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I am submitting herewith a dissertation written by Peggy Ann Johnson entitled "Mammography Screening Practices and Health Beliefs of Women in East Tennessee." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

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Mammography Screening Practices and Health Beliefs of Women in East Tennessee

A Dissertation Presented for the Doctor of Philosophy Degree

The University of Tennessee, Knoxville

Peggy A. Johnson

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DEDICATION

This study is dedicated to my mother, Edna Lane for the love, patience and support she has unceasingly provided; and, to Kathy White whose support, encouragement and love have made all things seem possible to me.

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ABSTRACT

One of every eight women in the United States will be diagnosed with breast cancer in her lifetime. Although early detection of breast cancer is the most effective method of assuring survival, many women throughout the country do not avail themselves of this advantage. This study examined mammography screening practices of women age 55 and older who attended senior citizen centers in rural, non-metro, and metro counties in the areas designated by the Tennessee Department of Health as the Eastern Grand Division of Tennessee.

Data were collected from four hundred women from fourteen counties in East Tennessee using the Champion Health Belief Survey instrument. Data analysis was done using SPSS software. Descriptive analyses were presented consisting of the percentage or mean responses for each of the survey items. Chi Square and ANOVA were used to test whether the observed proportions for mammography screening differed from the hypothesized proportions.

Results from this study revealed that health beliefs and demographic characteristics were associated with a higher likelihood of having recent mammography. The health beliefs of participants concerning the perceived benefits of mammograms and the perceived barriers to obtaining mammograms significantly impact one's willingness to engage in breast cancer screening practices. Also, the woman's perceived susceptibility to the disease of breast cancer and her perceived seriousness of the disease of breast cancer have a significant impact on breast cancer screening practices. Additionally, a significant difference was found in the screening practices of women based on whether they had health insurance and if their physician recommended a mammogram.

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CHAPTER I

Introduction

According to the American Cancer Society (2009), breast cancer remains the second leading cause of cancer death among women in the United States. Women have about a 1 in 8 chance of developing invasive breast cancer at some time during their life and about a 1 in 35 chance of dying from the disease (American Cancer Society, 2009). Breast cancer is the leading cause of cancer death for women in Tennessee (Li, 2009).

The statistic that one in eight women who survive to age 85 will develop some form of breast cancer in her lifetime is widely recognized and alarming; however, this statistic does not reveal the true picture of the relationship of age and cancer risk. Statistics further reveal that less than 5 percent of invasive breast cancers occur in women under age 40, whereas more than three quarters of breast cancers are found in women over the age of 50 (Institute of Medicine and National Research Council, 2005).

While deaths from breast cancer have decreased significantly during the decades since 1960 due to increased mammography screening, breast cancer is still the second leading cause of cancer death in White, African American, Asian/Pacific Islander, and American Indian/Alaska Native women in the United States (Henson, 2008). The leading cause of cancer death in women is lung cancer. The U. S. Cancer Statistics 2004 Incidence and Mortality Report stated that approximately 187,000 women were diagnosed with breast cancer and nearly 41, 000 women died from the disease that year (Henson, 2008).

Breast cancer mortality can be reduced significantly with the use of mammography for early detection. Breast cancer mammography screening cannot be effective unless it is widely used

and done early to detect cancer. Mammography has become an important cancer control activity (Breen, Wagener, Brown, Davis, & Ballard-Barbash, 2001).

There was no established method for the detection of breast cancer in its early stage until sixty years ago (Finkel, 2005). Advances in technology, policy recommendations by various organizations, and legal mandates have thoroughly changed that circumstance. Mammography began to emerge as an accepted technology in the 1960's when a number of technological innovations improved the images and made them more reproducible and therefore easier to interpret (Finkel, 2005).

Despite the lifesaving potential, breast cancer screenings remained underused, particularly in minority women (Holmes, Frank, & Curtin, 1999). Mammography is an essential surveillance tool in reducing the incidence and mortality from breast cancer (Selvin & Brett, 2003), but many women do not follow the recommendations of the American Cancer Society to obtain these screenings or in a timely and consistent manner (Gotay & Wilson, 1998).

The most recent estimates of mammography screening rates come from a report from the National Cancer Institute of 2005 statistics, which revealed that 67 %of women aged 40 and older had a mammogram within the past 2 years, a drop from 70 % in 2003. Among racial and ethnic groups, 59% of Hispanics (down from 65 percent in 2003), 65 %of Blacks (down from 70% in 2003), and 68% of Whites (down from 71 % in 2003) had a mammogram within the past 2 years, but these drops were not statistically significant although, some researchers consider them the beginning of a trend (United States Institute of Health, National Cancer Institute, 2010).

The two main purposes of mammography are screening and diagnosis. Screening mammography is used for the early detection of breast cancer and consists of an x-ray-based procedure used to examine a woman who has no signs or symptoms of breast disease (Institute of Medicine and National Research Council, 2005). Breast cancer screening is not used simply to detect breast cancer at an early stage, but to save lives.

A major benefit of screening is that small, screen-detected tumors might be effectively treated with less aggressive and harsh regimens than larger tumors would require. Diagnostic mammography uses the same x-ray-based procedure but is modified by the radiologist for specific patients' signs or symptoms (Institute of Medicine and National Research Council, 2005). Additionally, diagnostic mammography is designed to diagnose previously observed signs or symptoms of breast disease in an individual, or to determine the presence or absence of breast cancer in someone with a personal history of breast cancer or biopsy-proven breast disease (Institute of Medicine and National Research Council, 2005).

The American Medical Association, American College of Obstetricians and Gynecologists, and the American Cancer Society in the past recommended screening mammography every 1--2 years beginning at age 40 and yearly after the age of 50 (Finkel, 2005). However, recently recommendations have changed and there is now some controversy in the scientific community as to the appropriate age to initiate screening. These changes will be discussed at length in chapter 5. The age specific guidelines for mammography screening influenced the decision to use the age group for women 55 years old and older for this study.

The U.S. Preventive Services Task Force, an independent panel of private-sector experts in prevention and primary care convened by the Department of Health and Human Services,

recommended that women aged 50 years and older be screened for breast cancer with a mammogram every year (Finkel, 2005). The U. S. Preventive Services Task Force no longer recommends screening for breast cancer with mammography for women under the age of fifty (Finkel, 2005).

A study published by Ryerson, Miller, Eheman and White (2007) indicated that although mammogram use increased substantially during the 1990s, it is now declining. According to results these researchers obtained from a cohort study of health maintenance organization members, screening rates declined from1999—2002. A review of the literature did not provide any indication as to why screening rates are declining.

According to the Tennessee Department of Health, more than 3,800 cases of breast cancer are detected yearly in Tennessee residents (Li, 2009). Overall, Tennessee's breast cancer incidence rate (110.7 per 100,000 in 2004) was lower than the U.S. rate (117.7 per 100,000 in 2004), but Tennessee's breast cancer mortality rate (25.4 per 100,000 in 2004) was slightly higher than the U.S. rate (24.4 per100, 000 in 2004). Higher mortality rates usually indicate a lack of early and consistent screening for breast cancer (Li, 2009).

The extent to which women in rural areas follow breast cancer screening recommendations is not well-defined and further investigation of the impact of the geographic region of one's residence on breast cancer screening practices has been recommended (Cummings, Whetsome, Earp, & Mayne, 2002). A study by Hughes-Gaston (2002) indicated that higher income and greater levels of educational attainment are significant predictors of utilization of screening mammography. Additionally, age, culture and urban residence also predict utilization of screening mammography (Lannon et al., 1998).

This study examined the self-reported mammography screening practices and the perceptions of the benefits of obtaining a mammogram, the perceptions of the barriers to obtaining a mammogram, the perceptions of susceptibility to breast cancer, the perceptions of the seriousness of breast cancer of women age 55 and older who attended senior citizen centers in rural, non-metro, and metro counties in the area designated by the Tennessee Department of Health as the Eastern Grand Division of Tennessee. According to a study published by the National Institute of Health, the estimate of screening practices in a community is important for allowing health professionals to identify segments of the population in which breast cancer screening practices are not widely used (Hiatt, Klabunde, Breen, Swan, & Ballard-Barbash, 2002).

Significance of the Study

The researcher for this study had reviewed literature concerning women's health issues in professional and academic endeavors that revealed breast cancer mortality in Tennessee to be slightly greater than the national average. Additionally, the risk of developing breast cancer increases significantly with age. In working with Senior Citizens Centers in the past as a health educator, the researcher recognized that Senior Citizens Centers provide an effective avenue for education and research of health concerns.

As a health professional concerned with health promotion and disease prevention, this researcher is committed to lower the mortality and morbidity rate of breast cancer in the region that provided my education, where I still have family ties, and an interest in the health status of older women. The most effective tool for lowering morbidity and mortality for breast cancer is the early detection that results from the utilization of mammography. The researcher's

employment in health care administration has provided experience in how effective screening is in reducing the cost of the treatment of cancer, but more importantly early detection of breast cancer saves lives

Women in Tennessee have a mortality rate for breast cancer that is higher than the national average (Li, 2009). Defining the factors that influence breast cancer screening practices will help determine successful approaches to promote early detection thereby decreasing morbidity and mortality rates from breast cancer.

Strategies for decreasing the incidence and mortality of breast cancer in the nation and for the interest of this study in Tennessee, is a significant public health imperative as stated in Healthy People 2020 (U. S. Department of Health & Human Services, 2009). The United States Department of Health and Human Services has set national goals for breast cancer screening, and a primary goal is to achieve equity in breast cancer screening to eliminate health disparities (Hall, Uhler, Coughlin, & Miller, 2002). Among women, breast cancer remains a major public health problem in the United States. Women, who reside in rural areas, have lower socioeconomic status, and those 55 years and older are at greater risk of dying from breast cancer. This study examined screening mammography practices and health beliefs of women who are over the age of 55 and live in an area designated by the Tennessee Department of Health as the Eastern Grand Division.

Theoretical Framework

The model chosen for this study was the Health Belief Model (HBM). The Health Belief Model is used widely in studies of health behaviors including cervical cancer and breast cancer screening (Darnell, Chang & Calhoun, 2006). The HBM has also been used to explain the failure

of individuals to participate in programs for the detection and prevention of diseases (Strecher, Rosenstock, Glanz, Lewis, & Rimes, 1996). Researchers have shown that certain factors act as barriers and incentives to early screening for cancer for all women. Factors addressed in the HBM include fears and the influence of cultural values and attitudes about screening, as well as demographic factors such as education, age, lack of a doctor's recommendation, cost of health insurance, socioeconomic status, inconvenience, and lack of social support (Documèt, Green, Adams, Weil, Stockdale, & Hyseni, 2008).

A study of Latina women conducted by Graves et al., (2008) indicated that the perceptions of risk for breast cancer, comprehension of breast cancer risk and anxiety about developing breast cancer appeared to impact screening practices. The HBM measures perceptions of risk for breast cancer, comprehension of breast cancer risk, and anxiety concerning breast cancer. A study by Hutson, Dorgan, Phillips, & Behringer (2007), investigated cancer disparities in mountainous rural Appalachia. This study focused on breast cancer screening in communities in an area similar to communities in the current study of East Tennessee women. The researcher found similar challenges with the East Tennessee women to those found by Hutson et al. (2007), which included health disparities related to race, socioeconomic factors, and cultural values, these factors are addressed by the HBM constructs. Hutson et al. (2007), indicated that economic distress, low educational attainment, and environmental characteristics have been linked to adverse health outcomes, particularly in isolated rural mountain communities.

The HBM constructs have been used to evaluate the impact of select factors on health outcomes. Health Belief Model Interventions based upon the HBM constructs of perceived susceptibility, benefits, and barriers (Becker, 1974), have been shown to significantly increase

breast cancer screening (Champion & Huster, 1995). Using the Health Belief Model, researchers in one study found several culturally-specific factors (i. e. perceived susceptibility, benefits, and barriers) influencing cancer screening uptake and compliance among Hispanic women (Austin, Ahmad, McNally & Stewart, 2002). The HBM is based on a value expectancy that has been used to test the relationship between health concerns and health behaviors. HBM assumes that an individual health practice is more likely to occur if the action is one that a person believes her/himself to benefit. The benefit would need to be one whereby the individual recognizes he/she is susceptible to disease and the disease is serious. (Becker, 1974). Additionally, this model assumes that an individual is more likely to participate in an intervention if one believes her/himself to be susceptible to the disease and that the disease is serious. HBM has been used successfully to predict and explain adolescent HIV preventive behavior (Lux & Petosa, 1994), and sick role behavior actions (Becker, 1974). Educational interventions which intend to improve breast cancer screening practices in the past have been based on the HBM used to explain how and why individuals make decisions concerning preventive health practices (Katapodi, Lee, Facione & Dodd, 2004).

This study focuses on mammography screening practices of women in East Tennessee as they relate to early detection of breast cancer and decreased morbidity and mortality rates. The HBM was used as a framework to analyze the mammography practices of women in East Tennessee.

Purpose of the Study

The purpose of this study was to use the Champion Health Belief Mammography Screening instrument which was given to female participants in randomly selected sites to examine the

mammography practices of women 55 years and older who attended senior citizen centers and live in East Tennessee.

Statement of the Problem

The problem addressed in this study is the increased incidence and mortality of breast cancer in Tennessee. After extensive research, no baseline data was found of the mammography screening practices of women 55 years and older residing in rural, non-metro and metro areas of East Tennessee. Breast cancer has decreased significantly; however, it is still the second leading cause of cancer death in women. Mammography is the most effective tool in reducing the incidence and mortality from breast cancer (Selvin & Brett, 2003), but many women do not follow the recommendations to obtain these screenings (Gotay & Wilson, 1998).

Reaching women in the age group of 55 years and older presented a challenge, in that the women in this age group usually were not still employed. The faith based approach would not prove adequate based on the wide variance of churches and religious sects in the area, and would prove limiting in that women who were not church attendees would be missed. A secular gathering of women representative of the community could be found in Senior Citizens Centers. Senior Citizen Centers had provided opportunities for the researcher in the past for health promotion and disease prevention activities.

In Tennessee, breast cancer incidence is greater than the national average (Li, 2008). The mammography screening practices of women in East Tennessee compared to the American Cancer Society recommendations for breast cancer screening mammography has not been thoroughly evaluated. There are different ways to understand why women do or do not seek screening mammography. The method used in this study was the Champion Health Belief

Survey to develop a baseline of mammography screening practices of women 55 years and older in East Tennessee.

Research Questions

The following research questions were formulated to address the purpose of the study:

I. Do the mammography screening practices of women 55 and older who attend senior citizens centers in East Tennessee counties differ significantly from the American Cancer Society recommendations for breast cancer screening mammography?

II. Do the mammography screening practices of women 55 and older who attend senior citizens centers in the East Tennessee counties differ significantly according to codes of geographic residence?

III. Do the mammography screening practices of women 55 years of age and older who attend senior citizens centers in East Tennessee counties differ significantly when grouped by educational levels, age, or family history of the disease?

IV. Do the mammography screening practices of women 55 years of age and older who attend senior citizen centers in East Tennessee counties differ significantly based on whether they receive a recommendation for mammography from their health care providers?

V. Do the mammography screening practices of women 55 years of age and older who attend senior citizen centers in East Tennessee counties differ significantly based on self-reported access to health insurance coverage?

VI. Do the breast cancer screening mammography practices of women 55 years of age and older who attend senior citizens centers in East Tennessee counties differ significantly based on the self-reported perceived benefits of mammography?

VII. Do the breast cancer screening mammography practices of women 55 years of age and older in East Tennessee counties differ significantly based on their self-reported perceived barriers to mammography screening?

VIII. Do the breast cancer screening mammography practices of women 55 years of age and older in East Tennessee counties differ significantly based on their self-reported perceived susceptibility to breast cancer?

IX. Do the breast cancer screening mammography practices of women 55 years of age and older in East Tennessee counties differ significantly based on the self- reported perceived seriousness of the disease?

Limitations

1. A limitation to this study was the assumption that the participants of this study will respond accurately and honestly to questions on the written instrument.

2. A further limitation to this study was that permission from the administration of Senior Citizen Centers may not be obtained to distribute the instrument.

3. A limitation to this study was that participants must be able to read and understand instructions written in English.

4. The number of women pre-retirement age, (55-64), who attended senior citizen centers may not be representative of the general population.

5. Finally, a limitation to this study was that attendance on the days instruments were distributed and collected may not adequately reflect the normal attendance of women at the Senior Citizen Centers.

Delimitation

For the purpose of this study the following delimitation was made. The study was delimited to women 55 years and older who attended senior citizen centers and lived in East Tennessee counties in the area designated as the Eastern Grand Division by the Tennessee Department of Health.

Definition of Terms

Breast Cancer- Breast cancer forms in tissues of the breast, usually the ducts, (tubes that carry milk to the nipple) and lobules (glands that make milk). It occurs in both men and women, although breast cancer in men is rare (American Cancer Society, 2009).

Champion Health Belief Model Scale- A reliable and valid instrument developed for to measure beliefs about breast cancer in American women developed by Dr. Victoria Champion (Lee, Kim & Song, 2002).

Diagnostic Mammography- Diagnostic mammography is an x-ray-based procedure but is modified by the radiologist for specific patients' signs or symptoms (Institute of Medicine and National Research Council, 2005). Diagnostic mammography is designed to diagnose previously observed signs or symptoms of breast disease in an individual (Institute of Medicine and National Research Council, 2005).

Screening Mammography -This is an x-ray based procedure that is performed to screen healthy women for signs of breast cancer. It is also used to evaluate a woman who has symptoms of a breast disease, such as a lump, nipple discharge, breast pain, dimpling of the skin on the breast, or retraction of the nipple (Institute of Medicine, National Research Council, 2005).

Rural/non-metro/metro classification- The Rural Urban Continuum CodesRUCC was devised by the United States Department of Agriculture as classification of metro, non-metro, and rural as follow:

> Rural-Urban Continuum Codes form a classification scheme that distinguishes metropolitan (metro) counties by the population size of their metro area, and nonmetropolitan (non-metro) counties by degree of urbanization and adjacency to a metro area or areas. The metro and non-metro categories have been subdivided into two metro, three non-metro and four rural groupings, resulting in a nine-part county codification. For the purpose of this study the rural classification included all counties with a population of less than 20,000 adjacent or not adjacent to a metro area (United States Department of Agriculture Economic Research Service, 2009).The codes are represented in the Figure 1.

Figure 1.
Rural/non-metro/metro classification

Modified USDA Beale Code	
Code	**Description of County**
	Metro Counties
1	Counties in metro areas of 1 million population or more
2	Counties in metro areas of 250,000 to 1 million population
	Non-Metro Counties
3	Counties in metro areas of fewer than 250,000 population
4	Urban population of 20,000 or more adjacent to a metro area
5	Urban population of 20,000 or more, not adjacent to a metro area
	Rural Counties
6	Urban population of 2,500 to 19,999, adjacent to a metro area
7	Urban population of 2,500 to 19,999, not adjacent to a metro area
8	Completely rural or less than 2,500 adjacent to a metro area
9	Completely rural or less than 2,500 not adjacent to a metro area

Summary

Breast cancer mortality in Tennessee is slightly higher than the national average. To understand why women in Tennessee are dying at a greater rate than the rest of the country on average, the Champion Health Belief Model was adopted as the theoretical foundation of this study. Chapter one presented the purpose of the study, the significance of the study, the statement of the problem, and a description of the theoretical model used in this study. The primary purpose of the study was to use the Champion Health Belief Mammography Screening instrument, which was given to female participants in randomly selected sites. The questions examine the mammography practices of women 55 years and older who attend senior citizen centers and live in East Tennessee in order to establish a baseline profile of the mammography screening practices of the participants in this study. Also presented in chapter one were the delimitation, limitations, and the research hypotheses.

Chapter II will be the review of relevant literature. The literature review will focus on content and methodology.

CHAPTER II

LITERATURE REVIEW

Introduction

This purpose of this chapter is to present a review of the relevant literature that examined breast cancer mammography screening practices in the United States and throughout the world. The literature reviewed in related content focuses on research conducted and reported on different aspects of mammography screening practices. The literature review includes literature that supports the research design of the study.

Women today are enrolled in programs of adult education, recreation and leisure time activities in organizations known as Senior Centers. Kutner (1958) states that it seems clear that planned programs of health education could be best carried out within these organizations. This literature review included research recognizes that Senior Centers are an ideal setting for the delivery of health education as well opportunities for the study of health behaviors. This study was conducted with participants at Senior Citizens Centers in East Tennessee.

Literature Related in Content

In the United States, one in eight women will be diagnosed with breast cancer in her lifetime; yet, improvements in screening and treatments have caused survival rates to increase steadily according to the American Cancer Society. The best weapon against breast cancer morbidity and mortality is early detection through mammography (Wingo et al., 2008).

Screening Practices and Geographic Area of Residence

A study of breast cancer mammography screening practices of rural and non-rural women revealed that approximately 66.7% (95% confidence interval [CI] = 65.8% to 67.6%) of women

aged 40 years or older who resided in rural areas had received a mammogram in the past 2 years, compared with 75.4% of women living in larger metropolitan areas (95% CI = 74.9% to 75.9%) (Coughlin, Thompson, Hall, Logan, & Uhler, 2002). Many of the East Tennessee counties in which study participants reside are designated as rural counties by the United States Department of Agriculture.

Additionally, living in rural areas has been identified as a risk factor for breast cancer mortality (Coughlin et al., 2002). A brief from the Rural Health Research Center in Washington University reported in August of 2008 that timely mammography was received by 70.8% of rural and 75.7% of urban respondents in 2004. Unfortunately, despite a 10% increase over time in the overall participation in mammography, a rural-urban gap persisted, with women residing in the most remote rural areas least likely to receive a timely mammogram (Rural Health Research Center, 2008)

Medical service shortages, socioeconomic disadvantages, rural residence, and cultural factors were found by Hall et al. (2002), to pose barriers for women living in the Appalachian region of the United States. This study took place in several areas of Appalachia including Tennessee; however, many of the same factors found to be barriers to screening by Hall et al., (2002) are common characteristics of women living in East Tennessee region of Appalachia. These factors include geographic isolation, poverty, low educational attainment and cultural attitudes (Hall et al., 2002).

According to Coughlin et al. (2002), possible explanations accounting for the less frequent use of preventive services by women living in rural, compared with women living in non-rural areas, included greater distances to medical facilities and less accessibility of services. Both of

these factors are associated with lower education and income levels for people living in rural areas (Coughlin et al., 2002). Additionally, inadequate health insurance coverage has also been identified as an important barrier to the use of preventive health care services for people living in rural areas (Coughlin et al., 2002).

This study (Coughlin et al., 2002), defined rural and non-rural geographic areas using the U.S. Department of Agriculture's Beale codes. Beale codes were developed by Dr. Calvin Beale in the early 1970s for the Department of Agriculture to provide a classification of counties into various degrees of urbanicity (United States Department of Education, 2009). The resultant system, officially known as the ERS Rural-Urban Continuum Codes, is most often referred to as the Beale codes. The Beale codes are calculated through examining the size of a county and its proximity to a metropolitan area (United States Department of Education, 2009).

Breast Cancer Profile for Tennessee, the Nation and World

The latest statistical review of breast cancer in Tennessee for 2005, published by the United States Cancer Statistics and the National Program of Cancer Registries at the Centers for Disease Control and Prevention (CDC), in 2009 indicated that breast cancer is the leading cancer among females in Tennessee with an incidence rate of 120 per 100,000. The incidence rate of breast cancer in women in the state of Tennessee, according to the above statistic, exceeds the national incidence rate which is 117 per 100,000 (Centers for Disease Control and Prevention, 2009).

Worldwide, breast cancer is the most common cancer among women and the leading cause of cancer death in women (Althuis, Dozier, Anderson, Devesa, & Brinton, 2005). Breast cancer is the second leading cause of cancer death in the United States, second only to lung cancer. There has been widespread implementation of screening mammography since the 1980's in most

developed countries including the United States which has lead to a steady increase in breast cancer diagnosis and early treatment (Althuis et al., 2005).

Even though breast cancer therapies have improved over the years, there are still no reliable methods of preventing this cancer. Additionally, treatments are generally more effective when breast tumors are small and localized than when the tumors are large and metastatic (Institute of Medicine & National Research Center, 2005). Strategies as drastic as undergoing a double mastectomy will reduce the risk considerably, but will not completely eliminate the possibility of developing breast cancer. Early detection remains the most effective approach for reducing morbidity and mortality from breast cancer (Institute of Medicine, 2005). A recent study in the Journal of Clinical Oncology suggested that receipt of surveillance mammograms reduces the rate of breast cancer mortality in older patients diagnosed with early-stage disease (Lash et al., 2007).

Both breast cancer incidence and mortality rates varied four-fold by geographic location between countries with the highest and lowest rates according to Althuis et al., (2005). These researchers reported that incidence rates for 1993-1997 ranged from 27/100,000 in Asian countries to 97/100,000 among US white women. Overall, according to this study, North American and northern European countries had the highest incidence rates of breast cancer; intermediate levels were reported in Western Europe, Oceania, Scandinavia, and Israel; and Eastern Europe, South and Latin America, and Asia had the lowest levels (Althuis et al., 2005).

Breast cancer incidence increased 30–40% from the 1970s to the 1990s in most countries, with the most marked rise among women aged 50 years and older. Mortality from breast cancer paralleled incidence. Mortality was highest in the countries with the highest incidence rates

(between 17/100 000 and 27/100 000), lowest in Latin America and Asia (7–14/100 000), and rose most rapidly in countries with the lowest rates (Althuis et al., 2005).

Mortality rates from breast cancer generally parallel incidence throughout the world except in the United States where incidence in white women during 1993-1997 was the highest in the world, but the mortality rate ranked ninth. This was lower than in all other high risk countries except Australia, and lower than four of seven intermediate ranked countries being Canada, England, Italy and New Zealand (Althuis et al., 2005). However, in sharp contrast, the mortality rate among US African American women during this period was the second highest in the world (Althuis et al., 2005).

Demographic Characteristics as Predictors of Mammography Use

A diagnosis of cancer is not an automatic death sentence today due to advances in treatment and therapeutics. Many cancers now have a very favorable prognosis as is shown by cancer-specific survival rates (Finkel, 2005). Even though breast cancer incidence continues to grow in the United States, overall breast cancer mortality has steadily decreased since 1989. The explanation for this trend is not well understood, but may be the result of early detection and treatment (Finkel, 2005).

Screening technologies that have been proven to be effective exist for breast cancer; nevertheless, these technologies are underused by many women. There are certain demographic characteristics that have been found to be predictors of mammography underuse. These include low educational attainment, age greater than 65, residence in a rural area and Hispanic ethnicity (Cahle, Thun , Martin, & Flanders, 1993). Women with certain characteristics, such as those residing in rural areas, are less likely screened for breast cancer. In addition to rural residence,

geographic isolation, poverty, unemployment, lack of education, lack of child care services, and attitudinal and cultural factors may pose barriers to mammography screening among women in the Appalachian region (Hall et al., 2002).

Tracking of mammography use started many years ago. As early as 1987, a study of 852 Rhode Island women ages 55 and older interviewed by telephone (78 percent response rate) was done to measure their use of breast cancer screening. Additionally, these interviews investigated potential predictors of use and indicated that the predictors included the women's socioeconomic status, use of medical care, a provider's reported recommendations for screening, and the women's health beliefs about breast cancer and mammography (Fulton & Darcy, 2000). The Champion Health Belief model identified socioeconomic status, use of medical care and provider recommendation as psychosocial characteristics that predict mammography practice in women (Champion, 1993).

An early study reported in 1992 examined the utility of screening, both clinical examination and mammography in extending the life of women 65 years or more with comorbid conditions (Mandelblatt et al., 1992). This group of researchers from the Sloan-Kettering Cancer Center and Cornell University Medical College reported that screening saved life at all ages of patients studied with the highest gains for black women and the gains decreased with increasing age and co morbidity. However, the conclusion reached by these researchers was there is no inherent reason to impose an upper-age limit for breast cancer screening (Mandelblatt et al., 1992).

A study by Breen et al., (2001), found that several demographic factors are associated with individual use of health services and additionally predict preventive service use. The factors

identified included levels of income and education as well as health insurance status, and a usual source of health care (Breen et al., 2001).

Jemal et al., (2008) identified great variability across levels of basic demographic characteristics in the tendency of women to underuse screening technologies. However, while the overall incidence of breast cancer is higher among women of high socioeconomic status, there is evidence to suggest that women of low socioeconomic status are less likely to be diagnosed with early stage disease and are more likely to die of the disease (Jemal et al., 2008). The risk factors increase for older women if they have any of the following characteristics: 1) live below the poverty level, 2) have a low level of education (Jemal et al., 2008), and 3) reside in a rural areas (Coughlin et al., 2002).

Breast Cancer Screening and Appalachian Women

Medical services shortages, rural residence, socioeconomic and cultural factors are among the barriers that are attributed to lower screening rates in Appalachian women. Screening rates of women living in the Appalachian region of the United States are significantly lower than those of women living elsewhere in the United States according to a study done by the CDC. However, breast cancer incidence and mortality in this area of the country is significantly higher, especially women living in rural areas of Appalachia (Hall, Uhler, Coughlin, & Miller, 2002). The geographic area proposed for investigation in this study is in the Eastern Tennessee area of the Appalachian region.

A study by Lyttle and Stadelman (2006) indicated that only about three in five women in West Virginia are screened for breast cancer annually. The study also indicated that cancer mortality is higher in the Appalachian region than the rest of the United States (Lyttle &

Stadelman, 2006). Appalachia, as defined by the Appalachian Regional Act of 1965, contains 399 counties in portions of 13 states in the United States (McMillan et al., 2007). This study population resides within that region. According to McMillan et al. (2007), studies that have examined cancer education in this area have found that the health beliefs of Appalachians are often different than those of mainstream Americans.

Women who perceived more benefits from cancer screening were more likely to screen and perform breast cancer prevention practices. In looking at health beliefs, these researchers found that the Appalachian women most likely to be in compliance with cancer screening recommendations were those who have health insurance, reside in urban areas, and are better educated, according to McMillan, et al. (2007). The purpose of the study described in this paper focused on a specific group of women in 31 East Tennessee Counties, which are a part of the Appalachian region. These women live in rural, metro, and non-metro areas of the area specified by the Tennessee Department of Health as the East Tennessee Grand Region (Tennessee Department of Health, 2010).

A study published in the Journal of Clinical Oncology (2007), showed that each successive annual mammogram lowered a woman's breast cancer mortality risk by about 31 percent and compounding this benefit over a period of four years would cut a woman's cumulative risk of breast cancer death by 88 percent (Lash et al., 2007). However, women with certain characteristics, such as those residing in rural areas, are less likely to be screened for breast cancer (Schootman, Myers-Geadelmann & Fuortes**,** 2000).

Demographics affect screening rates, and women, regardless of income, who live in counties that have high rates of uninsured people, are less likely to receive clinical breast exams or

mammograms, according to a study by (Schootman et al., 2000). Schootman and colleagues at Washington University in Missouri used data collected in the 2000 Behavior Risk Factor Surveillance System and the 1999-2001 Surveillance, Epidemiology, and End Results program to determine if screening for breast cancer varied by the proportion of uninsured in the community. The study results indicated that as community residents who were uninsured increased by 5 percent, women were 5 percent less likely to be screened. Comparable to past research, the study indicated that fewer screenings also seemed to lead to lower rates of diagnosis of breast cancer in its early stages. For example, this study found that the rate of early-stage (less than 2 cm diameter) tumors declined with the increasing proportion of uninsured in a county regardless of the poverty rate (Schootman, Walker, & Jeffe, 2007).

A study in West Virginia that used focus groups to discuss breast and cervical cancer screening attitudes found that cost of health care and lack of health insurance were the dominant concerns among the women in the focus groups regarding their screening practices (Lyttle & Stadelman, 2006). Older women in the focus groups expressed concern that they were "falling through the cracks" when it came to health insurance. This subgroup of women were those fifty and older who had retired early, lost their jobs, were divorced or widowed and therefore found themselves without health benefits to pay for screening and other routine preventive and acute care (Lyttle & Stadelman, 2006).

A project conducted by the Rural Cancer Demonstration Program that was funded as part of a grant designed to identify, explore, and describe cancer disparities in the Central Appalachian region looked at breast cancer patterns of care for the region (McNeill & Dorgan, 2005). Data were collected on breast cancer patterns of care by tracking patients who had been diagnosed

with breast cancer and were receiving regular care from one of the two cancer centers in the area, located in East Tennessee and Virginia. The study revealed that a higher percentage of late stage diagnosis was found in the sample of women from this area then the SEER data of breast cancer incidence for the years 1992-1999 (McNeill & Dorgan, 2005). The study utilized follow up phone interviews using the Champion Health Belief Survey to investigate screening patterns of 88 women. This study found that women's screening mammography practices were influenced by perceived barriers and benefits (McNeill & Dorgan, 2005).

The Effects of Age and Ethnicity on Mammography Screening Practices

The risk for breast cancer rises sharply as one ages; however, breast cancer screening rates increases much less with age (Institute of Medicine, 2005). Usually, the women who die of breast cancer in a particular year are not the women who received mammography or are even diagnosed that year. Only about 63% of women older than 65 years received mammography screening in 2002 according to the Institute of Medicine, (2005), but well over half the deaths from breast cancer were in 2002 were women over the age of 65. Interestingly, years passed before specific attention was devoted to researching the age-associated aspects of breast cancer (Yancik, Ries, &Yates, 1989). The literature review indicated there has been little investigation of the breast cancer screening behaviors of women who are older and who live in mostly rural regions.

One of the most important predictors of breast cancer risk is age, due to the fact that risk increases as one gets older according to Finkel (2005). Three-quarters of women who have breast cancer are over the age of fifty when they receive the diagnosis. Women who are between the ages of twenty and twenty-nine only account for 0.3 percent of breast cancer cases (Finkel,

2005). Ethnicity is also related to breast cancer risk. White women aged fifty have a 1 in 34 chance of developing breast cancer within ten years; Hispanic women have and 1 in 63 chance, Asian women have a 1 in 51chance, and African American women have a 1 in 43chance (Finkel, 2005).

African-American women have higher rates of breast cancer mortality than do White women, which may be explained by the later stage at the time of diagnosis (O'Malley et al., 2001). Breast cancer is the second most common cause of death from cancer in African-American women according to the American Cancer Society (2005), and the leading cause of death from cancer among Latinas (American Cancer Society, 2003). Although this explanation accounts for only a proportion of the increased breast cancer mortality among Black women, lower mammography use among older Black women further explains some of the racial/ethnic differences in stage at diagnosis (O'Malley et al., 2001). Medicare data used in some studies reveal that older African American women less often used mammography, even after adjustment for age, income, and number of primary care visits. The reason for this remains unclear. (O'Malley et al., 2001).

African-American and Latina women are being diagnosed with breast cancer at regional and distant stages, and White women, in general receive more frequent and consistent cancer screening are diagnosed in the earlier stages of cancer which improves their chances of survival (Darnell, Chang, & Calhoun, 2006).

In a Florida study, a total of 63,472 patients with breast cancer were identified. The demographics included, 90.5% of patients were Caucasian, 7.6% African- American, and 8.7% Hispanic. The study suggested that African-American patients presented at a younger age and

with more-advanced disease, 10.5% presented with breast cancer before the age of 40 years, and 22.4% before 45 years of age (Yang et al., 2008). Furthermore, African-American patients were less likely to undergo operations to address their breast cancer. Likewise, low-socioeconomic status (SES) patients were less likely to have operations and presented more often with larger tumors. The results of this study indicated that race and low SES were independent predictors of a poorer prognosis for women diagnosed with breast cancerwhen controlling for patient co-morbidities and treatment (Zhu et al., 2000).

According to O'Malley et al., (2001), previous research had shown there has been a consistent and strong association of physician's recommendations to obtain mammograms with women's use of mammography. This could account for some of the racial/ethnic difference in mammography use (O'Malley et al., 2001). A 2000 study in North Carolina revealed that only 50% to 80% of women 50 years and older reported a physician recommendation for mammography in the past year, and it is unclear why some women received a recommendation and others did not (O'Malley et al., 2001).

Among women 52 years and older in the 10 counties in North Carolina, 53% surveyed reported a physician recommendation for mammograms in the past year, and 61% said that they had had a mammography in the past two years. White women more often reported a physician's recommendation compared to African American women, with the difference being significant (55% vs 45%; unadjusted OR= 1.49, 95% CI=1.24, 1.78) and mammography use (66% vs 48%; unadjusted OR=2.13, 95% CI=1.77, 2.56) (O'Malley et al., 2001). Even after 12 personal, health, and access characteristics were controlled for, women were significantly more likely to have had

a mammogram in the past two years (OR= 16.11, 95% CI = 12.37, 21.00) if a physician made a recommendation for a screening mammogram in the past year (O'Malley et al., 2001).

The disparities in cancer outcomes and the association of outcomes to race, ethnicity, and SES have been increasingly the focus of research and are not yet fully understood. African-American breast cancer patients suffer a higher mortality rate once diagnosed (Yang et al., 2008). One study in Florida examined a population-based cancer registry identifying 63,472 patients with breast cancer revealing that overall, 90.5% of patients were Caucasian, 7.6% African-American, and 8.7% Hispanic. African-American patients presented at a younger age with 10.5% having breast cancer before the age of 40 years and 22.4% before 45 years of age (Yang et al., 2008). This analysis is consistent with previous studies that have separately addressed disparities by race and low SES in women with breast cancer. The results of this study identify the first barrier to improved survival as being the problem of late presentation associated with the intrinsic characteristics of either the host or the tumor that leads to the additional virulence seen in African-American women with breast cancer. The second barrier is the under treatment of breast cancer in African-American women once a diagnosis is made (Yang et al., 2008). The Champion Health Belief model posits that barriers such as poverty impact the mammography screening practices of women (Champion, 1993).

Additionally, these studies are consistent with earlier research that demonstrated disparities in breast cancer outcomes are associated with poverty. Patients of lower SES have additional barriers in obtaining access to screening, and once they are diagnosed, they may not receive aggressive treatment due to economic factors (Yang et al., 2008). The observation that under

treatment is a causative factor in poor outcomes among patients of low SES has been noted in earlier studies. Other health system factors that can delay or prevent care also exist, such as out-of-pocket or up-front costs, lack of a centralized point of care, and other factors leading to decreased access to health care. The results Yang et al., (2008) found concerning SES were consistent with earlier studies that demonstrated disparities in breast cancer outcomes with regard to poverty.

A study of Appalachian women cited the main reasons women do not get screened as concern for health care costs and lack of health insurance. Cost, fear, and embarrassment were cited in this study as the primary barriers to breast cancer screening (Lyttle and Stadelman, 2006). The group in this study resided in rural West Virginia, which tends to be poorer and more likely to be uninsured or underinsured than the general U. S. population.

Age to Begin Screening Mammograms

The recent controversy surrounding mammography recently has been the age women should first receive a mammogram. Although there is general agreement that screening mammography reduces the rate of death from breast cancer among women who are 40 years of age or older, some researchers question whether the risks outweigh the benefits for women younger than 50 years of age (Pisano et al., 2005). The meta-analyses of eight large, randomized trials found a reduction in the mortality rate of 16 to 35 percent among women age 50 to 69 years of age who were assigned to screening mammography. However, women who were 40 to 49 years of age when they began the trial had a smaller but significant reduction of 15 to 20 percent. The smaller benefit of screening in younger women may be attributable to a lower incidence of breast cancer,

more rapidly growing tumors, and greater radiographic density of breast tissue in women less than 50 years of age (Pisano et al., 2005).

The sensitivity of mammography is greatly reduced when breast tissue is dense and there is an increases risk of breast cancer. Digital mammography separates image acquisition and display, allowing the optimization of both. Digital mammography was actually developed in part to address some of the limitations of film mammography (Pisano et al., 2005).These researchers report that image processing of digital data allows the degree of contrast in the image to be manipulated, so that contrast can be increased in the dense areas of the breast with the lowest contrast. Digital mammography, surprisingly, has not been found to be significantly more accurate for detecting breast cancer than film mammography in previous trials. The research cited here was limited due to the fact that only one type of digital detector was used in comparison. This resulted in insufficient statistical power to identify relatively small differences in diagnostic accuracy. The researchers stated that the Digital Mammographic Imaging Screening Trial (DMIST) was designed to measure relatively small but potentially clinically important differences in diagnostic accuracy between digital and film mammography (Pisano et al., 2005).

Literature Related to Methodology

This section will focus on research designs for the investigation of breast cancer screening practices in the population for this study. Educational interventions intended to improve breast cancer screening practices previously have been based on theoretical models that are used to explain how and why individuals make decisions concerning preventive health practices

(Katapodi, et al., 2004). Screening is the most effective means of detecting cancer early in order to lower the mortality and morbidity of the disease. The Health Belief Model has been used to determine why individuals decide to participate in screening for cancers of several types including breast, cervical, prostrate and colon cancer. The individuals perceived susceptibility or perceived risk is the principal variable in all the HBM (Katapodi et al., 2004). How variables influence health-enhancing behavior is not agreed on in most of the literature, but the HBM combines variables in an explicit or empirical equation to predict the adoption of the health-enhancing behavior (Katapodi et al., 2004). The instrument used in this study was based on the Health Belief Model.

Champion Health Belief Model Constructs

Early studies done by Dr. Victoria Champion to identify psychosocial variables that affect screening use set the standard early on for psychosocial research on breast cancer screening. One such study looked at variables within two different age groups of women, those younger than 50 and those 50 and older (Champion, 1993). Dr. Champion's early studies examined predictor variables identified using the Health Belief Model and the Theory of Reasoned Action which included: susceptibility, seriousness, benefits, barriers, health motivation, control, social influence, and experimental/demographic variables (Champion, 1993). A probability sample of 581 women aged 35 and older was included for analyses and two measures of mammography compliance were tested. The measures were compliance with American Cancer Society (ACS) guidelines for the 5 years before the study and compliance with the ACS guidelines for the year before the study (Champion, 1993).

The results revealed that compliance rates were significantly lower for women 50 and older than they were for younger women for both the 5-year compliance and the single year of compliance. Barriers were more significant for older women. Having a mammography suggested by a health care professional was most important in the older group, indicating that less weight may be given to personal decision making by this population on the topic of screening (Champion, 1993). The significance of higher socioeconomic status was greater with older but not younger women. Champion (1993) suggested that for older women, interventions need to be directed toward both the physician and the individual woman.

Further validation that the Health Belief Model is appropriate for researching factors that influence breast cancer screening was found in a meta-analysis that examined factors influencing breast and cervical cancer screening behavior in Hispanic women. Using the Health Belief Model, the researchers found several culturally-specific factors influencing cancer screening uptake and compliance among Hispanic women (Austin, Ahmad, McNally & Steward, 2002). These factors included fear of cancer, fatalistic views on cancer, linguistic barriers, and culturally-based embarrassment. Also, Hispanic women commonly feel less susceptible to cancer, which is an important reason for their lack of screening (Austin et al., 2002). Using the Champion Health Belief Model constructs, researchers have established that barriers to mammography may include culturally-based issues including language barriers and health beliefs (Champion, 1994).

Champion Revised Health Belief Model for other Cultures

The Champion instrument using the Health Belief Model scales to measure breast cancer screening were developed and tested by Victoria Champion for women in the U.S.A., and have been revised twice since then. Champion's Health Belief Model Scale (CHBMS) has been translated and tested in various studies in other countries and cultures such as Jordan and Turkey. A study done in Turkey and published by Gözüm and Ilknur (2004), examined the validity and reliability of the Turkish adaptation of the CHBMS among Turkish women. The technique used was a back-translation technique, which included the use of a panel of experts and interpreters to translate the items from the source language to the target language and then back-translate them to the source language. Using factor analysis and testing known-group techniques to examine the factor structure of the instrument, the construct validity was supported. Psychometric testing demonstrated satisfactory internal consistency and validity of the instrument for this group of women leading the researchers to conclude that this instrument can be used in planning and testing interventions to improve breast self examination (BSE) beliefs and practice (Gözüm & Ilknur, 2004).

The Champion Health Belief Model Scales were translated to the Arabic language, to measure Jordanian women's beliefs about breast cancer and breast self-examination (BSE) in Jordan, for a study that took place from 1999 to 2000. The study used a descriptive correlational design, using a cross-sectional survey with a random sample of 519 female university students and employees (Mikhail, Petro-Nustas, & Wasileh, 2001). As in many other countries, in Jordan, the primary site of cancer in women is the breast. The study described women's beliefs or

practices about breast cancer and BSE in Jordan (Mikhail, Petro-Nustas, & Wasileh, 2001). According to Mikhail, Petro-Nustas, & Wasileh, (2001), the translated version of Champion's scales was found to be a valid and reliable tool for use with Jordanian women. The authors posit that it can be used in planning and testing interventions to improve BSE beliefs and practice.

A study by Darnell, Chang, and Calhoun (2006) investigated the predictors of breast cancer screening practices of Latina and African American women in Chicago, Illinois. The researchers in this study modified the health belief model which has been used in studies of health behavior including mammography screening. The health belief model hypothesizes that a person's health beliefs affect one's decision to undertake an action related to one's health. This model informed the choice of the important variables included in the logistic regression models in this study of women in Chicago measured perceived susceptibility, perceived benefits, perceived barriers, cues to action, self-efficacy/health motivation, and modifying factors (Darnell et al., 2006). The perceived benefits in this study refer to the effectiveness of the actions taken by an individual that improve health or lessen the consequences of a disease process. Two items described the benefits of early detection. Perceived barriers refer to the potential obstacles to the implementation of the desired behavior. Four items measured in this study included embarrassment, pain, cost, and fear. Cues to action refer to factors that serve to promote or inhibit the said behavior. The two items concerning physician communication about breast cancer and mammograms measured cues to action; additionally, self-efficacy/health motivation combines two constructs and refers to confidence that an individual can practice the behavior and the desire to maintain good health status (Darnell et al., 2006).

Mammography, unlike breast self-examinations which require a woman's knowledge about how to perform the action and active participation to complete it, is not an action that a woman conducts herself. However, obtaining a mammogram does require that a woman visit a physician. The three items the Darnell et al., (2006) study focused on concerned the recency of last doctor visit, having a regular source of care, and site of care measured self-efficacy/health motivation. For each of the subscales, a Cronbach's coefficient alpha was calculated and they ranged from .71 to .84, indicating adequate internal consistency for the instrument (Darnell et al., 2006).

The results of the Darnell et al. (2006) study indicated that the frequency of reading, seeing and/or hearing messages about the early detection of breast cancer was found to be an important predictor of the mammography screening practices of the participants (Darnell et al., 2006). Breast cancer educational programs and informal group discussion about breast cancer and/or mammography were the most influential for the African-American population but not for the Latinas. For this population, the English speaking ability of the participants was the covariate that was the strongest predictor of mammography use (Darnell et al., 2006).

Provider Relationships using CHBM

Sheppard et al., (2008), investigated the impact of health-care relationships on adherence of Latinas to mammography using the Adherence Model which used several complementary theoretical perspectives including the Health Belief Model. Independent variables in this study were art of care factors which included satisfaction with health-care relationships, communication with health-care providers, and the length of the patient-provider relationship

(Sheppard et al., 2008). As in previous studies in this review of literature, age, education, and insurance were associated with a recent mammography in bi-variate analyses. Additionally, women who rated higher satisfaction with their health-care provider were also more likely to have had a recent mammogram than those women who reported less satisfaction with the patient/ provider relationship (Sheppard et al., 2008).

A study conducted in Texas by Fernandez and Morales (2007) used a behavioral model to examine the use of cancer screening services among border and non-border Hispanic Texas women. This model, much like the HBM, conceptualizes use of health care as an outcome determined by the interplay of predisposing socioeconomic characteristics, enabling and need factors. The socioeconomic factors examined in this study included: age, education, employment, language by the interview respondent, marital status and self-assessment of mental health. The enabling factors included some of the issues found on the Champion Health Belief Model such as: having health insurance, having a regular health care provider, household income, and perception of cost of mammography as a barrier to screening. The results of this study indicated that only 47% of Texas Latinas compared to 65% nationwide had a mammogram in the last year. Both interviewing in Spanish, an indication that Spanish is first language, and residing in a border country were associated with lower utilization of screening services (Fernandez & Morales, 2007).

The population of the United States continues to grow more diverse and minority populations continue to grow. Delays in cancer detection impose an increasing burden not just on individuals and their families, but also state and federal budgets and the nation's economy. Early

detection programs to be successful must be culturally competent, in other words, the health care environments must be deliberately modified to serve patients of various cultural backgrounds more effectively (Documèt et al. , 2008).

Summary

The literature review provided an opportunity to examine national and international research concerning mammography screening practices in both content and methodology. The literature presented some of the determinants of mammography screening practices in women over the age of 40. The literature also revealed the need to find strategies that will improve mammography screening practices in women who have lower SES and are of minority status. Chapter three will present the methodology used in collecting and analyzing the data.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this chapter is to outline the procedures used to achieve the stated purpose of this study which was to examine the mammography screening practices of women in East Tennessee. Data was gathered and analyzed to determine if there is an association between demographic characteristics, health beliefs and attitudes to mammography screening practices. The study addressed the research questions cited in Chapter One. Specifically, the research questions addressed the dependent variable of mammography screening practices and if it was associated with the following self-reported independent variables: age, family history of breast cancer, geographic residence, educational status, presence of a regular health care provider, perceived susceptibility to breast cancer, perceived seriousness of breast cancer, perceived benefits to breast cancer screening mammography and perceived barriers to breast cancer screening mammography.

Study Population

The study population consisted of a cross-section of a sample of women 55 years of age and older who attend senior citizens centers and live in rural, non-metro, and metro counties in Tennessee designated by the Tennessee Department of Health. There are 32 counties in the area designated as the Eastern Grand Division of Tennessee including: Anderson, Bledsoe, Blount,

Bradley, Campbell, Carter, Claiborne, Cocke, Cumberland, Grainger, Greene, Hamblen, Hamilton, Hancock, Hawkins, Jefferson, Johnson, Knox, Loudon, McMinn, Meigs, Monroe, Morgan, Polk, Rhea, Roane, Scott, Sevier, Sullivan, Unicoi, Union and Washington. Each county was designated as either rural, non-metro or metro as defined in chapter one, Figure I.

For this study the population was all women age 55 years and older who attended senior citizens centers in a sample taken from fourteen of the 32 counties. The senior citizens centers were randomly selected from each of the categories designated as either rural, non-metro or metro. Fourteen counties were selected and supplied a sample of 404 women.

The senior centers were located in 14 counties ranging from Mountain City, Tennessee to the north and to Chattanooga, Tennessee in the south which is approximately 330 miles between these communities. The fourteen site visits were completed during the last week of November, 2009, and the month of December, 2009. The response rate was 100 percent for permission letters sent to the directors of the senior citizen centers. Without exception, the center directors accepted enthusiastically the invitation to be a part of this study and encouraged the women attending their centers to fully participate.

Sampling Technique

The sampling frame for women age 55 and older in East Tennessee counties was clustered based on sub populations of women who attended senior citizens centers that are located within either a metro, non-metro or rural area in these counties. Cluster sampling was integrated into the sampling frame because the Eastern Grand Division covers a large geographic area and reaching every woman is unnecessary. A sample that is properly selected and one which is representative

of the population would give results that closely approximate the population (Henderson, 1983).The average attendance of women aged 55 and older at each senior citizens center was determined and considered in obtaining an appropriate sample number suggested by Leedy & Ormond, (2005).

Samples were taken from women attending senior citizens centers during November,2009 and December, 2009. (See Appendix F for a listing of the senior citizens centers and their classifications). The senior centers were assigned numbers and drawn randomly using random number tables. The sample size was determined to be 390 based on the N (population) needed to provide the correlation based on a study by Lee, Kim and Song (2002). At an r (sample correlation coefficient) of .14 the N needed was 395, at an r of .16 the N (population size) needed was 301, at an r of .14 the N needed was 173 and at an r of .37 the N needed was 52 (Lee, Kim, & Song, 2002). This computation was completed using SPSS power 8. The sample from each designation of rural, non-metro or metro subsets was 130, randomly drawn until the N of 390 was achieved. This sample size was indicated because it was the least number of people to survey in two previous studies that found a level of significance. Permission for administration of the instrument was obtained prior to sampling from Dr. Victoria Champion. Permission to survey women who attend the centers was obtained from the senior citizen center's directors prior to administration of the instrument. The permission forms from the senior citizen center directors are on file with the Institutional Review Board office at the University of Tennessee.

Instrumentation

The Champion Health Belief Survey instrument that Dr. Victoria Champion developed was to investigate the association between participation in breast cancer screening and the health beliefs

and attitudes of the participants (Champion, 1994). Additionally, certain demographics that may impact mammography screening practices were identified including: age, educational attainment, and the geographic code of residence of the participants. Characteristics of the participants that are of interest for this study included: mammography screening practices, family history of breast cancer, having a regular health care provider, and insurance status. The instrument provided a means to measure the extent to which personal breast cancer screening participation is affected by one's perceived susceptibility to the disease of breast cancer, perceived seriousness of the disease, perceived benefits from breast cancer screening behaviors, and perceived barriers against breast cancer screening behaviors (Graham, 2002; Champion 1994).

The instrument used for this study was the Champion Health Belief Model. The Champion Health Belief Model was modified to meet the social and cultural needs of the study population. The survey instrument wording was modified to a lower reading level without changing the context of the questions. The revised instrument was used to collect the data to assess the association of demographics and screening practices to compliance with American Cancer Society's recommendation for breast cancer mammography screening. Dr. Victoria Champion, who developed the Champion Health Belief survey, gave written permission to the researcher in a letter dated April 6, 2009 to use and modify the instrument with the stipulation that her work be referenced (Appendix G.)

Champion's (1993) revised Health Belief Model Scale (HBMS) consists of 30 items to measure four constructs: benefits, barriers, susceptibility, and seriousness. The Champion Health Belief Model Scale was designed for use with women in the age range of 40 years of age and older (Champion, 1993). Each concept was measured in a distinct sub-scale. The four sub-

scales consisted of four to seven items each. Items for each sub-scale were arranged on a 5 point Likert-type scale with “1” indicating strongly agrees, “2” indicating agree, "3" indicating neutral, “4” indicating disagree, and “5” indicating strongly disagree. The revised version of CHBMS consists of items which are grouped in six subscales as follows: susceptibility (four items); seriousness (four items); barriers (seven items); benefits (three items); compliance (three items) and demographic information (eleven items). A 5-point Likert Scale format with code 1(strongly agree), code 2(agree), code 3(neutral), code 4(disagree) and code 5 (strongly disagree) was used to code all items to enter into SPSS for analysis.

A translated version of Champion's scales was used in a study of Jordanian women and found to be a valid and reliable tool (Mikhail, Petro-Nustas, &Wasileh , 2001). The revised instrument is cited in Appendix A. Following review and approval from the Institutional Review Board of the University of Tennessee, and using the recommendations of the investigator’s dissertation committee, the Champion Health Belief Model was used to collect data during the months of November and December 2009.

Data Collection

Prior to data collection, East Tennessee senior center administrators were contacted to gain permission to survey female members concerning breast cancer screening mammography. Participants were advised of confidentiality, benefits, risks and future implications of the study. Data were collected from the participants using the revised Champion Health Belief model. The senior center directors chose the appointment times for the survey process which were often times associated with a specific event or gathering that had already been scheduled at the center to take advantage of a larger than usual number of participants. The researcher surveyed women:

before and after Christmas parties, cookie exchanges, quilting and toy making session, yoga classes, bible studies, line dancing classes and other activities that were either regularly scheduled activities or special events on the senior center activities calendar for the last week of November or the month of December, 2009. The surveys were conducted individually or in small groups throughout the day. The centers provided tables and chairs and allowed the researcher to create an area for conducting the studies. The timeframe for completing the CHBM surveys varied within the senior centers. Some sites required the entire day to complete the surveys, and others were done within an hour or two. During the process, participants shared verbally their own experiences with breast cancer or those of people close to them. Therefore, the researcher took the time to listen to personal stories and supported the women who were willing to share information. In order to complete the data collection during the 5 weeks of late November and December, the researcher devoted 12 to 14 hours per day which included time at the centers and driving time to the centers. At each center, the instrument was given by the researcher to participants to complete and the researcher collected the completed instruments directly from participants.

Analysis of Data

Using SPSS a descriptive analysis was performed on the data collected from the participants to examine the relationship between measurable construct and the breast cancer screening behaviors of the women. The health belief model constructs included as the dependent variable mammography screening practices. The independent variables are: geographic code of residence, level of education, age, family history of breast cancer, a recommendation for a mammogram from a healthcare provider, health insurance status, the participant's perception of the benefits

and barriers to breast cancer screening, the participant's perceived susceptibility to breast cancer, and the participant's perceived seriousness of the disease.

To determine if the survey participant's mammography screening practices were associated with the above mentioned factors, a Chi-square test, t-test and MANOVA at the 0.05 level of significance was performed. For this study, the outcome of interest was to determine if the mammography screening practices comply with the American Cancer Society recommendations for breast cancer screening mammography and if the variables of interest are associated with mammography screening practices.

The reason for using nonparametric tests in this study was the size of the sample. Parametric tests are robust to deviations from Gaussian distributions, so long as the samples are large. However, we do not know if the sample size is large enough, as it depends on the nature of the particular non-Gaussian distribution (Motulsky, 1995). A chi square statistic is used to investigate whether distributions of categorical variables differ from one another, in other words, to determine how closely observed frequencies or probabilities match the expected frequencies and probabilities (Leedy & Ormond, 2005). "When the data of research consist of frequencies in discrete categories, the chi-square test may be used to determine the significance of differences between two independent groups" (Siegel, 1956 p. 104). Level of education, geographic code of residence, a regular health care provider, family member with breast cancer, insurance status, perceived benefits and barriers, perceived susceptibility and seriousness are nominal data reported as frequencies for which an association will be determined.

A Chi-square test was followed by a multivariate analysis of variance, a MANOVA statistic. The research study involved using more than one independent variable. In dissertation research, the MANOVA statistic tests whether the mean differences between the groups on a combination of the dependent variables are likely to have happened by chance**.** This statistical analysis was performed to determine how the health belief model constructs are associated with mammography screening practices (Huberty & Morris, 1989).

Summary

This section on methodology discussed: the study population, sampling technique, the instrument used for data collection, how the data were collected and the analysis of data. Chapter IV will describe the analysis and interpretation of the data.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

Introduction

The primary purpose of the study was to use the Champion Health Belief Model Mammography Screening instrument (CHBM) to examine the mammography practices of women 55 years and older who attend senior citizen centers and live in East Tennessee. Additionally, the CHBM was used to examine whether the participant's mammography practices were compliant with the American Cancer Society (ACS) recommendations for yearly mammograms. The purpose of this chapter was to present the sample description, statistical analysis, and findings relating to the primary purpose of this study.

The instrument used to gather the research data was the Champion Health Belief Model Survey Instrument. The data were arranged in a manner to provide ease of understanding and interpretation. The chapter was assembled so that the analysis of data concerning each of the nine research questions was presented followed by the CHBM construct relating to a particular hypothesis. The data yielded were expressed in text and with tables.

Sample Description

There were 35 senior citizens centers in the 31 counties of the East Tennessee Grand Division, 14 of which were randomly selected to participate in this study. All 14 of the center directors chose to participate in the study for a response rate of 100%. Two counties were located in metro areas, five in non-metro areas, and nine in rural areas. There were 404 participants who

completed at least a part of the survey instrument. Some women refused to participate in the survey.

Descriptive Statistics

From a sample of 404 who completed the survey only 391 of the participants met the age requirements of 55 years of age and older. The participants who answered the first question on the survey instrument included 377 women.

The research question I addressed whether the participants have ever obtained a mammogram and if so how often. Of all the participants who responded to research question I on the CHBM survey, 265 women or 74.5 % responded yes to the statement, "I have a breast mammogram every year for the past five years" and "I have had a breast mammogram more than once in the last year." Of the participants who responded to statement one on the CHBM survey, 30 women or 8 % responded yes to the statement, "I have had a breast mammogram once in the last two years." Of the participants who responded to question one on the CHBM survey, 9 women or 2.4% responded yes to the statement, "I have had a breast mammogram once in the last three years." Of the participants who responded to question one on the CHBM survey, 35 women or 9.3 % responded yes to the statement, "I have had a breast mammogram once in the last five years." Table 1 describes the responses to having a breast mammogram.

Of the participants who responded to the research question I on the CHBM survey, 22 women or 5.8 % responded, "I have never had a mammogram." The number and percentage of responses to the variables of mammogram participation and rates of participation are depicted in Table 1. CHBM question number one was divided into two groups of women and also addressed research question I which states that women 55 years of age who reside in East Tennessee do not differ

significantly in their mammography practices from the American Cancer Society (ACS) recommendations for breast cancer screening mammography. Table 1 describes the responses to having a breast mammogram.

Group one consisted of women who had a mammogram every year for five years and those that had more than one in the last year. Group two consisted of women who indicated that they did not have a mammogram each year. The women who stated they obtained a mammogram each year were compliant with ACS recommendations for mammography and those women who did not obtain yearly mammograms were not compliant with ACS recommendations for mammography.

Table 1. Responses to having a breast mammogram

Response to: I have a breast mammogram	**N**	**(%)**
Every year for the last five years	265	70.3%
More than once in the last year	16	4.2%
Once in the last two years	30	8.0%
Once in the last three years	9	2.4%
One in the last five years	35	9.3%
I have never had a mammogram	22	5.8%
Total	377	100%

The results of the data analysis concerning research hypothesis number one which states that the mammography practices of women 55 years of age in East Tennessee did not differ significantly from the recommendations of the ACS concerning yearly mammograms for women 50 years of age and older are depicted in Table 2. The number of participants who meet the recommendations of the ACS which stated that all women 50 years of age and older should have a mammogram yearly were 281 women or 74.5%. There were 96 women or 25.5 % of the participants who did not meet the recommendations of the ACS for yearly mammograms.

Demographic Characteristics

The demographic characteristics that impact the decision to obtain a mammogram were examined and included: geographic area of residence, educational level, participant's age, and family history of the disease of breast cancer, the recommendation for screening mammography by a physician or other health care provider, and the participant's health insurance status. The dependent variable of mammography practices were collapsed into two groups.

Table 2: Participants' compliance with ACS Recommendations

Participants who met ACS yearly recommendations	**N**	**(%)**
No	96	25.5%
Yes	281	74.5%
Total	377	100%

The first group was the participants who answered that they had mammograms every year for the last five years and more than once in the last year; and, the second group was the participants who chose other answers to question.

Participant's area of residence was identified on the survey instrument when the surveys were collected. The number of surveys that were coded as to geographic residence was 391. The number of participants from Metro areas was 138 women, the number of participants from Non-Metro areas was 165 women, and the number of participants from rural areas was 88 women. Table 3. depicts the number of participants in the three areas.

The CHBM question 2 concerned the age of the participant, question 8 concerned family history of breast cancer, and question 9 concerned the level of education. There were 380 women who responded to this research question. The number of participants who responded that they had less than a high school education was 65 women, or 17.1%. The number of participants who responded that they had a high school degree was 117 women or 30.8%. The number of participants who responded that they had some college was 112 participants or 29.5%.

Table 3. Geographic Area of Residence

Area	**N**	**(%)**
Metro	138	35.3%
Non-metro	165	42.2%
Rural	88	22.5%
Total	391	100.0%

The number of participants who responded that they have a Bachelor's degree was 46 women or 12.1%. The number of participants who responded they have a graduate level education was 40 women or 10.5%. The number and percentages of responses by participants to the variable of level of education are depicted in Table 4.

The distribution of age of the participants ranged from 55 to 101 years of age with a mean age of 71.6. The number of participants who answered this question was 391. The youngest age of the participants was 55 and the oldest age of participants was 101. The distribution of age of the participants was depicted in Table 5.

Table 4. Level of Education

Level of education	**N**	**(%)**
Less than high school	65	17.1%
High school graduate	117	30.8%
Some college	112	29.5%
Bachelors degree	46	12.1%
Graduate school	40	10.5%
Total	380	100.0%

Table 5. Age of participants

N	**Youngest Age**	**Oldest Age**	**Mean Age**	**Std. Deviation**
391	55	101	71.6	8.2

The number of participants who responded to the statement, "I have a family history of breast cancer," was 391 women. There were 323 participants who responded that they had no family history of breast cancer and 68 participants who responded that they had a family history of breast cancer. The participant's family history of breast cancer is depicted in Table 6.

This question was answered by 326 participants and there were 65 missing responses to construct number four. The number of participants who answered "yes" that their physician recommends a yearly mammogram was 251 women. The number of participants who answered "no", to the statement that their physician recommends a yearly mammogram was 75 women. Table 7 depicts the number of participants who self-reported physician recommendations.

Table 6. Family History and Mammography Practices

Family History	**N**	**(%)**
No	323	82.6%
Yes	68	17.4%
Total	391	100%

Table 7. Physician Recommendation of Yearly Mammogram

Physician Recommendation	**N**	**%**
Yes	251	76.9%
No	75	23.1%

The number of participants who responded to the statement "I have health insurance," was 389 women. The number of participants who responded yes to the statement I do have health insurance was 375 women or 96.4 percent. The number of participants who responded no to the statement "I have health insurance" was 14 or 3.6 percent. The number and percentages of responses by participants to the variable health insurance were depicted in Table. 8.

The CHBM construct perceived benefits was addressed by three questions : (20) "A mammogram will help me find lumps early," (21) I don't worry as much about breast cancer if I have a yearly mammogram," (22) I feel good because I am taking care of my health when I have a mammogram." Table 9 depicts the responses of participants to the CHBM construct of perceived benefits of having a mammogram depicting the means from a 5 point scale with 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree.

Table 8. Health Insurance

Health Insurance	**N**	**(%)**
Yes	375	96.4%
No	14	3.6%
Total	389	100.0%

Table 9. Perceived Benefits of Mammogram

Participant Responses	N	Mean	Std. Deviation
A mammogram will help me find lumps early.	329	4.25	0.92
I don't worry as much about breast cancer if I have a yearly mammogram.	327	4.11	0.99
I feel good because I am taking care of my health when I have a mammogram.	302	4.29	0.86

There are six questions on a 5 point scale with 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree, that addressed barriers to obtaining a mammogram. These six questions on the CHBM survey instrument were associated with the participant's perceptions of the barriers they encountered when trying to obtain a mammogram. The perceived barriers to obtaining a mammogram addressed in the CHBM instrument included: (25) "Having a mammogram takes too much time, (26)"Having a mammogram is embarrassing,"(27) "I would have to travel to far to get a mammogram," (28) "A mammogram cost me too much money out of pocket," (32) "My family members are supportive of my having a mammogram," (33) "I have transportation to get a mammogram." Table 10 depicts participants responses to the questions associated with perceived barriers to obtaining a mammogram.

Responses to the three questions that addressed the CHBN construct of susceptibility indicated how participants' perceived their susceptibility to breast cancer. The questions on a 5 point scale with 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree included: (13), "It is likely I will get breast cancer in the next ten years, (14)," Compared to most women, I am more likely to get breast cancer," and (15), "I have about the same chance to get breast cancer as most women."

All three questions had a mean below 3.5 indicating that the participants disagreed or strongly disagreed, or were neutral concerning their perceived susceptibility to the disease of breast cancer. Table 11 depicts participants' responses to the questions on the CHBM constructs on perceived susceptibility.

Table 10. Perceived Barriers of Mammography

Participant Responses	**N**	**Mean**	**Std. Deviation**
A mammogram takes too much time.	316	1.64	0.87
Having a mammogram is embarrassing.	321	1.88	1.12
I would have to travel too far to get a mammogram.	320	1.73	0.95
A mammogram cost me too much money out of pocket.	318	1.89	1.06
My family members are supportive of my having a mammogram.	326	4.33	0.87
I have transportation to get a mammogram.	335	4.48	0.80

Table 11. Perceived Susceptibility of Breast Cancer

Susceptibility of breast cancer	**N**	**Mean**	**Std. Deviation**
It is likely I will get breast cancer in the next ten years.	319	2.56	1.07
Compared to most women, I am more likely to get breast cancer.	315	2.50	1.09
I have about the same chance to get breast cancer as most women.	330	3.44	1.09

The CHBM construct concerning perceived seriousness of the disease of breast cancer was measured with the following questions on a 5 point scale with 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree with which included: (16) "The thought of breast cancer is very scary to me." (17) "The problems I would experience if I get breast cancer would last for many years," (18) "Breast cancer would threaten my relationship with my boyfriend, husband, or partner," (19) "If I develop breast cancer, I will not live longer than five years,"(23) "If breast cancer is found in my body I do not want to know," (24) "If breast cancer is found in my body I will die." Participant's responses to the questions addressing perceived seriousness of the disease of breast cancer are depicted in Table 12.

Table 12. Perceived Seriousness of Breast Cancer

Perceived seriousness of breast cancer	**N**	**Mean**	**Std. Deviation**
The thought of getting breast cancer is very scary to me.	343	4.14	1.04
The problems I would experience if I get breast cancer would last for many years.	307	3.66	1.10
Breast cancer would threaten my relationship with my boyfriend, husband, or partner.	289	2.19	1.04
If I develop breast cancer, I will not live longer than five years.	306	2.44	1.08
If breast cancer if found in my body, I do not want to know.	318	1.91	1.18
If breast cancer is found in my body, I will die.	308	2.08	1.02

Statistical Analysis

The purpose of this study was to assess the mammography screening practices of women 55 years of age and older in a sample drawn from 31 East Tennessee Counties. Chi square, T-tests, and MANOVA statistical techniques were performed to test the research hypotheses and determine how the response to the CHBM constructs and demographic characteristics of the participants were associated with screening practices of women in East Tennessee, and whether the practices were compliant with the American Cancer Society's recommendations for yearly mammography.

A Chi Square test at the 0.05 level of significance was performed to determine if the mammography screening practices of women 55 years and older who attend senior citizens centers in East Tennessee counties do not differ significantly from the CDC estimated rate of compliance to yearly mammograms as recommended by the American Cancer Society according to research question I. The answers to question one were grouped into two groups, those who had mammography each year for five years and more than once in the past year were group one, all others formed group two. The value of the test statistic was 15.069 with a significance level of 0.000. At the 0.05 level of significance, the self-reported mammography practices of women 55 years of age and older in East Tennessee did differ significantly from the national compliance rate with the sample higher at 74.5% than the national compliance rate of 66 % for yearly mammograms. The results of the Chi Square test were depicted in Table 13.

Table 13. One Sample Chi Square Analysis for Meets Recommendation for Yearly Mammogram

	No	**Yes**	**X^2**	**p value**
Meets recommendation for yearly mammogram	96 (25.5%)	218 (74.5%)	15.069	**<0.001***

*** p<0.05**

Table 14. Chi-Square Analysis for Area of Geographic Residence

	Metro	**Non-Metro**	**Rural**	**p value**
Meets recommendation for yearly mammogram	108 (79.4%)	115 (72.8%)	58 (69.9%)	0.234
Does not meet recommendation for yearly mammogram	28 (20.6%)	43(27.2)	25 (30.12)	

A Chi Square test at the 0.05 level of significance was performed to determine if there was an association between the Beale Code assigned geographic areas of residence of participant and mammography screening practices as stated in research question II. The value of the test statistic of 2.907and the p=.234.

Table 14 provides the results of the Chi square test performed to determine the association between Beale Code assigned geographic area of residence of participant and compliance to ASC recommendations for yearly mammography. At the 0.05 level of significance, mammography practices of women 55 years of age and older did not differ significantly based on Beale Code assigned geographic area of residence.

A Chi square test at the 0.05 level of significance was performed to respond to the research question III concerning mammography screening practices of women in East

Tennessee. There were five levels of education for participants to choose from, these included less than high school, high school graduate, some college, bachelor's degree, and graduate school. The Chi square test statistic was 3.925, and the p = 0.416. At 0.05 the level of significance, the mammography screening practices of women 55 years of age and older in East Tennessee did not differ significantly based on level of education. Table 15 reports the result of the Chi square test for the variable compliance to mammography recommendation and level of education.

Table 15. Chi-Square Analysis by Level of Education

	Less than high school grad	**High school grad**	**Some college**	**4 yr degree**	**Grad School**	**P Value**
Meets recommendation mammogram	41 (65.1%)	85 (75.9%)	81 (75.7%)	81 (75.7%)	31 (77.5%)	0.416
Did not meet recommendation for mammogram	22 (34.9%)	27 (24.1%)	26 (24.3%)	9 (20.5%)	9 (22.5%)	

A t-test for significance was performed to determine if mammography screening practices differ significantly based on the age of the participant. The t-test revealed a t of .552, with df=375 and a p-value of .581. The t-test indicated the mammography screening practices of women aged 55 years and older in East Tennessee do not differ significantly based on age.

A Chi square analysis was performed to determine if the mammography screening practices of women age 55 years and older in East Tennessee differed significantly based on a self-reported family history of breast cancer. The test statistic was .084 and the p=.772. Therefore, it was concluded in response to research question III that the mammography screening practices of women 55 years of age and older in East Tennessee did not differ significantly based on a self-reported family history of breast cancer. Table 16 reported the results of the Chi square test mammography practices based on a family history of breast cancer.

A t-test for significance was performed to determine if mammography screening practices differed significantly based on whether a recommendation for a mammogram was received from a physician or health care provider.

Table 16. Chi-Square analysis –by Family History

	Family History	**No Family History**	**p value**
Meets recommendation for yearly mammogram	49 (73.1%)	232 (74.8%)	0.772
Does not meet recommendation for yearly mammogram			

The T value=8.583, with df=324, and a p=less than 0.001. Therefore, in response to research question IV, the mammography screening practices of women 55 years of age and older differ significantly based on whether they receive a recommendation for mammography from their physician or health care provider. Those women who met the recommendations for yearly mammograms from the ACS were more likely to have had a physician recommendation for mammography. Table 17 depicts this analysis.

A Chi square test with a critical value of 3.841 and a 0.05 level of significance was performed to respond to the research question V, that mammography practices of women 55 years and older in East Tennessee differed significantly based on whether or not the participant had health insurance. The Chi square value of 5.788 was higher than the critical value of 3.841 and the p=0.016 indicates that insurance status was significantly associated with compliance with recommendation of yearly mammograms. Of those with health insurance 75.7 % of the participant's mammography screening practices had met the ACS recommendation for yearly mammograms. Of participants who reported they didn't have health insurance 46.2% have not met the ACS recommendations for yearly mammograms. Table 18 reports the results of this test.

Table 17. T-Tests for Physician Recommendation

	Meets recommendation for yearly mammogram	**N**	**Mean**	**p- value**
Physician Recommendation	Yes	251	4.45	**<0.001***
	No	75	3.40	

***p <0.005**

CHBM Constructs Benefits, Barriers, Susceptibility and Seriousness

An MANOVA was performed to determine if the mammography screening practices of women age 55 years and older in East Tennessee differed significantly in at least one of the CHBM constructs of the self-reported perception of the benefits of mammography screening. The CHBM construct of perceived benefits were addressed by three questions : (20) "A mammogram will help me find lumps early," (21) I don't worry as much about breast cancer if I have a yearly mammogram," (22) I feel good because I am taking care of my health when I have a mammogram." These questions were used to test research question VI which stated that mammography screening practices of women in East Tennessee did not differ significantly based on the perceived benefits of obtaining a mammogram. The responses were coded ranging from 5 indicating strongly agree to 1 indicating strongly disagree with 3 being neutral.

Table 18. Chi Square Analysis: Insurance status

	Insurance	**No Insurance**	**p value**
Meets recommendation for yearly mammogram	274 (75.7%)	6 (46.2%)	0.016
Does not meet recommendation for yearly mammogram	88 (24.3)	7 (53.8)	

The results of the MANOVA indicated a p-value that showed at least one of the benefit questions differed significantly between those whose practices did and did not meet the ACS recommendations for yearly mammograms.

Individual ANOVA's were performed for each of the three questions. Each ANOVA revealed significant p values for the questions pertaining to perceived benefits. These results demonstrated that participants that met the ACS recommendations for yearly mammograms have a more positive view of benefits. The results of the statistical tests are depicted in Table. 19.

A MANOVA was performed to test research question VII which stated that the mammography screening practices of women age 55 years and older in East Tennessee did not differ significantly based on the CHBM constructs of the self-reported perception of the perceived barriers to mammography screening. The CHBM construct of perceived benefits were addressed in questions (25) "Having a mammogram takes too much time, (26)"Having a mammogram is embarrassing," (27) "I would have to travel too far to get a mammogram,"

Table 19. ANOVA for Perceived Benefits

	Meets recommendation for yearly mammogram	**Mean**	**p value**
A mammogram will help me find lumps early.	No	3.98	0.016*
	Yes	4.29	
I don't worry as much about breast cancer if I have a yearly mammogram.	No	3.54	<0.001**
	Yes	4.30	
I feel good because I am taking care of my health when I have a mammogram.	No	3.73	<0.001**
	Yes	4.49	

*** p<0.001 N=295**

(28) “A mammogram cost me too much money out of pocket,” (32) “My family members are supportive of my having a mammogram,” (33) “I have transportation to get a mammogram.” The answers were coded from 5 indicating strongly agree to 1 indicating strongly disagree with 3 being neutral. The results of the MANOVA indicated a p-value showed that at least one of the benefit questions differed significantly between those whose practices did and did not meet the ACS recommendations for yearly mammograms.

Individual ANOVA’s were performed to addressed research hypothesis VI to determine which of the questions concerning individual perceived barriers, which, differed significantly between the participants who obtained yearly mammograms and those who did not obtain yearly mammograms. The individual ANOVA’s revealed the barriers addressed in questions 25, 26, 28, and 32, had significant p values for those the participants that met the ACS recommendations for yearly mammograms. Table 20 depicts the results of the ANOVA for Perceived Barriers.

The result of the test of significance indicated that participants who were not compliant with the ACS recommendations were more likely to perceive the following barriers of: time, embarrassment, cost and lack of support to obtaining a mammogram.

Research question eight which stated that the mammography screening practices of women in East Tennessee did not differ significantly based on perceived susceptibility of the disease of breast cancer was addressed in questions: (13) “It is likely I will get breast cancer in the next ten years, (14)” Compared to most women, I am more likely to get breast cancer,” and (15) “I have about the same chance to get breast cancer as most women.”

Table 20. ANOVA for Perceived Barriers

	Meets recommendation for yearly mammogram	**Mean**	**p value**
Having a mammogram takes too much time.	No	1.92	**<0.001***
	Yes	1.50	
Having a mammogram is embarrassing.	No	2.34	**<0.001***
	Yes	1.72	
I would have to travel too far to get a mammogram.	No	1.88	0.087
	Yes	1.65	
A mammogram costs me too much out of pocket.	No	2.20	**<0.001***
	Yes	1.67	
My family members are supportive of my having a mammogram.	No	3.89	**<0.001***
	Yes	4.45	
I have transportation to get a mammogram.	No	4.35	0.149
	Yes	4.52	

*** P<0.001 N=280**

The MANOVA that was performed indicated that for questions 13, 14, and 15 women whose mammography screening practices were meeting the ACS and those that were not meeting ACS recommendations had equal views concerning their susceptibility to breast cancer with a p value=.095. The results of this test of significance for questions 13, 14, and 15 were depicted in Table 21.

Table 21. MANOVA for CHBM construct of Perceived Susceptibility

	Meets recommendation for yearly mammogram	**Mean**
It is likely I will get breast cancer in the next ten years.	No	2.34
	Yes	2.58
Compared to most women, I am more likely to get breast cancer.	No	2.41
	Yes	2.45
I have about the same change to get breast cancer as most women.	No	3.10
	Yes	3.40

p=.095 N=292

Research question IX stated that the screening practices of women in East Tennessee did not differ significantly based on perceived seriousness of the disease of breast cancer. A MANOVA was performed to determine if the mammography screening practices of women age 55 years and older in East Tennessee differed significantly in at least one of the CHBM constructs of the self-reported perception of the perceived seriousness of the disease of breast cancer. The MANOVA revealed that at least one of the questions concerning the CHBM construct of the perceived seriousness of breast cancer differed significantly.

The ANOVA that was performed to determine which questions differed significantly. Question 23 which states, “If I have breast cancer I do not want to know,” were significant with a p value of less than 0.01. The results indicate that both participants who met the ACS recommendations for yearly mammograms and those who did not meet recommendations have

equal views of the perceived seriousness of the disease of breast cancer with the exception of question 23.

Those whose mammography screening practices do not meet the ACS recommendations for yearly mammograms were more likely to not want to know if they developed breast cancer. The results of this test for significance were depicted in Table 22.

Table 22. ANOVA for Perceived Seriousness

	Meets recommendation for yearly mammogram	**Mean**	**p value**
The thought of getting breast cancer is very scary to me.	No	3.92	0.321
	Yes	4.32	
The problems I would experience if I get breast cancer would last for many years.	No	3.55	0.506
	Yes	3.66	
Breast cancer would threaten my relationship with my boyfriend, husband, or partner.	No	2.20	0.741
	Yes	2.15	
If I develop breast cancer, I will not live longer than five years.	No	2.60	0.052
	Yes	2.31	
If breast cancer is found in my body, I do not want to know.	No	2.23	**<0.001***
	Yes	1.67	
If breast cancer is found in my body, I will die.	No	2.24	0.209
	Yes	2.06	

*** p<0.005 N=256**

Summary

This chapter presented the analysis and interpretation of the data collected from fourteen counties in East Tennessee. The analysis of the self-reported data indicated that the women 55 years old and older who attended senior citizens centers in East Tennessee had mammography practices differ significantly from those mammography practices recommended by the American Cancer Society. Additionally mammography practices of women 55 years of age and older in East Tennessee differ significantly due to certain demographic factors including a physician recommendation for yearly mammograms and the insurance status of the participant. The analysis of the CHBM constructs of perceived benefits of mammography, perceived barriers to obtaining mammography, perceived seriousness of the disease of breast cancer, and perceived susceptibility to the disease of breast cancer also were found to have significant impact on the mammography practices of women 55 years and older in East Tennessee.

Chapter five will present a summary of the study findings. Additionally, the chapter will state conclusions and offer recommendations.

CHAPTER V

FINDINGS, CONCLUSIONS, RECOMMENDATIONS AND SUMMARY

Introduction

The purpose of this study was to use the Champion Health Belief Mammography Screening Instrument to examine the mammography practices of women 55 years of age and older who attend senior citizens centers and live in East Tennessee. This was done by sampling women 55 years of age and older who attended senior citizens centers, and who consented to participate in the study from randomly selected urban, non-metro and rural counties in East Tennessee.

A survey instrument based on the Champion Health Belief Model was used to collect the data. The CHBM instrument had been tested in several studies throughout the world to assure validity, reliability, and cultural sensitivity (Austin, Ahmad, McNally & Steward, 2002). The survey instrument was presented in a Likert-scale format and was originally developed and validated by Champion and others (Champion, 1994). The CHBM instrument has been used widely around the world to investigate the mammography screening practices of women in various cultures (Mikhail & Petro-Nustas, & Wasileh, 2001). The instrument has been successfully adapted to examine the mammography practices of women regardless of their culture, ethnicity, or nationality (Gözüm & Ilkur, 2004).

The data collected were coded and analyzed using Chi-square, T-tests, MANOVA, and ANOVA statistical tests on explanatory variables and to determine if the variables were related

to mammography practices. The following sections of this chapter will state the findings, conclusions, and recommendations.

Findings

Findings Based on Demographic Factors

1. There were 391 women age 55 and older who participated in this study. Of those participants, 74.5 % reported that they had obtained a yearly mammogram which met the American Cancer Society recommendations for yearly mammograms.
2. The participants were assigned a for area of residence which was identified as rural, metro or non-metro according to USDA Beale Codes. There were 138 women from metro areas, 165 women from non-metro areas and 88 women from rural areas. Mammography screening practices of participants did not differ significantly based on area of residence
3. The women who participated in this study had a median age of 71.4 and the majority reported they had health insurance which may also account for higher screening rates. Participant's age was not significantly associated with their mammography screening practices.
4. More than 82% of the women who participated in this study had at least a high school degree. Participants were not more likely to have a mammogram based on their level of education obtained.
5. Of the participants who reported a family history of breast cancer, approximately 73% met the recommendations for yearly mammograms. Additionally, of the participants who reported no family history of breast cancer nearly 75% met the recommendation for yearly mammograms.

6. Participants were significantly more likely to obtain a mammogram if their health care provider recommended that they get one. The participants who met the ACS recommendation for mammography were more likely to have had a physician's recommendation for a mammogram.
7. Participants were significantly more likely to obtain a mammogram if they reported they had health insurance coverage. Of the 274 participant who reported they had health insurance, slightly more than 75% had obtained a yearly mammogram. Of the participants who reported they had no insurance only 46% met the recommendations for yearly mammograms.

Findings Based on Health Belief Model Constructs

8. The participants of the study were more likely to obtain a mammogram if they perceived a benefit to obtaining a yearly mammogram. The two questions on the perceived benefit construct where the responses differed significantly between those who obtained a yearly mammogram and those who did not were "I don't worry as much about breast cancer if I have a yearly mammogram," and "I feel good because I am taking care of my health when I have a mammogram". The participants who obtained a yearly mammogram were significantly more likely to agree with those two statements.
9. The breast cancer screening mammography practices of women 55 years of age and older who attend senior citizens centers in East Tennessee counties did differ significantly based on the constructs of perceived barriers to mammography for the statements of "Having a mammogram takes too much time", "Having a mammogram is embarrassing", "A mammogram costs too much money out of pocket", and "My family members are supportive

of my having a mammogram". The breast cancer screening mammography practices of women 55 years of age and older did not differ significantly based on the barrier constructs of "I would have to travel too far to get a mammogram", and "I have transportation to get a mammogram."

10. Three questions in the perceived susceptibility construct addressed whether the mammography screening practices differed significantly between those women who believed themselves susceptible to breast cancer and those who did not believe themselves susceptible to the disease. Perceived susceptibility was not significantly associated with obtaining a mammogram.
11. The mammography screening practices of participants did not differ significantly based on the self- reported perceived seriousness of the disease in all the questions associated with this construct except the question "If breast cancer is found in my body I do not want to know" which did differ significantly. Women who agreed with the statement "If breast cancer is found in my body I do not want to know" were significantly less likely to obtain a yearly mammogram.

Conclusions

Based on the findings of this study, the following conclusions were drawn:

1. The rate of mammography screening of women 55 years of age and older in East Tennessee as reported by the participants of this study (74.1 %) is greater than the CDC reported national mammography screening rate of 66 %. Previous research supports this conclusion (Ryerson, Miller, Eheman and White 2007; Finkel, 2005).

2. The mammography screening practices of women 55 and older who attend senior citizens centers in the East Tennessee counties did not differ significantly between the women who were complaint and non-compliant to the recommendations of the American Cancer Society for yearly mammography screening according to geographic residence. The literature does not support the study's conclusion that geographic residence does not significantly impact mammography screening practices (Coughlin, Thompson, Hall, Logan, & Uhler, 2002). The higher rate of mammography screening in Tennessee as indicated in this study may be due to the fact that health education efforts and interventions were common in the area. East Tennessee State University's College of Public Health and the University of Tennessee's Public Health Graduate Program were located within the area targeted by the study. Both higher education institutions have actively researched and developed interventions for improving breast cancer screening in East Tennessee.
3. The mammography screening practices of participants did not differ significantly based on education level, age, and family history of the disease. Previous research does not support this conclusion (Hall, Uhler, Coughlin, & Miller, 2002). However, the number of participants in this study who had obtained less than a high school education was 17.1 percent. Had the education level of these individuals been lower as was the case in previous studies this number may have been significant.
4. The mammography screening practices of participants of the study did differ significantly based on whether they received a recommendation for mammography from their health care providers. This conclusion is supported by previous research (Fernádez & Morales, 2007; Hall, Uhler, Coughlin, & Miller, 2002; Lyttle & Stadelman, 2006; O'Malley, Earp , Hawley,

Schell, Mathew, & Mitchell, 2001; Sheppard, V., Wang, J., Yi, B., Harrison, T.,Feng, S., Huerta, E., & Mandelblatt, J. 2008).

5. The mammography screening practices of participants in the study did differ significantly based on self-reported access to health insurance coverage. This conclusion is supported by previous research (Lyttle & Stadelman, 2006; Documèt, et al, 2008; Schootman, Walker, & Jeffe, 2007).
6. The breast cancer screening mammography practices of participants in the study did not differ significantly based on the self-reported perceived benefits of mammography. This conclusion was not supported by previous research (Champion, 1994; Mikhail, Petro-Nustas, & Wasileh 2001).
7. The breast cancer screening mammography practices of women 55 years of age and older in East Tennessee counties did differ significantly based on their self-reported perceived barriers to mammography screening, with the exception of two constructs. Those were "I would have to travel too far to get a mammogram" and "I have transportation to get a mammogram" which did not differ significantly between those women who obtained a yearly mammogram and those women who did not obtain a yearly mammogram. The previous research reported mixed results in perceived barriers to mammography with some groups recognizing barriers that others did not (McNeill & Dorgan, 2005).
8. The breast cancer screening mammography practices of women 55 years of age and older in East Tennessee counties did not differ significantly based on their self-reported perceived susceptibility to breast cancer. Previous research did not support this conclusion. (Katapodi, Lee, Facione, & Dodd, 2004).

9. The breast cancer screening mammography practices of women 55 years of age and older in East Tennessee counties did not differ significantly based on the self- reported perceived seriousness of the disease with the exception of the perceived seriousness construct "If breast cancer is found in my body I do not want to know." These results were supported by previous research. Some studies did not include this construct because the perception is that all women understand the seriousness of breast cancer (Champion, 1994; Holmes, Frank, & Curtin, 1999).

Recommendations

The primary purpose of this study was to examine the mammography screening practices of women 55 years of age and older living in counties in East Tennessee. The findings of this study support further investigation. The following recommendations are made:

1. Intervention and educational efforts in East Tennessee to increase mammography screening should be focused on maintaining and increasing the current mammography screening rate. According to Menon, Champion, Monahan, Daggy, Hui, Skinner, (2007), changes in beliefs predict whether women who are currently not obtaining mammograms will obtain them. Menon et al, (2007) purports that the Champion Health Belief Model can lead the way for interventions tailored to both beliefs and behavior adoption.
2. Education and/or intervention efforts in East Tennessee should also be focused on the importance of yearly mammograms. Decreasing screening mammography to once every two years has not been proven to be appropriate based on the researcher's review of literature.
3. Efforts to increase mammography screenings in East Tennessee should also be directed at women who are under the age of eligibility for Medicare. Compared to the national average

for breast cancer screening, the women in this study who have Medicare benefits were more likely to obtain a yearly mammogram.

4. Educational efforts focused on increasing the awareness of the importance of recommendations for mammography screening should be directed toward physicians and health care providers.
5. Further research on the mammography screening practices of women younger than 55 should be conducted in East Tennessee.
6. If the mammography screening rates of women 55 years of age and older in East Tennessee are to be increased, the perceived benefits and barriers to the disease, and perceived seriousness of the disease should be addressed in intervention and/or educational efforts.

Summary

The rate of breast cancer mortality in East Tennessee is slightly higher than the national average. However, the mammography screening rate as reported by the participants of this study (70.2) is greater than the CDC reported national mammography screening rate of 66% (CDC, 2009; Li., 2009). The results of this study indicated that having health insurance and a recommendation from a physician or other health care provider are significant predictors of mammography screening practices for women in East Tennessee. Additionally, the Champion Health Belief Model constructs of perceived benefits of having a mammogram, perceived barriers to obtaining a mammogram, and the perceived seriousness of the disease of breast cancer were associated with obtaining a yearly mammogram for the women in this study.

The Health Belief Model (HBM) was the theoretical framework used in this study to explain the failure of individuals to participate in the screening for the detection of breast cancer. This model helped determine which factors acted as barriers and incentives to obtaining breast cancer screening mammograms in East Tennessee. Factors addressed in the HBM for this study included the influence of attitudes and perceptions on screening practices, as well as demographic factors: Education, age, doctor's recommendation, access to insurance, family history of the disease and geographic location of the participant.

Limitations to this study included the assumption that the participants responded accurately to questions on the written instrument and the study was limited to the extent that participants give complete and accurate responses to the instrument. A limitation to this study was that participants must be able to read and understand instructions written in English. Additionally, the number of women pre-retirement age, (55-64), who attended senior citizen centers may not be representative of the general population. Most of the women who attend senior centers are mobile; a few come with walking assistant devices such as walkers and canes. Women who fall within this age group and are home bound are not represented in this study. Finally, a limitation to this study was that attendance on the days instruments were distributed and collected may not adequately reflect the normal attendance of women at the Senior Citizen Center.

Chapter Six will provide a retrospective review of this study including the factors that did not lend themselves to analysis but were considered to be important by the researcher. It will also present the researcher's insights into the study that has now been completed.

CHAPTER VI

THE STUDY IN RETROSPECT

Introduction

The investigator concludes this research with an expression of immeasurable gratitude and respect for the women who participated in this study. The experience was rich and enlightening when meeting and talking with women who live in the cities, suburbs and rural areas of northeastern and southeastern Tennessee. The women I met on this journey across 31 counties when I traveled more than 400 miles represented a diverse segment of educational, socioeconomic, and racial characteristics. I witnessed a cross section of women in East Tennessee; some of the individuals that participated in this study were highly educated with master or doctoral level degrees and others had little formal education. Some women were barely able to read and write. The common bond of these women was the fear that one day they will find that small, hard, pea-sized lump in their breast tissue that will induct them into a club that is familiar to all and desired by none.

Personal Reflections

The data collection for this study took place during the last week of November and the entire month of December, 2009, with the exception of two days off during the week of Christmas. The scope of travel extended from the far northeastern corner of Tennessee just across the state lines of Virginia, North Carolina, and Kentucky, and south to the outskirts of Chattanooga, near the Georgia border and many points in between. The senior centers that graciously accepted the

invitation to participate in the study were varied in resources, culture, and members. All participants, however, were hospitable and welcoming to this investigator.

The stories and anecdotes varied in tone and eloquence but the expression of concern that often deepened into fear was constant. Without exception, at every center, women recounted the story of a family member or friend touched by breast cancer. Sometimes the narrator was the one who had battled breast cancer and who had overcome the odds. At times, these women were still reeling from the effects of the chemotherapy and radiation that had become their final hope. Other women, with fresh tears, expressed an inconsolable despair at the ravages of this disease. It was astounding to find the commonality of experience in these women. Again and again women spoke to either having had the disease, presently battling it, or losing someone to breast cancer.

Research has been done to investigate all known aspects of breast cancer. The technology used to detect and treat breast cancer has been repeatedly scrutinized. The characteristics of genetics, environment, and psychosocial aspects have been thoroughly investigated over the past few decades. The literature expands and we understand more and more of the disease process and the health protective behaviors that have decreased the mortality rate of breast cancer over time. However, the cure remains a mystery yet to be revealed. Nevertheless, the face of suffering this research revealed to the investigator has left an indelible mark.

The faces of the women who shared their experiences, hopes and fears, will remain a part of me. For example, the 101 year old retired school teacher in Knoxville who shared that she still personally drives herself in her white Cadillac to mammography screening. Then there was the overworked senior center director in a remote and rural community, who had little luck changing

the irrational fear that cancer engenders in many of the women in her community; a fear that extended to the diagnosis process. The disappointment she expressed when relaying the story of her failed campaign to bring breast cancer awareness to her community will remain etched on my mind. It seems she had secured a grant for a mobile screening unit to come to the community to provide free screening and was dismayed to find that only one woman made and kept the mammography appointment.

Throughout the world, more than 25 million people have been diagnosed with breast cancer and 10 million of those may die within the next ten years without a cure (Finkel, 2005). The researcher grew up in an era when the importance of breast health was not taught, talked about nor investigated. Many things have changed; the technology to detect and treat breast cancer continues to improve as does an understanding of the disease process. The Susan G. Komen Foundation and the American Cancer Society do tremendous work supporting research and providing education about breast cancer on the national and global stage. Federal tax dollars committed to women's health issues continue to grow.

There is an acute awareness of the vulnerability and mortality of life that comes with screening for breast cancer. Most of the women I have met who were living with or recovering from this disease, know their life will never be the same. The immediate changes are physical; however, the psychological, mental, and social impacts are also inestimable. The impersonal aspects of medical tests, procedures, and treatments have not only tremendous physical impacts on daily life but additional psychosocial ramifications. Breast cancer brings with it the entire spectrum of emotions including: Disbelief, denial, fear, depression, grief, anger, acceptance and

hopefully peace. The individuals who relayed to the investigator their personal experiences with breast cancer commonly complained that the psychological dimensions of the experience were largely ignored by their health care providers. Finkel (2005) in her book reported that only a small proportion of cancer patients who are clinically depressed are referred for counseling or given support. The impression I am left with after talking with the many women who have dealt with this disease is that we have failed to meet the challenge of providing psychological support and treatment during this difficult time.

Summary

The individual who has been recently diagnosed with breast cancer faces a most difficult and stressful event in her life. The expression of sadness, fear, anxiety and depression could be considered normal during this time; however, the biological changes associated with cancer and its treatment may account for much of the woman's psychological distress. The investigator found research that hypothesized that the manner in which a woman responds to and copes with her breast cancer has an impact on survival (Finkel, 2005). Some of the cancer patients I spoke to believe there is a direct association between their psychological state and their long-term survival. The research findings concerning these phenomena were mixed and no study seemed to be sufficiently rigorous to provide definitive conclusions. However, enough evidence exists to conclude that the psychodynamics of the disease deserve careful consideration within the treatment plan.

The majority of breast cancer patients that I spoke with expressed dissatisfaction with the communication they experienced when interacting with health care providers. Good

communication between patients and their doctors has a positive impact on the recovery process. Perhaps both doctors and patients need to recognize the importance of communication in this relationship. Psychiatric consults for patients who have difficulty communicating their needs or coping with the disease could be of significant benefit.

As more women are surviving for years after the initial cancer diagnosis, future research should consider psychological and mental health issues such as problems related to: Body image, personal relationships, financial concerns, vocational needs, and sexual issues. Breast cancer survivors described to me concerns about the loss of a breast and its impact on dating and one's sexuality. It appeared that after the fear of dying diminished, social issues become more important.

Through this experience, it was clear to me that Senior Citizens Centers provide wonderful opportunities for health education, health research, and interventions. Senior Citizens Centers can impact an older population by providing a gathering place for educational activities, a venue for screening for diseases, and a means of obtaining resources for disease prevention. Finally, it is my hope that breast cancer, like polio or smallpox, will someday be but a vague memory of a disease that has been eliminated.

Limitations to this study included the assumption that the participants of this study will respond accurately to questions on the written instrument and that participants give complete and accurate responses to the instrument. A limitation to this study was that participants must be able to read and understand instructions written in English. The number of women pre-retirement age, (55-64), who attended senior citizen centers may not be representative of the general population.

Most of the women who attend senior citizens centers are mobile with a small number aided by walking assistive devices such as canes and walkers. Those who are less mobile or completely homebound were not represented in this study. Finally, a limitation to this study was that attendance on the days instruments were distributed and collected may not adequately reflect the normal attendance of women at the Senior Citizen Center.

Public Health professionals and policy makers may find this information useful when allocating resources targeted at increasing breast cancer screening. The results of this study indicated that interventions directed at increasing the awareness of health care professionals, particularly physicians could increase breast cancer screening rates. Based on the findings interventions, to be successful should also address the health beliefs of women concerning their perception of the benefits of yearly mammography screening and the barriers to obtaining yearly mammograms. For this study, demographics characteristics including age, geographic area of residence, level of education, and family history of the disease of breast cancer did not influence screening rates. However, physician recommendation and insurance status appear to predict mammography screening. As the health care reform policies are implemented, allocations for preventive care will hopefully consider these findings in developing funding and programs for cancer prevention and early detection.

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APPENDICES

Appendix A

Consent Form

Consent Form

Dear Participant,

This survey is being conducted to learn more about factors associated with breast cancer in East Tennessee. Your responses will assist in making future decisions about cancer screening programs for women in East Tennessee.

Your participation in this project is voluntary and confidential; all responses will be valuable in helping women to reduce breast cancer illness and death. Your response to the survey serves as consent and acknowledgement of your willingness to participate in this research project. As you fill out the survey, you may stop at any point if you feel a need to no longer participate. The survey contains no names or identifiers. You will receive no monetary compensation for your participation.

If you have questions about the survey, you may reach Peggy Johnson, a University of Tennessee graduate student coordinating the project, at 423-967-1944. Thank you in advance for your time and contribution to this study focused on cancer screening behaviors.

Sincerely,

Peggy Johnson
Graduate Teaching Associate
Programs of Public Health
University of Tennessee, Knoxville
pjohns14@utk.edu
423-967-1944

Appendix B

Survey Instrument

Champion Breast Cancer Screening Instrument

This survey asks about mammograms which are used to diagnose breast cancer. The purpose of this survey is to determine the extent of breast cancer screening used by women in East Tennessee. The survey takes about 15 minutes to complete. All responses will be kept confidential. You can mark the appropriate box, fill in the blank, or make an X in the box provided to best answer the statement. Please answer all of the items to the best of your ability. Thank you for your participation.

1. I have a breast mammogram (Please mark whatever box applies to your mammography history).

   [ ] Every year for the last five years.
   [ ] More than once in the last year.
   [ ] Once in the last two years
   [ ] Once in the last three years
   [ ] Once in the last five years
   [ ] I have never had a mammogram

2. I am ____ years of age.

3. I was_____ years of age when I obtained my first mammogram.

4. I was _____ years of age when I obtained my last mammogram.

5. I have health insurance

   [ ] yes
   [ ] no
   [ ] undecided

6. The last mammogram I had was paid for by: (Mark all that apply)

[ ] Private health insurance
[ ] Medicare
[ ] Medicaid
[ ] I paid for the mammogram out of my pocket
[ ] My employer
[ ] My mammogram was paid for by the health department
[ ] Other _____

7. My marital status is

[ ] married
[ ] divorced
[ ] single
[ ] widow

8. I know the following people that have had a history of breast cancer. (Mark all that apply).

[ ] Mother
[ ] Sister
[ ] Aunt
[ ] Grandmother
[ ] Friend
[ ] Other

9. My education level is (please mark last level that applies)

[ ] 6 th grade or below
[ ] 6^{th} – 8^{th} grade
[ ] 9^{th}—12^{th} grade
[ ] High school graduate
[ ] some college
[ ] associates degree
[ ] bachelors degree
[ ] graduate school

10. I have attended programs in my community that offer health information about breast cancer sponsored through my: (Mark all that apply).
    [ ] church
    [ ] employer
    [ ] health department, community health clinic or hospital
    [ ] physician
    [ ] senior citizens center
    [ ] other_____

For the following statements mark the response that best relates to your practice, see example.

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Example. I am glad to participate in this survey.	X				
11. I do breast self-exams every month.					
12. The American Cancer Society recommends that I have a mammogram every year after my 50th birthday. 13.					
13. It is likely I will get breast cancer in the next ten years.					
14. Compared to most women, I am more likely to get breast cancer.					
15. I have about the same chance to get breast cancer as most women.					

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
16. The thought of getting breast cancer is very scary to me.					
17. The problems I would experience if I get breast cancer would last for many years.					
18. Breast cancer would threaten my relationship with my boyfriend, husband or partner.					
19. If I develop breast cancer, I will not live longer than five years.					
20. A mammogram will help me find lumps early.					
21. I don't worry as much about breast cancer if I have a yearly mammogram.					
22. I feel good because I am taking care of my health when I have a mammogram.					
23. If breast cancer is found in my body I do not want to know.					
24. If breast cancer is found in my body I will die.					
25. Having a mammogram takes too much time.					

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
26. Having a mammogram is embarrassing.					
27. I would have to travel too far to get a mammogram.					
28. A mammogram costs me too much money out of pocket.					
29. I see a personal physician on a regular basis.					
30. My personal physician recommends that I have a mammogram each year.					
31. My nurse practitioner recommends that I have a mammogram each year.					
32. My family members are supportive of my having a mammogram					
33. I have transportation to get a mammogram.					

The End

Thank you for your participation. Please return the completed survey to the representative from the University of Tennessee.

Appendix C

Permission Letter and Consent Form

[Date]

[Letterhead or Return address]

Re: Breast Cancer Screening Mammography Research

Dear [Sir or Madam] [Personal name, if known]:

I am a graduate student in the Programs of Public Health at the University of Tennessee. I am conducting a research project to determine the breast cancer screening practices of women 55 years of age and older who live in East Tennessee. The women who attend Senior Citizens Centers would be an excellent representation of the study population. I would like your permission to conduct a brief survey of the women who attend your center. I have attached a copy of the survey instrument. I assure you that the confidentiality of the participants and the center will be protected.

If you do not have the authority to grant permission for participating, I would appreciate any contact information you can give me regarding the individual who does have such authority, including current telephone numbers and address (es). Otherwise, your permission confirms that you hold the right to grant the permission requested here. A duplicate copy of this request has been provided for your records. I would greatly appreciate your consent to my request. If you agree with the terms as described above, please sign the enclosed release form and forward the copy using the self-addressed return envelope I have provided.

If you have questions, please contact me. Thank your for assisting with the project.

Sincerely,

Peggy Johnson
423-967-1944
Programs of Public Health
University of Tennessee, Knoxville
pjohns14@utk.edu

Enclosures (3)

Consent Form

I_____ give my consent for Peggy Johnson, PhD candidate at the University of Tennessee to survey women 55 years of age and older who attend _____ Senior Center at the center for the purpose of obtaining information concerning the breast cancer screening practices of these women. It is understood that the participants' responses and the name of the center will be kept confidential,

_____

Signature of Administrator

_____

Senior Citizens Center

_____

Date

Appendix D

American Cancer Society Recommendations for Screening Mammography

American Cancer Society Recommendations for Screening Mammography

Women age 40 and older should have a screening mammogram every year and should continue to do so for as long as they are in good health.

Most doctors feel that early detection tests for breast cancer save many thousands of lives each year, and that many more lives could be saved if even more women and their health care providers took advantage of these tests. Following the American Cancer Society's guidelines for the early detection of breast cancer improves the chances that breast cancer can be diagnosed at an early stage and treated successfully.

- Current evidence supporting mammograms is even stronger than in the past. In particular, recent evidence has confirmed that mammograms offer substantial benefit for women in their 40s. Women can feel confident about the benefits associated with regular mammograms for finding cancer early. However, mammograms also have limitations. A mammogram will miss some cancers, and it sometimes leads to follow up of findings that are not cancer, including biopsies.

- Women should be told about the benefits, limitations, and potential harms linked with regular screening. Mammograms can miss some cancers. But despite their limitations, they remain a very effective and valuable tool for decreasing suffering and death from breast cancer.

- Mammograms for older women should be based on the individual, her health, and other serious illnesses, such as congestive heart failure, end-stage renal disease, chronic

obstructive pulmonary disease, and moderate-to-severe dementia. Age alone should not be the reason to stop having regular mammograms. As long as a woman is in good health and would be a candidate for treatment, she should continue to be screened with a mammogram. If you are a woman aged 40 or over, you should get a mammogram every year. You can schedule the next one while you're at the facility and/or request a reminder.

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Last Revised: 05/21/2009

Appendix E

County Classifications with RUC Codes

County Classifications

A sample of the population was taken from senior citizens centers in the 32 counties in the area designated as the Eastern Grand Division of Tennessee including: Anderson, Bledsoe, Blount, Bradley, Campbell, Carter, Claiborne, Cocke, Cumberland, Grainger, Greene, Hamblen, Hamilton, Hancock, Hawkins, Jefferson, Johnson, Knox, Loudon, McMinn, Meigs, Monroe, Morgan, Polk, Rhea, Roane, Scott, Sevier, Sullivan, Unicoi, Union and Washington. County Classifications are:

	Metro Counties:
1	Counties in metro areas of 1 million population or more
2	Counties in metro areas of 250,000 to 1 million population

Knox County-2

Hamilton County-2

	Non-Metro Counties
3	Urban population less than 250,000
4	Urban population of 20,000 or more, adjacent to a metro area
5	Urban population of 20,000 or more, not adjacent to a metro area

Anderson 4

Blount 4

Bradley 4

Campbell 5

Carter 5

Claiborne 5

Cocke 5

Cumberland 5

Greene 5

Grainger 5

Hamblen 5

Hawkins 4

Jefferson 4

Loudon 4

McMinn 4

Monroe 5

Roane 5

Sevier 4

Sullivan 5

Washington 5

	Rural Counties
6	Urban population of 2,500 to 19,999, adjacent to a metro area
7	Urban population of 2,500 to 19,999, not adjacent to a metro area
8	Completely rural or less than 2,500 adjacent to a metro area
9	Completely rural or less than 2,500 not adjacent to a metro area

Bledsoe-6

Hancock-7

Johnson - 7

Morgan-7

Meigs-6

Polk-7

Rhea7

Scott- 7

Union- 6 Unicoi-7

Appendix F

Listing of Senior Citizens Centers

Listing of Senior Citizens Centers

County and Classification Code	Senior Center
Anderson County-4	**Clinton Senior Center** **Roger Houck** 101 Hicks Street Clinton TN 37716 865/457-0642S rhouck@clintontn.net
Bledsoe-6	**Bledsoe Senior Activity Center** **Joyce Houston - Center** **Director/Congregate Meal Program P.O**. Box 751,120 Frazier St. Pikeville, TN 37367 (423) 447-6111 bcsc@comcast.net
Blount County-4	**Everett Park Adult Center** **Janet Thompson** P. O. Box 789 Alcoa TN 37701-0789 865/983-9422 i1eet@parksrec.com
Bradley County-4	**Bradley/Cleveland ActiVity Center** **DWight Donohoo - Center Director** 230 Urbane Rd. Cleveland, TN 37312 (423) 559-2171
Campbell County-5	**LaFollette Senior Center** **Jim Finley** 102 South 8th Street LaFollette TN 37766 423/562-6672 **Jellico Senior Center** **Alisa Smiddy** 300 Baker Street Jellico TN 37762 423/784-9041 lizsmiddy@jellico.com
Carter County-5	**Elizabethton Senior Citizens Center** **Director: Ruth Goodwin** 428 East "G" Street Elizabethton, TN 37643 423-543-4362 FAX 423-547-3061 E-mail: katdula@hotmail.com

Claiborne County-5	**Harrogate Senior Center** **Donna Williams** P. O. Box 71 Harrogate TN 37752 423/869-8080dwilliams@ethra.org **Tazewell Senior Center** **Donna Williams** P. O. Box 326 Tazewell TN 37879 423/626-9471
Cocke County-5	**Cocke County Senior Center** **Carlene Robinson** P. O. Box 768 Newport TN 37822 423/623-1400
Cumberland County-5	**Fair Park Senior Center** **Peggy Houston** 1433 Livingston Highway Crossville, TN 38571 931/484-7416 Fax: 931/456-6541 fpsctn@yahoo.co
Grainger County-4	**Grainger County Senior Center** **Sheila Varner** 8659 Rutledge Pike Rutledge TN 37861 865/828-5397
Greene County-5	**Roby Fitzgerald Adult Center** **Director: Glenda Blazer** 203 N. College Street Greeneville, TN 37745 423-639-3128 FAX 423-639-7916 423-639-3129 E-mail: glenda_blazer@yahoo.com
Hamblen County-5	**Morristown Senior Center** **Debbie Thayer** 841 Lincoln Avenue Morristown TN 37813 423/581-5166 hamblenooa@lcs.net

Hamilton County-2 **Hamilton County-2**	**Boynton Senior -Neighbors of Chattanooga- Susan Dunn - Center Director-**95JBoynton Dr. Chattanooga, TN 37403 (423) 755-9108 sdunn@alexianbrothers.net **Mary Walker Senior Neighbors of Chattanooga** **Susan Dunn - Center Director** 2505 S. Market St. Chattanooga,TN 37408 (423) 756-3130 sdunn@alexianbrothers.net **Soddy DaisylNorth Hamilton Senior** **Cathy Neely - Center Director** Neighbors of Chattanooga 190 Depot St. Soddy, TN 37379 (423) 332-1702 cneely@alexianbrothers.net
Hancock County-7	**Hancock County Senior Center** **Director: Deanna Swiney** P.O. Box *403/0bie* Road Sneedville, TN 37869 423-733-4253 phone & FAX E-mail: snseniors@yahoo.com
Hawkins County-5	**Mount Carmel Senior Center** **Director: Wanda Davidson** P.O. Box 1424 Mt. Carmel, TN 37645 1-423-357-4851 FAX 1-423-357-3281 E-mail: wanda_worley@yahoo.com **Rogersville Senior Citizens Center** **Director: Carolyn Shipley** 407 E. Main Street Rogersville, TN 37857 1-423-272-9186 FAX 1-423-272-9185 E-mail: gabby917@hotmail.com
Jefferson County-4	**Dandridge Senior Center** **Linda Manley** 917 Elliot Ferry Road Dandridge TN 37725 865/397-7605
Johnson County-7	**Johnson County Senior Center**

	Director: Joyce Kidd 128 N. College Street Mountain City, TN 37683 423-727-8883 FAX 423-727-5757 e-mail: jo~_kidd@yghoocom
Knox County-2	**John T. O'Connor Senior Center** **Bettie Wilkie** 611 Winona Street Knoxville TN 37917 865/523-1135 bwilkie@knxcac.org
Loudon County-4	**Loudon County Senior Center** **Toby Brewster** 901 Main Street Loudon TN 37774 865/458-5445 srcenter@bellsouth.net
McMinn County-5	**McMinn Senior Activity Center** **Holly Currier - Center Director** 205 McMinn Ave. Athens, TN 37303 (423) 745-6830 mcminnsenior@comcast.net
Meigs County-6	**Meigs Senior Activity Center** **Virginia Lee - Center Director** P.O. Box 762 Decatur, TN 37322 (423) 334-3242 meigsseniorcenter@yahoo.com
Monroe County-5	**Cora Veal Center** **Frances Maxwell** 144 College Street Madisonville TI\I 37354 423/442-2022 mcooac@bellsouth.net
Morgan County-7	**Wartburg Senior Center** **Carolyn Lones** P. O. Box 406 Wartburg TN 37887 423/346-6651 Clones@ethra.org
Polk County-7	**Copperhill Senior Activity Center**

	Sue Russell - Center Director 840 Cherokee Trail Rt. 1 Box 252 Copperhill, TN 37317(423) 496-7113
Rhea County-6	**Rhea Richland Senior Center** **Marilyn Monday - Center Director** 241 Alabama Ave. Dayton, TN 37321 rhearichlandsen@bellsouth.net
Roane County-5	**Kingston Senior Center** **Amber Jacks** 201 Patton Ferry Road Kingston TN 37763 865/354-0450 **ajacks@mecaa.net** **Blair Senior Center** **Edna Cox** 1911 Old Harriman Highway Oliver Springs TN 37840 865/435-7677 **Rockwood Senior Center** **Amber Jacks** P. O. Box 43 Rockwood TN 37854 865/354-0450 **ajacks@mecaa.net**
Scott County-7	**Scott County Senior Center** **Kathy Rose** 102 South Main Street Oneida TN 37841 423/569-5972 srcenter@highland.net
Sevier County-4	**Sevier County Senior Center** **Lisa Yarber** P. O. Box 4157 Sevierville, Tn. 37864 865/453-8080 email: lyarberseviersenioreenter@yahoo.com
Sullivan County-5	**Kingsport Senior Center**

	Director: Shirley Buchanan 1200 E. Center Street Kingsport, TN 37660 423-392-8400 FAX 423-224-2488 Email:mailto:buchanans@cLkingsport.tn.us **Bristol-Slater Senior Center** **Director: Mallory Cross** P.O. Box 1189 328 McDowell Street Bristol, TN 37621 423-764-4023 FAX 423-989-5624 Email-mcross@bristoltn.org
Unicoi County-7	**Clinchfield Senior Adult Center** **Director: Charlene O'Dell** Box 778, 220 Union Street, Erwin, TN 37650, 423-743-5111 FAX 423-743-5444- E-mail:charlene_odell@comcast.net
Union County-6	**Union County Senior Center** **Lisa Clapp** P. O. Box 387 865/992-3292 Maynardville TN 37807 seniorcenter@unioncountytn.org
Washington County-5	**Jonesborough Area Senior Center** **Director: Joan Miller** 1521 Persimmon Ridge Road Jonesborough, TN 37659 423-753-1075 FAX 423-753-1027 E-mail: jbsenior@embarqmail.com **Johnson City Seniors' Center** **Director: Sue Orr** 607 E. Myrtle Avenue Johnson City, TN 37601 423-434-6237 FAX 423-434-6244 E-mail: sueorr.jcsc@charterinternet.com

Appendix G

Letter of Consent from Dr. Victoria Champion

INDIANA UNIVERSITY
SCHOOL OF NURSING
IUPUI

April 6, 2009

Ms. Peggy Johnson
8132 Sam Cruze Lane
Knoxville, TN 37920

Dear Ms. Johnson,

Thank you for your interest in my work. Enclosed please find a copy of the health belief instrument you requested as well as a copy of the article. You have permission to revise the tool for your use as long as you cite my work and send me an abstract of your completed project.

Sincerely,

Victoria Champion

Victoria Champion, DNS, RN, FAAN
Associate Dean for Research
Edward W. and Sara Stam Cullipher Endowed Chair
Mary Margaret Walther Distinguished Professor

VC:dg

Center for Research and Scholarship 1111 Middle Drive Indianapolis, IN 46202-5107 (317) 274-4187 fax (317) 278-2021
Indiana University Purdue University Indianapolis

Vita

Peggy Johnson is currently an assistant professor in the School of Health Administration, the College of Health Professions at Texas State University at San Marcos, Texas. Peggy has a background in respiratory therapy having worked in Intensive Care/Critical Care, Coronary Care and Home Health Care facilities. She has also worked in Cardiopulmonary Rehabilitation in hospital and nursing home settings. She earned a Master of Public Health with a concentration in Health Planning and Administration during the summer of 2006. She was a doctoral student and Graduate Teaching Associate in the Health & Safety Programs at the University of Tennessee for the three years from 2006 through 2009. Her research interests include women's health concerns, barriers to healthcare access, patient safety and environmental management.

Ms. Johnson taught the following undergraduate courses at the University of Tennessee: Emergency Management and First Aid, Personal Health, Human Sexuality, and Women's Health. At Texas State University in San Marcos, Ms. Johnson has taught Resident and Patient Care in the Long Term Care Graduate Certificate Program, graduate courses in Advanced Patient Care and undergraduate courses in Health Administration and Patient Care.

Ms. Johnson has had her research selected for presentations at 1) The Society for Public Health Education Annual Meeting, 2) the National Safety Council's annual conference in 2007 and 2008, 3) the Tennessee Public Health Association annual meetings and at various local and regional conferences focused on education and university health services.

In 2004, Ms Johnson was named Most Outstanding Student in the School of Public Health at East Tennessee State University, Johnson City, Tennessee. She is a member of Phi Kappa Phi since 2005. Ms. Johnson received the competitive Dr. June Gorski Scholarship in 2008 for her contributions to health education and public health.

Ms. Johnson has published with co-authors research findings in peer-reviewed journals and conference proceedings including the "International Journal of Emergency Management," and contributed a chapter to a publication due for release November 9, 2010 entitled *Hospitals: What They Are and How They Work.*