Factors**

| | Crude Odds Ratio | | | | Adjusted Odds Ratio | | | |
| | 95% C.I. for Exp (B) | | | | 95% C.I. for Exp (B) | | | |
	Exp (B)	Lower	Upper	p	Exp (B)	Lower	Upper	p
Age of Participants in years (40-49 is the reference category)				<.001				.006
50-59	5.286	2.227	12.551	<.001	5.918	1.534	22.828	.010
60-69	6.444	1.810	22.949	.004	17.613	2.408	128.857	.005
70 and above	.906	.236	3.484	.886	.299	.006	15.924	.552
Highest Level of Education ("Primary education" is the reference category)				.658				.021
High School, GED	.612	.100	3.739	.595	.023	.000	1.128	.058
Undergraduate	.982	.185	5.203	.983	.004	.000	.276	.011
Graduate School	1.188	.228	6.182	.838	.016	.000	1.131	.057
Marital Status (Married is the reference category)				.427				.179
Single	.527	.184	1.513	.234	.199	.035	1.117	.067
Divorced/separated	1.034	.322	3.323	.956	.226	.039	1.300	.096
Widowed	.417	.150	1.159	.094	.112	.008	1.525	.100
In partnership	3.930E8	.000	.	.999	6.32E7	.000	.	.999
Employment Status (Unemployed, not seeking job is the reference category)				.037				.661
Unemployed, seeking job	.250	.019	3.342	.295	2.173	.001	5864.930	847

Employed, part time	.450	.044	4.596	.501	3.919	.002	7141.274	.721
Employed, full time	1.240	.133	11.567	.850	2.082	.001	3615.258	.847
Retired	375	.030	4.709	.447	53.443	.009	306827.6	368

Table 6 Cont'd

Income Per Year ("$20,000 or below" is the reference category)				.004				.264
21,000-40,000	4.420	1.529	12.778	.006	3.551	.364	34.624	.275
41,000-60,000	4.745	1.584	14.210	.005	5.319	.500	56.637	.166
61,000-80,000	7.500	2.289	24.575	.001	2.190	.188	25.571	.532
81,000-100,000	3.367	1.099	10.318	.034	.627	.052	7.544	.713
101,000 and above	11.250	2.220	57.018	.003	1.259	.070	22.722	.876
Number of Years Participant Live in the US ("5 years or less" is the reference category)				<.001				.003
6-10	3.343	1.006	11.107	.049	14.816	1.908	115.015	.010
11-15	6.367	1.831	22.141	.004	34.122	3.786	307.518	.002
16-20	10.612	3.132	35.956	<.001	53.743	5.534	521.947	.001
More than 20 years	17.776	5.331	59.272	<.001	91.669	9.705	865.870	.000

* The dependent variable is a binary categorical variable on whether a woman uses mammographic services or not. The full logistic regression model had independent variables that included the demographic variables (listed in Table 6), the breast cancer/mammogram knowledge variables (listed in Table 7), and the breast cancer related belief variables (listed in Table 8). The full logistic regression model was statistically significant (p < 0.001) and had a moderate effect size of 0.566 (based on the coefficient of determination – the Cox and Snell R Squared).

Research Question 2: What relationship exists between breast cancer knowledge and utilization of mammographic services among Nigerian women aged 40 years and older in the U.S.?

$H_0$2:. There is no statistically significant relationship between breast cancer knowledge and utilization of breast cancer screening services among Nigerian women (40 years and older) in the U.S.

H_a2:. There is a statistically significant relationship between breast cancer knowledge and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.

The results obtained from testing the second null hypothesis showed that breast cancer knowledge had a statistically significant ($p < 0.05$, Table 7) effect on the utilization of mammographic services among the Nigerian women (40 years or older) in the United States. Therefore, the null hypothesis was rejected and the alternative hypothesis that there is a statistically significant relationship between breast cancer knowledge and utilization of breast cancer screening services among Nigerian women (40 years and older) in the United States was accepted.

The logistic regression model (Table 7) indicated that for every unit increase in the knowledge of breast cancer among the Nigerian women, 40 years and older in the United States there is eight times increase in the odds (Adjusted OR = 8.136, 95% C.I. of Adjusted OR = (2.841, 23.297), $p < 0.05$, Table 7; Crude OR = 10.583, 95% C.I. of Crude OR = (4.646, 24.107), $p < 0.001$, Table 7) of using mammographic services. Each of the knowledge variables by itself did not have a statistically significant effect on the

utilization of mammographic services by the Nigerian women but their combined effect did have a statistically significant effect on the utilization of mammographic services (see the first row of Table 7), as explained in the previous paragraph.

Table 7

The Regression Coefficients for the Breast Cancer Knowledge Variables*

| | Crude Odds Ratio | | | | Adjusted Odds Ratio | | | |
| | *95% C.I. for Exp (B)* | | | | *95% C.I. for Exp (B)* | | | |
	Exp (B)	*Lower*	*Upper*	*p*	*Exp (B)*	*Lower*	*Upper*	*p*
Knowledge of Breast Cancer	10.583	4.646	24.107	<.001	8.136	2.841	23.297	.000
Ever Heard of Breast Cancer	0.0	0.0	.	.999	.000	.000	.	.999
History of Breast Cancer	4.803E8	0.0	.	.999	2.375E6	.000	.	.998
Family with Breast Cancer	1.037	.276	3.892	.957	1.967	.029	131.290	.752
Friend with Breast Cancer	2.012	.926	4.373	.077	.582	.053	6.450	.660
Ever Heard of Mammogram	1.575E10	0.0	.	.998	9.41E19	.000	.	.994

* The dependent variable is a binary categorical variable on whether a woman uses mammographic services or not. The full logistic regression model had independent variables that included the demographic variables (listed in Table 6), the breast cancer knowledge variables (listed in Table 7), and the breast cancer related belief variables (listed in Table 8). The full logistic regression model was statistically significant (p <

0.001) and had a moderate effect size of 0.566 (based on the coefficient of determination – the Cox and Snell R Squared).

Research Question 3: What is the relationship between health beliefs held by Nigerian women (40 years and older) in the U.S. towards breast cancer and the utilization of mammographic service?

$H_0 3$: There is no statistically significant relationship between beliefs held by Nigerian women in the U.S. (40 years and older) and the utilization of mammographic services.

$H_a 3$: There is a statistically significant relationship between beliefs held by Nigerian women in the U.S. (40 years and older) and utilization of mammographic services.

The test of the third null hypothesis showed that beliefs regarding breast cancer had statistically significant ($p < 0.05$, Table 8) effect on the utilization of mammographic services among Nigerian women (40 years and older) in the United States. Therefore, the null hypothesis was rejected and the alternative hypothesis that there is a statistically significant relationship between health beliefs held by the Nigerian women in the United States (40 years and older) and utilization of mammographic services in the United States was accepted.

The logistic regression model (Table 8) indicated that Nigerian women in the United States, 40 years and older who have higher level of positive beliefs regarding breast cancer screening are more likely to utilize mammographic services in the United States. With every unit increase in the level of positive belief regarding breast cancer

screening, there is a 112% or 1.12-folds increase in the odds (Adjusted OR = 1.121, 95%

C.I. of Adjusted OR = (1.016, 1.238), $p < 0.05$, Table 8; Crude OR = 1.102, 95% C.I. of

Crude OR = (1.039, 1.168), $p < 0.05$, Table 8) of utilizing mammographic services by the

Nigerian women in the United States (40 years and older).

Since the level of positive belief regarding breast cancer screening was an index

obtained by summing up the contributions of the eight belief variables, I also examined

the effect of each of the eight belief variables on the utilization of mammographic

services by the Nigerian women in the United States (40 years and older). It was found

that Nigerian women in the United States who have higher level of positive belief

regarding breast cancer screening by not believing that mammogram requires

unnecessary exposure of breasts were about 522 times more likely to utilize

mammographic services in the United States (Adjusted OR = 521.922, 95% C.I. of

Adjusted OR = (0.973, 279901.4), $p = 0.051$, Table 8; Crude OR = 1.712, 95% C.I. of

Crude OR = (1.212, 2.419), $p < 0.001$, Table 8). Each of the other belief variables by

itself did not have a statistically significant effect on the utilization of mammographic

services by the Nigerian women, 40 years and older but their combined effect did have a

statistically significant effect on the utilization of mammographic services (see the first

row of Table 8), as explained in the previous paragraph.

Table 8
The Regression Coefficients for the Breast Cancer Belief Variables*

| | Crude Odds Ratio | | | | Adjusted Odds Ratio | | | |
| | | 95% C.I. for Exp (B) | | | | 95% C.I. for Exp (B) | | |
	Exp (B)	*Lower*	*Upper*	*p*	*Exp (B)*	*Lower*	*Upper*	*p*
Positive Belief Regarding Breast Cancer	1.102	1.039	1.168	.001	1.121	1.016	1.238	.023
Having Breast Cancer is like a Death Sentence	1.200	.923	1.561	.173	2.713	.645	11.411	.173
Breast Cancer Cannot be Cured	1.285	.947	1.743	.107	.187	.012	2.977	.235
Even if Breast Cancer is detected early, there is very little a woman can do to Reduce the Chances of Dying from it	1.452	1.083	1.945	.013	.774	.161	3.728	.750
If a Woman is Destined to Have Breast Cancer, she will Surely have it	1.174	.852	1.618	.327	1.356	.328	5.612	.674
I am Worried that Mammogram will Hurt my Breasts	1.988	1.448	2.729	<.001	3.150	.700	14.174	.135
It is Difficult to Arrange Transportation to go for Mammogram	1.352	.968	1.890	.077	.118	.013	1.060	.056
I do not want to have Mammogram to Avoid Exposing my Breasts	1.712	1.212	2.419	.002	521.922	.973	2.799E5	.051
Having Mammogram is Embarrassing	1.603	1.150	2.234	.005	.013	.000	1.566	.076

* The dependent variable is a binary categorical variable on whether a woman uses mammographic services or not. The full logistic regression model had independent variables that included the demographic variables (listed in Table 6), the breast cancer knowledge variables (listed in Table 7), and the breast cancer related belief variables (listed in Table 8). The full logistic regression model was statistically significant ($p <$ 0.05) and had a moderate effect size of 0.566 (based on the coefficient of determination – the Cox and Snell R Squared).

Conclusion

Chapter 4 presented the study purpose, research questions, the null and alternative hypotheses of this study. A brief description of the data collection process was stated, and the analysis of the data was described as follows. The descriptive statistical analysis was presented with frequency tables to display the results of the analysis based on each of the independent variables. Inferential statistical analysis was performed using the logistic regression model to investigate the research questions, and to test the hypotheses. The data analysis showed that following the testing of the hypotheses of the study, all the 3 null hypotheses were rejected, and the alternative hypotheses accepted.

For RQ1: There is a statistically significant relationship between demographics factors and utilization of mammogram among Nigerian women in the U.S. Specifically, Nigerian women of 50-69 years age range were more likely to utilize mammogram than their counterparts in the age range of 40-49 years, and 70 years and above in the U.S. The result further showed that Nigerian women who have lived in the U.S. for more than 5 years were more likely to utilize mammogram than their counterparts who have lived in

the U.S. for 5 years or less. The longer their residency in the U.S. the higher the likelihood of their utilizing mammogram.

The Question 2 null hypothesis that there is no statistically significant relationship between breast cancer knowledge, and utilization of mammographic services among Nigerian women, 40 years and older in the U.S. was rejected, and the alternative hypothesis retained. The combined effect of breast cancer knowledge impacted mammogram utilization than each knowledge variable effect. Question 3 null hypothesis that there is no statistically significant association between the beliefs held by Nigerian women, 40 years and older, living in the U.S. and mammogram utilization was also rejected. The alternative hypothesis was accepted based on the fact that Nigerian women, 40 years and older living in the U.S. had a higher level of positive responses on beliefs about breast cancer and mammogram, hence they are more likely to utilize mammogram services. The next chapter focused on the interpretation of the study findings, limitations of the study, recommendations and social change implications.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to determine the association between demographic factors, breast cancer knowledge, as well as health beliefs, and utilization of breast cancer screening services, specifically mammogram among Nigerian women, 40 years and older living in the U.S. The study was nonexperimental, descriptive quantitative research study conducted among 200 Nigerian women, 40 years and older in the U.S. The study participants were recruited by convenient sampling technique from Nigerian organizations and churches in Baltimore, Atlanta, and Houston. This chapter focused on the interpretation of the study findings, limitations of the study, recommendations, implications for social change and conclusions.

Interpretation of Findings

The study was conducted on 200 study participants and the 3 research questions and hypotheses were as follows: Research Question 1: What association exist between demographic factors (age, level of education, marital status, level of income, and length of stay in the U.S.) and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.?

$H_0 1$: There is no statistically significant association between demographic factors and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.?

H_i1: There is a statistically significant relationship between demographic factors and use of mammographic services among Nigerian women (40 years and older) in the U.S.

Research Question 2: What relationship exists between breast cancer knowledge and utilization of mammographic services among Nigerian women aged 40 years and older in the U.S.?

$H_0$2:. There is no statistically significant relationship between breast cancer knowledge and utilization of breast cancer screening services among Nigerian women (40 years and older) in the U.S.

H_a2:. There is a statistically significant relationship between breast cancer knowledge and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.

Research Question 3: What is the relationship between health beliefs and the utilization of mammographic service among Nigerian women (40 years and older) in the U.S.?

$H_0$3: There is no statistically significant relationship between health beliefs and the utilization of mammographic services among Nigerian women (40 years and older) in the U.S.?

H_a3: There is a statistically significant relationship between beliefs and utilization of mammographic services among Nigerian women (40 years and older) in the U.S.?

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Demographic Factors and Mammogram Utilization

Research Question 1 of this study was to determine the association that existed

between demographic factors, namely: age, highest level of education, marital status,

employment status, level of income per year, and the duration of residency in the U.S.

and the utilization of mammographic services among Nigerian women, 40 years and

older living in the U.S. The null hypothesis stating that there was no statistical

significance between demographic factors and utilization of mammographic services was

rejected, while the alternative hypothesis was accepted. Logistic regression statistical

model was used for the analysis, and the regression coefficient for demographic variables

showed two specific demographic factors that indicated statistical significance. The two

demographic variables of significance in this study were age and the length of stay in the

U.S.

Age. Age has been identified as a significant predictor for mammographic

utilization. According to American Cancer Society's (2017) recommendation, women

between the ages of 40-54 years should perform annual mammogram, and women from

55 years of age should perform mammogram once every 2 years (biennially). The study

findings indicated that Nigerian women in the United States who are between the ages of

50 and 59 years are about six times more likely to use mammographic services than their

counterparts who are between the ages of 40 and 49 years. Similarly, the Nigerian women

who are between the ages of 60 and 69 years are seventeen and a half times more likely

to use mammographic services than their counterparts who are between the ages of 40

and 49 years. On the other hand, the Nigerian women who are 70 years and older are not

statistically different from their counterparts who are between the ages of 40 and 49 years in the odds of making use of mammographic services.

This study findings supported the study conducted by Kalahdooz et al. (2014); Ogunsiji et al. (2017) that women who were 50 years and older were likely to utilize mammogram services than their younger counterparts. The correlation of mammogram utilization with older women supported the explanation by CDC (2017) that breast cancer is more commonly diagnosed in older women (50 years and older). It could therefore be interpreted that post-menopausal, older age women are more aware of their higher risks of developing breast cancer, hence the likelihood of their utilizing mammographic services. On the contrary, Vahabi et al. (2015) reported a significantly lower utilization of mammographic services among the older women than the younger immigrant women in Canada. Vahabi and colleagues attributed the higher rate of mammogram utilization among the younger immigrant women to their higher enrollment in the primary care with ultimate increase in health care services.

However, CDC (2018) posited that up to 11% of breast cancer affect women younger than 45 years each year in the U.S. Most of the younger group women diagnosed with breast cancer in the U.S. are of African descent. The incidence rate of breast cancer among the African descent women population is two times higher than the Caucasians of the same age range (CDC, 2018). The study findings indicated that Nigerian women 70 years and older are not statistically different from their 40-49 years old counterparts in the utilization of mammographic services. This could be attributed to immigrant women of this age range being on retirement, and may experience poor socio-economic status

with lack of health insurance, which could negatively impact access to health care services (Binton et al. 2014).

Furthermore, some women 70 years and older may consider discontinuing mammogram due to lack of receiving benefit from it. Freedom (2018) posited that many older women tend to discontinue utilization of mammogram because of personal reasons, such as breast discomfort experienced during the mammographic procedure. Also, some may discontinue mammogram because of facing more life-threatening health issues, such as heart disease and stroke. The level of education, marital status, employment status and level of income of study participants in this study had no statistical significance to the utilization of mammographic services among Nigerian women 40 years and older in the U.S.

Length of residency in the U.S. The findings of this study showed that study participants with more than 5 years of residence in the U.S. were likely to utilize mammographic services than their counterparts with 5 years or less period of residence in the U.S. This study finding was consistent with the study findings of Harcourt et al (2013), and Lee et al. (2014). Furthermore, this study finding was supported by other studies on the use of mammogram by immigrant women and its relationship to residency in the U.S. Vahabi et al. (2015) attributed the utilization of mammographic services by immigrant women to lengthy residency in the U.S. due to their ability to navigate the seemingly complex U.S. health care system than those who live in the U.S. in a shorter period of time.

On the other hand, Vahabi and colleagues attributed lower use of mammographic services among immigrant women with a short residency time in the U.S. to such barriers as limited knowledge of breast cancer and screening, cultural beliefs and language difficulties. Sheppard et al. (2015) correlated the underutilization of mammogram to a shorter residence of African women immigrants in the U.S. with unfamiliarity with the availability of preventive breast health services since such women are more familiar with treating diseased conditions, which is the standard practice in their native homeland.

Other barriers included illegal immigration status with lack of health insurance, and negative health beliefs about breast health services. Furthermore, Kim et al. (2014) in their study findings identified lengthy residency of immigrant women in the U.S. as an important variable that impacts mammogram utilization. A longer time of residency could positively produce changes in breast health knowledge, perceptions and behaviors that allow immigrant women to obtain healthcare information, and seek breast health services.

The Level of education, marital status, employment status and level of income of study participants in this study had no statistical significance to the utilization of mammographic services. Contrary to these findings, Kim et al. (2013) associated mammographic screenings among Korean women in the U.S. to higher education and income levels. They indicated higher level of education and income as determinants of mammographic use among Korean women in the U.S. Furthermore, these findings were inconsistent with the study findings of Ogunsiji et al. (2015) that unemployed and retired African immigrant women were significantly less likely to utilize mammogram when

compared to their employed counterparts. They related this possibility to working women having better economic status to afford breast health services; better exposure to health information that promote greater breast cancer awareness and access to breast screening services.

Knowledge: RQ2 was to determine the relationship between breast cancer knowledge and mammogram and their impact on utilization of mammogram among Nigerian women 40 years and older in the U.S. The null hypothesis was that there was no statistically significant relationship between breast cancer knowledge and utilization of mammogram among Nigerian women 40 years and older in the U.S. The alternative hypothesis was accepted as there was statistically significant relationship between breast cancer knowledge and utilization of mammogram among Nigerian women, 40 years and older in the U.S. In this study, the null hypothesis was rejected and the alternative hypothesis was accepted on the premise that there was statistically significant relationship between breast cancer knowledge and utilization of mammographic services among Nigerian women, 40 years and older in the U.S.

Ninety-eight percent of the study participants responded that they heard of breast cancer, while 86% indicated that they heard of mammogram, and a total of 78% of the participants responded that they utilized mammogram. However, 51% responded to once a year mammogram; 17% responded to once in every 2 years mammogram, while 10% responded to once every 3 or more years. Comparatively, the U.S. national mammogram utilization rate by 2015 was 71.6% for women aged 50-74. By 2020, the estimated national mammogram utilization rate is expected to increase to 81.1% (NIH, 2019).

The study findings were consistent with previous study that indicated that 65% of the African immigrant women in Australia responded to mammogram utilization than 55% rate scored by the Australian-born women. The researchers attributed the higher breast screening rate to the recruitment setting with easy access to breast screening facilities (Ogunsiji et al. 2017). The seemingly high breast cancer knowledge rate in this study could be attributed to recruiting the study participants from 3 major cosmopolitan U.S. cities with likely high availability of access to breast screening services. This assumption was supported by Million-Underwood and Kelber (2015) that study participants living in areas with easy access to mammographic services were likely to have their breast screening behaviors influenced. Adegbulugbe & Ayars (2018) attributed the likelihood of African-born women in the U.S. using mammographic services to social support from family, increase access to primary care providers through expanded health insurance coverage of the Affordable Care Act. All these factors could lead to promoting awareness, and empowering immigrant women to seek breast health services.

However, it is worthy of note that 10% of study participants who utilized mammographic services responded to using such service every three or more years. Such mammogram frequency does not conform to the American Cancer Society's recommendation of an annual or biennial mammogram.

The study findings were higher than the study findings of Vahabi et al. (2016) that the Sub-Saharan immigrant women in Canada had 57% mammographic screening rate when compared to the national rate of 70%. The significantly decreased rate was

attributed to a confluence of factors, such as low economic status and living in poor neighborhoods without the availability of breast screening services.

Beliefs about Breast Cancer and Mammogram Utilization

RQ3: What is the relationship between health beliefs held towards breast cancer and the utilization of mammographic services among Nigerian women, 40 years and older in the U.S? There was statistically significant relationship between beliefs held by Nigerian women 40 years and older and the utilization of mammogram services. The findings showed that Nigerian women, 40 years and older in the U.S. with positive beliefs regarding breast cancer screening were more likely to utilize mammographic services in the U.S. Overall, with every unit increase in the level of positive belief regarding breast cancer screening, there was 112% or 1.12 folds increase in the odds of utilizing mammographic services.

Theoretical Applications

The findings of this study supported the Health Belief Model (HBM). According to Glanz et al. (2015), HBM focuses on the beliefs that people's health behavior is influenced by the individual personal beliefs about the diseased condition, and the availability of strategies made to decrease the occurrence of such condition. This study findings did not support the perceived barrier belief, which is an obstacle to utilization of mammogram; rather, the study participants had a higher level of positive belief about breast cancer screening by not believing that mammogram required unnecessary exposure of breasts. Such belief by the study participants reflected low barrier belief and good self-efficacy (conviction), which directly impacted perceived benefits. Self-efficacy in the

context of mammographic utilization becomes realistic when the individuals receive appropriate information on breast cancer, and timely mammographic screening services.

In this study, the assumption about the high positive beliefs of the study could be related to a culmination of factors, such as living in areas with easy access to breast health care; having higher level of education could promote access to health information, and use of mammogram. The study findings supported Davishpour et al. (2018) that self-efficacy and perceived benefit were predictors of mammogram utilization among their study participants. However, this study findings were inconsistent with Sunil et al. (2014); Ndukwe et al. (2013) that perceived barriers to mammogram utilization, translated as fear of pain during breast screening, fatalism, believing that breast cancer was a curse, and a cause of embarrassment by exposing one's body during mammogram, which negatively impacted mammographic screening behaviors of their study participants.

Limitations of the Study

There were some limitations identified in this study. The study participants were recruited using a convenience sampling technique from the Nigerian women 40 years and older who patronized the Nigerian community organizations, and churches to the exclusion of those who might not be affiliated with such organizations. By using this technique, those who were isolated from such organizations were likely underrepresented. Also, the study utilized self-reported information about demographics, breast cancer knowledge and beliefs that might not have been accurate information from the study participants. Additionally, the study focused on recruiting Nigerian women

living in the cosmopolitan cities of the U.S. to the exclusion of those living in the rural

areas of the U.S. For these reasons, generalization of the study findings to the entire

Nigerian women, 40 years and older in the U.S. should be done cautiously.

<div align="center">**Recommendations**</div>

Further research study with a larger sample size, and suitable verification of self-

reported information that is structured into the study design is recommended. The

findings of this study addressed the gap in the literature, and provided information to

design culture sensitive interventional programs to reach out to Nigerian women, 40

years and older, especially those who have been residing in the U.S. for 5 years or less.

Also, further study is recommended to target the Nigerian women 40-49 years to

investigate factors that are detrimental to their utilization of breast health services.

Definite plan to reach out to immigrant women, especially Nigerian women in the rural

communities of the U.S. to seek their perceptions about breast cancer, and factors that

impede early mammogram utilization is necessary. Such study could be conducted

through in-depth interviews in qualitative or mixed method studies to reach out to

Nigerian women who may be isolated from the Nigerian community organizations due to

varied reasons. There is a need to extend such studies to those with lower residency in the

U.S. to identify and mitigate factors that promote health disparities in this population.

Furthermore, health care providers, law makers and public health workers in the U.S.

could be informed by this study findings to develop culture-sensitive breast health

policies and programs that would be favorable to immigrant women in the U.S.

Social Change Implications

The findings of this study have shown the interrelated factors that should be considered in improving mammographic utilization, specifically among Nigerian women, 40 years and older, and other women immigrant populations in the U.S. The social change implications of this research study focus on the knowledge gained to develop appropriate strategies to reach out to all Nigerian women, especially those between ages 40 and 49 years, and those living in the rural areas of the U.S. Such change implications are equally geared towards those with decreased residency of less than 6 years in the U.S. through community-based health campaigns that promote breast health knowledge, and development of positive health beliefs toward optimal utilization of mammogram. Furthermore, the findings of this study would provide policymakers, and health care providers insight on developing culturally-sensitive health policies and programs at the community level. Provision of such programs such as free and subsidized mammogram services in the immigrant/minority communities would increase mammogram accessibility, hence narrowing the health disparity gap that is experienced by many immigrant women in the U.S.

Conclusion

The undertaking of this study was relevant because of the dearth of research studies about breast health among African women immigrants, specifically Nigerian women in the U.S. Some of the previous studies on African born women and breast cancer were grouped with African American, and Caribbean women, which guise the unique cultural differences that impact their breast screening practices. Ndukwe et al.

(2014) in their findings reported that Nigerian women are at risk of being diagnosed with late stages of breast cancer due to delay in their seeking timely breast cancer screening services because of lack of breast cancer knowledge, and other factors that do not promote the utilization of such services. This study findings indicated that Nigerian women between the ages of 50-69 years are more likely to utilize mammogram than their younger counterparts 40-49 years and those who are 70 years and older.

The length of residency in the U.S. was identified as a significant determinant in the utilization of mammographic services among the study participants. The longer the residency, the higher the likelihood of utilization of mammographic services. Another significant finding in this study was that although 98% of the study participants responded that they heard about breast cancer; 86% responded that they hears about mammogram, only 68% responded accurately to utilizing mammographic services either once a year or once every 2 years according to ACS recommendation (2017). The lower mammogram utilization rate when compared to the U.S. national rate calls for education and outreach campaigns that promote appropriate use of mammogram among Nigerian women living in the U.S.

Additionally, the study participants indicated a higher positive health belief that significantly impacted the utilization of mammographic services. However, it is relevant that the generalization of the study findings to all Nigerian women, 40 years and older in the U.S. should be done with caution because the study participants were recruited in 3 Cosmopolitan cities of the U.S. to the exclusion of those living in the rural areas of the U.S. The use of HBM was necessary to have a good understanding of the effect of

perceived beliefs and their influence on the use of mammographic services among the study participants.

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Appendix A: Study Questionnaire

The following questions are multiple choice and require the selection of **ONE** answer per question.

1. Age range (in years)

    o 40-49

    o 50-59

    o 60-69

    o 70 years and above

2. What is your highest level of Education?

    o Primary education

    o High school/GED graduate

    o Undergraduate degree

    o Graduate school

3. What is your marital status?

    o Married

    o Single

    o Divorced/separated

    o Widowed

    o In partnership

4. Are you currently-----

    o Employed: Full time

o   Employed: Part time

o   Unemployed: Seeking work

o   Unemployed: Not seeking work

o   Retired

5. What is your level of income per year?

o   20,000 or Below

o   21,000-40,000

o   41,000-60,000

o   61,000-80,000

o   81,000-100,000

o   101,000 and above

6. How many years have you lived in the U.S.?

o   Less than 5 years

o   6 to 10 years

o   11 to 15 years

o   16 to 20 years

o   More than 20 years

7. Have you ever heard of breast cancer?

o   Yes

o   No

8. Do you have history of breast cancer?

   o Yes

   o No

   o I don't know

9. Has anyone in your immediate family (mother, sister, daughter, grandmother) had breast cancer?

   o Yes, if so, who:_____

   o No

   o I don't know

10. Has any of your friends had breast cancer?

    o Yes

    o No

    o I don't know

11. Have you ever heard of mammogram? (means having your breasts x-rayed in a machine)

    o Yes

    o No

    o I don't know

12. How often do you have a mammogram?

    o Once a year

    o Once every two years

o   Once every three years or more

o   Never had one

Please tick the box that best represent your opinion.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
13. Breast cancer is like a death sentence; if you get it, you will surely die from it.					
14. Breast cancer cannot be cured; you can only prolong the suffering.					
15. Even if breast cancer is detected early, there is very little a woman can do to reduce the chances of dying from it.					
16. If a woman is fated to get breast cancer, she will get breast cancer; there is nothing she can do to change fate.					

17. I'm worried that having a mammogram will hurt my breasts.					
18. It would be difficult to arrange transportation for getting a mammogram.					
19. I don't want to go for mammogram because I would need to take off my clothes and expose my breasts.					
20. Having a mammogram is embarrassing.					

21. Would you prefer the mammogram technician to be male or female?

- o   Male

- o   Female

- o   No preference

22. If you receive an invitation to have a free mammogram, would you go?

- o   Yes

- o   No

- o   I don't know