

Health Belief Model and Fatalism related to Breast Cancer Screening in Working Women

by

Amy Curtis, RN, MSN

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Approved by

Maria Witte, Chair, Professor of Educational Foundations, Leadership and Technology
James Witte, Professor of Educational Foundations, Leadership and Technology
Leslie Cordie, Assistant Professor of Educational Foundations, Leadership and Technology
Bonnie Sanderson, Professor of Nursing

Abstract

Breast Cancer is the most common cancer in women, with the exception of cancers of the skin, and is responsible for thousands of deaths each year. The American Cancer Society indicates that breast cancer death rates and incidence increase with age. In the United States, there will be 234,190 new cases of breast cancer and 40,290 women will die from this disease in 2015 alone. Among the women who were diagnosed with breast cancer, Caucasian women have a higher incidence than African American women beginning at age 45. However, African American women have a higher incidence rate before 45, and are more likely to die from this type of cancer at any age. It has been said that one in four women in the United States ages 50–74 have not had a mammogram within the past two years. Therefore, the purpose of this study is to explore the relationships between components of the Health Belief Model (HBM), level of breast cancer knowledge and fatalism on breast cancer screening behaviors in working women at a southeastern United States university. The researcher will pay particular attention to those relationships discovered in African American and Caucasian women. The sample for this study consisted of 667 females who were employed at this particular university. The findings of this study revealed that certain components of the HBM (perceived benefits and perceived barriers) and the Fatalism scale (pessimism) have a predictive effect of an individual's screening behaviors.

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List of Abbreviations or Symbols

ACS	American Cancer Society
BSE	Breast self-exam
CBE	Clinical breast examination
CDC	Centers for Disease Control and Prevention
CFA	Confirmatory Factor Analysis
EBP	Evidence Based Practice
HBM	Health Belief Model
IRB	Institutional Review Board
NCI	National Cancer Institute
USPSTF	United States Preventive Services Task Force

CHAPTER 1 – INTRODUCTION

Breast cancer is an important health concern especially for women, because one in eight women will develop breast cancer at some point in their lifetime (Humphrey, Helfand, Chan, & Woolf, 2002). It can be said that women often wonder what breast cancer really is, what it means for their health, and whether it can be prevented or effectively treated. According to the American Cancer Society (ACS), breast cancer is a malignant tumor that starts from cells that reside in breast tissue (2010). A malignant tumor is a group of cancer cells that grow and move into surrounding tissue and can spread to other parts of the body. This disease occurs mainly in women, but can occur in men as well (ACS, 2010). Mammography is one of the most common methods for early diagnosis of breast cancer. A mammogram is an x-ray of the breast, which can detect problems within the breast long before signs and symptoms of a presenting problem (CDC, 2013). Mammograms tend to be quick and relatively easy as the woman stands in front of the x-ray machine. The entire procedure lasts around thirty minutes and can help save lives (National Institute of Health, 2010). Breast cancers that are found during screening exams, such as mammograms, are more likely to be small and confined to the breast and less likely to be palpable during a routine self-breast exam. The size of tumor and if/how far it has spread are important factors in predicting prognosis for those diagnosed with breast cancer (ACS, 2010).

Statement of the Problem

Although the incidence of breast cancer is higher among Caucasian women, African American women continue to get diagnosed at later stages and thus experience a higher cancer mortality rate with lower survival rate than their counterpart who are the same age and are in the same cancer stage (Thomas, 2004). Breast cancer is the most common cancer in women, with the exception of cancers of the skin, and is responsible for thousands of deaths each year (ACS, 2015). It is estimated that 234,190 new cases of breast cancer will occur in 2015, 2,350 of which will affect the male population according to the annual report distributed by the American Cancer Society (ACS). This report also shows that an estimated 40,730 deaths will be associated with breast cancer in 2015; 40,290 will be women and the remaining 440 will be men. Breast cancer ranks as the second leading cause of death in women, second to lung cancer (ACS, 2015). The ACS indicates that breast cancer death rates and incidence increase with age. It was estimated that during the 2002–2006 study, 95% of new cases and 97% of all breast cancer deaths occurred in women aged 40 and over (ACS, 2009). The ACS *Cancer Facts and Figures 2015* annual report revealed that within the state of Alabama, the number of new cases of breast cancer for women was 3,680 which was the second highest form of cancer behind lung and bronchus (ACS, 2015). The Centers for Disease Control and Prevention (CDC) indicated that in 2011, 220,097 women were diagnosed with breast cancer and 40,931 women in the United States died from breast cancer (CDC, 2011). Among the women who were diagnosed with breast cancer, Caucasian women have a higher incidence than African American women beginning at age 45. However, African American women have a higher incidence rate before 45, and are more likely to die from this type of cancer at every age (ACS, 2009).

Throughout the literature, many factors are reported to be associated with breast cancer. According to the ACS, some risk factors include: being female, getting older, family history, personal history of cancer in one breast, first child after the age of 30 or no children, getting a period early in life (menarche) before age 12, menopause after age 55, overweight, hormone replacement therapy and being a carrier of the breast cancer gene BRCA1 or BRCA2 (2015). The ACS (2010) also discusses known risk factors for developing breast cancer. One of the risk factors that a person cannot change is their gender. A female is at greater risk due to the fact she has more breast cells that are constantly exposed to estrogen and progesterone hormones, which increases the risk of breast cancer. Another factor is aging, as the risk of developing breast cancer increases with age. One in eight women younger than forty-five and two in three women ages fifty-five or older will develop invasive breast cancer in their lifetime. Genetics is yet another important risk factor. The ACS indicates that five to ten percent of cases of breast cancer are thought to be hereditary in nature. Having a family history of breast cancer increases a woman's risk of developing the disease as well. If a woman has a first-degree relative (mother, sister or daughter) with breast cancer, her chances double for developing this type of cancer at some point in her life. A personal history of breast cancer causes one's risk of developing it in the other breast to increase three to four fold. Caucasian women tend to develop breast cancer more often than African American women, but African American women tend to die more from the disease than their Caucasian women. Women who have conditions of the breast such as dense breast tissue, fibrocystic disease, hyperplasia, adenosis, duct ectasia, papilloma, fat necrosis, mastitis, fibroadenoma, or ductal hyperplasia tend to be at higher risk for breast cancer. Early menarche, prior to age twelve, or late menopause, after age 55, causes a woman's risk to increase. The ACS identified lifestyle-related factors as raising the risk of breast cancer

including having children after age thirty or not having children at all. Also, the use of oral contraceptives, hormone replacement therapy, and alcohol consumption, as well as being obese have been shown to increase the risk for developing breast cancer. However, breast feeding and physical activity, for at least forty-five to sixty minutes, five or more days a week have been shown to decrease one's risk of developing breast cancer (ACS, 2010).

Breast cancer screening, which means checking a person's breast before any signs or symptoms have developed, is still one of the best ways to reduce the incidence of mortality from breast cancer in women and men today (ACS, 2009). As discussed previously, mammography is still the best mechanism for early detection. The ACS puts forth that women can reduce their risk of developing breast cancer by decreasing the risk factors that can be changed. These factors include behaviors such as avoiding hormone replacement therapy, making lifestyle changes, having genetic testing (if indicated), and following recommended mammography guidelines. According to the ACS (2010), the chance of a woman developing invasive breast cancer at some point in their life is about one in eight or twelve percent. ACS statistics also indicate that the chance that breast cancer will be responsible for a woman's death is about one in thirty-five or approximately three percent. Studies have shown that one in four women in the United States ages 50–74 have not had a mammogram within the past two years (Plescia & White, 2013). The most significant recommendation dealing with reduction of incidence of breast cancer would be for a woman to know her risk factors, make changes accordingly, and to follow prevention guidelines.

Breast cancer is the most common form of cancer among African American women in the United States. It has been shown that when African American women follow the same preventative guidelines as Caucasian women, their mortality rates are similar. But, according to

Trigg (2001), African American women are still more likely to be diagnosed at later states of breast cancer and thus mortality rates are higher than in Caucasian women. Trigg also identified potential barriers that African American women might report such as cost, physicians' failure to discuss mammography with them, misconceptions that screenings are unnecessary, and lack of health insurance.

According to the Centers for Disease Control (CDC), only 53% of women without a high school diploma or GED were getting their screening mammograms. In this same study, 65% of women who had their GED or high school diploma and 73% of those who had some college education were getting mammograms in that same year (2008). These statistics indicate that people with lower educational levels are at higher risk of late stage diagnosis of breast cancer and need to be educated on the importance of receiving screening mammograms and proper guidelines to follow to help deter breast cancer.

Theoretical Framework

Nursing practice is based on scientific evidence which supports patient care delivery, and this evidence comes from clinical trials, studies, and reports and outcomes research. Evidence-based practice (EBP) is thoughtful integration of the best available evidence joined with clinical expertise. This information enables healthcare professionals to address questions with an evaluative and qualitative approach. Evidence-based practice allows members of the healthcare team as well as educators to assess current and past research, guidelines, recommendations, and other relevant resources in order to identify changes and make appropriate clinical judgments. According to Melnyk and Fineout-Overholt (2005), the goal of EBP is to promote optimal outcomes for those involved in the healthcare profession (patients, and families alike) by

utilizing best practices. An example of EBP set into theory is the Health Belief Model which originated in the 1950's and helped to guide this research study.

Health Belief Model

The Health Belief Model (HBM) originated in the 1950s by Hockbaum, Kegeles, Leventhal, and Rosenstock (social psychologists) to predict a person's attitudes and actions (behaviors) regarding health issues and has been refined over the years (Rosenstock, 1974). This theory is based on a person's willingness to change their behaviors related to health concerns. This model has been applied in several research studies to guide the development of health interventions to change behaviors. There are six constructs in the current HBM, and they are: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. The HBM postulates that people will take action to prevent, to screen for, or to control conditions of ill health if they regard themselves as susceptible to the condition, if they believe it could have potentially serious consequences, if they believe that a course of action available to them would be beneficial in reducing either their susceptibility to or the severity of the condition, and if they believe that the anticipated barriers to taking the action are outweighed by its benefits (Champion, et al., 2003). The HBM is regularly used in the nursing profession particularly because it focuses on patient compliance and preventative health care practices. This theory focuses on the belief that health seeking behaviors are influenced by a person's perception of a threat posed by a health problem and the value associated with actions aimed at reducing the threat. It is a way of understanding and predicting how clients will behave in relation to their health and how they will comply with prescribed therapies (Janz, Champion, & Stretcher, 2002).

Purpose of the Study

The purpose of this study was to explore the level of breast cancer knowledge as well as the health promotional behaviors in a group of women employed at a southeastern university in the United States. This study included evidence-based factors known to influence mammography beliefs including potential barriers, intent to perform health promotional behaviors, and other factors associated with the procedure. The questionnaire incorporated components of the breast cancer knowledge test, health belief model, and other questions related to cancer fatalism to help determine personal factors, attitudes and beliefs, and other health factors that differentiate women's decision-making process for participation in mammography screenings.

Significance of Study

Chronic health diseases are a leading public health concern in the United States and studies have shown that cancer, heart disease, stroke and diabetes are among the most common, and most expensive of all health problems (CDC, 2005). According to a study conducted by the CDC in 2005, it was revealed that yearly there are seven out of ten deaths in the U.S. that are the result of chronic disease and illness. It was said that management of these diseases account for over half of the current \$1.4 trillion plus health care costs (CDC, 2010). Combating these rising costs by educating the general public on health promotional behaviors and screening methods is where the nursing profession can step in and help with prevention, and management of these health issues.

A major goal outlined in *Healthy People 2020* is to reduce the number of new cancer cases, as well as the illness, disability and death caused by cancer in our country (U.S.

Department of Health and Human Services, 2014). Other goals that can be specifically linked to cancer are:

- reduce the overall cancer death rate
- increase the proportion of cancer survivors who are living 5 years or longer after diagnosis
- increase the proportion of adults who were counseled about cancer screening consistent with current guidelines

Goals that can be directly linked to breast cancer are:

- reduce the female breast cancer rate
- reduce late-stage female breast cancer
- increase the proportion of women who receive a breast cancer screening based on the most recent guidelines (USDHHS, 2010).

Making cancer screening information as well as services available to women is essential to reduce late stage diagnosis rates and ultimately reduce cancer deaths (Loerzel & Bushy, 2005; NCI, 2009). Nurses can play a vital role in promoting screening behaviors to patients at every level of patient care. Nurses can educate on the current ACS's guidelines to breast cancer screening as the key to prevention and early detection is education.

Breast cancer screening, knowledge and diagnosis rates have been one of the most prevalent health topics in the media recently. The reports have been focused on the significance breast cancer has had on individuals as well as their families. Breast cancer is being diagnosed at alarming rates, thus bringing the focus on screening to the forefront. The recent changes in the ACS breast cancer screening recommendation guidelines have brought about tremendous media coverage. Thus, the pressure is being placed on health professionals to make sure the public is

aware of breast cancer, health behaviors, screenings, and health status in general. This makes this research study relevant and timely because the researcher is looking into breast cancer knowledge, beliefs and screening behaviors of a group of women in the Southeastern United States. The researcher hopes that the findings of this study can be a step towards more educational interventions regarding screening and the reduction of negativity towards health promotional behaviors, and in the long term reducing morbidity and mortality rates in this region.

Research Questions

The following research questions were used in this study:

1. What is the relationship between components of the Health Belief Model and breast cancer screening behaviors in female employees at a southeastern university in the United States?
2. What is the relationship between level of breast cancer knowledge and screening behaviors in female employees at a southeastern university in the United States?
3. What is the relationship between cancer fatalism and screening behaviors in female employees at a southeastern university in the United States?
4. What are the relationships between racial populations and components of the Health Belief Model, level of breast cancer knowledge, and fatalism on screening behaviors in female employees at a southeastern university in the United States?
5. What is the relationship between screening behaviors and ethnicity in female employees at a southeastern university in the United States?

6. What is the relationship between screening behaviors and level of education, household income, and insurance status in female employees at a southeastern university in the United States?

Assumptions

The assumptions related to this research study included the following: (a) the employed females at this southeastern university who will serve as participants in this study will respond to the questionnaire with integrity and accuracy, (b) all questionnaire items will be sufficient to elicit appropriate data from the sample population, (c) no potential subjects will be excluded from the administration procedures, (d) study participants will fully comprehend the process to complete the questionnaire upon reading the invitational email and informed consent statement, and (e) participants will understand the nature of the questions on the questionnaire.

Limitations

One limitation of this study is the sampling method utilized, convenience sampling. This type of method could limit the degree of generalizability of the study due to the fact the sample did not necessarily represent the general population. Another limitation of this study is the reliance on self-report from the participant. The participants were encouraged to answer each question in the survey with honesty and integrity to the best of their knowledge. However, there are no means to ensure honesty and integrity when respondents answered the questions. The researcher could only assume participants answered honestly and reliably. Another limitation of this study was the fact the researcher did not take into consideration those women who had already been diagnosed with breast cancer, the questionnaire was not a fit for that population particularly regarding mammograms. Those who have had breast cancer and undergone

mastectomy (single or double), may forgo mammograms and have an MRI instead so the entire mammography section would not apply to this population.

Delimitations

A delimitation of this study centered on the fact that it was restricted to only female employees who were employed during the Fall 2015 semester. Also, the study was limited to only those who had a valid email address on file with the Office of Institutional Research and Assessment office. Also, it was limited to those who have access to a computer, those who check emails, and those who were working during the four weeks and not on “leave” or “out of the office” while the survey was open.

Definition of Terms

For the purpose of this study, the following terms are defined:

African American: includes persons who indicated their race as “Black” or reported entries such as Afro-American, Black Puerto Rican, Jamaican, Nigerian, West Indian, or Haitian (Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity, 2003).

Asian: a person having origins in any of the original people of the Far East, Southeast Asia, or the Indian subcontinent including Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam (Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity, 2003).

Barriers: perceived emotions, physical or structural concerns related to mammography or BSE behavior that interferes with screening (Champion, 1999).

Breast Cancer: cancer that forms in tissues of the breast, usually the ducts and lobules. It occurs in both men and women (National Cancer Institute, 2008).

Breast Self-Examination (BSE): an exam by a woman of her breasts to check for any changes such as lumps (National Cancer Institute, 2008).

Cancer: the abnormal, uncontrolled multiplication of cells, which if left untreated can cause death (American Cancer Society, 2015).

Caucasian: includes persons who indicated their race as “White” or reported entries such as Canadian, German, Italian, Lebanese, Near Eastern, Arab or Polish (Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity, 2003).

Clinical Breast Exam (CBE): a physical examination of the breast performed by a healthcare provider to check for abnormal changes in the breast (NCI, 2008).

Early Detection: the use of screening tests to detect cancers at early stages to provide better outcomes (ACS, 2015).

Fatalism: is a cultural belief that death is inevitable when cancer is present (Finnie & Powe, 2003).

Health Belief Model (HBM): focuses on the belief that health seeking behaviors are influenced by a person’s perception of a threat posed by a health problem and the value associated with actions aimed at reducing the threat. It is a way of understanding and predicting how clients will behave in relation to their health and how they will comply with prescribed therapies (Janz, Champion, & Stretcher, 2002)

Health Beliefs: include an individual’s perception of susceptibility to and seriousness of disease or disorder, as well as the perceptions of benefits and barriers to taking preventative action (Glanz, Rimer, & Lewis, 2002).

Hispanic: a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race (Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity, 2003).

Mammogram: the use of film or a computer to create a picture of the breast (ACS, 2015).

Mastectomy: the surgical removal of the breast (ACS, 2015).

Perceived Barriers: one's belief about the tangible and psychological costs of the advised action; a key component of the HBM.

Perceived Benefits: one's belief in the efficacy of the advised action to reduce risk or seriousness of the disease; a key component of the HBM.

Perceived Severity: one's belief of how serious a disease or illness is; a key component of the HBM.

Perceived Susceptibility: one's belief regarding the chance of getting the disease or illness; a key component of the HBM.

CHAPTER 2 – REVIEW OF THE LITERATURE

Introduction

This chapter provides an overview of the concepts pertaining to breast cancer, breast cancer screening and barriers or beliefs in relation to breast cancer screening. Additionally, the history, development and application of the Health Belief Model are presented. This chapter includes three main sections: 1) Breast Cancer Overview which includes: definition of breast cancer, risk factors, signs and symptoms of breast cancer, morbidity and mortality rates, barriers to screening, cancer disparities, current screening recommendations, mammograms/MRI/CBE/BSE, (2) Health Belief Model, and 3) Cancer Fatalism.

Purpose

The purpose of this study was to explore the level of breast cancer knowledge as well as the health promotional behaviors in a group of women employed at a southeaster university in the United States. This study included evidence-based factors known to influence mammography beliefs including potential barriers, intent to perform health promotional behaviors and other factors associated with the procedure. The questionnaire incorporated components of the breast cancer knowledge test, health belief model, and other questions related to cancer fatalism to help determine personal factors, attitudes and beliefs, and other health factors that differentiate women's decision-making process for participation in mammography screenings.

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5. What is the relationship between screening behaviors and ethnicity in female employees at a southeastern university in the United States?
6. What is the relationship between screening behaviors and level of education, household income, and insurance status in female employees at a southeastern university in the United States?

Breast Cancer Overview

Breast Cancer Defined

What is cancer? The ACS defines cancer as normal body cells that start growing out of control in a person's body. Normal cells grow, divide, and die to replace worn-out cells in the body. However, cancerous cells do not necessarily die, they continue to grow, and form new, abnormal cells. Some of these cancer cells can grow into other tissues (invade), and this is

something “normal” cells cannot do (ACS, 2015). Cells are in nearly any part of the body and can become cancer, and can spread all over the body; this is why cancer is so dangerous. To understand breast cancer, one must understand the structure of the breast. The breast is made up of milk producing glands as well as tubes (known as ducts) that carry milk to the nipple. These structures are surrounded by fatty and connective tissue, along with blood and lymphatic vessels. Breast cancers can be lobular (originating in the cells that line the lobules or milk producing glands), while others originate in the ducts that carry the milk from the lobules, known as ductal cancer (ACS, 2015).

Breast cancer occurs in two broad categories, noninvasive and invasive. Noninvasive breast cancer is also known as breast cancer in situ. Cancerous cells remain in a particular location of the breast without spreading to surrounding tissue/lobes/ducts. Invasive breast cancer is also known as infiltrating breast cancer. This is when cancerous cells leave the normal tissue and spread to other parts of the body through the bloodstream and the lymphatic system via the lymph nodes. Sometimes, breast cancer can be both invasive and noninvasive in nature. Some of the cancer cells have grown into the normal tissue and some have remained in the ducts or lobules. Invasive breast cancer is the most common type of breast cancer among American women. Breast cancer is also classified based on where in the breast the disease started, such as the milk ducts or lobules, as well as how the disease grows, and a host of other factors (CDC, 2010).

How does breast cancer spread? The lymphatic system is the key to spreading breast cancer to other parts of the body via the bloodstream. The lymphatic system consists of lymph nodes which houses immune system cells that are key to fighting infections in the body. These nodes are connected by vessels that carry lymphatic fluid from the breast. The lymphatic vessels

are connected to more lymph nodes under the arm, known as axillary nodes, or to nodes inside the chest, known as internal mammary nodes, and even around the collarbone, known as supraclavicular or infraclavicular nodes. Once cancer cells spread to these nodes, there is a higher chance that cancer could be in the bloodstream and spreading/metastasizing to other sites in the body. This is one of the main reasons, if breast cancer is suspected, the physician will check the lymph nodes in the axilla of the arm during treatment (ACS, 2015).

It has been shown that most lumps found in the breast are benign, or noncancerous. Many times these lumps can be benign changes in breast tissue caused by fibrosis or cysts. Many women suffer from a condition known as fibrocystic breast disease, which is characterized by benign breast lumps. This can cause alarm for some women who think this could potentially be cancer. These benign lumps can cause swelling, tenderness and/or pain in one or both breasts. Another benign breast condition is known as fibroadenoma or intraductal papilloma which causes lumps to form in the breast tissue. These do not spread outside of the breast and are not cancerous (ACS, 2015).

Risk Factors

Risk factors vary in women based on several factors such as diet, exercise, income, education, culture, and beliefs. Some specific factors that increase the relative risk for breast cancer in women include: being a woman, age, biopsy confirmed atypical hyperplasia, genetic mutations, ductal carcinoma in situ, lobular carcinoma in situ, personal history of early onset breast cancer, two or more first degree relatives with breast cancer, postmenopausal, radiation to chest or face before the age of 30, dense breasts, alcohol consumption, race/ethnicity particularly those of Ashkenazi Jewish heritage, early menarche, height, late age at first birth, late menopause, never breast fed a child, no full term pregnancy, obesity, smoking, lack of exercise,

personal history of ovarian cancer, hormone replacement therapy and recent oral contraceptive use (ACS, 2015).

Excluding skin cancer, breast cancer is the most common cancer among U.S. women, accounting for 29% of newly diagnosed cancers. Breast cancer risk generally increases with age. It is said “a woman living in the US has a 12.3%, or a 1 in 8, lifetime risk of being diagnosed with breast cancer. Conversely, seven out of eight women born today will not be diagnosed with breast cancer in their lifetimes” (ACS, Breast Cancer Facts and Figures, 2015, p. 4). There has been no explanation as to why breast cancer affects women differently or why it varies in African American and Caucasian women. Villarosa (2002) pointed out that a possible explanation is a combination of genetics, biology, environment, and diet could set this group of women up for a more deadly form of breast cancer. Studies have shown that mutations of two specific genes, BRCA1 and BRCA2, to be associated with an increased risk of developing breast and ovarian cancer. On average, women with a BRCA1 mutation have a 55–65% lifetime risk of developing breast cancer. For women with a BRCA2 mutation, the risk is slightly lower at 45% (ACS, 2015). Those at increased risk of the genetic factors are those who have been diagnosed with breast cancer at an early age, multiple cases of breast cancer in the family, bilateral breast cancer, and a history of ovarian cancer (Nelson, Huffman, Rongwei, & Harris, 2005). Jones and Chilton (2002) indicated that non-inherited gene alterations occurring in breast epithelial cells are the most common cause of breast cancer. Villarosa (2002) also identified genetics as a risk factor for breast cancer that continues to be investigated. However, African American women are more frequently diagnosed with estrogen receptor negative tumors. These types of tumors tend to be larger in size, and more aggressive than other tumors. They also do not feed off of estrogen and are not responsive to the most common and effective breast cancer treatment drug,

tamoxifen (Villarosa, 2002). The five year survival rate for this group is 71% compared with 86% for Caucasians (Jones & Chilton, 2002). African American women have been found to have higher levels of estrogen, which puts them at greater risk of more aggressive forms of breast cancer. Reasons for the higher levels of estrogen could be related to high fat diets and lack of exercise, both of which can raise estrogen levels. African American women also tend to live in areas with higher pollution levels. This in combination with lifestyle and genetic factors make African American women more vulnerable to developing breast cancer (Villarosa, 2002). Age is considered the most significant risk factor for breast cancer. Breast cancer is known to be far more aggressive in younger women as opposed to older women. The risk of breast cancer is also higher for women 40–49 years of age if they have a family history of breast cancer; namely a first degree relative (NCI, 2009).

Another issue facing African American women is that most tend to be uninsured. Sixteen and a half percent of African American women are uninsured versus slightly less than ten percent (9.8%) for Caucasian women. African American women are also “somewhat less likely than White women to have private insurance or to be on Medicare and more likely to be on Medicaid or to have no insurance” (Altpeter, Mitchell & Pennell, 2005, p. 225). African American women felt they did not get their mammogram screening due to lack of physician referral (Lukwago et al., 2003).

Other factors such as “limited health literacy, perceived discrimination in medical settings, difficulties communicating with physicians, shorter office visits with lower visit satisfaction with physicians of other races” (Royak-Schaler et al., 2008, p. 836) tend to have an impact on African American women as well. This group of women tends to be least knowledgeable about breast cancer and its risks. They tend to be in denial of being at risk, avoid

discussing breast cancer and mammograms with their physicians, or even discussing screening methods (Altpeter et al., 2005). Additional factors for physician cancer detection procedures include: “attitude (e.g., perceived ineffectiveness), knowledge (e.g., confusion about guidelines), and organizational factors (e.g., scheduling problems)” (Coleman et al., 2003, p. 670). Other barriers to African American women obtaining mammograms include women felt embarrassed, and stated the procedure was painful and uncomfortable. Others included lack of insurance (Fowler, Rodney, Roberts, & Broadus, 2005), fear of the procedure, fear of certain radiation that might be involved, and lack of knowledge about the screening process itself (Simonian et al., 2004). Also, access to care has been shown to have an impact on breast cancer in African American women (Maloney et al., 2006).

African American women now have about the same risk of getting breast cancer as Caucasian women. However, the risk of dying from breast cancer remains higher for African American women. In 2012, African American women had a 42% higher rate of breast cancer mortality than Caucasian women (Howlader et al., 2014). In the past, African American women were less likely than White women to get regular mammograms. These lower screening rates may have increased the chances of this group of women being diagnosed with more advanced stages of breast cancer. This may be one possible reason for the difference in survival rates. Now, African American women and Caucasian women have about the same rates of mammography use, 66%. However the survival rate after diagnosis is not the same in these two groups of women. The 5-year survival rate for African American women diagnosed with breast cancer during 1996–2004 was 77%, compared to 90% among Caucasian women (ACS, 2010). Access to follow-up care after an abnormal mammogram may explain the survival gap. Some

findings have shown that African American women may experience more delays in follow-up care than their Caucasian counterparts (Howlander, et al., 2014).

There has been an increase in breast cancer in Asian American women in the United States. Breast cancer is the most commonly diagnosed cancer in this group of women according to the National Cancer Institute (2009). English language fluency, cultural beliefs and behaviors, breast cancer knowledge, educational level and insurance coverage among other factors directly and indirectly affect the breast cancer incidence rate in this group of women. It has been shown that in order to combat these issues, an educational intervention session is needed to reach this population (Lee-Lin, Menon, Pett, Nail, & Mooney, 2007).

There has also been an increase in breast cancer diagnosis as well as deaths associated with breast cancer in Hispanic women in the United States according to findings of Hall, Hall, Pfriemer, Wimberley and Jones in a study conducted in 2007. Underutilization of breast cancer screening services, lack of breast cancer knowledge, poor health literacy, lack of health insurance, cultural beliefs/behaviors, and other factors have been associated with the increase risk of breast cancer in this group of women (Hall et al., 2007). The ACS revealed an estimated 19,800 new cases of female breast cancer diagnosed in 2015, along with an estimated 2,800 deaths associated with breast cancer. Among Hispanic women the leading cause of cancer death is breast cancer, with approximately 16% of the deaths in 2015 (ACS, 2015).

Signs and Symptoms of Breast Cancer

Breast cancer often produces no symptoms in early stages when the tumor is relatively small. Therefore, it is important for women to follow current screening guidelines for early detection of breast cancer (ACS, 2015). As the tumor grows, the woman feels a small painless lump. In some cases, the tumor can spread to lymph nodes in the axilla of the breast and small

lumps may be felt here as well. Other signs and symptoms of breast cancer are breast pain, heaviness, changes to the breast such as swelling, thickening or redness of the skin, as well as nipple abnormalities. Nipple abnormalities include discharge, erosion, retraction or inversion of the nipple. Skin changes, and increase in size or shape of the breast have also been linked to breast cancer. Symptoms more specific to invasive breast cancer are as follows: irritated or itchy breasts, change in breast color, changes in touch (may feel hard, tender or warm), peeling or flaking of the nipple skin, and redness or pitting of the breast skin (like the skin of an orange) (ACS, 2015).

Morbidity and Mortality Rates

Approximately one in eight U.S. women will develop invasive breast cancer over the course of their lifetime. In 2016, an estimated 246,660 new cases of invasive breast cancer are expected to be diagnosed in women in the U.S. along with 61,000 new cases of non-invasive (in situ) breast cancer. Overall, breast cancer death rates decreased 36% from 1989 to 2012 and this declination has been attributed to improvements in breast cancer treatment and breast cancer screening. However, breast cancer is the second most common cause of cancer among U.S. women, surpassed only by lung cancer. In women under 45, breast cancer is more common in African American women than Caucasian women. Overall, African American women are more likely to die of breast cancer. The risk of developing and dying from breast cancer is relatively low in Asian, Hispanic, and Native American women. The 5-year survival rate for African American women diagnosed with breast cancer during 1996–2004 was 77%, compared to 90% among Caucasian women (ACS, 2010). This difference can be attributed to being diagnosed at later stages of breast cancer and poorer stage-specific survival among African American women. Studies have shown an inequality in receiving prompt, high-quality treatment for African

American women as compared to Caucasian women. There is also evidence that aggressive tumor characteristics are more common in African American women than other races (ACS, 2010). About 5–10% of breast cancers can be linked to gene mutations inherited from one's mother or father. Mutations of the BRCA1 and BRCA2 genes are the most common. On average, women with a BRCA1 mutation have a 55–65% lifetime risk of developing breast cancer. For those with BRCA2 mutation, the risk is slightly lower at 45%. These genetic mutations often occur in younger women, and with these genetic mutations there is also an increased risk for ovarian cancer. Approximately 85% of breast cancer occurs in women who have no family history of breast cancer. These occur due to the genetic mutations that happen as a result of the normal aging process rather than the inherited mutations (ACS, 2015).

Mortality rates for African American women breast cancer survivors are 33% higher than for Caucasians, even though the incidence of the disease is higher in Caucasians. African American women are less likely to survive for five years following initial diagnosis of breast cancer. African American women are usually diagnosed at later stages in the cancer progression than Caucasians (Royak-Schaler et al., 2008). This disparity of breast cancer among African American women is decades old. Each year the ACS, the National Cancer Institute (NCI), CDC, and the National Center for Health Statistics (NCHS) distribute a report card to discuss the progress towards cancer treatment and prevention. Back in 1998, the report card showed a disproportionate breast cancer incidence and death rate of African American women compared with Caucasian women. This rate was steadily increasing with no signs of decrease in mortality trends. From 1973 to 1998, breast cancer increased by more than 40% in women. Breast cancer is most common among African American women, even though the incidence of newly diagnosed cases is 13% lower than that of Caucasian women (Jones & Chilton, 2002).

Barriers to Screening

Mammography screening is important for all women, regardless of their race/ethnicity or their risk of breast cancer. Some women are less likely to get mammography screening. There are many reasons noted as to why some women are not screened. The main reason given in the U.S. is health insurance. According to the ACS, in 2013 only 38% of women ages 40 and older with no health insurance had a mammogram within the past 2 years as compared to 70% of those with insurance. As of January 2014, under the Affordable Care Act (ACA), women's preventive health care must be covered. So, a mammogram generally must be covered without cost sharing. However, a study conducted by the Society for Women's Health Research revealed that most women did not know the ACA demands health insurance plans to cover mammography screening (2014).

Other barriers noted are age, low income, lack of access to care, lack of health care provider, lack of provider recommendation for mammogram, lack of awareness, as well as cultural and language differences. Also in the ACS Facts and Figures document (2015) it was noted that the screening rates varied by race and ethnicity. Asian women aged 40 and older, who had a mammogram in the past 2 years accounted for 67%, African American women, 66%, Caucasians, 66%, American Indian/Alaska Native, 63% and Hispanic, 62% (ACS, 2015).

It has been said that "one of the greatest barriers to addressing cancer within minority populations is the lack of adequate and consistent cancer data" (Jones & Chilton, 2002, p. 540). Adams (2007) from the University of Texas at Austin School of Nursing published a study that discussed multiple barriers to screening for African American women which included system/access barriers, psychosocial barriers and environmental barriers. The system/access barriers include lack of facilities, lack of transportation, and inconvenient timing of services.

The psychosocial barriers include African American women's attitudes and beliefs about susceptibility to breast cancer, fears, and lack of consistent information from medical community regarding screening guidelines. Environmental barriers are defined as lack of coordinated effort for outreach to African American women, lack of support for screening activities in the community, not having a diverse community coalition to facilitate culturally sensitive screening and case management, and healthcare providers needing additional training and skills to provide culturally competent outreach screening services (Adams, 2007; Patel, et al., 2014). Several obstacles have emerged from the literature based on mammography usage including cost, transportation, time, lack of information regarding screening and where to go to get screened, child care or care for elders, and fear of cancer diagnosis (Patel et al., 2014). There is no guaranteed way to prevent breast cancer; therefore, routine screening mammograms are recommended. Generally, African American women are less likely than Caucasian women to receive timely follow-up after an abnormal or inconclusive screening mammogram (Gerend & Pai, 2008). Throughout this review of literature, numerous studies have shown the disproportionate diagnosis and mortality rates dealing with breast cancer and African American women and other races.

Can cancer be prevented? A substantial portion of cancers could be prevented with the adoption of healthier lifestyles, stopping smoking, exercising, eating a healthy diet, and maintaining an ideal body weight. But many cancers can be detected at an earlier stage before symptoms develop by following recommended screening behaviors/tests (ACS, 2015).

Removing barriers to screening may help decrease the mortality rate as previously discussed. This can be accomplished by increasing access to screening; awareness and sensitivity may also help remove some of these barriers. Community education, particularly

those that address negative beliefs and feelings regarding mammography, may help increase awareness and improve the public's value of breast cancer screening and timely follow up care. Improving access to mammography and primary care while removing financial and language barriers are vital to improving mammography rates. Educating women regarding free or low cost mammography screening available in their area could also help achieve this goal. Health care providers working with women from different communities and cultures should be sensitive to their needs as well. It has been shown that if a provider does not recommend a mammogram, some women feel they do not need one (Alexandraki & Mooradian, 2010).

Cancer Disparities

Cancer disparities related to socioeconomic and racial/ethnic inequalities have been documented in several parts of the world, including the U.S. The National Cancer Institute (NCI) defined cancer disparities as differences in cancer incidence, prevalence, mortality, and survivorship that exist among specific population groups in the U.S. (NCI, 2008). The Trans-HHS Cancer Health Disparities Progress Review Group in 2004 reported that within the United States,

minority and underserved populations bear a greater cancer burden than the rest of the nation, and are significantly more likely to be diagnosed with and die from preventable cancers; be diagnosed with late-stage disease for cancers detectable through screening in the early stage; receive either no treatment or treatment that does not meet currently accepted standards of care; die of cancers that are generally curable; and suffer from cancer without the benefit of pain control and other palliative care. (p. 2)

Due to the increase in minorities and their vulnerability to cancer disparities, it has been said that in the years from 2010–2030 there will be a 99% increase in the incidence of cancers for

minorities, compared with a 31% increase for those who are of Caucasian descent (Smith, Smith, Hurria, Hortobagyi, & Buckholz, 2009). Thus, more educational interventions need to be performed to increase the level of cancer screening behaviors in the U.S.

Current Screening Recommendations

There are many groups that disseminate breast cancer screening guidelines and this can be confusing for some women. Two of those groups are the American Cancer Society (ACS) and the U.S. Preventive Services Task Force. In the past the ACS recommended that women should conduct breast self-examinations each month as well as undergo a clinical breast exam every one to three years beginning at the age of 20. Once a woman turns 40, they are encouraged to continue monthly breast self-exams, undergo a clinical breast exam as well as having a screening mammography performed every one to two years (ACS, 2005). In 2005, the U.S. Preventive Services Task Force (USPSTF) neither recommended nor discouraged breast self-examinations, while the American Cancer Society (ACS) still recommended it (Norman & Brain, 2005). But in 2009, the American Cancer Society changed its recommendations and no longer recommends monthly breast self-examinations, but suggests that women still be informed of the benefits as well as disadvantages of breast self-examinations (ACS, 2009; Smith, Cokkinides, & Brawley, 2009). This conflicting information was attributed to the over usage of breast self-examinations and improper performance (CDC, 2010). The literature still is suggestive of the ACS recommendation of having a mammogram and clinical breast exam every year after the age of 40 (Patel et al., 2014).

The U.S. Preventive Services Task Force (USPSTF) published their recommendations in 2009. Their recommendations are that women aged 40–49 should not be screened routinely. There should be an individualized decision to begin biennial screening according to the patient's

context and values. This is for women who are not at an increased risk by virtue of a known genetic mutation or history of chest radiation. A biennial schedule preserves most of the benefit of annual screening and cuts the harms nearly in half. For women aged 50–74 the recommendation is to be screened every 2 years. And for those who are aged 75 and older, there is currently no recommendation for that age group as comorbidities, quality of life and life expectancy is taken into consideration. There is lack of empirical evidence stating that screening in this age group is beneficial (USPSTF, 2009).

The American Cancer Society (ACS) set out screening recommendations in 2015 for most adults. Screening tests or examinations are set forth to attempt to find cancer before the person experiences symptoms. The following recommendations are for those women who are at average risk of breast cancer, i.e. those without a family history or personal history, those who were not exposed to radiotherapy of the chest region, or those who have a genetic predisposition for a genetic mutation such as that of BRCA. The ACS recommends that women aged 40–44 should have the choice to start screening mammograms in this age range. Routine annual screening should begin at age 45 and last through the age of 54. Women who are 55 and older should begin biennial screening or have the opportunity to continue annual screening. Women should continue screening mammography as long as they are in good health and have a life expectancy of 10 years or more. The ACS no longer recommends clinical breast examination for breast cancer screening among average-risk women at any age (ACS, 2015).

The American Cancer Society suggests that women with a high or moderate lifetime risk should have adjunctive breast magnetic resonance imaging (MRI). Those considered high risk include those who have a known BRCA1 or BRCA2 gene mutation, have a first degree relative with BRCA1 or BRCA2 gene mutation, but have not undergone genetic testing themselves.

Also at high risk are those women who have had radiation to the chest when they were between the ages 10 and 30 years or those who have Li-Fraumeni syndrome or Cowden syndrome, or have a first degree relative with one of these syndromes. The ACS considers women with a moderate lifetime history as those who have a personal history of breast cancer, ductal carcinoma in situ (DCIS), lobular carcinoma in situ (LCIS), atypical ductal hyperplasia or atypical lobular hyperplasia. Also at a moderate lifetime risk of breast cancer are those women with highly dense breasts or unevenly dense breasts when viewed by mammograms (ACS, 2015).

The Health Information National Trends Survey (HINTS) revealed that the majority women in the U.S. (approximately 73%) are aware that they should get a mammogram at a 1–2 year interval once screening has begun. Thus, HINTS recommended more efforts to educate women of all races about starting breast cancer screening at age 40 (NCI, 2007). Even though most Americans know that it is possible for individuals to take actions to reduce the risk of cancer, fatalism and confusion about risk factors and recommendations are a few barriers that have discouraged health screening behaviors to protect against cancer (NCI, 2010).

Mammography

Mammography is a low dose x-ray procedure that allows for visualization of breast tissue and internal structures of the breast. These tests are categorized by the purpose of the test. A diagnostic mammogram is undertaken to diagnose breast disease when someone reports a symptom or has had an abnormal screening mammogram. A screening mammogram is defined as a mammogram that is performed on a woman without breast related symptoms to search for unsuspected cancer. Screening mammograms usually consist of two x-ray images of each breast which can detect tumors which are not felt. Screening mammograms are considered a superior screening tool compared to clinical breast exams and breast self-exams. Mammograms can often

show a breast lump even before it is felt. Examples of mammograms that can be done is film, digital, as well as digital breast tomosynthesis (2D and 3D mammograms). Digital mammography uses lower dose radiation than that of film, and film has been largely replaced by this new digital form. The benefits and risks associated with tomosynthesis are still being assessed. According to a report put out by the ACS, studies have shown that tomosynthesis, in addition to traditional digital films, have reduced the incidence rate of false positive results. Unfortunately this type of mammogram is not available in all communities nor is it fully covered by health insurance. Traditional film mammograms sometimes lead to more in-depth follow-up examinations including biopsies when cancer is not present. These false positive results have been linked to postmenopausal hormone therapy and having denser breast tissue. As with all screening examinations and tests, mammography is not 100% effective and not all breast cancer will be detected by mammography exams. Most women will not be diagnosed with breast cancer in their lifetime, but will undergo annual screening exams and could experience a false alarm. However, mammography is the single most effective method of early detection as it can pick up breast cancer several years before symptoms show up (ACS, 2015).

Magnetic Resonance Imaging (MRI)

The ACS recommends annual MRI screening in addition to mammography for women at high risk of breast cancer starting at age 30 and those at moderate risk should begin having talks with their physicians regarding the addition of an MRI for preventative screening of breast cancer. An MRI uses magnetic fields instead of x-rays to produce cross-sectional images of the breast and its surrounding tissue. These tests are more expensive than traditional mammograms; however, if a woman is proven to be at high risk, insurance will usually cover a portion of the cost. An MRI is a more sensitive tool; however, it misses some tumors that would be detected

by a mammogram, and MRIs pick up on abnormalities that are not necessarily cancerous (ACS, 2015).

Clinical Breast Exams and Breast Self-Exams

Clinical breast exams (CBE) are performed by a physician or health care provider looking for differences in size or shape of a woman's breast. The skin is examined for dimpling, or any abnormal skin reactions as well as checking the nipples for inversion or discharge (NCI, 2009). This type of examination is no longer recommended by the ACS as part of routine screening for breast cancer. There seem to be no clear benefits of CBE for women who are at average risk of breast cancer. Due to the limited time for office visits, the ACS recommend health care providers spend this time educating women about the importance of changes in one's own breasts, as well as the risks/benefits/limitations associated with mammography screening (ACS, 2015). The USPSTF does not recommend CBE due to the fact that evidence of CBE's additional benefit, beyond mammography, is inadequate. CBEs may result in more women undergoing biopsies (USPTF, 2009).

Breast self-exam (BSE) only plays a small role in detecting breast cancer. BSE consists of women knowing their own breasts, both in appearance and feel. It involves the woman feeling each breast for possible lumps, swelling, or distortions. BSE was once a heavily promoted means of detecting breast cancer at a more curable stage. The ACS also no longer recommends that women do monthly BSE; however, they do insist that women be aware of any changes in their breasts. Some experts worried that performing BSEs incorrectly could result in additional physician visits and diagnostic testing without reducing the risk of death from breast cancer. Healthcare providers who still encourage BSEs should review the patients' techniques routinely when performing CBEs, to ensure proper technique. Women are encouraged to contact

their health care provider at the first sign of changes in their breasts. Breast self-awareness is considered as effective for detecting breast cancer as a regimented monthly BSE according to the American Cancer Society's *Breast Cancer Facts & Figures 2015-2016* report (ACS, 2015). The USPSTF does not recommend BSE due to the lack of evidence suggesting that BSE reduce breast cancer mortality rates (USPSTF, 2009).

Genetic testing for the BRCA1 and BRCA2 genes is a more in-depth, two-step process for those who are considered high risk for developing breast cancer. This type of screening is only recommended for those who have had a personal or family history suggestive of inherited cancer susceptibility and if it is thought to aid in the management of the disease. This is a tedious process and highly costly and most insurance companies will only cover a portion if the woman is noted to be in the high-risk category (Nelson et al., 2005).

Health Belief Model

The Health Belief Model (HBM) originated in the 1950s by Hockbaum, Kegeles, Leventhal, and Rosenstock to predict a person's attitudes and actions (behaviors) regarding health issues and has been refined over the years (Rosenstock, 1974). This theory is based on a person's willingness to change their behaviors related to health concerns. This model has been applied in several research studies to guide the development of health interventions to change behaviors. There are six constructs in the current HBM, and they are: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy.

Perceived susceptibility is the subjective perception of the risk of an illness as seen by the patient. This can be seen as the chances of being diagnosed with breast cancer, in the long term or immediate future, as felt by the patient. The risk for each individual may be characterized or based on personal characteristics and behaviors. *Perceived severity* refers to an individual's

belief about the severity or seriousness of a disease and the sequence of events after diagnosis. This can also be linked to personal feelings related to the consequences of a specific medical condition. Some of these consequences may include death, disability or pain which can be labeled a perceived threat by the patient. *Perceived benefits* refer to a person's opinion of the usefulness of a new behavior or action related to a specific health outcome. These perceived benefits can be directly related to a person's attitude regarding screening behaviors. If someone feels that they will benefit from screening then they will likely perform the behavior more willingly. Thus educating the patient regarding benefits of early detection and treatment linked to greater survival rate could increase the chances of behavior modification. *Perceived barriers* refer to the negative components or obstacles to taking the recommended health action. This can be linked to the belief regarding physical and psychological costs of taking a new health action or new behavior. Some obstacles could include cost, danger, pain, inconvenience, and time commitment (Janz et al., 2002).

The HBM postulates that people will take action to prevent, to screen for, or to control conditions of ill health if they regard themselves as susceptible to the condition, if they believe it could have potentially serious consequences, if they believe that a course of action available to them would be beneficial in reducing either their susceptibility to or the severity of the condition, and if they believe that the anticipated barriers to taking the action are outweighed by its benefits (Champion, et al., 2003). The HBM is regularly used in the nursing profession, particularly because it focuses on patient compliance and preventative health care practices. This theory focuses on the belief that health seeking behaviors are influenced by a person's perception of a threat posed by a health problem and the value associated with actions aimed at reducing the threat. It is a way of understanding and predicting how clients will behave in relation to their

health and how they will comply with prescribed therapies (Janz, Champion, & Stretcher, 2002). This is the theory that this researcher focuses on as the theoretical framework and basis for this study.

Cancer Fatalism

Cancer fatalism is a cultural belief that death is inevitable when cancer is present. Fatalism has been identified as a barrier to participation in breast cancer screening since those who have fatalistic tendencies feel that mammograms are not beneficial (Finnie & Powe, 2003). Fatalism is coined as a belief that events are fixed in advance for all time in such a manner that humans are powerless to change them. It is a belief that situations, like an illness, happen because of a higher power (God), or they are just meant to happen, and cannot be avoided. It can also be defined as “the belief that some health issues are beyond human control, encompassing notions of luck, fate, and predestination” (Straughan & Sewo, 1998, p. 88).

Constructs related to fatalism in the literature include a lack of control over external events in one’s life, concepts of fate, luck and predestination and feelings of powerlessness, hopelessness, and meaninglessness (Davison, Frankel, & Smith, 1992; Powe & Johnson, 1995; Straughan, & Seow, 1998). Because fatalism encompasses the feelings of powerlessness and hopelessness, individuals with fatalistic attitudes may perceive that they no longer have control over their health. Once they begin feeling this way, it will have an impact on the decisions about health promotion behaviors. In this perspective, cancer fatalism emerges from an individual’s perceptions that cancer is inevitable regardless of the person’s actions and that screening will not prevent cancer from occurring or affect the outcome. Fatalism represents the surrender of the human spirit to external forces that destroy human personality, potential, hope and life. Among African Americans, for example, oppressive forces such as slavery, segregation, discrimination,

substandard healthcare, and subsequent perceptions of hopelessness, and social despair set the stage for fatalistic views and tendencies when it comes to health promotional behaviors such as cancer screening (Powe, 1996). Research has suggested that perceptions of cancer fatalism were most evident among women, older persons, persons with lower levels of education, those with decreased income, and racial and ethnic minority groups, and that these perceptions influenced decisions to participate in cancer screening. Fatalistic attitudes have been correlated with unwillingness to change behavior and with a variety of negative health outcomes (Brooks, Hanilton, & Powe, 2006).

The belief of fatalism has been around for some time and the first to develop a tool to measure this concept was Barbara Powe. In 1995, Powe conducted a study utilizing her Powe Fatalism Model to evaluate perceptions of cancer fatalism among elderly African American women. The results of this study revealed fatalism as a significant predictor of colorectal cancer screening among elderly African American women. In this study participants received free transportation, free education program on cancer screening, and the screening was provided free of cost; however, elderly African American women did not participate in the screening. When other factors were controlled for (age, education, income), fatalism was the only significant predictor of colorectal cancer screening participation (Powe, 1995). Thus, until effective strategies have been put into place to eliminate cancer disparities among minorities, fatalistic tendencies will continue to be a factor in some women's screening behaviors. The key is educational interventions within this population to help reduce the fatalistic tendencies and beliefs regarding screening.

Conclusion

Breast cancer screening, knowledge and diagnosis have been the topics of much research in the past as well as the present. These studies have primarily focused on screening, attitudes, beliefs and some on knowledge but not a lot on cultural beliefs such as fatalism or the level of breast cancer knowledge and the impact it has on screening behaviors. Breast cancer is also being diagnosed at alarming rates, thus bringing the focus on screening to the forefront. The recent changes in the ACS breast cancer screening recommendation guidelines have brought about tremendous media coverage. Thus, the pressure is being placed on health professionals to make sure the public is aware of breast cancer, health behaviors, screenings, and health status in general. This makes this research study relevant and timely because the researcher is looking into breast cancer knowledge, beliefs and screening behaviors of a group of women in the Southeastern United States.

The researcher hopes that the findings of this study can be a step towards developing educational interventions regarding screening and the reduction of negativity towards health promotional behaviors, and in the long term reducing morbidity and mortality rates in this region. It could potentially impact health researchers, health educators, doctors, nurses, or any health care provider working with the female population. It will hopefully increase the body of knowledge regarding breast cancer beliefs, knowledge, and adherence to screening behaviors in this particular region.

CHAPTER 3 — METHODS

Introduction

This study investigated the relationship between components of the Health Belief Model (HBM), level of breast cancer knowledge, cancer fatalism, and demographic components of working women at a southeastern university located in the United States. Previous scholars have applied components of the HBM to screening behaviors among women, but they did not focus on working women in the southeastern United States and did not include cancer fatalism in their studies.

This chapter will address the methods process of this study. The researcher submitted this study to the Institutional Review Board (IRB) of Auburn University for review and did not begin the data collection process until IRB approval from this institution was obtained.

Purpose

The purpose of this study was to explore the level of breast cancer knowledge as well as the health promotional behaviors in a group of women employed at a southeastern university in the United States. This study included evidence-based factors known to influence mammography beliefs including potential barriers, intent to perform health promotional behaviors, and other factors associated with the procedure. The questionnaire incorporated components of the breast cancer knowledge test, the Health Belief Model, and other questions related to cancer fatalism to help determine personal factors, attitudes and beliefs, and other

health factors that differentiate women's decision-making process for participation in mammography screenings.

Research Questions

The following research questions were used in this study:

1. What is the relationship between components of the Health Belief Model and breast cancer screening behaviors in female employees at a southeastern university in the United States?
2. What is the relationship between level of breast cancer knowledge and screening behaviors in female employees at a southeastern university in the United States?
3. What is the relationship between cancer fatalism and screening behaviors in female employees at a southeastern university in the United States?
4. What are the relationships between racial populations and components of the Health Belief Model, level of breast cancer knowledge, and fatalism on screening behaviors in female employees at a southeastern university in the United States?
5. What is the relationship between screening behaviors and ethnicity in female employees at a southeastern university in the United States?
6. What is the relationship between screening behaviors and level of education, household income, and insurance status in female employees at a southeastern university in the United States?

Study Setting

The study was conducted at a public university located in the southeastern region of the United States. According to the Office of Institutional Research and Assessment at this particular university in the Southeast, there were 5,655 females employed (faculty, staff,

executive/administrative, professional, secretarial/clerical, technical, skilled crafts, service/maintenance, student workers, graduate teaching assistants, etc.) in the Fall 2015 academic semester who were 19 years of age or older (M. Campbell, personal communication, December 7, 2015).

Participants

This study utilized a convenience sample of female employees ($n = 667$) currently employed in the Fall 2015 academic semester of this public university. Inclusion criteria were as follows: female, employee, and were age 19 or older. After obtaining permission from the Office of Institutional Research and Assessment, an invitational email including a link to the questionnaire was provided to that department and they sent it out electronically to those who met inclusion criteria (see Appendix A). The researcher was never aware of any employees email address or identifiable information.

Instrumentation

Questionnaire

Participants were asked to complete an electronic questionnaire comprised of 83 items, using a variety of question styles. Some were forced responses using yes or no questions, question-specific multiple choice format, or two five-point Likert scales with one using Strongly Disagree, Disagree, Neither Agree Nor Disagree, Agree, and Strongly Agree; and the other using No Chance, Very Little Chance, Equal Chance, Some Chance or Very Good Chance. Sample items were as follows: “Are women who have family members with breast cancer more likely to get breast cancer?;” “It is likely that I will get breast cancer?;” and “Breast cancer that is found early—when it is just getting started—has a good chance of being cured.” The survey items which comprised the questionnaire were from previously published studies. The researcher used a

version of Rosenstock's HBM (1974) to examine the knowledge, attitudes and screening behaviors regarding breast cancer screening among female employees at a southeastern university in the United States as redefined by Sunil et al in 2014 because it related to breast cancer. The researcher also used a fatalism scale published by Shen, Condit, and Wright in 2009 based on the original fatalism scale constructed by Powe (Shen et al., 2009). These combined scales served as the primary data collection instrument (see Appendix B).

Each of these instruments has been rigorously tested for reliability and validity, and each was considered to be a valid and reliable survey instrument. The reliability reported by Sunil et al for this section of the HBM scale was Cronbach α 0.791 (2014). The researcher added descriptive questions directly related to the participants' demographic information such as gender, age, ethnicity, marital status, educational level, household income, health insurance status, and mammography compliance. Completing the survey took an estimated 15 minutes. There were no incentives offered to participants for agreeing to take part in this research study.

Health Belief Model

The Health Belief Model (HBM) has been used to predict mammography screening behaviors in women since the 1950s. Its origins trace back to the studies of Hockbaum, Kegeles, Leventhal, and Rosenstock, social psychologists, in which the model was used to predict a person's attitudes and actions (behaviors) regarding health issues; it has been refined over the years (Rosenstock, 1974). This theory is based on a person's willingness to change their behaviors related to health concerns. The HBM focuses on the belief that health seeking behaviors are influenced by a person's perception of a threat posed by a health problem and the value associated with actions aimed at reducing the threat. It is a way of understanding and predicting how clients will behave in relation to their health and how they will comply with

prescribed therapies (Janz, Champion, & Stretcher, 2002). There have been many variations of the HBM developed and modified over the years as seen in the literature. However, the core concepts have remained steadfast.

The core concepts of this model include knowledge regarding the disease, perceived susceptibility to the disease, perceived severity of the disease, perceived barriers to a particular health behavior associated with the disease, perceived benefits to a particular health behavior associated with the disease, and cues to action. There have been several versions of this model derived since the 1950s; in this study the researcher used a version of Rosenstock's HBM to examine knowledge, attitudes and screening behaviors regarding breast cancer screening (Sunil et al., 2014).

In this version of the HBM, the questionnaire consisted of 66 questions corresponding to the following categories: knowledge, perceived susceptibility, perceived severity, perceived benefits, perceived barriers to clinical breast exam, perceived barriers to mammography, and cues to action (Sunil et al., 2014). The researcher chose to omit the clinical breast exam section due to the fact this study was focusing on mammography.

The knowledge section of the HBM consisted of 8 yes/no questions. These were objective questions dealing with breast cancer concepts and curability. There was only one correct answer for each question. The responses were recoded with 0=incorrect and 1=correct. Thus the resulting knowledge level ranged from 0–8 with 0 being least knowledgeable and 8 being most knowledgeable about breast cancer and its curability. The reliability reported by Sunil et al for this section of the HBM scale was Cronbach α 0.791 (2014).

The perceived susceptibility section of the questionnaire contained 3 questions pertaining to the likelihood of the respondent personally contracting breast cancer. The questions gauged

the degree to which the respondent felt that she was at risk of developing breast cancer. Each question was based on a 5-point scale ranging from 0=no chance to 4=very good chance. These scores range from 0–12 with lower value reflecting lower perceived susceptibility and higher value reflecting higher perceived susceptibility. The reliability for this section of the HBM as reported by Sunil et al. was Cronbach α 0.762 (2014).

The perceived severity section of the questionnaire contained 3 questions pertaining to the perceived disruption caused by breast cancer or the potential thereof. The response categories range from 0=no chance to 4=you will get breast cancer. Perceived severity scores range from 0–12 with lower value reflecting lower perceived severity of breast cancer and higher values reflecting higher perceived severity. Sunil et al. reported a Cronbach α of 0.790 (2014).

The perceived benefits section of the questionnaire contained 17 questions pertaining to the perceived benefits associated with early detection of breast cancer as associated with better health. The response categories range from 0=perceived almost no benefit to 4=perceived great benefit. Perceived benefits scores ranged from 0–68 with lower scores perceiving low benefits and higher scores perceiving greater benefit to breast cancer screening. However, only 11 questions were found to be reliable in this study; this will be discussed in the Results chapter. Sunil et al. reported a Cronbach α of 0.738 (2014).

The perceived barriers section of the questionnaire contained 17 questions related to mammography. The perceived barriers consisted of things like cost, pain, and embarrassment as associated with mammography screening. The response categories range from 0=strongly disagree to 4=strongly agree. The scores ranged from 0–68 where lower scores reflect lower perceived barriers and higher scores reflect higher perceived barriers to mammography screening. Sunil et al. reported a Cronbach α of 0.958 (2014).

The cues to action section of the questionnaire contained only 2 questions. The first question related to where the participant obtains most of their health information. And the second question related to whom they would go to if they found a breast lump (physician, church, no one, family, close friend, or other).

Fatalism Scale

Cancer fatalism is a cultural belief that death is inevitable when cancer is present. Fatalism has been identified as a barrier to participation in breast cancer screening since those who have fatalistic tendencies feel that mammograms are not beneficial (Finnie & Powe, 2003). Fatalism is coined as a belief that events are fixed in advance for all time in such a manner that humans are powerless to change them. It is a belief that situations, like an illness, happen because of a higher power (God), or they are just meant to happen, and cannot be avoided. It can also be defined as “the belief that some health issues are beyond human control, encompassing notions of luck, fate, and predestination” (Straughan & Sewo, 1998, p. 88). Constructs related to fatalism in the literature include a lack of control over external events in one’s life, concepts of fate, luck and predestination and feelings of powerlessness, hopelessness, and meaninglessness (Davison, Frankel, & Smith, 1992; Powe & Johnson, 1995; Straughan, & Seow, 1998).

The researcher chose to utilize a version of Powe’s original fatalism scale that was developed by Shen, Condit, and Wright in 2009. This 20-item scale was used to measure the concept of fatalism in relation to mammography screening and breast cancer. The dimensions addressed in this scale included predetermination, luck, and pessimism. There were 10 questions related to the concept of predetermination, 4 questions related to the concept of luck, and 6 questions related to the concept of pessimism. The psychometric properties and validation of this tool was examined prior to the decision to utilize this particular fatalism scale in this study.

Scale reliability for predetermination, as reported by Shen et al., was Cronbach alpha value of 0.86, luck 0.80 and pessimism 0.82, which all prove the scale was reliable. Three external variables, one potential cause and two possible outcomes were used to investigate the validity of the scale. Positive correlations were seen and demonstrated evidence for the validity of the fatalism scale (Shen, et al., 2009).

Procedure and Data Collection

This research was approved by the Institutional Review Board (IRB) of the university in which it was conducted (IRB#15-480 EX 1511) (see Appendix C). The study transpired during Fall 2015 semester during the months of November and December. After approval from the IRB, a formal invitational email was sent to the Office of Institutional Research and Assessment which included a link to the questionnaire. Once the participant clicked on the link, they were directed to the Qualtrics software to access the questionnaire. Qualtrics is an approved platform for data collection at this particular institution where the study was performed. Before beginning the questionnaire, an informational letter was presented for them to read and once they clicked the link, consent was then assumed and the questions began. The link remained active for 4 weeks, during which time two reminder emails were sent out. Data remained strictly anonymous throughout the duration of the study as no identifiable data was obtained through the questionnaire. The data was stored on a secure server approved by the university with access granted only to the researcher involved in the study.

Data Analysis

Upon closing of the questionnaire, the participant results were entered into an Excel file. The data analysis was performed using the statistical software, SPSS 23.0 as well as AMOS 23.0. Electronic data files were stored on a drive in a locked office at the university where the

study was conducted. Descriptive statistical analysis was used to describe the demographic factors of the study sample including age, gender, ethnicity, marital status, educational level, income, and insurance status. Descriptive statistics were also obtained for study variables.

A confirmative factor analysis (CFA) was first used to evaluate the internal structure of HBM and Fatalism Scales. In order to evaluate the structures, a Chi-square Goodness-of-fit and other fit indices were used. The Chi-square was expected to be not significant to indicate a good fit. However, Chi-square is very sensitive to large sample size. Therefore, other fit indices were also used to evaluate the structure. Based on Hooper, Coughlan, and Mullen (2008), the relative/normed Chi-square (the ratio of chi-square and degree of freedom), Goodness-of-fit Index (GFI), Comparative Fit Index (CFI), and the Normed Fit Index (NFI) need to be larger than .90 to indicate a good fit, whereas Root Mean Square Error of Approximation (RMSEA) needs to be smaller than .80 to indicate a good fit. Cronbach's alpha was utilized to assess the degree of internal consistency among subscales of the questionnaire.

This coefficient is a helpful tool when investigating the reliability of the test results. Reliability is an estimate of the consistency of a set of items when they are administered to a certain group of participants at a specific time under specific conditions for a specific purpose. Cronbach alpha is used to estimate the proportion of variance that is systematic or consistent in a set of test scores. A reliability coefficient of .70 or higher is widely considered to be an acceptable social science research.

Several statistical tests were performed on the data collected by the researcher. Some of these include MANOVA, Chi-square Independence test, and a logistic regression. Logistic regression was utilized for several aspects of this study. It was particularly helpful when looking at the "benefits, barriers, and pessimism" components of the questionnaire as well as the

screening behaviors, and some of the knowledge questions. Linear regression is typically utilized in the effort to predict or forecast relationships between variables, thus it was a major point of reference in many of the research questions. The results of all of these tests will be discussed in the Results chapter.

Research Questions

Research Question One was, “What is the relationship between components of the Health Belief Model and breast cancer screening behaviors in female employees at a southeastern university in the United States?” This question was analyzed using a logistic regression model. The criterion variable is screening behavior for breast cancer (coded 1=yes, 0=no). The predictor variables include: perceived susceptibility and severity, perceived benefits, and perceived barriers for components of the HBM. The perceived susceptibility section of the questionnaire contained 3 questions pertaining to the likelihood of the respondent personally contracting breast cancer. The questions gauged the degree to which the respondent felt that she was at risk of developing breast cancer. Each question was based on a 5-point scale ranging from 0=no chance to 4=very good chance. These scores range from 0–12 with lower value reflecting lower perceived susceptibility and higher value reflecting higher perceived susceptibility. Perceived severity scores range from 0–12 with lower value reflecting lower perceived severity of breast cancer and higher values reflecting higher perceived severity. Perceived benefit scores range from 0–68 with lower scores perceiving low benefits and higher scores perceiving greater benefit to breast cancer screening. The scores ranged from 0–68 where lower scores reflect lower perceived barriers and higher scores reflect higher perceived barriers to mammography screening. Therefore, a logistic regression with forward procedure was used to model the screening behaviors.

Research Question Two was “What is the relationship between level of breast cancer knowledge and screening behaviors in female employees at a southeastern university in the United States?” The criterion variable is screening behavior for breast cancer (coded 1=yes, 0=no). The predictor variables include eight knowledge questions (coded 1=correct answer, 0=not correct answer). Therefore, a logistic regression with enter procedure was used to model the screening behaviors.

Research Question Three was, “What is the relationship between cancer fatalism and screening behaviors in female employees at a southeastern university in the United States?” In this question components of the Fatalism Scale and screening behaviors were examined. Those components were predetermination, luck and pessimism. Participants who scored high in this section tend to be more fatalistic when it comes to breast cancer. Therefore, a logistic regression with forward procedure was also used to model the screening behaviors.

Research Question Four was, “What are the relationships between racial populations and components of the Health Belief Model, level of breast cancer knowledge, and fatalism on screening behaviors in female employees at a southeastern university in the United States?” The knowledge component of this question as it relates to the relationships between knowledge, ethnicity and screening behaviors a Chi-square Independence Test was performed. The knowledge portion of the model revealed low reliability thus making the Chi-square Independence Test the most appropriate to examine potential relationships. For components of the HBM and the Fatalism scale in relation to ethnicity and screening behaviors a five group between subjects multivariate analysis of variance (MANOVA) was conducted on six dependent variables: Susceptibility and Severity, Benefit, Barriers, Predetermination, Luck, and Pessimism.

The independent variable was participants' ethnicity, including Caucasian, African American, Hispanic, Asian, and Other.

Research Question Five was, "What is the relationship between screening behaviors and ethnicity in female employees at a southeastern university in the United States?" A Chi-square Independence Test conducted to see if different ethnicity groups had different screen behaviors. Research Question Six was, "What is the relationship between screening behaviors and level of education, household income, and insurance status in female employees at a southeastern university in the United States?" A Chi-square Independence Test conducted to see if screening behaviors would differ based on educational level, income level, or insurance status.

The results of the data analysis for each of the above-mentioned research questions will be revealed and discussed in the following chapter.

CHAPTER 4 — RESULTS

Introduction

This study investigated the relationship between components of the Health Belief Model (HBM), level of breast cancer knowledge, cancer fatalism, and demographic components of working women at a southeastern university located in the United States. Previous scholars have applied components of the HBM to screening behaviors among women but they did not focus on working women in the southeastern United States and did not include cancer fatalism in their studies.

This chapter will address the results of this study in relation to each of the research questions. As a reminder, the researcher submitted this study to the Institutional Review Board (IRB) of Auburn University for review and did not begin the data collection process until IRB approval from this institution was obtained.

Purpose

The purpose of this study was to explore the level of breast cancer knowledge as well as the health promotional behaviors in a group of women employed at a southeastern university in the United States. This study included evidence-based factors known to influence mammography beliefs including potential barriers, intent to perform health promotional behaviors and other factors associated with the procedure. The questionnaire incorporated components of the breast cancer knowledge test, health belief model, and other questions related to cancer fatalism to help determine personal factors, attitudes and beliefs, and other health

factors that differentiate women's decision-making process for participation in mammography screenings.

Research Questions

The following research questions were used in this study:

1. What is the relationship between components of the Health Belief Model and breast cancer screening behaviors in female employees at a southeastern university in the United States?
2. What is the relationship between level of breast cancer knowledge and screening behaviors in female employees at a southeastern university in the United States?
3. What is the relationship between cancer fatalism and screening behaviors in female employees at a southeastern university in the United States?
4. What are the relationships between racial populations and components of the Health Belief Model, level of breast cancer knowledge, and fatalism on screening behaviors in female employees at a southeastern university in the United States?
5. What is the relationship between screening behaviors and ethnicity in female employees at a southeastern university in the United States?
6. What is the relationship between screening behaviors and level of education, household income, and insurance status in female employees at a southeastern university in the United States?

Descriptive Statistics

The study sample consisted of 667 participants; however when the data was analyzed there were 118 sets of "missing data" and this is indicated on various tables throughout this section, thus all variables may not be represented on the various tables. The participants were

recruited via invitational email which provided a link to the questionnaire itself. The invitational email was initially sent to approximately 5,000 female employees by the Office of Institutional Research and Assessment. However, several emails were undeliverable, no longer valid, or the person was on leave for the Fall semester of 2015.

The participants ranged in age from 19 to 72 years, with an average age of 40 (see Table 1). There were 667 females who completed at least some of the questions on the questionnaire. Of the study participants, the major ethnic group who participated was Caucasian (87.9%), followed by African Americans (6.1%), Hispanic (2.1%), Asian (1.9%) and “Other” (1.9%). Most participants indicated that they were either married or living with a partner (62.4%), or they indicated that they were single (27.4%). Over eighty percent of the participants indicated that they had a college degree (81.9%), while 15% indicated they had “attended some college classes but no degree”. Income levels varied among participants ranging from 47.6% claiming an income level of greater than \$75,000 while 14.9% claimed an income level of less than \$25,000 per year. Since the sample consisted of females who were employed by this particular university, 98.8% of the participants indicated that they had insurance coverage at the time surveyed (see Table 2).

Table 1

Age

	N	Minimum	Maximum	Mean	Standard Deviation
Age	658	19	72	40.14	13.991
Valid N (list wise)	658				

Table 2

Demographics of Participants

	Frequency	Percent	Valid Percent	Cumulative Percent
Gender				
Male	1	.1	.1	.1
Female	667	84.9	99.9	100.0
Total	668	85.0	100.0	
Missing System	118	15.0		
Total	786	100.0		
Race				
Caucasian	586	74.6	87.9	87.9
African American	41	5.2	6.1	94.0
Hispanic	14	1.8	2.1	96.1
Asian	13	1.7	1.9	98.1
Other	13	1.7	1.9	100.0
Total	667	84.9	100.0	
Missing System	119	15.1		
Total	786	100.0		
Marital Status				
Married/Living w/ partner	416	52.9	62.4	62.4
Divorced/Separated	55	7.0	8.2	70/6
Widowed	13	1.7	1.9	72/6
Single	183	23.3	27.4	100.0
Total	667	84.9	100.0	

(table continues)

	Frequency	Percent	Valid Percent	Cumulative Percent
Missing System	119	15.1		
Total	786	100.0		
Education				
High School diploma or GED	19	2.4	2.8	2.8
Attended some college classes but no degree	102	13.0	15.3	18.1
College Degree	546	69.5	81.9	100.0
Total	667	84.9	100.0	
Missing System	119	15.1		
Total	786	100.0		
Income				
Less than \$25,000	98	12.5	14.9	14.9
\$25,000–\$49,999	118	15.0	18.0	32.9
\$50,000–\$74,000	128	16.3	19.5	52.4
Greater than \$75,000	312	39.7	47.6	100.0
Total	656	83.5	100.0	
Missing System	130	16.5		
Total	786	100.0		
Possess Insurance				
Yes	660	84.0	98.8	98.8
No	8	1.0	1.2	100.0
Total	668	85.0	100.0	
Missing System	118	15.0		
Total	786	100.0		

Health Belief Model and the Fatalism Scale

The revised HBM questionnaire by Sunil et al in 2014, consisted of 66 questions corresponding to the following categories: knowledge, perceived susceptibility, perceived severity, perceived benefits, perceived barriers to clinical breast exam, perceived barriers to mammography, and cues to action. The researcher chose to omit the clinical breast exam section due to the fact this study was focusing on mammography.

Cancer fatalism is a cultural belief that death is inevitable when cancer is present. Fatalism has been identified as a barrier to participation in breast cancer screening since those who have fatalistic tendencies feel that mammograms are not beneficial (Finnie & Powe, 2003). Constructs related to fatalism in the literature include a lack of control over external events in one's life, concepts of fate, luck and predestination and feelings of powerlessness, hopelessness, and meaninglessness (Davison, Frankel, & Smith 1992; Powe & Johnson, 1995; Straughan, & Seow, 1998). The Fatalism scale consisted of 20 questions related to the concept of predetermination, luck, and pessimism.

Reliability information related to these scales specific to the current study is shown in Table 3. The knowledge section of the HBM was shown to have low reliability with Cronbach's α of .349. The remaining components of the subscales ranged from .82 to .90, thus revealing all other components had a high reliability value in regards to this particular research study.

Table 3

Reliability Information for HBM and Fatalism Scales

Scale	Subscale	# of Items	<i>M</i> (<i>SD</i>)	Cronbach's α
HBM	Knowledge	8	6.91 (1.12)	.349
	Susceptibility & Severity	6	2.96 (0.78)	.905
	Benefit	11	4.07 (0.52)	.838
	Barriers	15	1.91 (0.60)	.899
Fatalism Scale	Predetermination	10	2.26 (0.73)	.887
	Luck	4	1.78 (0.73)	.893
	Pessimism	6	2.09 (0.67)	.824

HBM and Fatalism CFA Results

The hypothesized model was assessed using Confirmatory Factor Analysis (CFA) via AMOS 23.0 with maximum likelihood procedure. The model was evaluated using six fit measures: (a) the Chi-square; (b) the relative/normed Chi-square (the ratio of chi-square and degree of freedom); (c) the normed fit index (NFI); (d) the comparative fit index (CFI); (e) the Goodness-of-Fit index (GFI); as well as (f) the root mean square error of approximation (RMSEA). Based on statistical inferences from Hooper, Coughlan, and Mullen (2008), the Chi-square test does not need to be statistically significant to be included in a research study. However, the Chi-square test is very sensitive to sample size in any research conducted. Therefore, other indices are also used to determine the model fit. For the relative/normed Chi-square, results need to be between two and five in order to be an acceptable ratio for model fit. As for the NFI, CFI, and GFI, values larger than .90 are considered a good fit, whereas the RMSEA

value needs to be smaller than .80 to show a good fit. CFA results indicate a good fit with results as follows: $\chi^2/df=2.47$, GFI=.90, CFI=.94, NFI=.90 and RMSEA=.05, even the Chi-square test was statistically significant ($\chi^2_{(446)}=1099.90, p < .001$). Figure 1 shows the HBM results.

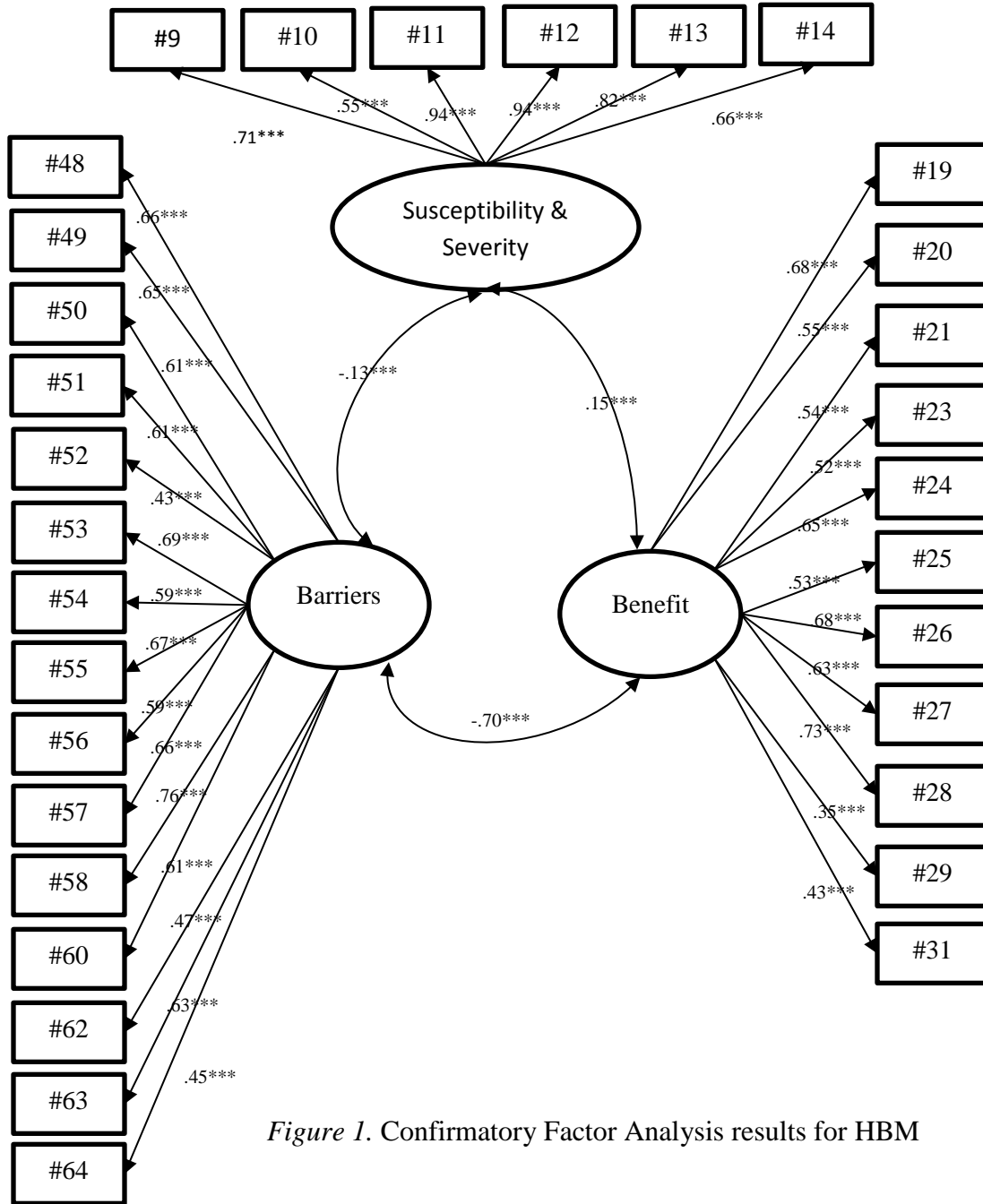


Figure 1. Confirmatory Factor Analysis results for HBM

The Fatalism scale hypothesized model was assessed using Confirmatory Factor Analysis (CFA) via AMOS 23.0 with maximum likelihood procedure. Using the same criteria to examine the model fit, CFA results indicate a good fit with the following results: $\chi^2/df=4.14$, GFI=.91, CFI=.93, NFI=.91, and RMSEA=.07, even the Chi-square test was statistically significant ($\chi^2_{(163)} = 673.99, p < .001$). Figure 2 shows the results of the Fatalism Scale fit test.

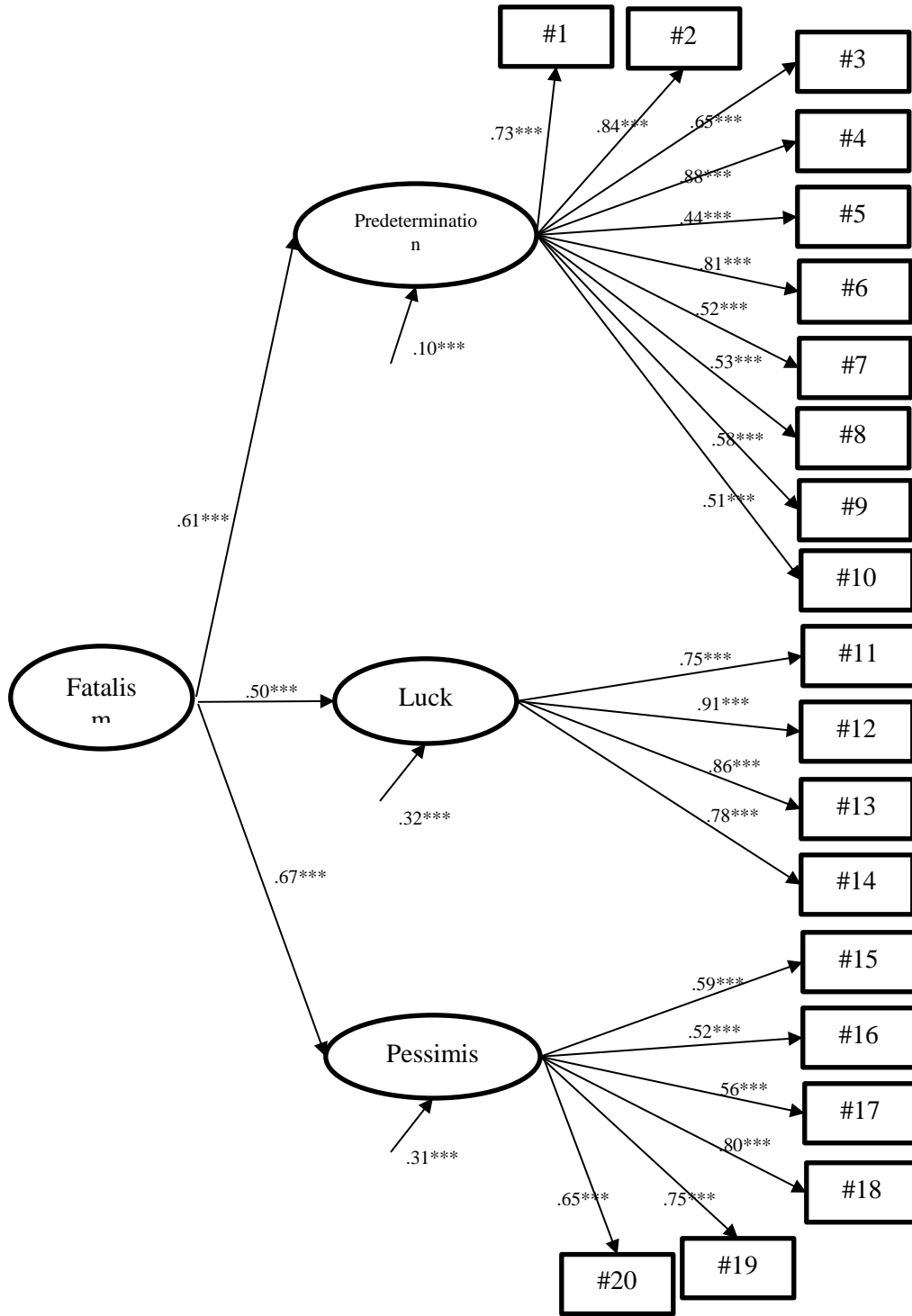


Figure 2. Confirmatory Factor Analysis results for Fatalism Scale

Mammogram Results of Participants

Of the participants, 373 participants (56%) have had a mammogram in their lifetime and it has been with in the last two years. Approximately 67 (18%) of the participants indicated that this was their first mammogram. Thus, over half of the participants are following current screening guidelines based off of this study (see Tables 4, 5 and 6).

Table 4

Ever had a Mammogram

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	373	47.5	56.2	56.2
No	291	37.0	43.8	100.0
Total	664	84.5	100.0	
Missing System	122	15.5		
Total	786	100.0		

Table 5

Was this the First Mammogram?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	67	8.5	17.9	17.9
No	308	39.2	82.1	100.0
Total	375	47.7	100.0	
Missing System	411	52.3		
Total	786	100.0		

Table 6

Any Kind of Screening Behavior

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	292	37.2	43.7	43.7
No	376	47.8	56.3	100.0
Total	668	85.0	100.0	
Missing System	118	15.0		
Total	786	100.0		

Research Question Results**Research Questions One and Three**

Research question one was, “What is the relationship between components of the Health Belief Model and breast cancer screening behaviors in female employees at a southeastern university in the United States?” And question three reads: “What is the relationship between cancer fatalism and screening behaviors in female employees at a southeastern university in the United States?” Due to the similar question for HBM and Fatalism, research questions one and three were evaluated together using logistic regression. The criterion variable is screening behavior for breast cancer (coded 1=yes, 0=no). The predictor variables include: perceived susceptibility and severity, perceived benefits, perceived barriers (HBM constructs), and predetermination, luck and pessimism (Fatalism constructs).

Logistic regression results indicated that the overall model fit of three predictors (Benefit, Barriers, and Pessimism) provided statistically significant results in distinguishing between yes or no when it comes to the participants screening behaviors ($\chi^2_{(3)} = 152.24, p < .001$). The Nagelkerke pseudo R^2 indicated that the model accounted for 27% of the total variance.

Hosmer and Lemeshow Goodness of Fit test indicated the data fit the model ($\chi^2_{(8)} = 8.50, p = .39$). The correct prediction rate is 69%; 77% correct for participants having screening behavior and 58% for those do not or have not participated in screening behaviors. The results of Wald statistic indicated that perceived benefit and perceived barriers components of the HBM, and the fatalism component of pessimism are statistically significant predictors of screening behavior in this study population (Wald₍₁₎ = 12.31, $p < .001$; Wald₍₁₎ = 104.54, $p < .001$; Wald₍₁₎ = 9.56, $p = .002$, respectively).

For the participants in this study, it was revealed that for every point increased in the area of perceived benefit (HBM), the screening behavior decreased by 53%, which is the opposite of what was expected according to the literature. Results also revealed that for every point increased in the area of perceived barriers (HBM), the screening behavior decreased by 90%, which is similar to what is shown in the research. However the fatalism component of pessimism, for every point increased in pessimism, the screening behavior increased by 157%. Thus revealing the more pessimistic a person is the more likely they are to have screening behaviors.

Research Question Two

Research question two was, “What is the relationship between level of breast cancer knowledge and screening behaviors in female employees at a southeastern university in the United States?” Research question two was also evaluated using logistic regression. The criterion variable is screening behavior for breast cancer (coded 1=yes, 0=no). The predictor variables include eight knowledge questions (coded 1=correct answer, 0=not correct answer). Therefore, a logistic regression with enter procedure was used to model the screening behaviors.

Logistic regression results indicated that the overall model reveals statistically significant differences in distinguishing between yes or no for screening behaviors ($\chi^2_{(8)} = 17.31, p = .027$). The Nagelkerke pseudo R^2 indicated that the model accounted for 3.5% of the total variance. Hosmer and Lemeshow Goodness of Fit test indicated the data fit the model ($\chi^2_{(6)} = 3.51, p = .74$). The correct prediction rate is 59.5%; with 82.2% correct for participants having screening behavior and 30.6% for those who do not have or participate in screening behaviors. The results of Wald statistic indicated that knowledge question #2 (do women with breast cancer usually have to have their breasts removed?) and #7 (a healthy diet can decrease my chances of developing breast cancer?) were statistically significant predictors of screening behavior ($Wald_{(1)} = 10.36, p = .001$; $Wald_{(1)} = 3.96, p = .047$, respectively. Those participants who responded “yes” to breast removal due to cancer their screening behavior increased by 180%; those who responded “yes” to a healthy diet decreasing risk of breast cancer their screening behaviors increased by 185% compared to those who responded “no”.

Research Question Four

Research question four was, “What are the relationships between racial populations and components of the Health Belief Model, level of breast cancer knowledge, and fatalism on screening behaviors in female employees at a southeastern university in the United States?” This question was analyzed in different parts due to the complexity of the question. The first part is reported with Chi-square Independence Test results for Ethnicity by each knowledge question in the HBM portion of the questionnaire (eight questions) (see Table 7).

Table 7

Chi-Square Results for Knowledge Questions Based on Racial Populations

Knowledge Question	$\chi^2_{(4)}$	<i>p</i>
1. Are women who have family members with breast cancer more likely to get breast cancer?	3.27	.51
2. Do women with breast cancer usually have to have their breasts removed?	13.94	.007**
3. Can bumping or bruising the breasts lead to breast cancer?	1.14	.89
4. Can touching or squeezing the breasts lead to breast cancer?	3.94	.41
5. Are women with large breasts more likely to get breast cancer than women with small breasts?	3.42	.49
6. Exercise can decrease my chances of developing breast cancer?	2.20	.70
7. A healthy diet can decrease my chances of developing breast cancer?	3.04	.55
8. Smoking increases my chances of developing breast cancer?	8.76	.07

There were no statistically significant differences among racial populations for knowledge except for question #2 (do women with breast cancer usually have to have their breasts removed?). The results for this knowledge question revealed that the proportions of participants who answered the question correctly differed by ethnicity with a small effect size ($\chi^2_{(4)} = 13.94, p = .007, \text{Cramer's } V = .15$). Correct responses among ethnic groups were Caucasian (76%), African American (71%), Hispanic (57%), Asian (46%), and Other (46%).

The second part of research question #4 was analyzed using MANOVA analysis. The independent variable is Ethnicity and the dependent variables are the subscales (HBM-perceived susceptibility, perceived severity, perceived benefits, perceived barriers and Fatalism-

predetermination, luck and pessimism). Table 8 is a descriptive table based on ethnicity by subscales.

Table 8

Descriptive Statistics based on Ethnicity by Subscales

Scale	Subscale	Caucasian (n = 585) M (SD)	AA (n = 41) M (SD)	Hispanic (n = 14) M (SD)	Asian (n = 13) M (SD)	Other (n = 13) M (SD)	Total (n = 666) M (SD)
HBM	Susceptibility & Severity	3.03 (.757)	2.57 (.845)	2.57 (.538)	2.65 (.668)	2.71 (.755)	2.98 (.768)
	Benefit	4.09 (.519)	4.07 (.432)	4.08 (.459)	4.03 (.571)	3.75 (.397)	4.08 (.513)
	Barriers	1.89 (.590)	1.90 (.548)	2.29 (.634)	2.15 (.932)	2.34 (.573)	1.91 (.602)
	Predetermination	2.23 (.723)	2.54 (.732)	2.05 (.816)	1.83 (.519)	2.67 (.659)	2.25 (.728)
Fatalism Scale	Luck	1.78 (.735)	1.62 (.662)	1.70 (.907)	2.13 (.852)	1.83 (.494)	1.78 (.734)
	Pessimism	2.10 (.659)	1.87 (.667)	2.21 (.823)	2.03 (.910)	2.67 (.466)	2.09 (.671)

A five-group between-subjects multivariate analysis of variance (MANOVA) was conducted on six dependent variables: Susceptibility and Severity, Benefit, Barriers, Predetermination, Luck, and Pessimism. The independent variable was participants' ethnicity, including Caucasian, African American, Hispanic, Asian, and Other.

Based on the MANOVA results, the dependent variables showed statistically significant differences by the participants' ethnicity with small to moderate effect size (Wilks' Lambda = .89, $F_{(24,2289.721)} = 3.36$, $p < .001$, partial $\eta^2 = .03$).

Univariate ANOVAs were conducted on each dependent variable in order to determine the locus of the statistically significant multivariate effect. The results indicated that different ethnicity groups had different scores on Susceptibility and Severity, Barriers, Predetermination, and Pessimism subscales with small to moderate effect size ($F_{(4,661)} = 5.54$, $p < .001$, partial $\eta^2 = .03$; $F_{(4,661)} = 3.88$, $p = .004$, partial $\eta^2 = .02$; $F_{(4,661)} = 4.24$, $p = .002$, partial $\eta^2 = .03$; $F_{(4,661)} = 3.72$, $p = .005$, partial $\eta^2 = .02$ respectively).

Further follow up post hoc tests suggested that the HBM constructs of Susceptibility and Severity, Caucasian participants reported higher than African American and Hispanic participants ($p < .001$, $p = .03$, respectively). For the Barrier subscale, the Hispanic participants experienced higher barriers than Caucasian and African American participants ($p = .01$, $p = .03$, respectively). Participants from other ethnic groups experienced higher barriers than Caucasian and African American participants did ($p = .01$, $p = .02$, respectively).

For the Fatalism Predetermination subscale, Asian participants scored lower than Caucasians, African Americans and participants who identified as other ($p = .046$, $p = .002$, $p = .003$, respectively). On the other hand, the other ethnicity group participants had higher score in Predetermination than Caucasian and Hispanic participants ($p = .03$, $p = .03$, respectively). Caucasian participants scored lower in Predetermination than African American ($p = .01$). African American participants scored higher than Hispanic participants ($p = .03$). Finally, for the Pessimism subscale, the other ethnicity group participants scored higher than Caucasian, African

American, and Asian participants ($p = .002$, $p < .001$, $p = .014$, respectively). Finally, Caucasian participants scored higher than African American participants ($p = .04$).

Research Question Five

Research question five asked, “What is the relationship between screening behaviors and ethnicity in female employees at a southeastern university in the United States?” This question was analyzed using a Chi-square Independence Test. The results indicated that the screening behaviors differ by ethnicity groups with small effect size ($\chi^2_{(4)} = 17.12$, $p = .002$, Cramer’s $V = .16$). Those who responded “yes” to screening behavior among ethnic groups included Caucasian (59%), African American (49%), Hispanic (29%), Asian (39%), and Other (15%).

Research Question Six

Research question six was “What is the relationship between screening behaviors and level of education, household income, and insurance status in female employees at a southeastern university in the United States?” This question was analyzed in different levels (screening against level of education, income, and insurance). Results indicated that screening behaviors differ by education level with small effect size ($\chi^2_{(2)} = 10.53$, $p = .005$, Cramer’s $V = .13$). Those who responded “yes” to screening behavior among education groups included high school or GED (3.5%), some college (11.5%), and college degree (85%).

In regards to income level and screening behaviors, a Chi-square Independence Test was conducted to see if participant’s household income had any relationship with their screening behaviors. Results indicated that the screening behaviors differ by income level with large effect size ($\chi^2_{(3)} = 98.32$, $p < .001$, Cramer’s $V = .39$). Those reporting less than \$25,000, screening behaviors were 3.3%; \$25,000-49,999 (17.7%); 50,000-74,999 (20.4%); and greater than 75,000 (58.6%).

When it comes to establishing a relationship between insurance statuses and screening behaviors, a Chi-square Independence Test was conducted. Results indicated that the screening behaviors differ by insurance coverage with small effect size ($\chi^2_{(1)} = 10.46, p = .001, \text{Cramer's } V = .13$). Of those reporting having insurance, 57% responded “yes” to having screening behaviors. If no insurance, then participants reported no screening.

CHAPTER 5 — DISCUSSION

Introduction

This study investigated the relationship between components of the Health Belief Model (HBM), level of breast cancer knowledge, cancer fatalism, and demographic components of working women at a southeastern university located in the United States. Previous scholars have applied components of the HBM to screening behaviors among women but they did not focus on working women in the southeastern United States and did not include cancer fatalism in their studies. This chapter presents a discussion of the study's key findings, limitations of the study, implications for health education, and recommendations for future research.

Purpose

The purpose of this study was to explore the level of breast cancer knowledge as well as the health promotional behaviors in a group of women employed at a southeaster university in the United States. This study included evidence-based factors known to influence mammography beliefs including potential barriers, intent to perform health promotional behaviors and other factors associated with the procedure. The questionnaire incorporated components of the breast cancer knowledge test, health belief model, and other questions related to cancer fatalism to help determine personal factors, attitudes and beliefs, and other health factors that differentiate women's decision-making process for participation in mammography screenings.

Research Questions

The following research questions were used in this study:

1. What is the relationship between components of the Health Belief Model and breast cancer screening behaviors in female employees at a southeastern university in the United States?
2. What is the relationship between level of breast cancer knowledge and screening behaviors in female employees at a southeastern university in the United States?
3. What is the relationship between cancer fatalism and screening behaviors in female employees at a southeastern university in the United States?
4. What are the relationships between racial populations and components of the Health Belief Model, level of breast cancer knowledge, and fatalism on screening behaviors in female employees at a southeastern university in the United States?
5. What is the relationship between screening behaviors and ethnicity in female employees at a southeastern university in the United States?
6. What is the relationship between screening behaviors and level of education, household income, and insurance status in female employees at a southeastern university in the United States?

Discussion of Key Findings

Findings of this research study indicate important information related to the constructs of the HBM model, Fatalism and screening behaviors regarding working women in a southeastern university. This information may help guide future research in promoting appropriate breast cancer screening behaviors among working women. The findings of this study may also guide future educational interventions regarding screening behavior among this group of women. The

following summary discusses the findings of each research question posed in this particular study. It is important to note the results of the current study were responses from female employees at a southeastern United States university employed in the Fall semester of 2015. Therefore, the findings reflection relationships among this demographic sample are not representative of all working women in the U.S.

Answering Research Question One

The components of the HBM revealed that those participants who perceived increased benefits from following screening behaviors, actually showed decreased personal screening behaviors. This finding is not consistent with what has been shown in the literature. A study conducted by Janz et al (2002) revealed that if a behavior is perceived as beneficial that particular behavior is likely to be performed and/or continued in the future. Perceived benefits can be directly related to attitudes regarding screening behaviors . The HBM postulates that actions will be taken to prevent, to screen for, or to control conditions of ill health if a person regards themselves as susceptible to the condition, believes there could be potentially serious consequences, believes that a course of action available would be beneficial in reducing either susceptibility to or the severity of the condition, or if the anticipated barriers to taking the action are outweighed by its benefits (Champion et. al, 2003). Even though participants, in this study, felt that having mammograms were beneficial, they did not follow the recommended screening guidelines. This could be because they have had at least one mammogram in their lifetime and feel that one exam alone is enough.

When looking at the HBM component of perceived barriers, if someone indicated a higher sense of perceived barriers, their screening behaviors decreased significantly which is consistent with the literature. Several barriers have been identified in the literature as having a

negative impact on mammography adherence. Such barriers include cost, transportation, time, lack of information regarding screening and where to go to get screened, child care or care for elders, and fear of cancer diagnosis (Patel et al., 2014). African American women's attitudes and beliefs about susceptibility to breast cancer, fears, and lack of consistent information from the medical community regarding screening guidelines have also been noted (Adams, 2007). Therefore, removing barriers to screening may help decrease the mortality rate and increase screening rates among working women. This can be accomplished by increasing access to screening; awareness and sensitivity may also help remove these barriers. Community education, particularly those that address negative beliefs and feelings regarding mammography, may help increase awareness and improve the public's value of breast cancer screening and timely follow up care. Improving access to mammography and primary care while removing financial and language barriers are vital to improving mammography rates. Educating women regarding free or low cost mammography screening available in their area could also help achieve this goal. Health care providers working with women from different communities and cultures should be sensitive to their needs as well. It has been shown that if a provider does not recommend a mammogram, some women feel they do not need one (Alexandraki & Mooradian, 2010).

Answering Research Question Two

The knowledge component of the HBM was found to have low reliability in this particular study. However, knowledge questions 2 (do women with breast cancer usually have to have their breasts removed) and 7 (a healthy diet can decrease my chances of developing breast cancer) were found to be statistically significant predictors of screening behaviors. Those participants who responded "yes" to breast removal due to cancer their screening behavior

increased; those who responded “yes” to a healthy diet decreasing risk of breast cancer their screening behaviors increased as compared to those who indicated “no”. Further research into comparing level of breast cancer knowledge with mammography compliance should be investigated in future studies as this particular study did not reveal enough data to indicate a link between the two.

Answering Research Question Three

Fatalism components revealed that those participants who indicated higher rates of pessimism also reported higher levels of screening behaviors than those who were less pessimistic. Thus revealing, the more pessimistic a person is the more likely they are to have screening behaviors such as getting a mammogram. This is different than what has been shown in the literature. Fatalism has been identified as a barrier to participation in breast cancer screening since those who have fatalistic tendencies feel that mammograms are not beneficial (Finnie & Powe, 2003). Because fatalism encompasses the feelings of powerlessness and hopelessness, individuals with fatalistic attitudes may perceive that they no longer have control over their health. Once they begin feeling this way, it will have an impact on the decisions about health promotion behaviors. In this perspective, cancer fatalism emerges from an individual’s perceptions that cancer is inevitable regardless of the person’s actions and that screening will not prevent cancer from occurring or affect the outcome (Powe, 1996). Until effective strategies have been put into place to eliminate cancer disparities among minorities, fatalistic tendencies will continue to be a factor in some women’s screening behaviors. The key is educational interventions within this population to help reduce the fatalistic tendencies and beliefs regarding screening. Since the findings in this study do not match the literature, future studies should be conducted to look at the concept of fatalism in working women.

Answering Research Question Four

An attempt was made to link racial populations, components of the HBM and Fatalism, and level of breast cancer knowledge to screening behaviors. There were no statistically significant differences among racial populations for knowledge except for question 2 (do women with breast cancer usually have to have their breasts removed). Correct responses *among* racial populations were Caucasian (76%), African American (71%), Hispanic (57%), Asian (46%), and Other (46%).

With regards to the HBM, the constructs of Susceptibility and Severity, the Caucasian participants reported a higher level in regards to breast cancer than African American and Hispanic participants. This could be related to the fact that Caucasian women are diagnosed more often than African American and Hispanic women. As far as the perceived barrier component of the HBM, Hispanic and those who identified their ethnicity as “Other” indicated a higher level of perceived barriers than Caucasian and African American participants. There has not been a direct correlation noted in the literature linking certain barriers to the Hispanic population; however there has been an increase in breast cancer diagnosis as well as deaths associated with breast cancer in Hispanic women in the United States according to findings of Hall, Hall, Pfriemer, Wimberley and Jones (2007). Underutilization of breast cancer screening services, lack of breast cancer knowledge, poor health literacy, lack of health insurance, cultural beliefs/behaviors, and other factors have been associated with the increase risk of breast cancer in this group of women (Hall et al., 2007). Thus, further research in this area is warranted in the future.

When examining components of Fatalism, predetermination was found to be statistically significant differences between racial groups. It was reported that Asian participants

reported less fatalistic tendencies than any other ethnic groups particularly when it comes to predetermination. This could be directly related to their cultural and spiritual beliefs. Also, the “Other” ethnic group reported more fatalistic tendencies than other ethnic groups particularly in the predetermination and pessimism constructs. It was interesting to note that Caucasian participants tended to be more pessimistic than all the other ethnic groups in this study, but less fatalistic. African American participants were found to be more fatalistic than their Hispanic counterparts. These findings could indicate a need for educational and informational sessions that are geared towards ethnic groups other than Caucasian and African Americans, in this particular setting. However, further research is needed for all ethnic groups when it comes to fatalistic/pessimistic tendencies in regards to breast cancer screening behaviors.

Answering Research Question Five

Screening behavior based on ethnicity results revealed that differences were seen in this population. Approximately half of Caucasian and African American participants reported screening behaviors (clinical breast exam or mammogram). All other ethnic groups reported rates of 39% or less, thus revealing the need for education as related to the importance of mammography and clinical breast exams in the screening process for breast cancer.

Answering Research Question Six

This research question revealed that only small effect sizes were seen in education and insurance as relating to screening behaviors, while income was noted to have a large effect size. It was revealed that those with a higher income level, higher educational level and were insured those participants reported having screening behavior. Regardless of income level, educational level and insurance status it was revealed that Hispanic, Asian, and “Other” did not participate in screening behaviors, again validating the need for future educational sessions

regarding the importance of breast cancer screening. All of this could be linked to level of breast cancer knowledge which could be the perceived barrier that was shown in this study as well.

Further investigation is needed.

Limitations

There are several limitations to this study. One limitation of this study is the sampling method utilized, convenience sampling. This type of method could limit the degree of generalizability of the study due to the fact the sample did not necessarily represent the general population. The inclusion criteria included being employed by this particular university, female, and aged 19 or older. A more varied recruitment strategy including mail delivery as well as electronic via email or even making the study qualitative could reduce bias in the future. The participants ranged in age from 19 to 72 years, with the average age of 40. Thus, the average participant had not started screening mammography as part of their health promotional behaviors, as it is recommended that you start screening at the age of 40. So the results could have been skewed some due to the age factor and not necessarily knowledge or beliefs. Extending the study to a broader range of geographical regions and institutions may yield more generalizable data. Also, separating the participants into specific group comparisons resulted in small sample sizes within groups (racial populations, education, income level), thus results may not be representative of those specific groups and cannot be generalizable.

Another limitation of this study is the reliance on self-report from the participant. The participants were encouraged to answer each question in the survey with honesty and integrity to the best of their knowledge. However, there are no means to ensure honesty and integrity when respondents answered the questions. The researcher could only assume participants answered

honestly and reliably. Also, another limitation of this study was the fact the researcher did not take into consideration those women who had already been diagnosed with breast cancer, the questionnaire was not a fit for that population particularly regarding mammograms. Those who have had breast cancer and undergone mastectomy (single or double), may forgo mammograms and have an MRI instead so the entire mammography section would not apply to this population. So in future studies, one should take into consideration the audience, which could include those who have been diagnosed with breast cancer and make appropriate modifications to the questionnaire.

Implications for Health Education Practice

Breast cancer and breast cancer awareness is an important health topic across ethnic populations. An increase in breast cancer educational interventions, including the risk factors (modifiable and non-modifiable) of breast cancer, general knowledge regarding breast cancer, current screening recommendations, as well as information for those who have already been diagnosed with breast cancer should be included. Education regarding support groups, coping mechanisms, and post mastectomy supplies would be beneficial information to include for those who already have been diagnosed and treated. Implications specific to health educators and health professionals would include individual and community educational programs, informational sessions, educational intervention programs with pre/post testing research in the community as well as university setting, and other programs to help increase individual's knowledge of breast cancer, breast cancer screening, and to dispel negative beliefs when it comes to cancer and screening behaviors. Also, it is important to reach and address minority communities in which fatalistic tendencies may reside and include education specific to breast cancer. The overall Health Belief Model and Fatalism scales did not appear to significantly

affect breast cancer screening behaviors in working women at this particular university, only specific components of the model were significant (perceived benefit, perceived barriers, susceptibility and severity, as well as only one knowledge question). This could have been related to the age of this particular sample (median age of 40), and the relation to screening behaviors. Approximately half of Caucasian and African American participants reported screening behaviors (clinical breast exam or mammogram). All other ethnic groups reported rates of 39% or less, thus revealing the need for education as related to the importance of mammography and clinical breast exams in the screening process for breast cancer. So, further exploration of other theoretical models could be explored prior to planning and implementing a breast health education program to this particular population.

Recommendations for Future Research

As previously mentioned, only a few components of the Health Belief Model and Fatalism scales appeared to significantly affect breast cancer screening behaviors in working women at this particular university. So, further exploration of other theoretical models should be explored prior to planning and implementing a breast health education program to this particular population. Also, the HBM and Fatalism scale could be helpful in a community setting rather than a university setting. In the university setting, most participants were well educated (having a college degree) and had health insurance. If the researcher could get out into the community setting, where more fatalistic tendencies have been shown to appear, according to the literature, while targeting a minority population, results might be different. Also, the need to explore the Hispanic population, particularly looking into perceived barriers to breast cancer screening as this was a key finding in this study.

Additional research should be aimed at linking the level of breast cancer knowledge to breast cancer screening behaviors. In this study, overall the knowledge component of the utilized scale was not a reliable tool to look at this variable. So, it is recommended that further studies should be conducted utilizing a different breast cancer knowledge test to see if there are any links between knowledge and screening behaviors in all ethnic groups.

Future research should also be conducted to examine ethnic groups and their fatalistic and pessimistic tendencies when it comes to breast cancer screening. It would be interesting to see if their different ethnic and cultural beliefs had a direct impact on their compliance with screening recommendations.

Also, it would be interesting to include men in future studies. Although, breast cancer in males is rare, it has been noted to be increasing and warrants further investigation. Men should be educated on breast cancer as well as the risks associated, not only for themselves but for their potential wife, mom, sister, or other female family members so they can continue the cycle of education as it relates to breast cancer.

REFERENCES

- Alexandraki I., & Mooradian A. D. (2010). Barriers related to mammography use for breast cancer screening among minority women. *Journal of the National Medical Association, 102*(3), 206–218.
- Altpeter, M., Mitchell, J., & Pennell, J. (2005). Advancing social workers' responsiveness to health disparities: The case of breast cancer screening. *Health & Social Work, 30*(3), 221–232.
- American Cancer Society (ACS). (2015). Breast cancer facts and figures 2015–2016. Atlanta: American Cancer Society, Inc.
- American Cancer Society (2014). Breast cancer facts and figures 2009–2010. <http://www.cancer.org/research/cancerfactsstatistics/breast-cancer-facts-figures>
- Adams, M. L. (2007). The African American breast cancer outreach project [Electronic version]. *Family Community Health, 30*(1S), S85–S94.
- Akhigbe, A., & Akhigbe, K. (2012). Effects of health belief and cancer fatalism on the practice of breast cancer screening among Nigerian women. Retrieved from <http://www.intchopen.com/books/mammography-recent-advances/effects-of-health-belief-and-cancer-fatalism-on-the-practice-of-breast-cancer-screening-among-nigeri>
- Altpeter, M., Mitchell, J., & Pennell, J. (2005). Advancing social workers' responsiveness to health disparities: The case of breast cancer screening [Electronic version]. *Health and Social Work, 30*(3), 221–232.

- Bailey, T. M., Delva, J., Gretebeck, K., Siefert, K., & Ismail, A. (2005). A systematic review of mammography educational interventions for low income women. *American Journal of Health Promotion, 20*(2), 96–107.
- Brooks, P., Hamilton, J., & Powe, B. (2006). Perceptions of cancer fatalism and cancer knowledge: A comparison of older and younger African American women. *Journal of Psychosocial Oncology, 24*, 1–13. doi: 10.1300/J077v24n_01
- Cancer screening – United States, 2010. (2012). *MMWR: Morbidity & Mortality Weekly Report, (61)*, 41–45.
- Casciotti, D. M., & Klassen, A. C. (2011). Factors associated with female provider preference among African American women, and implications for breast cancer screening. *Health Care For Women International, 32*(7), 581–598. doi:10.1080/07399332.2011.565527
- Centers for Disease Control and Prevention (CDC). (2010). Breast cancer in African American women. Retrieved from www.cdc.gov
- Centers for Disease Control and Prevention (CDC). (2005). The burden of chronic diseases and their risk factors: National and state perspectives 2004. Atlanta, GA: Centers for Disease Control and Prevention.
- Centers for Disease Control and Prevention (CDC). (2010). National program of cancer registries. Retrieved from www.cdc.gov/cancer/data
- Centers for Disease Control and Prevention (2013). Breast cancer. Retrieved from www.cdc.gov/cancer/breast/basic_info/index.htm.
- Centers for Disease Control and Prevention (2014). Breast Cancer Statistics. Retrieved from www.cdc.gov/cancer/breast/statistics/index.htm

- Champion, V. L. (1999). Revised susceptibility, benefits, and barriers scale for mammography screening. *Research in Nursing & Health*, 22, 341–348.
- Champion, V. L., Hui, S., Maraj, M., Menon, U., Perkins, A. J., Skinner, C. S., & Tierney, W. (2003). Comparison of tailored interventions to increase mammography screening in non-adherent older women. *Preventive Medicine*, 36, 150–158.
- Champion, V. L., Monahan, P. O., Springston, J. K., Russell, K., Zollinger, T. W., Saywell Jr., R. M., & Maraj, M. (2008). Measuring mammography and breast cancer beliefs in African American women. *Journal of Health Psychology*, 13(6), 827–837.
doi:10.1177/1359105308093867
- Coleman, E. A., Lord, J., Heard, J., Coon, S., Cantrell, M., Mohrmann, C., & O’Sullivan, P. (2003). The delta project: Increasing breast cancer screening among rural minority and older women by targeting rural healthcare providers [Electronic version]. *Oncology Nursing Forum*, 30(4), 669–677. doi:10.1188/03.ONF.669-677
- Conway-Phillips, R., & Millon-Underwood, S. (2009). Breast cancer screening behaviors of African American women: A comprehensive review, analysis, and critique of nursing research. *ABNF Journal*, 20(4), 97–101.
- Davison, C., Frankel, S., & Smith, G. D. (1992). The limits of lifestyle: Reassessing ‘fatalism’ in the popular culture of illness prevention. *Social Science and Medicine*, 34, 675–685.
- Erwin, D., Spatz, T., Craig Scotts, R., & Hollenberg, J. (1999). Increasing mammography practice by African American women. *Cancer Practice*, 7(2), 78–85.
- Fair, A., Monahan, P. O., Russell, K., Zhao, Q., & Champion, V. L. (2012). The Interaction of Perceived Risk and Benefits and the Relationship to Predicting Mammography Adherence in African American Women. *Oncology Nursing Forum*, 39(1), 53-60.

- Farmer, D., Reddick, B., D'Agostino Jr., R., & Jackson, S. A. (2007). Psychosocial Correlates of Mammography Screening in Older African American Women. *Oncology Nursing Forum*, 34(1), 117-123. doi:10.1188/07.ONF.117-123
- Finnie, R., & Powe, B. D. (2003). Cancer fatalism: The state of the science. *Cancer Nursing*, 26, 454–465.
- Fowler, B.A., Rodney, M., Roberts, S., & Broadus, L. (2005). Collaborative breast health intervention for African American women of lower socioeconomic status [Electronic version]. *Oncology Nursing Forum*, 32(6), 1207–1216. doi:10.1188/05.ONF.1207-1216
- Freitas, C. C., Tura, L. R., Costa, N. N., & Duarte, J. J. (2012). A population-based breast cancer screening programme: conducting a comprehensive survey to explore adherence determinants. *European Journal of Cancer Care*, 21(3), 349–359. doi:10.1111/j.1365-2354.2011.01305
- Gerend, M. A., & Pai, M. (2008). Social determinants of black-white disparities in breast cancer mortality: A review. *Cancer Epidemiology, Biomarkers & Prevention*, 17, 2913–2923.
- Germino, B. B., Mishel, M. H., Crandell, J., Porter, L., Blyler, D., Jenerette, C., & Gil, K. M. (2013). Outcomes of an uncertainty management intervention in younger African American and Caucasian breast cancer survivors. *Oncology Nursing Forum*, 40(1), 82–92.
- Glanz, K., & Rimer, B. K. (2005). Theory at a glance: A guide to health promotion practice. NIH Publ 05-3896. Bethesda MD: National Cancer Institute.
- Grindel, C., Brown, L., Caplan, L., & Blumenthal, D. (2004). The effect of breast cancer screening messages on knowledge, attitudes, perceived risk, and mammography

- screening of African American women in the rural south. *Oncology Nursing Forum*, 31(4), 801–808. doi:10.1188/04.ONF.801-808
- Hall, C. P., Hall, J. D., Pfriemer, J. T., Wimberly, P. D., & Jones, C. H. (2007). Effects of a culturally sensitive education program on the breast cancer knowledge and beliefs of Hispanic women. *Oncology Nursing Forum*, 34, 1195–1202.
- Hall, C. P., Wimberly, P. D., Hall, J. D., Pfriemer, J. T., Hubbard, E., Stacy, A. S., & Gilbert, J. D. (2005). Teaching breast cancer screening to African American women in the Mississippi river delta. *Oncology Nursing Forum*, 32(4), 857–873.
- Hall, I. J., Rim, S., Johnson-Turbes, C., Vanderpool, R., & Kamalu, N. N. (2012). The African American women and mass media campaign: A CDC breast cancer screening project. *Journal of Women's Health (15409996)*, 21(11), 1107–1113. doi:10.1089/jwh.2012.3903
- Holt, C., Shipp, M., Eloubeidi, M., Clay, K., Smith-Janias, M., Janias, M., Britt, K., Norena, M., & Fouad, M. (2009). Use of focus group data to develop recommendations for demographically segmented colorectal cancer educational strategies. *Health Education Research*, 24(5), 876–889. doi:10.1093/her/cyp024
- Hooper, D., Coughlan, J., & Mullen, M.R. (2008). Structural equation modeling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, 6(1), 53–60.
- Howlader N., Noone A. M., Krapcho M., Garshell J., Miller D., Altekruse S. F., Kosary C. L., Yu M., Ruhl J., Tatalovich Z., Mariotto A., Lewis, D. R., Chen H. S., Feuer E. J., & Cronin K. A. (2014). SEER cancer statistics review, 1975–2012. Bethesda, MD: National Cancer Institute. Retrieved from http://seer.cancer.gov/csr/1975_2012/

- Humphrey, L. L., Helfand, M., Chan, B. K. S., & Woolf, S. H. (2002). Clinical guidelines. Breast cancer screening: A summary of the evidence for the US Preventative Services Task Force. *Annals of Internal Medicine*, 137(5 part 1), 347–360.
- Husain, M., Orłowski, M. A., Wonders, K., & Hallam, J. S. (2010). Revisiting the relationship between beliefs and mammography utilization. *American Journal of Health Studies*, 25(2), 78–85.
- Janz, N. K., Champion, V. L., & Strecher, V. J. (2002). The Health Belief Model. In K. Glanz, B. K. Rimer, & F. M. Lewis (Eds.), *Health behavior and health education: Theory, research, and practice* (3rd ed., pp. 45–66). San Francisco, CA: Jossey-Bass.
- Jennings-Sanders, A. (2009). Measuring self-efficacy for mammography screening in older African American women. *ABNF Journal*, 20(2), 49–52.
- Jones, L. A., & Chilton, J. A. (2002). Impact of breast cancer on African American women: Priority areas for research in the next decade [Electronic version]. *American Journal of Public Health*, 92(4), 539–542. doi:10.2105/AJPH.92.4.539
- Kessler, T. A. (2012). Increasing mammography and cervical cancer knowledge and screening behaviors with an educational program. *Oncology Nursing Forum*, 39(1), 61–68. doi:10.1188/12.ONF.61-68
- Lee, H., Ju, E., Vang, P., & Lundquist, M. (2010). Breast and cervical cancer screening among Asian American women and Latinas: Does race/ethnicity matter?... [corrected] [published erratum appears in *Journal of Women's Health* 2011; 20(12):1938]. *Journal of Women's Health* (15409996), 19(10), 1877–1884. doi:10.1089/jwh.2009.1783

- Lee-Lin, F., Menon, U., Pett, M., Nail, S.L., & Mooney, K. (2007). Breast cancer beliefs and mammography screening practices among Chinese-American immigrants. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 36, 212–221.
- Loerzel, V., & Busby, A. (2005). Interventions that address cancer health disparities in women. *Family & Community Health*, 28(1), 79–89.
- Lukwago, S. N., Kreuter, M. W., Holt, C. L., Steger-May, K., Bucholtz, D. C., & Skinner, C. S. (2003). Sociocultural correlates of breast cancer knowledge and screening in urban African American women. *American Journal of Public Health*, 93(8), 1271–1274.
- Mahon, S. M. (2012). Screening for breast cancer: Evidence and recommendations. *Clinical Journal of Oncology Nursing*, 16(6), 567–571. doi:10.1188/12.CJON.567-571
- Maloney, N., Koch, M., Erb, D., Schneider, H., Goffman, T., Elkins, D., & Laronga, C. (2006). Impact of race on breast cancer in lower socioeconomic status women [Electronic version]. *The Breast Journal*, 12(1), 58–62.
- McAlearney, A., Reeves, K. W., Tatum, C., & Paskett, E. D. (2007). Cost as a barrier to screening mammography among underserved women. *Ethnicity & Health*, 12(2), 189–203. doi:10.1080/13557850601002387
- McQueen, A., Kreuter, M. W., Kalesan, B., & Alcaraz, K. I. (2011). Understanding narrative effects: The impact of breast cancer survivor stories on message processing, attitudes, and beliefs among African American women. *Health Psychology*, 30(6), 674–682. doi:10.1037/a0025395
- National Cancer Institute. (2005). *Theory at a glance*. Washington, DC: National Institutes of Health.

- National Cancer Institute. (2008). Cancer health disparities fact sheet. Retrieved from www.cancer.gov/cancertopics/factsheet/disparities/Fs11_1.pdf
- National Cancer Institute. (2014). Mammograms. Retrieved from <http://www.cancer.gov/cancertopics/factsheet/Detection/mammograms>
- Nelson, H. D., Huffman, L. H., Fu, R., & Harris, E. L. (2005). Genetic risk assessment and BRCA mutation testing for breast and ovarian cancer susceptibility: Systematic evidence review for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*, *143*(5), 362–382.
- Northington, L., Martin, T., Walker, J. T., Williams, P., Lofton, S. P., Cooper, J. R., & ... Keller, S. D. (2011). Integrated community education model: Breast health awareness to impact late-stage breast cancer. *Clinical Journal of Oncology Nursing*, *15*(4), 387–392. doi:10.1188/11.CJON.387-392
- Patel, K., Kanu, M., Liu, J., Bond, B., Brown, E., Williams, E., Theriot, R., Bailey, S., Sanderson, M., & Hargreaves, M. (2014). Factors influencing breast cancer screening in low-income African Americans in Tennessee. *Journal of Community Health*, *39*(5), 943–950. doi:10.1007/s10900-014-9834-x
- Plescia, M., & White, M. C. (2013). The national prevention strategy and breast cancer screening: Scientific evidence for public health action. *American Journal of Public Health*, *103*(9), 1545–1548. doi:10.2105/AJPH.2013.301305
- Powe, B. D. (1995). Cancer fatalism among elderly Caucasians and African Americans. *Oncology Nursing*, *26*, 1355–1359.
- Powe, B. D. (1996). Cancer fatalism among African Americans: A review of the literature. *Nursing Outlook*, *44*, 18–21. doi:10.1016/s0029-6554(96)80020-0.

- Powe, B. D., & Johnson, A. (1995). Fatalism as a barrier to cancer screening among African Americans: Philosophical perspectives. *Journal of Religion and Health, 34*, 119–125.
- Reiter, P. L., & Linnan, L. A. (2011). Cancer screening behaviors of African American women enrolled in a community-based cancer prevention trial. *Journal of Women's Health (15409996), 20*(3), 429-438. doi:10.1089/jwh.2010.2245
- Rosenstock, I. (1974). Historical origins of the Health Belief Model. *Health Education Behavior, 2*(4), 328-335. doi: 10.1177/109019817400200403.
- Royak-Schaler, R., Passmore, S. R., Gadalla, S., Hoy, K., Zhan, M., Tkaczuk, K., Harper, L. M., Nicholson, P. D., & Hutchison, A. P. (2008). Exploring patient-physician communication in breast cancer care for African American women following primary treatment [Electronic version]. *Oncology Nursing Forum, 35*(5), 836–843. doi:10.1188/08.ONF.836-843
- Russell, K. M., Perkins, S. M., Zollinger, T. W., & Champion, V. L. (2006). Sociocultural context of mammography screening use. *Oncology Nursing Forum, 33*(1), 105–112. doi:10.1188/06.ONF.105-112
- Sassi, F., Luft, H. S., & Guadagnoli, E. (2006). Reducing racial/ethnic disparities in female breast cancer: Screening rates and stage at diagnosis. *American Journal of Public Health, 96*(12), 2165–2172. doi:10.2105/AJPH.2005.071761
- Schueler, K. M., Chu, P. W., & Smith-Bindman, R. (2008). Factors associated with mammography utilization: A systematic quantitative review of the literature. *Journal of Women's Health (15409996), 17*(9), 1477–1498. doi:10.1089/jwh.2007.0603
- Simonian, K., Brown, S. E., Sanders, D. B., Kidd, C. Y., Murillo, V. E., Garcia, R., & Marks, S. (2004). Promoting breast cancer screening to women of color [Electronic version].

- The Nurse Practitioner*, 29(3), 45–46.
- Smith, B. D., Smith, G. L., Hurria, A., Hortobagyi, G. N., & Buckholz, T. A. (2009). Future of cancer incidence in the United States: Burdens upon an aging, changing nation. *Journal of Clinical Oncology*, 27, 2758–2765. doi:10.1200/JCO.2008.20.8983
- Smith, R. A., Cokkinides, V., & Brawley, O. W. (2009). Cancer screening in the United States, 2009: A review of current American Cancer Society guidelines and issues in cancer screening. *CA: A Cancer Journal for Clinicians*, 59, 27–41.
- Smith-Bindman, R., Miglioretti, D. L., Lurie, N., Abraham, L., Barbash, R., Strzelczyk, J., & ... Kerlikowske, K. (2006). Does utilization of screening mammography explain racial and ethnic differences in breast cancer? *Annals of Internal Medicine*, 144(8), 541–589.
- Society for Women’s Health Research. (2014). What women want: Expectations and experiences in breast cancer screening. Retrieved from <http://swhr.org/wp-content/uploads/2014/05/FINAL-SWHR-Exec-Sum-.pdf>
- Straughan, P. T., & Seow, A. (1998). Fatalism reconceptualized: A concept to predict health screening behavior. *Journal of Gender, Culture, and Health*, 3, 85–96.
- Thomas, E. (2004). African American women’s breast memories, cancer beliefs, and screening behaviors. *Cancer Nursing*, 27(4), 295–302.
- Trans-HHS Cancer Health Disparities Progress Review Group. (2004). *Making cancer health disparities history*. Retrieved from www.hhs.gov/chdprg/pdf/chdprg.pdf
- Underwood, S. (2006). Breast cancer in African American women: Nursing essentials. *ABNF Journal*, 17(1), 3–14.

- U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion (2014). *Access to health services: Overview*. Retrieved from <https://healthypeople.gov/2020/topics-objectives/topic/Access-to-Health-Services>
- United States Preventive Services Task Force. (2009). Screening for breast cancer: US Preventive Services Task Force recommendation statement. *Annals of Internal Medicine*, *151*(10), 716–726.
- Villarosa, L. (2002). Does your race put you at risk? Breast cancer strikes African American women younger than it does White women, and is more devastating. We take a look at why. *Health*, 110–112.
- Wood, R., Duffy, M., Morris, S., & Carnes, J. (2002). The effect of an educational intervention on promoting breast self-examination in older African American and Caucasian women. *Oncology Nursing Forum*, *29*(7), 1081–1090. doi:10.1188/02.ONF.1081-1090.
- Zollinger, T., Champion, V., Monahan, P., Steele-Moses, S., Ziner, K., Zhao, Q., Hickey, S., Saywell, R., & Russell, K. (2010). Effects of personal characteristics on African American women's beliefs about breast cancer. *American Journal of Health Promotion*, *24*(6), 371–377. doi:10.4278/ajhp.07031727

APPENDIX A

INVITATIONAL EMAIL FOR RECRUITMENT

Dear Auburn University Employee,

I am a Doctoral Candidate in the Department of Educational Foundations, Leadership, and Technology (Adult Education) at Auburn University. I would like to invite you to participate in my research study exploring the relationship between the Health Belief Model and the belief in Fatalism regarding breast cancer screening in working women. You may participate if you are female aged 19 years or older, and are an employee of Auburn University.

Participants will be asked to complete a brief online survey administered through Qualtrics, which will take no longer than fifteen minutes to complete. Information gathered as part of the survey will be anonymous; all information will be kept confidential and secured using industry standard methods. Any identifiable information you choose to provide will be encrypted and secured.

Participation in this study is voluntary. There are no known risks, direct benefits or cost to you, but your participation in this research might help health professionals understand the screening behaviors of working women here at Auburn University. Filling out this questionnaire will not affect your employment or benefits here at Auburn University and this survey is completely anonymous.

If you would like to know more information about this study, an information letter can be obtained by clicking on the link provided or contacting me directly via email. If you decide to participate after reading the letter, you can access the survey from a link in the letter.

Link to information letter and survey https://auburn.qualtrics.com/SE/?SID=SV_eaGqdV3GzVFKupv

If you have any questions, please contact me at azc0007@auburn.edu or my advisor, Dr. Maria Witte, at wittemm@auburn.edu.

Thank you for your consideration,

Amy Curtis, RN, MSN, Doctoral Candidate

APPENDIX B

SURVEY QUESTIONNAIRE

Health Belief Model (Sunil, Hurd, Deem, Nevarez, Guidry, Rios, Guerra, Ortiz, & Jones, 2014)

Knowledge Questions: (yes or no)

1. Are women who have family members with breast cancer more likely to get breast cancer?
2. Do women with breast cancer usually have to have their breasts removed?
3. Can bumping or bruising the breasts lead to breast cancer?
4. Can touching or squeezing the breasts lead to breast cancer?
5. Are women with large breasts more likely to get breast cancer than women with small breasts?
6. Exercise can decrease my chances of developing breast cancer
7. A healthy diet can decrease my chances of developing breast cancer
8. Smoking increases my chances of developing breast cancer

Perceived susceptibility (1=no chance to 5=you will definitely get breast cancer)

1. It is likely that I will get breast cancer
2. My chances of getting breast cancer in the next few years are great
3. I feel I will get breast cancer sometime during my life

Perceived severity (1=no chance to 5=you will definitely get breast cancer):

1. What do you think are your chances of getting breast cancer?
2. Compared with other women your age, what do you think are your chances of getting breast cancer?
3. How worried are you about getting breast cancer?

Perceived benefits (use 5 point Likert scale ranging from 1=strongly disagree to 5=strongly agree) (recode as 1=perceived almost no benefit and 5=perceived a great benefit):

1. Breast cancer that is found early-when it is just getting started-has a good chance of being cured
2. If a woman has breast cancer, it is better she not know

3. The treatment for breast cancer may not be as bad if the cancer is found early
4. The side effects of the treatment for breast cancer are worse than the cancer itself
5. My family will benefit if I have a mammogram
6. If I have a clinical breast exam from a doctor or nurse, I don't need mammograms
7. Mammograms often lead to surgery that is not needed
8. I am more likely to go for mammograms if my doctor tells me they are important for me
9. Having mammograms cause a lot of worry or anxiety about breast cancer
10. Having mammograms every year or two gives me a feeling of control over my health
11. Once I have a couple of mammograms that are normal, I don't need any more for a few years
12. I do not need a mammogram unless I have some breast problem or pain
13. Having mammograms every year or two gives me peace of mind about my health
14. Having a mammogram is just looking for trouble
15. Having a mammogram will help me find breast lumps early
16. Having a mammogram is the best way for me to find a very small lump
17. Having a mammogram will decrease my chances of dying from breast cancer

Perceived barriers (mammograms) (Using 5 point Likert scale, 1=strongly disagree and 5=strongly agree):

1. The embarrassment caused by having a mammogram would make me have second thoughts about having one
2. I have so many other problems that I cannot be bothered with having a mammogram
3. The cost of mammograms would cause me to hesitate getting one
4. It is very hard for me to get to a place where they do mammograms
5. There is so much different information about how often women should have mammograms that I am confused
6. The pain caused by having a mammogram is bad enough to make me put off getting one
7. I am afraid to have a mammogram because I might find out something is wrong
8. I am afraid to have a mammogram because I don't understand what will be done
9. I don't know how to go about getting a mammogram
10. Having a mammogram is too embarrassing
11. Having a mammogram takes too much time
12. Having a mammogram is painful
13. People who do mammograms are rude to women
14. Having a mammogram exposes me to X-rays I do not need
15. I cannot remember to make an appointment for a mammogram
16. I have other problems more important than getting a mammogram
17. I am too old to need a mammogram

Cues to action:

1. Where do you get most of your health information?
2. If you found a breast lump, who would you go to first?

Fatalism Scale (Shen, Condit, & Wright, 2009)**Predetermination (1=strongly disagree, 5=strongly agree):**

1. If someone is meant to get a serious disease, it doesn't matter what kinds of food they eat, they will get that disease anyway.
2. If someone is meant to get a serious disease, they will get it no matter what they do.
3. If someone gets a serious disease, that's the way they were meant to die.
4. If someone is meant to have a serious disease, they will get that disease.
5. If someone has a serious disease and gets treatment for it, they will probably still die from it.
6. If someone was meant to have a serious disease, it doesn't matter what doctors and nurses tell them to do, they will get the disease anyway.
7. How long I live is predetermined.
8. I will die when I am fated to die.
9. My health is determined by fate.
10. My health is determined by something greater than myself.

Luck:

1. I will get diseases if I am unlucky.
2. My health is a matter of luck.
3. How long I live is a matter of luck.
4. I will stay healthy if I am lucky.

Pessimism:

1. Everything that can go wrong for me does.
2. I will have a lot of pain from my illness.
3. I will suffer a lot from bad health.
4. I often feel helpless in dealing with the problems of life.
5. Sometimes I feel that I'm being pushed around in life.
6. There is really no way I can solve some of the problems I have.

Demographics:

1. Age (numeric value)
2. Gender (Male or Female)
3. Ethnicity (Caucasian, African American, Hispanic, Asian, Other)
4. Marital status (single, married/living with partner, divorced/separated, widowed)
5. Educational level (elementary school or less, some high school, high school diploma or GED, Attended some college classes but no degree, or College Degree)
6. Total household yearly income (less than 25,000, \$25,000-\$49,999, \$50,000-\$74,999, or greater than \$75,000)
7. Do you have health insurance (yes or no)
8. Have you ever had a mammogram? (yes or no)
9. How long has it been since you had your last mammogram? (less than 1 year ago, more than one year ago)
10. Was this your first mammogram? (yes or no)
11. Do you get yearly mammograms? If No, why not? (yes or no)
12. If you are not of age to get a mammogram (40 years or older), do you get a yearly breast exam done by a healthcare provider? (yes or no)

APPENDIX C
APPROVED IRB LETTER

INFORMATION LETTER
for a Research Study entitled
*“Health Belief Model and Fatalism Related to Breast Cancer Screening in
Working Women”*

You are invited to participate in a research study to determine the relationship between the Health Belief Model and Fatalism related to breast cancer screening in working women here at Auburn University. The study is being conducted by Amy Curtis, RN, MSN, a Ph.D. candidate under the direction of Dr. Maria Witte in the Auburn University Department of Educational Foundations, Leadership and Technology. You are invited *to* participate because you are a female employee of Auburn University and are age 19 years or older.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, you will be asked to complete a brief online survey administered through Qualtrics, which will take approximately fifteen minutes *to* complete. The survey is anonymous.

Are there any risks or discomforts? There are no known risks associated with this survey; however, if you become uncomfortable or distressed as a result of this survey, you can skip that question or withdraw from the survey altogether by clicking the "X" button at the top right of your browser screen.

Are there any benefits to yourself or others? There are no direct benefits associated with this study. However, if you participate, you might help health professionals understand breast cancer screening behaviors, and components associated with screening behaviors of working women here at Auburn University.

Will you receive compensation for participating? No compensation will be offered for participation in this study.

Are there any costs? There are no costs associated with this study.

**Add this approval information in
sentence form to your electronic
information letter!**

The Auburn University Institutional
Review Board has approved this
Document for use from
11/18/15 to 11/17/18
Protocol # 15-480 EX 1511

If you change your mind about participating, you can withdraw at any time by closing your browser window. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Once you've submitted anonymous data, it cannot be withdrawn since it will be unidentifiable.

Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Educational Foundations, Leadership and Technology; or the researcher and his/her affiliates.

Any data obtained in connection with this study will remain anonymous. Your privacy will be protected. Any information obtained in connection with this study will remain anonymous. Your survey data will be stored on a secure server approved by Auburn University with access granted only to researchers involved in this study. Any identifiable information you choose to provide will be encrypted using industry standards and stored in a secure physical location. Information collected through your participation may be presented at a professional meeting, and/or published in a professional journal.

If you have questions about this study, please contact Amy Curtis, RN, MSN, at azc0007@auburn.edu or Dr. Maria Witte at wittemm@auburn.edu You may print a copy of this page for your records.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334) 844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu

HAVING READ THE INFORMATION ABOVE, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW. YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

Investigator _____ Date _____

Add this approval information in sentence form to your electronic information letter!

Co-Investigator _____ Date _____

The Auburn University Institutional Review Board has approved this Document for use from 11/18/15 to 11/17/18
Protocol # 15-480 EX 1511

The Auburn University Institutional Review Board has approved this document for use from 11/18/15 to 11/17/18. Protocol #15-480 EX 1511

Link to information letter and survey https://auburn.qualtrics.com/SE/?SID=SV_eaGgdV3GzVFKupv

Add this approval information in sentence form to your electronic information letter!

The Auburn University Institutional
Review Board has approved this
Document for use from
11/18/15 to 11/17/18
Protocol # 15-480 EX 1511

**AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS
REQUEST FOR EXEMPT CATEGORY RESEARCH**

For Information or help completing this form, contact: THE OFFICE OF RESEARCH COMPLIANCE, 115 Ramsay Hall
Phone: 334-844-5966 e-mail: IRBAdmin@auburn.edu Web Address: [http://www.auburn.edu/research/vpr/ohs/index .htm](http://www.auburn.edu/research/vpr/ohs/index.htm)

Revised 2/1/2014 Submit completed form to IRBsubmit@auburn.edu or 115 Ramsay Hall, Auburn University 36849.

Form must be populated using Adobe Acrobat / Pro 9 or greater standalone program (do not fill out in browser). Hand written forms will not be accepted.

Project activities may not begin until you have received approval from the Auburn University/IRB.

1. PROJECT PERSONNEL & TRAINING

PRINCIPAL INVESTIGATOR

Name Amy Curtis Title Graduate Student Dept/School _____ EFLT/Adult Ed _____
Address 212 Miller Hall AU Email _____ azc0007 _____
Phone 334-844-7988 Dept. Head Sheri Downer

FACULTY ADVISOR

Name Maria Witte Title Professor Dept/School _____ EFLT _____
Address 4012 Haley Center
Phone 334-844-3078 AU Email wittemm

KEY PERSONNEL: List Key Personnel (other than PI and FA). Additional personnel may be listed in an attachment.

Name	Title	Institution	Responsibilities
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

KEY PERSONNEL TRAINING: Have all Key Personnel completed CIT1 Human Research Training (including elective modules related to this research) within the last 3 years? YES NO

TRAINING CERTIFICATES: Please attach CITI completion certificates for all Key Personnel.

2. PROJECT INFORMATION

Title: Health Belief Model and Fatalism related to Breast Cancer Screening in Working Women

Source of Funding: Investigator Internal External

List External Agency & Grant Number: NA

List any contractors, sub-contractors, or other entities associate with this project.

NA

List any other IRBs associated with this project (including those involved with reviewing, deferring, or determinations).

NA

FOR ORC OFFICE USE ONLY

DATE RECEIVED IN ORC: _____ by _____
DATE OF IRB REVIEW: _____ by _____
DATE OF ORC REVIEW: _____ by _____
DATE OF APPROVAL: _____ by _____
COMMENTS:

APPROVAL #CATEGORY:
APPROVAL OR CONTINUING REVIEW:
INTERVAL F

The Auburn University Institutional Review Board has approved this Document for use from
11/18/15 to 11/17/18
Protocol # 15-480 EX 1511

