BREAST CANCER KNOWLEDGE, BELIEFS, AND SCREENING

BEHAVIORS OF COLLEGE WOMEN:

UTILIZATION OF THE

HEALTH BELIEF MODEL

by

KENDRA GUILFORD

A DISSERTATION

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in the Department of Health Science
in the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2011

ABSTRACT

Aside from skin cancer, breast cancer is currently considered the most common cancer and the second leading cause of cancer death among women in the U.S. It is unique from other cancers in that it presents extreme financial costs, coupled with both physiological and psychological consequences for the impacted women and their families. Lifestyle factors are known contributors to rates of breast cancer, and knowledge is essential to its prevention. Women who are classified as "emerging adults" offer a vital window of opportunity for intervention, as lifestyle patterns are often set during this time.

This cross-sectional, descriptive study examined the level of breast cancer knowledge, beliefs, and screening behaviors among a sample of emerging adult college women ($n = 342$) in the southeastern U.S. by measuring participants' confidence, health motivation, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers, in addition to their degree of worry in relation to breast cancer. Participants responded to a written, self-report 86-item questionnaire. All analyses were conducted using SAS$^{®}$ 9.0.

Results of the study showed participants had a low level of perceived susceptibility towards breast cancer, as well as relatively low overall breast cancer knowledge. Findings also revealed a significant association between ethnicity, year in school, and family history of breast cancer and participants' general degree of breast cancer-related worry. Of the Health Belief Model constructs, confidence and perceived barriers were found to significantly predict breast self-examination.

ii

The college years provide a great opportunity for health intervention strategies. Health program planners should aim to develop interventions that are adapted to address the unique needs of women who are transitioning from adolescence to adulthood. These interventions should center on enhancing self-efficacy of breast cancer screening and reducing barriers. Education-based programs are also needed to increase women's overall knowledge and awareness of breast cancer-related issues. Such strategies have great potential to enhance women's quality of life and positively influence those with whom they closely interact.

DEDICATION

This dissertation is dedicated to Mr. and Mrs. James E. Guilford for establishing in me such a strong foundation, for always giving me their utmost support, and for reminding me constantly of my abilities. They have always been a constant and overwhelmingly loving presence in my life. I am forever indebted to them both for making all of this possible; I only wish that everyone could experience the honor of such extraordinary parents.

LIST OF ABBREVIATIONS AND SYMBOLS

ACS   American Cancer Society

BCKT   Breast Cancer Knowledge Test

BRFSS   Behavioral Risk Factor Surveillance System

BSE   Breast self-examination

CBE   Clinical breast examination

CDC   Centers for Disease Control and Prevention

CHBMS   Champion's Health Belief Model Scale

DHS   Department of Health and Human Services

FIPS   Federal Information Processing Standards

HBM   Health Belief Model

HES   Human Environmental Sciences

IBC   Inflammatory Breast Cancer

IRB   Institutional Review Board

NIEHS   National Institute of Environmental Health Sciences

NIH   National Institutes of Health

NCI   National Cancer Institute

RSBBSMS   Revised Susceptibility, Benefits, and Barriers Scale for

        Mammography Screening

USDHHS   U.S. Department of Health and Human Services

USPSTF   U.S. Preventive Services Task Force

ACKNOWLEDGEMENTS

Without the unwavering support, guidance, and love of several very special people, this dissertation would not have been possible. First, I am especially thankful to the chair of my committee, Lori Turner, for sharing her wisdom, time, expertise, etc. throughout this process. She has kindly served as the ultimate mentor--advising me on countless issues--and I am truly grateful to her for all her efforts. Brad Lian, who so graciously served as co-chair, has also patiently given of his time and expertise; his assistance has also been invaluable to me. I also acknowledge committee members Stuart Usdan, Lea Yerby, and Brian Gordon for all of their support and input; it is the combination of their input and inspiring questions that helped develop this research project into something of which I can be proud.

I also recognize Stan for his tremendous assistance in this research endeavor. His unremitting love, dedication, and motivation have helped sustain me from the very beginning of this journey. To him and for him, I am forever grateful.

Again, I am immensely indebted to my parents for making this entire journey possible. I love you both.

Finally, all praise is due to the Almighty.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Many of the risk factors linked to the leading causes of morbidity and mortality in present day America are clearly associated with health behavior and lifestyle choices (U.S. Department of Health and Human Services [USDHHS], 2009; McKenzie, Pinger, & Kotecki, 2008). Chronic health diseases remain a leading public health concern in the U.S. and have been for decades (Centers for Disease Control [CDC], 2009; DeVol, Ross, & Bedroussian, 2007). Previous studies have shown that a significantly small number of chronic diseases account for a comparatively large share of annual U.S. deaths (CDC, 2010). Particularly, cancer, heart disease, stroke, and diabetes are among the most common, expensive, and avertable of all health problems (CDC, 2009); the first three diseases, alone, account for over 50% of all deaths in America every year (CDC, 2010). According to the Centers for Diseases Control and Prevention (CDC), 7 out of 10 deaths in the U.S. each year are a result of chronic disease and illness.

Management of these diseases accounts for over 75% of the current total $1.4 trillion-plus health care costs in the U.S. (CDC, 2009). The cost of chronic diseases encompasses more than the financial, however. One must also consider the overall impact chronic diseases have on morbidity and mortality. Zekeri & Habtemariam (2006) indicate that chronic diseases disproportionately affect individuals of lower socioeconomic status, racial and ethnic minorities, children, and women. Evidence also shows that rural communities have higher rates of chronic illness and disability, as well as poorer overall health status, compared to urban communities (Seshamani, Norstrand, Kennedy, & Cochran, 2006).

1

If our country continues on its current path, the U.S. will likely experience a dramatic increase in chronic disease in the next 20 years (DeVol et al., 2007). Inevitably, chronic diseases decrease quality of life for many Americans and lead to an increase in overall medical expenditures (CDC, 2009). One of the most effective strategies to combat this growing health concern is to focus not on the treatment of chronic disease and illness, but to direct attention and resources to the prevention of the very onset of these diseases.

Because of its significance in terms of both incidence and mortality, a specific chronic disease that warrants scrupulous reflection is cancer. An estimated 1,437,180 Americans received a new diagnosis of invasive cancer in 2008; 565,650 Americans died in the same year due to this chronic disease (CDC, 2009). For 2008, the overall annual cost of cancer for our country was $228.1 billion (National Institutes of Health [NIH], 2008). Moreover, because of an increasing American population, cancer costs are very likely to increase, as well (CDC, 2009).

A major goal outlined in *Healthy People 2020* is to reduce the number of new cancer cases, as well as the illness, disability, and death caused by cancer in our country (USDHHS, 2010). *Healthy People 2020* also contains objectives that are specifically related to cancer: "reduce the overall cancer death rate," "increase the proportion of cancer survivors who are living 5 years or longer after diagnosis," and "increase the proportion of adults who were counseled about cancer screening consistent with current guidelines" (USDHHS, 2010). Furthermore, a myriad of organizations throughout the country—both governmental and private--are dedicated solely to reducing health disparities in cancer in our nation at the local, state, and national levels (American Cancer Society [ACS], 2009; Loerzel & Busby, 2005).

Individuals who reside in rural areas, in particular, report a higher prevalence of heart disease and cancer, as compared to those in urban populations (Gosschalk & Carozza, 2005). In

the southeastern region of the U.S.—Alabama specifically—21% of all deaths in 2005 were due to cancer (CDC, 2008).   In 2009, there were an estimated 24,090 new cases of cancer in Alabama, alone, a state known to contain a significant proportion of rural residents and residents with inadequate health insurance coverage (CDC, 2010).

Specifically, breast cancer forms in tissues of the breast, usually the ducts (tubules that carry milk to the nipples) and lobules (glands that make milk). Although it can occur in both men and women, breast cancer in men is rare (National Cancer Institute [NCI], 2009). The overriding impact of community, social, environmental, and intrapersonal factors on breast cancer incidence cannot be ignored. Factors such as diet, exercise, gender roles, income, education, culture, and individual attitudes and beliefs are all interconnected in the schema of underlying issues contributing to the prevalence of breast cancer (Smith, Cokkinides, & Brawley, 2009).

Because of its associated issues of depression, disfigurement, body image, and sexuality—coupled with overwhelming financial constraints—breast cancer is unique from other forms of cancer. Moreover, because it has significantly infiltrated virtually all classifications of women in our country, in terms of ethnicity, socio-economic status, and religion, breast cancer has mandated national (and global) attention. A major objective of *Healthy People 2020* that was retained from *Healthy People 2010* is to "reduce the female breast cancer death rate." (USDHHS, 2010). Two additional *Healthy People 2020* objectives are directly related to breast cancer: "reduce late-stage female breast cancer" and "increase the proportion of women who receive a breast cancer screening based on the most recent guidelines." Accordingly, our federal government has increased funding for early detection, diagnosis, and prognosis of breast cancer from $36.4 million to $73.2 million (NIH, 2008). Even more, the total number of projects

dedicated solely to early detection, diagnosis, and prognosis of breast cancer in our country has risen from 197 to over 288 (NCI, 2007)

According to the American Cancer Society (ACS) (2009), an estimated 192,370 women were diagnosed with breast cancer in 2009, with 40,170 women dying from the disease. Although the overall mortality rate due to breast cancer is now on a downward spiral (CDC, 2009; Welch, Miller, & James, 2008), the incidence of breast cancer has risen gradually over the past century (Wood, 2008). This disease is currently considered the most common cancer (other than skin cancer), and the second leading cause of cancer death among women in the U.S., surpassed only by lung cancer (NCI, 2009). One out of every eight American women will develop breast cancer at some point in her life. Each year in the United States, more than 192,000 women are diagnosed with breast cancer (NIH, 2009), and 250,000 U.S. women living with the disease are under the age of 40 (CDC, 2006). Moreover, younger women with breast cancer tend to experience worse outcomes and more advanced disease than older women (CDC, 2009; Jones, Denham, & Springston, 2007).

In Alabama in 2006, the overall female death rate due to breast cancer was roughly 24% (CDC, 2010). In addition, as recently as 2007, an estimated 2,750 new cases of breast cancer in women were diagnosed in this Southeastern portion of the country (CDC, 2008). Further, even though mammography screening has been shown to reduce mortality due to breast cancer by approximately 20-25% over 10 years among women aged 40 years and older, in 2006, 23% of women in Alabama in the 40-plus age group reported not having had a mammogram within the last two year (CDC, 2008).

The financial impact of breast cancer can be quite significant, and studies have shown that women diagnosed with the disease are especially likely to experience financial hardship

(ACS, 2008; Arozullah et el., 2004). Next to cardiovascular disease, cancer is the second most expensive disease in the United States, with an estimated annual cost of $171 billion (Arozullah et al., 2004), and specifically, annual breast cancer-related medical treatment costs, specifically, are now estimated at $8.1 billion (NCI, 2007; Welch et al., 2008). Physiological and psychological issues compound the financial impact of breast cancer (ACS, 2008). For example, certain treatment methods (such as surgical removal of the breast, or mastectomy) can result in permanent disfigurement and subsequent tingling sensations, numbness, and chronic pain (NCI, 2009).

In addition to the physiological impact of breast cancer, women are also likely to experience psychological and social consequences related to the disease. Depression, worry, anxiety, and isolation are among the various emotions women may feel at any given point in her experience with breast cancer (ACS, 2007). Moreover, many women deal with issues related to body image because they oftentimes find that breast cancer treatment changed the way they looked; such changes include hair loss, skin-related issues, and weight gain or loss (NIH, 2008). In addition to body image concerns, some treatments for breast cancer--such as chemotherapy-- can alter a woman's hormone levels and may reduce her sexual interest or response (ACS, 2007). Some studies even suggest that younger women tend to have more problems with these issues than older women (ACS, 2007).

Making cancer screening information and services available to women is essential for reducing high rates of cancer and cancer deaths (Loerzel & Bushy, 2005; NCI, 2009). Early detection can reduce mortality significantly and will promote women's overall quality of life (ACS, 2009; CDC, 2010; Lee et al., 2010; Smith et al., 2009). Breast self-examination (BSE), clinical breast exam, and mammography are widely known to be the main methods of breast

cancer screening. Medical literature suggests that a significant percentage of breast cancer is discovered by chance, and women doing monthly BSE often recognize a mass in their breasts earlier than women who do not perform monthly BSE (Regan & Durvasula, 2009; Wood, 2009). Moreover, screening tests such as clinical breast exams and mammography have been shown to reduce the risk of dying from breast cancer by as much as 25% in women between ages 50 and 69 (ACS, 2009; CDC, 2010).

Even with evidence-based guidelines and recommendations, as recently as 2005, our society has been inundated with conflicting evidence and opinions on the efficacy of breast self-exam, in particular. In 2005, the U.S. Preventive Services Task Force (USPSTF) neither recommended nor discouraged breast self-examination, while the American Cancer Society continued to promote it (Norman & Brain, 2005). Much of the conflicting views on BSE have been attributed to women's over performance of BSE and not performing BSE correctly. Despite an update issued by the U.S. Preventive Services Task Force (2009) indicating no observed benefit for breast self-examination, the issue remains a controversial one--even among medical professionals (CDC, 2010; Lee et al., 2010).

Formerly, the medical literature strongly suggested that women conduct breast self-examinations each month and undergo a clinical breast examination every one to three years beginning at the age of 20. Starting at age 40, women were encouraged to continue monthly self-examinations, obtain an annual clinical breast examination, and undergo a mammogram every one to two years (ACS, 2005). Presently, however, the American Cancer Society no longer officially recommends monthly breast self-examinations (ACS, 2009) but suggests that women be informed about the potential benefits and disadvantages that are associated with breast self-examinations (Smith et al., 2009). With this knowledge, women may then decide on their

6

own accord whether to perform breast self-examinations regularly, occasionally, or not at all. Still, many researchers and health practitioners stress that breast self-examinations (BSE) provide an alternative and relatively simple, inexpensive means of early detection of breast cancer that can be performed in conjunction with mammography and/or clinical breast examinations (Norman & Kate, 2005).

Mammography screening guidelines have also been recently disputed. The U.S. Preventive Services Task Force (USPSTF) (2009) examined the efficacy of film mammography, clinical breast examination, breast self-examination, digital mammography, and MR imaging in relation to breast cancer screening. Prior to the update, the American Cancer Society (ACS) guidelines officially recommended annual mammography for all healthy women beginning at age 40 (ACS, 2009). Contrary to these recommendations, in November of 2009, the USPSTF revised guidelines and recommended that women under age 50 not undergo annual mammography. The matter is very much being debated, even to present day, among medical personnel, political officials, and the general public alike. Hence, now more than ever before, American society is witnessing a major push to ensure that women are given the most accurate, reliable, evidence-based, updated, information possible concerning breast cancer screening, in the attempt to effectively deal with this major health issue.

Several barriers have been identified throughout the literature that influence women's choices regarding breast cancer screening. These factors include educational level, accessibility, cost, trust of healthcare providers, cultural beliefs, lack of transportation, lack of knowledge of cancer screening guidelines, and the underlying belief that cancer, itself, is incurable (ACS, 2008; CDC, 2009; Farmer et al., 2007; Simon, 2006). In essence, although the factors related to

7

screening behaviors are multi-faceted, the overarching argument is that knowledge is a crucial component in the war on breast cancer.

Knowledge certainly is a basic requirement for any individual to maintain proper health. Therefore, knowledge objectives are a vital element of virtually all health promotion activities (Royse & Dignan, 2009; Simons-Morton, Green, & Gottlieb, 1995). In the greater attempt to disseminate knowledge and increase awareness about a given health-related issue such as breast cancer, researchers develop and deliver health interventions tailored to a specific target population. Interventions that yield desirable changes are ideally based on at least one theoretical framework (Glanz, Rimer, & Lewis, 2002). Theories help guide researchers' investigation into why people do or do not engage in specific health behaviors (NCI, 2005). They are useful during the various stages of planning, implementing, and evaluating an intervention. Moreover, theories help explain behavior and suggest ways to achieve behavior change (Glanz, Rimer, & Lewis, 2002).

The Health Belief Model (HBM) is a prime example of value-expectancy theory, which, prior to 1984, was not regularly used in explaining screening behaviors. In more recent years, however, it has gained recognition for use in examining and describing health screening behaviors and associated factors (Glanz, Rimer, & Lewis, 2002). The HBM is now considered the most widely used model for predicting BSE behavior (Champion, 2003; Champion & Miller, 1992). At least part if its increased popularity may be attributable to an array of research competed by Champion (1984) and her development of an instrument (and subsequent others) to measure HBM concepts in relation to breast cancer screening: breast self-examination (Champion & Miller, 1992) and mammography (Champion, 1999). Initially developed in the 1950s by social psychologists in the U.S. Public Health Service, HBM has since evolved

8

gradually in response to practical programmatic concerns (Becker, 1974; Janz & Becker, 1984; Kirscht, 19974; & Rosenstock 1974). The key concepts of HBM include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (added by Bandura in 1977).

The HBM has been used in several studies as a theoretical framework to study BSE and other breast cancer detection behaviors (Barron, Houfek, & Foxall, 1997; Champion, 1984; 1999; Hoeman & Ku, 1996). It has also been utilized to explore culturally relevant differences associated with screening behaviors (Cohen & Azaiza, 2005). Because of its long record of use in several studies exploring health behaviors in general, and cancer screening behaviors, specifically, this model served as the ideal theoretical foundation on which the present study was based. Major HBM constructs as they relate to this study are shown in Table 1.1 below.

Table 1.1.
Summary of Health Belief Model Constructs and Breast Cancer Screening

HBM Construct	Example
Perceived Severity	How serious will breast cancer be?
Perceived Susceptibility	How likely am I to get breast cancer?
Perceived Threat	How bad will it be and how likely am I to get it?
Cues to Action	What will remind/cause me to perform screening?
Self-efficacy	Have I the skills/confidence to perform screening?
Perceived Benefits	What have I to gain from breast cancer screening?
Perceived Barriers	What is hindering me from breast cancer screening?

Purpose

  This research study sought to investigate the level of breast cancer knowledge, beliefs, and screening behaviors among undergraduate college women located at a major university in the southeastern segment of the United States by measuring their perceived susceptibility, severity, benefits, barriers, and self-efficacy (constructs of the Health Belief Model) in relation to breast cancer prevention, as well as their degree of breast cancer-related worry. A written 86-item questionnaire compiled from three existing valid, reliable instruments-- the *Breast Cancer Knowledge Test* (McCance et al., 1990); the *Revised Susceptibility, Benefits, and Barriers Scale for Mammography Screening* (Champion, 1999); and the *Breast Cancer Worry Scale* (Lerman et al., 1991)--served as the primary assessment battery.

Significance

  It is widely known and accepted that early diagnosis of breast cancer can reduce mortality significantly and will promote women's overall health (ACS, 2009; CDC, 2010; Champion, 1999, 2003; NCI, 2009). Women have been shown to be more likely to actively participate in making health-related decisions than men (Arora & McHorney, 2000). They also play a critical role in making healthcare decisions for the family unit. Specifically, those women who are in the process of transitioning from adolescence to adulthood offer a unique, critical window of opportunity for change in (or impact on) health behavior. These women represent a category labeled as "emerging adults," which includes individuals ranging in age from 18 to 25 (Arnette, 1999; 2000; Shifron, Firnham, & Bauserman, 2003).

  Arnette (2000) argued that in modern industrialized societies, "emerging adulthood" is one of the most volitional stages in life, during which time people definitively and actively

10

choose between numerous possibilities in work, love, and worldviews. Likewise, this period

may also be a significant time when individuals establish independence and adopt lasting health

behavior patterns known to be associated with increased long-term risk for disease (Nelson et al.,

2008). This observation helps provide rationale for investigating "emerging adult" women

attending a university located in the southeastern region of the U.S.

Numerous research studies have relied on the Health Belief Model (HBM) to explore

breast cancer screening behaviors (Champion, 1984; 1990; 1994; 1999; Miller & Champion,

1997). However, most such studies have investigated breast cancer beliefs and screening

compliance of older adult women—those who are age 40 and older. The American Cancer

Society currently recommends that women under 40 have a clinical breast examination every

three years and optional monthly breast self-exam every year beginning at age 20; however, to

date, data are not readily obtainable regarding women under age 40 and their breast cancer

awareness and overall screening behaviors. This study sought to address this informational gap

in existing literature by assessing such beliefs and behaviors among younger women—those

between ages 18 and 25.

Further, while several studies have addressed a range of health-related problems and

behaviors during adolescence, few have explored similar issues in relation to "emerging

adulthood" (Laska, Pasch, Lust, Story, & Ehlinger, 2009)—the transitional period between

adolescence and adulthood (Arnette, 1999; 2000).

Moreover, although minimal researchers have previously examined breast cancer

knowledge, beliefs, and screening behaviors of college women in general, they have failed to

target college women located in the southeastern region of the U.S. Currently, there is limited

literature that focuses on breast cancer-related knowledge and screening behaviors among college women in this particular region of the country.

Thus, this study could potentially help health researchers, health educators, doctors, nurses, and any individual concerned or interested in breast cancer-related information. It may enhance the overall understanding of breast cancer-related knowledge, attitudes, and behaviors of college-aged females, and add to the pool of research on such issues as they relate to emerging adult women in the southeast. Finally, this study could potentially aid health program planners in developing interventions that are uniquely adapted for this emerging adult population.

Research Questions

The research questions related to this study included the following:

1. To what extent are female undergraduate college students conducting breast self-examination?

2. Is there a relationship between scores on a breast cancer knowledge test and frequency of performing breast self-examination?

3. Is there a relationship between items composing a breast cancer worry test and frequency of performing breast self-examination?

4. Is there a relationship between demographic factors--ethnicity, cumulative grade average, year in school, and family history of breast cancer-- and level of breast cancer knowledge?

5. Is there a relationship between demographic factors--ethnicity, cumulative grade average, year in school, and family history of breast cancer-- and breast cancer beliefs regarding perceived susceptibility and perceived severity?

6. Is there a relationship between demographic factors, ethnicity, cumulative grade average, year in school, and family history of breast cancer--and the worry item "how worried are you about getting breast cancer someday?"

7. Are the individual Health Belief Model constructs, confidence, health motivation, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers, significant predictors of breast self-examination performance?

Assumptions

The assumptions related to this research study included the following: (a) all survey items will be sufficient to elicit appropriate data from the sample population, (b) The University of Alabama college females who will serve as participants in this study will respond to survey questions with integrity and accuracy, (c) no potential subjects will be excluded from the administration procedures, and (d) study participants will fully comprehend the process to complete the questionnaire upon being provided adequate explanation in the informed consent statement.

Limitations

One limitation of this study rested on the sampling method utilized—convenience sampling. This type of sampling method could potentially limit the degree of generalizability of this study because the sample did not necessarily represent the general population. Another possible limitation was the reliance on self-report for the primary method of data collection. Each participant was asked to complete a questionnaire formulated by combining three existing survey instruments. There was no means of ensuring honesty and accuracy when respondents answered questions. The researcher could only assume that participants responded to survey

items accurately and reliably. However, because of the observed advantages of self-report such as convenience, cost-effectiveness, the notion that data can be collected from a large population in many different locations, and that participants are exposed to exactly the same questions (Cottrell & McKenzie, 2005), self-report was viewed to be a credible source of data collection—despite its limitations.

Delimitations

A delimitation of this study centered on its being restricted to surveying female students who are enrolled in specific courses housed within the College of Human Environmental Sciences during Summer and Fall 2010 semesters at The University of Alabama. Another possible delimitation is that the study included only female college students who were in the 18-25 age range.

Definition of Terms:

The following terms were used throughout this study and were defined as follows:

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

Alopecia: loss of hair; baldness, often associated with forms of treatment for breast cancer (Merriam-Webster, 2005; NCI, 2009).

American Indian or Alaska Native: a person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment. "Alaska Native" should replace the term "Alaskan Native."

Alaska Native should be used instead of Eskimo and Aleut (Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity, 2003).

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

Benign: term indicating a non-cancerous state (National Cancer Institute, 2009).

Breast Cancer: cancer that 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, but male breast cancer is rare (National Cancer Institute, 2008).

Breast Self-Exam (BSE): an exam by a woman of her breasts to check for lumps and other changes (NCI, 2008).

Cancer: the abnormal, uncontrolled multiplication of cells, which, if left untreated, can ultimately cause death (Insel & Roth, 2010).

Clinical Breast Exam (CBE): a physical exam of the breast performed by a healthcare provider to check for lumps and other changes (NCI, 2008).

Convenience Sample: type of non-random sampling method whereby researchers may have to rely on readily available subjects; generalizations must be made on the basis of nonstatistical considerations (Daniel, 2005).

Cues to Action: strategies to activate one's "readiness" to adopt a health behavior; a key construct of the HBM.

Ducts: tubules located in a woman's breast that carry milk to the nipples (NCI, 2009).

Early Detection: the use of screening tests to detect cancers at early stages to provide better opportunities for patients to obtain more effective treatment with fewer side effects. Evidence suggests that early detection decreases the chance of dying from cancer (NIH, 2009).

Emerging Adults: developmental category of individuals ranging in age from 18 to 25; also a time when individuals are more likely to explore their world for new experiences (Shifren, Furnham, & Bauserman, 2003).

Ethnic Group (or Ethnicity): a group of people whose members identify with each other through a common heritage, consisting of a common language, a common culture (often including a shared religion) and a tradition of common ancestry (Abizadeh, 2001).

HBM: the Health Belief Model is a value-expectancy theory that has been used both to explain change and maintenance of health-related behaviors and as a guiding framework for health behavior interventions. The constructs of the Health Belief Model (Rosenstock, 1974) are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action (Hochbaum, 1958), and self-efficacy (Rosenstock, Strecher, & Becker, 1988).

Health Behavior: those personal attributes such as beliefs, expectations, motives, values, perceptions, and other cognitive elements; personality characteristics, including affective and emotional states and traits; and overt behavior patterns, actions, and habits that related to health maintenance, to health restoration, and to health improvement (Gochman, 1982; Gochman, 1997; Glanz, Rimer, & Lewis, 2002).

Health Beliefs: include an individual's perception of susceptibility to and seriousness of disease or disorder, as well as the perception of benefits and barriers to taking actions to prevent disease or disorder (Glanz, Rimer, & Lewis, 20002).

Health Disparities: differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in the U.S. (National Institutes of Health, 2006).

Health Promotion: any planned combination of educational, political, environmental, regulatory, or organizational mechanisms that support actions and conditions of living conducive to the health of individuals, groups, and communities (Joint Commission on Health Education and Promotion Terminology, 2001).

Hispanic or **Latino/Latina**: a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. The term "Spanish origin" can be used in addition to "Hispanic or Latino" (Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity, 2003).

Inflammatory Breast Cancer: a rare and extremely aggressive type of breast cancer in which the cancer cells actually block the lymph vessels in the skin of the breast (NCI, 2009).

Intervention: an activity or activities designed to create change in people (McKenzie, Pinger, & Kotecki, 2008).

Lobules: glands located in the woman's breast that make milk (NCI, 2009).

Lymphedemia: severe swelling associated with a decreased flow and subsequent buildup of lymph fluid, caused by the surgical removal of the lymph nodes under the arm (NCI, 2009).

Malignant: term used to indicate a cancerous state (NCI, 2009).

Mammography: the use of film or a computer to create a picture of the breast (ACS, 2008).

Mastectomy: surgical removal of the breast (NCI, 2009).

Metastasis: the spread of cancer from one site in the body to another (ACS, 2008).

Minority Groups: subgroups of the population that consist of less than 50% of the population (McKenzie, Pinger, & Kotecki, 2008).

Native Hawaiian or Other Pacific Islander: a person having origins in any of the original people of Hawaii, Guam, Samoa, or other Pacific Islands " (Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity, 2003).

Other race: includes all other persons not included in "white," "black," "American Indian or Alaska Native," and "Asian or Pacific Islander" race categories (Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity, 2003).

Perceived Barriers: one's belief about the tangible and psychological costs of the advised action; a key construct of the Health Belief Model (HBM).

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

Perceived Severity: one's belief of how serious a condition and its sequelae are; a key construct of the HBM.

Perceived Susceptibility: one's belief regarding the chance of getting a condition; a key construct of the HBM.

Prevention: the planning for and taking action to forestall the onset of a disease or other health problem before the occurrence of undesirable health events (McKenzie, Pinger, & Kotecki, 2008).

Primary Prevention: preventive measures that forestall the onset of illness or injury during the prepathogenesis period (McKenzie, Pinger, & Kotecki, 2008).

Quality of Life: the perception of individuals or groups that their needs are being satisfied and that they are not being denied opportunities to pursue happiness and fulfillment. Health is one quality of life.

Race: concept as outlined by the Federal Office of Management and Budget (OMB) for the U.S. Census Bureau as not "scientific or anthropological" and "takes into account social and cultural characteristics as well as ancestry," using "appropriate scientific methodologies" but not primarily biological or genetic in reference" (U.S. Census Bureau, 2000).

Secondary Prevention: preventive measures that lead to early diagnosis and prompt treatment of a disease or injury to limit disability and prevent more severe pathogenesis (McKenzie, Pinger, & Kotecki, 2008).

Self-efficacy: one's confidence in one's ability to take action; a key construct of HBM.

Social Determinants of Health: the economic and social conditions under which people live that have a direct impact on health status.

Tertiary Prevention: measures aimed at rehabilitation following significant pathogenesis (McKenzie, Pinger, & Kotecki, 2008).

Tumor: also known as a lump or growth, it is a mass of tissue in the body formed by a buildup of extra cells (NCI, 2009).

Urban: of, relating to, characteristic of, or constituting a city (Merriam-Webster, 2005).

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

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter provides an overview of the concepts pertaining to breast cancer knowledge, beliefs, and screening behaviors of college women. Additionally, the history, development, and application of the Health Belief Model are presented. This chapter includes sections on (a) the history of breast cancer, (b) mortality and morbidity of breast cancer, (c) overall expense of breast cancer, (d) risk factors for breast cancer, (e) current screening recommendations, (f) knowledge and attitudes about breast cancer and breast cancer screening, (g) past and present strategies, (h) Health Belief Model, (i) emerging adulthood, (j) college student health behavior, and (k) concluding thoughts.

History of Breast Cancer

According to the NIH (2009), cancer is a term for diseases in which abnormal cells divide without control and have the ability to invade nearby tissues. Cancer cells can also spread to other parts of the body through the blood and lymph systems. Breast cancer, in particular, is a specific type of cancer that occurs in both men and women—although breast cancer occurring in males is extremely rare (NCI, 2009). To put this chronic disease in better perspective, in 2009, there were an estimated 192,370 new cases of breast cancer among the American female population; 1,910 breast cancer cases among American males were reported for the same year. Moreover, an estimated 40,170 female deaths and 440 male deaths in 2009 were also attributed to breast cancer (NCI, 2009). Clearly, the incidence of cancer in our country is extensive and deserves contemplation.

In the attempt to most effectively and efficiently grapple with such a substantial disease, it is best to first consider its origins. A woman's breast contains approximately 15 to 20 sections called lobes, each of which is made up of many smaller sections referred to as lobules. (Lobules are comprised of tiny glands that have the capability of producing milk). The spaces between the lobules and ducts are filled with fat and fibrous tissues. When something goes awry in the normal process of the growth and division of cells, new cells are produced unnecessarily, and old or damaged cells do not die as they should. The result is a buildup of extra cells, which oftentimes form a mass of tissue; this mass of tissue—called a lump, growth, or tumor—is what, in turn, becomes the epicenter of alarm for many women (NCI, 2009).

What follows the discovery of the growth depends mainly on the type of tumor that has developed. Tumors in the breast can be benign (not cancerous) or malignant (cancerous). The latter of the two has the capability of invading and damaging nearby organs and tissues (such as the chest wall); can spread to other parts of the body; can be removed yet sometimes can grow back; and may very well be a threat to one's life (NCI, 2009). In essence, it is this type of tumor that constitutes what is known as breast cancer.

The National Cancer Institute officially denotes breast cancer as a type of cancer that forms in the tissues of the breast, usually the ducts (tubules that carry milk to the nipples) and lobules (glands that make milk) (NCI, 2009). Breast cancer cells can potentially spread to other parts of the body by breaking away from the original tumor and subsequently entering blood vessels or lymph vessels, which branch into all the tissues of the body. The cancerous cells may, then, be found in lymph nodes near the breast, or they could attach to other tissues and grow to form new tumors. This spread of cancer from one site in the body to another is known as metastasis (ACS, 2007).

Breast cancer is categorized according to stages. The stage of the disease helps medical professionals and patients choose the best form of treatment. Stage delineation is based on the size of the cancer, whether it has invaded nearby tissues, and whether it has spread to other parts of the body (NCI, 2009). CT (Computed Tomography) scans, bone scans, and lymph node biopsies are all common measures used to determine the stage progression of breast cancer. Breast cancer is generally categorized as Stage I. through Stage IV., with I. representing the earliest and least invasive stage of the disease and IV. representing the latest, most invasive stage (CDC, 2008).

Although it is considered to be a rare type of breast cancer, inflammatory breast cancer (IBC) is an extremely aggressive type of breast cancer in which the cancer cells actually block the lymph vessels in the skin of the breast. IBC accounts for 1 to 5 percent of all breast cancer cases in the United States. It usually grows very rapidly and oftentimes spreads to other parts of the body. Interestingly enough, IBC tends to be diagnosed in younger women compared to non-IBC breast cancer (NCI, 2009).

Mortality and Morbidity Related to Breast Cancer

The incidence of breast cancer has risen gradually over the past century (Wood, 2008). Breast cancer is now considered the second most common form of cancer (besides skin cancer) in American women, as well as the second leading cause of cancer-related death, surpassed only by lung cancer (CDC, 2010; NCI, 2009). The National Cancer Institute estimates that about one out of every eight American women will develop breast cancer at some point in her life. Each year in the United States, more than 192,000 women are diagnosed with breast cancer (NIH, 2009).

The incidence of breast cancer dramatically increased throughout much of the 1980s, rising from 85 cases per 100,000 in 1980 to 112 cases per 100,000 by 1987 (Smith & McGhan, 1996). Comparatively, based on rates from 2002-2006, the age-adjusted incidence of breast cancer for all races was 123.8 cases per 100,000 women (SEER, NCI, 2009). Hence, there is evidence that the incidence of breast cancer has gradually and steadily risen over the past two decades.

Fortunately, however, recent mortality rates represent an impressive decrease in mortality by about 20% from the rates reported in the 1980s (NCI, 2004; Welch, Miller, & James, 2008; ACS, 2007. Actual deaths due to this disease have fallen primarily as a result of preventive measure in the form of timely screening (ACS, 2009). A collaborative effort involving both governmental and private sectors at all echelons has greatly assisted in early detection of breast cancer. Patients in whom this disfiguring cancer is found at early stages and are treated in an aggressive, timely manner, are much more likely to survive a cancer diagnosis than those whose disease is found at later stages. Moreover, screening tests such as clinical breast exams and mammography have been shown to reduce the risk of dying from breast cancer by as much as 30% in women between ages 50 and 69. Still, however, despite the significant decrease in breast cancer-related fatality, breast cancer still remains a significant public health concern in our country (CDC, 2010; NCI, 2009).

Expense of Breast Cancer

The overall impact of beast cancer ranges from the financial to the physiological to the psychological and social (ACS, 2007). In the late 1990s, for instance, the total cost of illness for breast cancer was an estimated $3.8 billion, $1.8 billion of which represented medical care costs.

The associated annual costs for breast cancer-specific medical treatment are now estimated at $8.1 billion (NCI, 2005; Welch et al., 2008). Even more, our country currently spends approximately $548.7 million dollars in breast cancer research alone (NCI, 2007).

Even among women with comprehensive insurance, the financial burden of a breast cancer diagnosis can still be quite considerable. Direct medical and nonmedical expenses such as treatment, childcare, transportation, and income lost due to cancer-related morbidity and treatment add to the financial constraints for many women (Arozalla et al., 2004). Moreover, studies have shown that women with cancer are more likely than men to have to pay for transportation, nursing care, and housecleaning, to have inadequate family support, and to be without a spouse or significant other (Emmanuel, Faircloth, & Slutsman, 1999).

In their study examining the financial burden of breast cancer, Arozullah et al. (2004) interviewed a total of 156 women about cancer-related-out-of-pocket costs, as well as their knowledge and use of cancer insurance policies. To be included in the study, participants had to be over the age of 18, had to have received a confirmed breast cancer diagnosis within the past 24 months, and had to have a life expectancy greater than 6 months. Specifically, the researchers assessed the women's age, insurance status, education, marital status, ethnicity, time since diagnosis, caregiver status, wages, annual household income, time missed from work, and out-of-pocket costs related to cancer treatment during the previous 3 months. Patients' age ranged from 29 to 78 years, with a mean of 52 years. Eighty percent of the patients described themselves as white, 10% as black, 5% as Latino, and 4% as Asian. After conducting the study, researchers found that the monthly financial burden of breast cancer averaged $1,455 per month. Individual estimates ranged from $0 to $15, 700 per month (Arozullah et al., 2004). In addition, researchers found half (50%) of the overall financial burden associated with breast cancer was

directly related to lost income. In essence, this study showed that the financial impact of breast cancer can be quite substantial, even among women fortunate enough to have comprehensive health insurance policies; the impact can be even greater among women without health insurance. This study highlighted the need for more affordable programs that provide reimbursements for medical and nonmedical costs incurred after a breast cancer diagnosis, particularly for low-income women (Arozullah et al., 2004).

Physiological Expense of Breast Cancer

The burden of breast cancer exceeds financial factors to include physiological and emotional concerns for women (NCI, 2009). Generally, early breast cancer does not cause symptoms. However, as the tumor grows, the look and feel of the breast can be altered. These physiological changes women experience include a change in the actual size or shape of the breast; a lump or thickening in or near the breast or underarm area; scaly, red, or swollen skin on the breast, nipple, or areola (dark area of skin at the center of the breast); a nipple that is turned inward into the breast; and discharge from the nipple, particularly bloody discharge (NCI, 2009).

Other physiological consequences are also associated with breast cancer. Surgery is the most common treatment for breast cancer (ACS, 2007). If a woman has to undergo a mastectomy (surgical removal of the breast), in addition to potential permanent disfigurement, she is likely to experience subsequent numbness and tingling in the chest area, underarm, shoulder, and arm. These feelings usually go away within a few weeks or months, but for some women, numbness does not ever subside (NCI, 2009). Removal of the breast due to breast cancer can also cause a shift in weight, constant fatigue, and chronic pain (ACS, 2007). Removal of the breast may also

cause the woman to feel off balance; this imbalance can, in turn, lead to discomfort in the neck and back.

A mastectomy is regularly coupled with removal of the lymph nodes under the arm. This procedure slows the flow of lymph fluid. Consequently, the fluid may build up in the arm and hand, causing severe swelling. This swelling is known as lymphedemia. It can develop immediately after surgery, or it can develop gradually over a duration of several months or even years after surgery (NCI, 2009).

Psycho-Social Expense of Breast Cancer

Aside from the physiological concerns, women may also experience psychological and social consequences of breast cancer (Helms, O'Hea, & Corso, 2008). Just as various forms of treatment for breast cancer can have potentially disfiguring effects in the physical sense, research has indicated that the actual loss or mutilation of a woman's breast can also have negative psychosocial consequences (Helms et al., 2008).

For example, women often worry about the cancer one day coming back, or recurring. They may also experience feelings of depression and isolation (ACS, 2007). Breast cancer also affects a woman's body image and feelings towards sexuality (Sheppard, Apple Sc, & Ely, 2008). Because the breast is considered to be an integral component of a woman's femininity and sexuality, breast cancer may elicit coping strategies that are distinctly different from other kinds of cancer (Choumanova, Wanat, Barrett, & Koopman, 2006). Many women are forced to deal with issues related to body image because they oftentimes find that breast cancer treatment changed the way they looked; such changes include hair loss, skin-related issues, and weight gain or loss (NIH, 2009).

Roid & Fitts (1998) suggest that body image refers to a mental image or picture of the "physical self" that encompasses perceptions and beliefs associated with an individual's skills, state of health, sexuality, and physical appearance. Body image is accepted as being an essential component of sexual health. According to Vaeth (1986), when a disease or disfiguring treatment regimen jeopardizes the physical beauty of a woman's body, it has the potential to negatively affect the value of her body to herself and others (such as spouses or intimate partners). Moreover, the breast has a social connotation of motherhood, femininity, and sexuality (Kahn et al., 2000). In this view, for several women, the experience with and subsequent effects of breast cancer are oftentimes interpreted as a "grievous assault on her femininity and her fundamental sense of herself as a woman" (Vaeth, 1986).

Sheppard & Ely (2008) conducted a search of Medline databases in their investigation of breast cancer and how it relates to sexuality. The authors relied on key words including "breast cancer," "body image," "sexuality," "cancer," "marriage," and "relationship" to identify articles related to their chosen theme. Their search of breast cancer-related literature revealed a few key findings. First, as previously assumed, their research confirmed that breast cancer is intensely distressing not only for the patient, but for her family, as well (Henson, 2002). Moreover, 50% of women were shown to experience sexual difficulties following breast cancer treatment (Burbie & Polinski, 1992). Common side effects cited include vaginal dryness and irritation, painful intercourse, lowered libido, and hair loss (Sheppard & Ely, 2008). Another interesting finding revealed from the authors' systematic review of the literature was that after a breast cancer experience, many women reported feeling more self-conscious, less attractive, and as having an overall poorer body image than their healthier counterparts (Sheppard & Ely, 2008).

Al-Ghazal, Fallowfield, & Blamey (2000) conducted a research study on 577 women to assess the effects of breast cancer on psychological functioning and cosmetic satisfaction of the breast. At their post-operative follow-up visit, participants completed a written questionnaire. The researchers categorized the women according to the type of breast cancer surgery received— lumpectomy, breast reconstruction, or simple mastectomy. Researchers found an overwhelming 91% of women in the lumpectomy group to be at least moderately satisfied with their breast's cosmetic appearance, compared to 80% in the breast reconstruction group, and 73% in the simple mastectomy group (Al-Ghazal et al., 2000). The researchers also found that 10% of the women in the simple mastectomy group were clinically depressed. This study suggested that the more invasive the surgery for breast cancer, the greater the effect on the woman's sense of cosmetic satisfaction and psychological well-being (Al-Ghazal et al., 2000).

Hair loss is another issue with which many women with breast cancer are forced to deal (ACS, 2007). The concept of hair possesses many connotations according to any given cultural group. Hair is readily associated with life, life processes, and personal growth (Batchelor, 2001). Further, hair has also been linked to gender, beauty, maturity, age, and even religious affiliation (Freedman, 1994; Helms et al., 2008). Thus, when an individual loses his or her hair, the crisis can be associated with a loss of sexuality, individuality, and attractiveness (Helms et al., 2008). It is widely known that many of the chemical agents used in a common form of breast cancer treatment—chemotherapy—cause hair loss, also known as alopecia.

In their study exploring chemotherapy-induced alopecia and its relation to body image, Boehmke & Dickerson (2005) examined 20 women who had undergone treatment for breast cancer. The researchers utilized interviewing as their method of data collection. This qualitatively-driven study resulted in several themes that emerged from the data. The authors

28

found that the extent of negative effects of hair loss on overall body image depended directly on

how the women coped with their hair loss. Feelings about hair loss varied from perceiving

baldness as a symbol of courage and pride, to feelings of trauma (Boehmke & Dickerson, 2005).

Another interesting finding of this study was that women reported not only hair loss from their

head as traumatic, but the loss of other body hair was equally distressing for the women

(Boehmke & Dickerson, 2005).

It is important to note that in addition to body image concerns, some treatments for breast

cancer, such as chemotherapy, can actually alter a woman's hormone levels and may reduce her

sexual interest or response (ACS, 2007). Some studies even suggest that younger women tend to

have more problems with these issues than older women (ACS, 2007).

Risk Factors for Breast Cancer

Each woman's risk for breast cancer varies, depending on several factors. Factors such

as diet, exercise, gender roles, income, education, culture, and individual attitudes and beliefs are

all interconnected in the schema of underlying issues contributing to the prevalence of breast

cancer (ACS, 2008; CDC, 2009; Johnson & Smith, 2002). More specifically, doctors now know

that women with certain risk factors are more likely than others to develop breast cancer.

Studies have shown older age, personal health history, family health history, certain genome

changes, ethnicity (African American, Asian, and Latina), higher breast density, lack of physical

activity, and excessive alcohol consumption all to be risk factors associated with breast cancer

(NCI, 2009).

Approximately 70% of the breast cancers diagnosed are believed to have developed

sporadically as a result of exposure to carcinogens in the environment or mistakes in the process

of normal breast cell division (Underwood, Richards, Bradley, & Robertson, 2008).

Comparatively, about 5% to 10% of breast cancers are thought to result from inherited genetic mutations. 15% to 20% of diagnosed breast cancers are believed to be a result of a combination of both genetic and environmental factors (Underwood et al., 2008).

Aside from being female, age is the most significant risk factor for breast cancer (NCI, 2009; Sinicrope et al., 2009). A breast cancer diagnosis is less frequent among women in their thirties and younger; however, breast cancer is known to be far more aggressive in the younger population as compared to older women (NCI, 2009; Imaginis, 2005). A family history of breast cancer also increases risk and accounts for 20-30% of all breast cancers (NCI, 2009). The risk for breast cancer is also higher for women 40 to 49 years of age if they have a history of breast cancer in a first-degree relative (ACS, 2007).

Clinical studies have also discovered mutations of two specific genes *BRCA1* and *BRCA2* to be associated with increased susceptibility for breast cancer and ovarian cancer (Nelson, Huffman, Rongwei, & Harris, 2005). These genetic mutations increase a woman's lifetime risk for breast cancer to 60% to 85%. Additionally, several characteristics have been identified as having an association with an increased likelihood of clinically significant *BRCA* mutations. Such characteristics include young age at breast cancer diagnosis, multiple cases of breast cancer in a family, bilateral breast cancer, history of both breast and ovarian cancer, both breast and ovarian cancer in a family, and Ashkenazi Jewish heritage (Nelson et al., 2005). Moreover, young women (18-39 years) who are at risk for hereditary breast and ovarian cancer and who have a *BRCA1* and/or *BRCA2* mutation face a high risk of developing cancer before age 50, as well as a 50% chance of transmitting that risk to each offspring (Hamilton, Williams, Bowers, & Calzone, 2009).

Considering factors related to heritage, non-Hispanic White women are more likely than any other ethnic group to be diagnosed with breast cancer; however, the overall breast cancer mortality rate is highest among African-American women (34.3/100,000) (Underwood et al., 2008; NCI, 2009). Non-Hispanic White women have the second highest breast cancer mortality rate (25.8/100,000), followed by Hispanic women (16.2/100,000), American Indian/Alaska Native women (13.4/100,000), and Asian /Pacific Islander women (12.6/100,000) (ACS, 2007; Underwood et al., 2008).

Race and ethnicity are concepts that are embedded in the American consciousness. Moreover, even to date, these concepts have varying connotations, which have greatly influenced both health-related behaviors and the delivery of health care to certain populations (Simon, 2006). An individual who is a member of an ethnic minority group may tend to approach health care differently, depending on how he/she combines his or her particular cultural health beliefs and behaviors with biomedical practices (Andrulis, 2005). Culture potentially plays a powerful role in influencing health care and, ultimately, health status. Moreover, a newer approach to understanding ethnic and socio-economic differences and their association with health behaviors has been to include measures of the social environment to help explain why members of ethnic minority groups are more likely to develop high risk factors for numerous health concerns (Lee & Cubbin, 2002).

In terms of breast cancer incidence, particularly, nationally, African-American women have a 35% higher breast cancer mortality rate than White women (Peek, Sayaa, & Markwardt, 2008; NCI, 2008), and the ethnic gap in breast cancer mortality has steadily increased over the past decade. The literature focusing on health disparities suggests the need for significant improvement in two key areas: developing knowledge and skills that integrate factors affecting

individuals from diverse heritages, and understanding the cultural context affecting health decisions (Andrulis, 2005).

Because of the many roles it has assumed within the African-American community particularly, the Christian Church cannot be overlooked as a credible context to address health issues facing this population—especially the incidence of breast cancer (Isaac, Rowland, & Blackwell, 2007). The historical uniqueness of the Church in the African- American community has been its concentration on the social, political, cultural, and religious well being of its parishioners. The Black Church has strong roots in African traditions that naturally link religion and medicine in a holistic manner. Further, it has often been described as an epicenter for artistic growth, a distinct social and political organization, a cultural cornerstone, as well as a vital center for health (Isaac, Rowland, & Blackwell, 2007). To utilize the Church, then, as a main health education and health promotion source for African-American women seems a viable means through which health professionals can help address breast cancer awareness and prevention among this population.

Another segment of the U.S. populations that has witnessed an increase in breast cancer incidence is Asian-American women. Among these women, cancer is currently the leading cause of death, and breast cancer is the most commonly diagnosed cancer (NCI, 2009). Interestingly enough, the change in incidence of breast cancer is rising more quickly among Asian-American women than among White women, in spite of the fact that the overall breast cancer incidence is lower among the former as compared to the latter (Lee-Lin et al., 2007). English language fluency, socio-economic status, acculturation, educational level, insurance coverage, knowledge about breast cancer warning signs, screening beliefs, and cultural attitudes and beliefs are likely factors that directly or indirectly affect the breast cancer incidence among

these women (Lee-Lin et al., 2007). Thus, much like the African-American community, health interventions tailored to address the unique concerns of the Asian-American community are needed to help effectively combat the occurrence of breast cancer among these women.

The Hispanic population represents another ethnic minority that is greatly impacted by breast cancer. Compared to non-Hispanic White women, Hispanic women have a much higher risk of dying from breast cancer. Even more alarmingly, breast cancer is also the most commonly diagnosed cancer and the leading cause of cancer death among this group of women (Hall et al., 2007). According to the American Cancer Society, an estimated 1,740 Hispanic women died from breast cancer in 2006. Under-utilization of breast cancer screening services, limited knowledge about breast cancer, poor health literacy, lack of health insurance, under-performance of BSE, and cultural beliefs have all been cited as possible underlying factors related to the breast cancer incidence among Hispanic women (Hall et al., 2007). Hence, a seeming trend exists that links some women who are members of ethnic minority groups. Whether African-American, Asian-American, or Hispanic, it is clear that causes of breast cancer rates among these women are multi-dimensional and cannot be successfully abated through a single, universal method. Perhaps a more viable approach lies within preventive efforts aimed at increasing knowledge, raising awareness, and addressing risk factors for the disease.

The largest known research study of its kind to investigate breast cancer risk factors is the *Sister Study*, conducted by the National Institute of Environmental Health Sciences (NIEHS), which is part of the National Institutes of Health. This national cohort study seeks to investigate environmental and genetic risk factors for breast cancer by studying 50,000 U.S. women between the ages of 35 and 74 who do not have breast cancer at baseline but have at least one sister—living or deceases-- diagnosed with the disease (NIH, 2008). In the attempt to recruit a diverse

group of volunteers and ensure that study results are beneficial to all women, researchers particularly encouraged African-American, Latina, Asian, and Native-American women to join the study. Study participants complete several questionnaires initially, in addition to providing samples of their household dust, blood, toenails, and urine. The objective was to examine the correlation that gentetics, exposure to environmental factors, and daily activities have in relation to breast cancer risk. The *Sister Study* will follow participants for 10 years and make a comparative analysis between those women who develop breast cancer and those who do not (Sandler, 2004).

In 2004, the study officially opened in pilot states including Arizona, Florida, Illinois, Missouri, North Carolina, Ohio, Rhode Island, and Virgina; it later extended enrollment nationwide. Although the study is no longer officially enrolling women, additional research projects it helped spawn include *The Two Sister Study*, *Early Life Exposures Study*, and *Young Women's Breast Cancer Project.* Moreover, the American Cancer Society, Sisters Network, Inc., the Susan G. Komen Breast Cancer Foundation, and the Y-ME National Breast Cancer Organization, in addition to a host of community breast cancer support and advocacy groups, are all in partnership with this landmark study in the greater effort to examine breast cancer risk factors in a comprehensive way (NIH, 2010).

Current Screening Recommendations

Breast cancer mortality rates have dramatically decreased in our country chiefly as a result of primary and secondary preventive measures in the form of timely screenings (ACS, 2009; CDC, 2010; Loerzel & Busby, 2005; Welch et al., 2008). Ensuring that accurate, up-to-date cancer screening information and services are easily accessible to women is critical in

reducing rates of cancer incidence and mortality (NCI, 2009). Early detection can reduce

mortality significantly and will promote women's overall quality of life (ACS, 2008; CDC,

2010; Sutherland, 2001; Welch et al., 2008). Breast self-examination (BSE), clinical breast

exam (CBE), and mammography are widely known to be the main methods of breast cancer

screening.

Breast self-examination is a screening method used to detect early breast cancer that

involves a woman examining her own breasts—looking and feeling eacg breast for possible

lumps, swelling, or distortions. BSE was once heavily promoted as a means of detecting breast

cancer at a more curable stage on a monthly basis, checking for any abnormalities in appearance,

size, shape, etc.(ACS, 2009).

During a clinical breast exam, a health care provider looks for differences in size or shape

between a woman's breasts. The skin is examined for any abnormal signs, and the nipples may

be squeezed to check for fluid (NCI, 2009). A mammogram is an x-ray picture of the tissues

inside the breast. Mammograms can often show a breast lump even before it can be felt. They

can also show a cluster of tiny specks of calcium, which can be a result of cancer, pre-cancerous

cells, or other conditions. If the mammogram shows an abnormal area of the breast, clearer,

more detailed images of that area will be obtained (NCI, 2009).

Screening for inherited breast cancer susceptibility is a 2-step process that includes

evaluation of clinically significant *BRCA* mutations, followed by genetic testing of individuals

who are considered to be at high risk for breast cancer (Nelson et al., 2005). Current guidelines

recommend testing for mutations only when an individual had personal or family history

suggestive of inherited cancer susceptibility, when the test result can be adequately interpreted,

and when results will aid in management of disease (Nelson et al., 2005; ACS, 2009).

The most recent guidelines concerning breast cancer screening issued by the U.S.

Preventive Services Task Force (USPSTF) in November of 2009 ignited tremendous debate and

subsequent backlash among U.S. political officials, medical personnel, varied health

organizations, and the general American public (ACS, 2009; CDC, 2010; Kravitz & Feldman,

2010; Lee et al., 2010; Smith, Cokkindes, & Brawdley, 2009). In stark contradiction to

American Cancer Society's breast screening guidelines recommending annual mammography for

all healthy women beginning at age 40 (ACS, 2009), the USPSTF issued a statement advising

against routine mammography screening for women 40 to 49 years of age; the USPSTF also

endorsed mammography screening every other year rather than annually for women between 50

and 74 (CDC, 2010; Kravitz & Feldman, 2010). The risks associated with screening, such as

false positives, exposure to radiation, and increased worry/anxiety, outweighed the benefits,

according to the panel. These guidelines loosed a huge eruption of criticism from several

organizations including the Society of Breast Cancer Imaging (SBI) and the American College of

Radiology (ACR) (Lee et al., 2010).

The USPTF panel was comprised of an independent group of primary care physicians

and scientists sponsored and staffed by the U.S. Department of Health and Human Services'

Agency for Healthcare Research and Quality. The panel investigated the effectiveness of film

mammography, clinical breast examination, breast self-examination, digital mammography, and

MR imaging—as well as risks and benefits of screening. Criticisms of the panel's findings have

been numerous. Breast imaging experts, particularly, have argued a lack of scientific evidence

used as a basis for the recent guidelines. The body of research on which the USPSTF based its

recommendations included eight mostly older randomized trials, many of which finished over 20

years ago. Critics have also voiced that no breast imaging or cancer specialist (radiologist,

surgeon, oncologist, etc) sat on the 16-person panel. Others have claimed that the panel's

members were not receptive to input from experts not on the panel. Even a politically-based

agendum has been postulated, especially given recent economical problems currently plaguing

the country. Further, some medical professionals have insisted the panel simply misinterpreted

analysis of the data. Dr. Carol Lee, for example, who is the current chair of the ACD Breast

Imaging Commission, has interpreted the risk/benefit ratio to be in favor of annual

mammography screening beginning at age 40 (Lee et al., 2010).

     Advantages and disadvantages associated with mammography are well documented. The

main benefit of screening mammography every 1 to 2 years, especially in women 40 to 49 years

of age is a decrease in breast cancer mortality (Qaseem et al., 2007).   Over the past 40 years,

randomized clinical trials have shown significantly lowered breast cancer mortality rates among

U.S. women who participate in screening mammography (Feig, 2002). Radiation exposure, pain,

false-positive results, and false reassurance are cited as the main drawbacks of mammography

(NCI, 2009).

     Clinical breast exams and mammography have been shown to reduce the risk of dying

from breast cancer by as much as 25% in women between ages 50 and 69 (CDC, 2010). The

majority of those opposing the revised guidelines have referenced the fact that in numerous

studies, mammography has been shown to reduce breast cancer risk in women 40 to 49, as well.

And although no major clinical trials have yet proven the efficacy of breast self-examination,

there is evidence in the medical literature that a significant percentage of breast cancer is

discovered by chance and that women who perform monthly BSE often recognize a mass in their

breasts earlier than women who do not perform monthly BSE (Wood, 2009). Regan &

Durvasula (2009) suggest that preventive screening in the form of regular breast self-examinations still remains one of the best protections against breast cancer.

A rather recent Swedish study seemed to add to this controversial topic. This study found that starting women on mammography screening at age 40 rather than age 50 was correlated with a 26% reduction in risk of death due to breast cancer (Jonsson et al., 2010). The finding was extremely important because it raises even further questions surrounding what 40 to 49-year-old women should do about mammography screening.

The American Cancer Society does not officially endorse recommendations for monthly breast self-examinations but keeps it optional for women, starting at age 20 (ACS, 2009). The ACS also currently recommends annual mammography screening of women 40 and older. Meanwhile, the National Cancer Institute (NCI) currently recommends mammography screening for women 40 and older every one to two years. Still, women should be well-versed about the potential benefits, limitations, and disadvantages (false-positives) that are associated with various screening methods, in general—a task that has proven challenging to achieve in lieu of the recent ongoing controversy (ACS, 2009; Smith, Cokkinides, & Brawley, 2009; Lee et al., 2010).

Knowledge and Attitudes about Breast Cancer Screening

Even though early detection of breast cancer is clearly associated with breast cancer survival, many women still do not follow recommended screening guidelines (Regan & Durvasula, 2008). Several barriers have been identified that influence women's choices regarding breast cancer screening. These factors include accessibility, cost, trust of healthcare providers, lack of transportation, lack of knowledge of cancer screening guidelines, and the underlying belief that cancer, itself, is incurable (Farmer et al., 2007). Other factors studies have

shown to be related to screening compliance center on patients' perceptions of potential health risks associated with radiation exposure to (such as in mammography screening) (Regan & Durvasula, 2008; Ludwig & Turner, 2002). In essence, although the factors related to breast cancer screening behaviors are multi-faceted, the overarching idea is that knowledge and awareness are crucial for breast cancer prevention.

In the attempt to explain this phenomenon, Rowe, Montgomery, Duberstein, & Bovbjerg (2005) completed a study testing the hypothesis that perceived risk for breast cancer is related to health locus of control. Sixty-six healthy women with and without family histories of breast cancer participated in the study. Researchers found a significant relationship between internal health locus of control and perceived risk of breast cancer among the women studied (Rowe et al., 2005).

Although their research did not focus, per se, just on breast cancer awareness and screening behaviors, Ludwig and Turner (2002) addressed an extremely pertinent issue in examining public perceptions of radiation exposure risk. The basis for conducting such research was that healthcare providers are aware of the radiation dose and associated health risks of a particular medical procedure, yet many care providers struggle to sufficiently and clearly address concerns posed by patients due to the patients' misunderstanding—or lack thereof—of dose/medical terminology (Ludwig & Turner, 2002). Study authors utilized a descriptive, cross-sectional research design to survey a convenience sample of 200 adult shoppers at two malls. The survey instrument consisted of 25 items, which elicited demographic information, perceptions and behaviors regarding sources of potential radiation exposure, and perceptions and behaviors related to radiographic procedures and imaging personnel. Study results indicated that one third of the respondents believed most of their personal radiation exposure had come from

medical imaging procedures. In addition, the authors indicated that survey response implied that public perceptions and behaviors related to screening and imaging are based on beliefs and attitudes stemming from inadequate information and knowledge; thus, these findings suggest a great need for better public education about medical screening-related radiation exposure and its associated health risks (Ludwig & Turner, 2002).

Ackerson & Preston (2009) completed a systematic review of forty-seven research papers addressing the underlying reasons why women did or did not decide to have cancer screenings. The authors utilized MEDLINE and PsycINFO databases and the Cumulative Index to Nursing and Allied Health Literature. Key search terms included 'decision,' 'choice,' 'framing,' 'breast cancer screening,' 'cervical cancer screening,' and 'adherence.' To be included in the review, papers had to be qualitative or quantitative in design; had to have been published between January 1994 and November 2008; and had to focus on breast and/or cervical cancer screening as the primary health promoting behavior (Ackerson & Preston, 2009). Although the focus of this review was on both cervical and breast cancer, the findings are still relevant. The authors found fear to be the greatest emotion guiding women's decision to screen or not to screen. Another finding was that healthcare providers tend to underestimate the degree to which patients need cancer information, and they wrongly assume that patients usually ask for information when they need it (Ackerson & Preston, 2009). Thus, the findings from this review seem to confirm the overarching theme of a great need for better dissemination of accurate, up-to-date information as a means to increase knowledge, particularly when it comes to breast cancer awareness.

Improving cancer knowledge and screening awareness through a telephone interviewer educational intervention was the main objective of a study conducted by Royse & Dignan (2009)

in the Appalachian region of the U.S. The researcher relied on a telephone survey to assess a total of 696 Appalachian respondents concerning their knowledge of cancer and cancer screening intentions, utilizing a pre/post research design. At baseline, study respondents were divided into two groups: an educational intervention group (the Informed group) and a Control group. All participants were asked the same questions, but interviewers provided correct information to the members of the intervention group whenever they answered incorrectly or had a lack of knowledge of the particular question being raised. Researchers then re-interviewed respondents four months later. This telephone educational interviewer intervention did not appear to increase respondents' knowledge about cancer or affect their intentions to request cancer screening (Royse & Dignan, 2009). The authors suggested the possibility of respondents being positively impacted but not enough to pull the aggregate data in a positive direction as a potential reason of lack of success. The authors also indicated that the telephone interviewers failed to make a personal connection to the Appalachian residents. In this view, if the surveyor, like the respondents, spoke with an Appalachain accent, then the surveyor's credibility may have been more easily established (Royse & Dignan, 2009). Moreover, the authors offer the Health Belief Model in helping to explain why the intervention was not successful. Although this study's focus was on cancer, in general, many items on the questionnaire addressed women's knowledge of breast cancer and breast cancer screening methods specifically (Royse & Dignan, 2009).

Ethnic minority women, especially Asians and Latinas, are particularly unlikely to undergo regular screening for breast cancer and may suffer increased morbidity and mortality as a direct result of delayed detection and/or treatment (Regan & Durvasula, 2009). Breast cancer is the most commonly diagnosed cancer among Asian-American women in the U.S., yet these women have the lowest mammography screening rates among ethnic groups in the country (Lee-

Lin et al., 2007). In their study on breast cancer beliefs and screening practices among Asian-American women, Lee-Lin et al. (2007) found this group to have low knowledge scores about breast cancer and screening recommendations. Current findings suggest that negative attitudes towards breast cancer screening—generalized distrust of others, fear of pain or diagnosis, and disbelief in the efficacy of screening tests—may be more predominant among racial and ethnic minorities and could, therefore, account for lower rates of cancer screening among these women (Kressin, Manze, Russell, Katz, Claudio, Green, & Wang, 2010). More culturally relevant strategies are increasingly being cited as viable ways to address barriers to breast cancer screening among women who are considered to be ethnic minorities.

Simon (2006) extensively examined the impact that cultural beliefs have on breast cancer screening among diverse women—African American, American Indian/Alaskan Native, Asian American/Pacific Islander, and Hispanic/Latina. The underlying premise of this study was that because culture is increasingly being recognized for its influence on health behavior, more strategies that are culturally appropriate and effective in decreasing the breast cancer incidence among culturally diverse women are needed (Simon, 2006). The author addressed each ethnic group specifically, presenting key ideals that impact these women's screening behaviors.

For example, the prominence of faith and religion in the African-American culture may contribute to an overall mentality that serves as a barrier to screening among African-American women (Simon, 2006). Hispanic/Latina women tend to embrace a belief system known as "fatalismo"—which is cited as the belief that a cancer diagnosis is a death sentence; thus, early detection of cancer, in turn, may be of little to no value among Hispanic women (Simon, 20006). The author goes on to explain that Asian-American women have not been as rigorously studied as compared to other ethnicities. However, among these women is the idea that cancer

oftentimes is a consequence or punishment for not living a morally correct lifestyle (IOM, 2002; Simon, 2006). A preference for Eastern medicines is also given as a potential barrier to screening among these women (Simon, 2006). Much like Asian Americans, some American Indian women also share the belief that cancer is a sort of punishment for wrongdoing. Moreover, there is also a cultural belief unique to the Navajo that language can shape what happens; in other words, having a conversation about breast cancer could lead to its manifestation in the body (Rajaram & Rashisidi, 1998; Simon, 2006).

In the article's conclusion, Simon (2006) asserts that much like the fields of health promotion/education, nursing, medicine, etc., the field of social work also has great potential to play a vital role in cancer control in the U.S. Because of its holistic approach, social work is a viable vessel through which cultural beliefs, attitudes, and knowledge regarding breast cancer screening behaviors among diverse women can be more appropriately examined. To help achieve this end, four overarching principles are offered and expounded upon: inclusion and use of indigenous support; cross application of approaches for diverse populations; honor and incorporation of culture; and attention to language, literacy, and cultural information (Simon, 2006).

A recent study also sought to incorporate sociodemographic factors in the analysis of general willingness to engage in cancer screening among a diverse cohort from multiple geographic areas (Kressin et al., 2010). In order to ensure a wide racial and geographic representation that included Whites, African Americans, and Hispanics, study authors conducted random-digit-dial telephone interviews to adults residing in San Juan, Puerto Rico; Baltimore, Maryland; and New York, New York. The final study sample consisted of 356 African Americans, 493 non-Hispanic Whites, and 313 Puerto Rican Americans. Telephone interviews

were conducted in either English or Spanish whenever appropriate. Respondents reported on sociodemographic characteristics, attitudes about barriers and facilitators of cancer screening, and willingness to have cancer screening under four scenarios: when completed in the community vs one' doctor's office, and whether or not one had symptoms (Kressin et al., 2010). Study authors found that ethnic minority status, lower income, and age all to be frequently associated with increased willingness to undergo cancer screening, even after including attitudes and beliefs about screening. The authors concluded from this study that that sociodemographic factors were generally much stronger than attitudinal barriers and facilitators in relation to participants' willingness to have cancer screenings. And despite the study's inclusion of both males and females, implications are relevant to the present discussion: cancer screening campaigns should affect attitudinal change, but should also target screening to specific population groups (Kressin et al., 2010).

In their study of predictors of breast cancer screening among Asian and Latina university students, Regan & Durvasula (2006) targeted women of both ethnic groups who were enrolled in an urban university located in the Los Angeles Metropolitan area. A total of 240 women participated in the study, 165 being Latina and 75 Asian. Researchers utilized class credit and a token fee as incentives. Participants completed a written self-report questionnaire, which assessed health-related beliefs, sexual experience, cancer knowledge, family history of cancer, acculturation, and breast cancer screening behavior. The average age of participants was 20.15 years. Study results indicated that only 39.4% of Latinas and 36.0% of Asians reported having ever had a clinical breast examination. Among Latina women, cancer-related knowledge and perceived barriers to screening were predictors of screening behavior. Among Asian women,

age, sexual intercourse experience, and perceived barriers to cancer screening predicted whether or not women had undergone a clinical breast exam (Regan & Durvasula, 2006).

Latina women were also the focus of a cross-sectional study conducted by Bird, Moraros, & Banegas (2010) along the U.S.-Mexico border. Because this area is known to be a medically-underserved region characterized by high poverty and uninsured rates and rapid population growth, researchers sought to analyze differences in breast cancer-related knowledge, attitudes, and practices between Latina women with and without a family history of breast cancer. Study participants completed an interviewer-administered questionnaire that obtained information regarding sociodemographic traits, beliefs and knowledge about breast cancer and breast cancer screening, family history of breast cancer, preventive screening practices, and recent medical visits (Bird et al., 2010). Among the 137 participants, those with a family history of breast cancer had levels of breast cancer knowledge and attitudes similar to those with no family history of the disease. Additionally, women with a family history of breast cancer were more likely to have ever performed breast self-examinations. The authors of this study concluded that women in this particular region of the U.S. who have a family history of breast cancer comprise an at-risk group; adherence to breast cancer screening recommendations could substantially lower breast cancer mortality among this group (Bird et al., 2010). Although partiapants of this study were age 40 and over, the findings are still very much applicable in that they highlight the importance of addressing knowledge, beliefs, and factors influencing screening behaviors in relation to breast cancer.

Research also suggests that African-American women are less likely to participate in breast cancer screening and early detection programs (Powe, Daniels, Finnie, & Thompson, 2005). Factors that influence their breast cancer screening and treatment decisions include such

things as cancer fatalism, fear, knowledge about the disease, access to healthcare issues, and mistrust of the healthcare establishment (Powe et al., 2005).

Peek, Sayaa, & Markwardt (2008) completed a qualitative study to explore the underlying reasons for fear in relation to breast cancer screening among low-income African-American women. Researchers conducted four focus group sessions among a sample of 29 women at an urban academic medical center. Each group consisted of approximately 6-8 people and lasted about 90 minutes. In the attempt to foster a "safe environment," accurate data collection, and understanding of cultural phenomena, each focus group was led by an experienced African-American moderator. A brief self-report questionnaire assessing breast cancer knowledge (mammogram definition and efficacy), health screening behaviors (clinical breast examinations, mammograms, and breast self-examination), and demographic information was administered before each focus group session began. Each interview/focus group was audio-taped, transcribed verbatim, and imported into Atlas.ti software. Members of the research team independently coded each transcription. Study results showed that fear concerning breast cancer screening among low-income African-American women stems from a multi-faceted source; one single cause could not be ascertained. Underlying feelings of mistrust were also commonly reported during the study. This study identified the need for health care professionals to address physical, social, and cultural barriers to breast cancer screening within this population (Peek et al., 2008).

Past and Present Strategies

When it comes to health promotion and disease prevention, probably the most critical type of intervention involves the communication of risk information to the public (Rothman,

1999; Vahabi, 2005). In this view, knowledge is an essential element in people's health

behaviors. Thus, the accumulation of knowledge should not begin when people initially

encounter a disease; the process of acquiring knowledge should begin much earlier in people's

lives.

In this view, our federal government has increased funding for early detection, diagnosis,

and prognosis of breast cancer from $36.4 million to $73.2 million. In addition, the total number

of projects dedicated solely to early detection, diagnosis, and prognosis of breast cancer in our

country has risen from 197 to a total of 288 (NCI, 2005). Moreover, initiatives like the

International Breast Cancer Screening Networks, *Insight Awards to Stamp out Breast Cancer*,

Minority-Based Community Oncology Program, and the *Specialized Program of Research*

Excellence in Breast Cancer (SPORE) are a few of the initiatives created solely to address the

breast cancer incidence in recent times (NCI, 2005). Through such initiatives, women are given

assistance with screening and/or treatment costs, educational training, and self-empowerment

strategies in relation to breast cancer. Despite the vast array of initiatives such as these,

however, breast cancer still poses a tremendous threat to the health and quality of life of scores

of American women.

Health Belief Model

Researchers create and implement interventions as a major means by which to

disseminate knowledge and increase awareness about a given health problem, such as breast

cancer. Interventions that yield desirable changes are ideally based on at least one theoretical

framework (Glanz, Rimer, & Lewis, 2002). Health-behavior theories assist researchers by

organizing their inquiry into why people do or do not engage in specific health behaviors (NCI,

2005). They are valuable during different stages of planning, implementing, and evaluating an intervention. Theories also help explain behavior and suggest ways to achieve behavior change (Glanz, Rimer, & Lewis, 2002).

The Health Belief Model (HBM) is an example of a health behavior theory that considers one's overall perceived risk of an illness as a precursor to positive, preventive behavior (Wendt, 2005; Janz & Becker, 1984; Weinstsin & Sandman, 1992). It was originally postulated in the 1950's by social psychologists in the U.S. Public Health Service (Becker, 1974; Janz & Becker, 1984; Kirscht, 19974;Rosenstock 1974; Glanz, Rimer, & Lewis, 2002). Perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action comprised the initial core components of the model; in 1977, Bandura added the self-efficacy component to the HBM (Janz, Champion, & Strecher, 2002). This theory is known as a value-expectancy theory and known to now be the most widely used model for predicting BSE behavior (Champion, 1993; Champion & Miller, 1992). The fundamental premise of the HBM is that an individual's desire to evade illness, coupled with a belief that a particular health action would avert onset of the illness, can be interpreted and explained in relation to a number of diseases. More detailed analysis can estimate an individual's perceived susceptibility, severity, and cues to action to attempt to reduce overall risk for a particular illness or disease (Glanz, Rimer, & Lewis, 2002).

Earlier studies using the HBM centered typically on primary and tertiary preventive behaviors. Janz and Becker (1984) conducted an extensive literature review of the usage of the HBM in research beginning in the early 1970s through 1984. Their review encompassed 46 studies including both prospective (n=18) and retrospective (n=28) studies investigating a conglomeration of preventive-health behaviors and sick-role behaviors. The results of their review suggested that the HBM concepts are valuable tools in research studies in that they can

48

serve as predictors in examining health behavior (Janz & Becker, 1984). Hence, since that time, the HBM has been used in several studies as a theoretical framework to study BSE and other breast cancer detection behaviors, specifically (Hoeman & Ku, 1996; Houfek & Foxall, 1997).

The year 1984 proved to be a major turning point for the HBM and research focusing on cancer screening behaviors. In that year, Champion initiated an innovative research instrument that directly linked the HBM constructs to breast cancer screening behaviors. (Prior to 1984, the HBM was not frequently used to explain such behaviors). Champion used a convenience sample of 301 females who were at least 16 years of age and literate (Champion, 1984). The sample was stratified for variation in socioeconomic status. Champion distributed written questionnaires via postal service, as well as by hand; these collection methods yielded a 47% return rate. A retest questionnaire mailed randomly later produced a 95% return rate. Chanmpion (1984) concluded from this study that her scales for susceptibility, seriousness, and barriers were internally consistent and reliable. Additionally, she revised the benefits and health motivation scales due to their being rejected for inconsistency (Champion, 1984)

Expanding her previous work studying HBM and BSE, Champion (1999) modified scales used in measuring perceived susceptibility, benefits, and barriers to breast cancer screening behaviors— and applied them to mammography, as well. Criteria for participant eligibility in this study included not having had a mammogram in the last 15 months, not having had breast cancer, and being able to read and write English (Champion, 1999). Additional scale items were presented to participants via two focus group sessions. Results of the newly modified scales indicated internal consistency ranging from .75 to .88, and test reliabilities between .59 and .72. Thus, these scales represented an improvement from those Champion had developed earlier

(Champion, 1999). Since Champion's work, the HBM has been used in a variety of populations and settings to explore a wide range of health beliefs and behaviors.

Although the participants in Champion's study included women age 50 and older, her revised scale is applicable to virtually any age of adult women. This notion rests on the idea that despite mammography screening being a current breast cancer screening recommendation for older women; younger women should still be well informed and made aware of it, as they will certainly encounter mammography screening later in life. Therefore, Champion's (1999) revised scale served a major component in assessing the level of breast cancer knowledge, beliefs, and screening behaviors in this current study examining emerging adult women.

Relying on the main components of HBM, a cross-sectional, community-based study examining why some women have either an optimistic or pessimistic bias about their breast cancer risk was completed by Katapodi, Dodd, Facione, Humphreys, & Lee earlier this year (2010). They utilized HBM to measure family history of breast cancer, worry about getting breast cancer, overall knowledge about breast cancer risk factors, as well as women's perceived susceptibility of getting breast cancer. Consistent with findings in other studies, family history and breast cancer worry were found to be significant predictors of personal risk judgments for the women surveyed. Another finding was that women who overestimate their breast cancer risk may suffer unnecessary stress, and anxiety, and may overuse health services (Katapodi et al., 2010).

In their study of the effects of peer and group education on knowledge, beliefs, and breast self-examination practices of Turkish female university students, Karayurt et al. (2009) also used the Health Belief Model as a theoretical basis. The study was conducted during the 2006-2007 academic year and included a total of 193 participants. Researchers used a written questionnaire

to collect data at baseline and after six months on socio-demographic characteristics, knowledge of breast cancer and breast self-examination, frequency of breast self-examination practice, and Champion's Health Belief Model Scale (CHBMS). Specifically, the CHBMS was comprised of a total of 42 items with six subscale, and used a 5-point Likert scale from 1 "strongly disagree" to 5 "strongly agree." In compliance with the major constructs of HBM, the CHBMS included subscales related to susceptibility, seriousness, benefits, barriers, confidence/self-efficacy, and health motivation. Results of the study showed that mean knowledge scores increased from 42.08 to 65.26 after peer education and from 41.44 to 63.74 after group education. The rate of regular breast self-examination also increased significantly for both groups. Perceived benefits and confidence related to breast self-examination increased and perceived barriers decreased significantly after both interventions, as well. Thus, from this study, the authors concluded that both interventions (peer and group) are beneficial in increasing breast awareness among young women (Karayurt et al., 2009).

Norman & Brain (2005) applied an extended Health Belief Model (HBM) to the prediction of breast self-examination among women with a family history of breast cancer. This study also examined the impact of breast cancer worries and past behavior on breast cancer screening practices. Researchers compiled a written questionnaire measuring HBM variables (as used in previous research studies), worry, and demographic variables. Specifically, researchers utilized the *Breast Cancer Worry Scale* by Lerman et al. (1991) to assess the frequency of concerns about developing breast cancer and the impact of breast cancer worries on mood and daily functioning. Items were rated on a 4-point response scale, with high scores indicating breast cancer worries. Respondents were also asked to indicate the frequency with which they performed breast self-examination. Finally, they were asked to indicate the number of first and

second-degree relatives affected with breast cancer as a measure of family history of breast cancer. Study results emphasized the importance of focusing on over-performance and under-performance of breast self-examination for breast cancer prevention. The study also highlighted a need for health interventions designed to enhance women's overall confidence in their ability to perform breast self-examination. And, attempts to reduce worry related to breast cancer may encourage more appropriate and effective breast self-examination, according to the study (Norman & Brain, 2005).

Wendt (2005) also applied the Health Belief Model to her examination of how female undergraduates perceive their future risk of breast cancer and coronary heart disease. Unlike the present study, which targets female college students in the Southeastern region of the country, the Wendt (2005) study participants included 137 female undergraduate students attending a small liberal arts college in the northeastern region of the U.S. Participants were asked to complete a written survey, which assessed items such as perceived illness frequency, level of worry, awareness of risk factors, cognitive variables, mental image, health behaviors, seriousness, etc. Demographic variables included year in college, age, and ethnic/racial composition. Results of the study indicated unrealistic pessimism regarding the women's personal risk of breast cancer among peers. When compared to coronary heart disease, participants were significantly more worried about getting breast cancer; yet, they were less aware of breast cancer risk factors. Further, perceived risk of breast cancer was not associated with breast self-examinations.

The HBM has been especially valuable in examining various concepts in primary care, preventive medicine, and public health. It has been repeatedly utilized as a theoretical framework to examine a range of health behaviors, including those associated with chronic

illness and disease. Additionally, the HBM model has been frequently applied to the

investigation of individual health-related beliefs. In this study, the HBM was employed as a

theoretical basis to explore breast cancer-related knowledge, beliefs, and screening behaviors

among emerging adult college women in the southeastern part of the U.S.—a population not

previously commonly targeted. A graphic representation of applied HBM constructs is shown in

Figure 1.

Figure 1. *The Health Belief Model* (Rosenstock, 1966, revised by Becker et al., 1974, 1984*)*
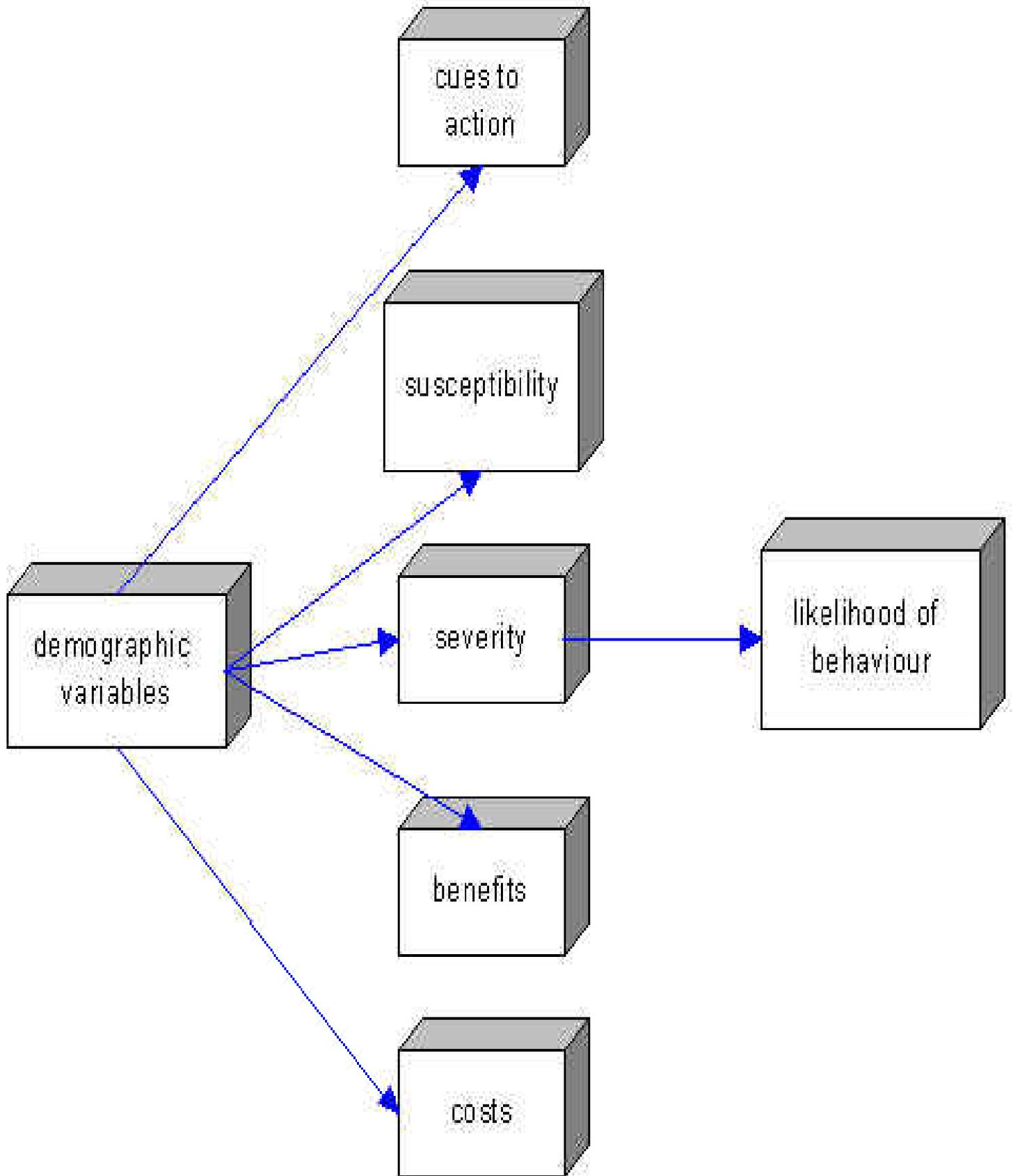
Emerging Adult Women's Role in Health Decision-Making

Early diagnosis of breast cancer has been widely accepted as a viable means to significantly reduce mortality and promote women's overall health and quality of life (ACS, 2009; CDC, 2010; Sutherland, 2001). Women, in general, have been shown to be more likely to actively participate in making health-related decisions than men (Arora & McHorney, 2002). Women also play a vital function in making healthcare choices for the entire family unit (Sutherland, 2001). Specifically, those women who are in the process of transitioning from adolescence to adulthood offer a unique, critical window of opportunity for change in (or impact on) health behavior.

Emerging Adults

Arnette (2000) has recently proposed the term "emerging adulthood" to refer to a developmental period from the late teens through to the twenties, with a focus specifically on the years 18-25. An increase in the number of young adults enrolled in institutions of higher learning, compounded by a delay of marriage and childbearing, has influenced the conception of a period of maturity during which individuals no longer perceive themselves as adolescents, yet do not consider themselves to be adults, either (Arnette, 1999). A key marker in emerging adulthood is individuals' relinquishing the reliance on parents and replacing it with an established sense of autonomy (Cohen, Kasen, Chen, Hartmark, & Gordon, 2003). This is a time of change and identity exploration that precedes settling into long-term adult roles characterized by higher degrees of permanence and stability (Friedman & Weissbrod, 2005).

The development of a self-identity is a defining characteristic of emerging adulthood (Nelson et al., 2008). During this time, individuals explore new ideologies, conceptual

55

frameworks, and behaviors that ultimately allow them to express, to some degree, their individuality. Further, this time period may also be one of changing support systems and altering interpersonal influences. Studies have shown, for example, that young adults spend more leisure time alone compared to any other age groups except retirees older than age 55 (Nelson et al., 2008; Larson, 1990). Another interesting finding is that as youth transition into college and adulthood, closer relationships with siblings and parents may evolve (Nelson et al., 2008).

Compared to adolescence, emerging adulthood has received far less attention from researchers and policymakers alike (Schwartz, Zamboanga, Ravert, Kim, Weisskirch, &Williams, 2009). This stage of development was once considered to be a time of optimal health and well-being. More recently, however, the transition from adolescence to young adulthood is gaining acceptance as a vital time for health promotion and disease prevention (Nelson et al., 2008). During this time, individuals are at risk for a range of adverse health behaviors (Nelson et al., 2009). Emerging adulthood may also be a critical time during which individuals adopt long-term health behavior patterns, which are associated with increased long-term disease risk (Friedman & Weissbrod, 2005). During this time, an individual's sense of insight, judgment, and wisdom is being established. Optimal decision-making patterns and capacities for reasoning have also been found to actually increase through late adolescence and into the early twenties (Pasupathi, Staudinger, & Baltes, 2001).

Harris et al. (2006) conducted a study examining diet, inactivity, access to healthcare, substance abuse and reproductive health of young adult participants in relation to age. Study authors did not overtly use the term emerging adults, but their focus was on participants between ages 18 and 25—the age level comparable to that of emerging adulthood. The results of this study indicated that health risks increased and access to health care decreased as adolescents

transitioned into young adulthood. Thus, these findings support the notion that young adults are engaging in behavioral activities that place them at risk for adverse health in the future (Harris et al., 2006).

Emerging adulthood is a period marked by social and biological change. For example, although scholars view the overall impact as minimal, the hormonal fluctuations that take place throughout puberty have long been correlated with mood and behavior precariousness in adolescents (Arnette, 1999). In an experimental controlled study of college students, Bennett and Bard (2006) found that significant age-related variations in brain structure occurred over time, particularly in regions linked to behavior, in a group of 18-year-old college freshmen. Similar changes were not observed in the control group of students over age 25. The authors postulate that observed changes result from the students' response to and need to adapt to environmental changes and demands of the freshman year (Bennett & Bard, 2006).

Emerging adults were also the focus of Laska, Pasch, Lust, Story, & Ehlinger's (2009) research project investigating a wide range of health risk behaviors among this audience. The authors obtained health survey data from 2,026 emerging adult college students in a large northern public university in the U.S. on issues health-related issues including physical activity and diet, sexual behavior, sleep, stress, and substance abuse. The 10-page health risk survey has been conducted at this university every three years since 1995 (Laska et al., 2009). Researchers also collected sociodemographic data such as year in school, age, and gender. Approximately 38% of the respondents were male, nearly 83% were White, and the mean age was 21.8 years. Overall, study authors found that a meaningful patterning of risk behaviors and lifestyle characteristics occurs among emerging adults in college. In their sample, approximately one in every four females and one in three males were classified as high risk—showing elevated risk for

both traditional risk behaviors (e.g., substance use) as well as lifestyle characteristics (e.g., diet, physical activity). These students may be in the greatest need of health-related interventions (Laska et al., 2009).

In their work on mass communication and its impact on perceptions about breast cancer, Jones, Denham, & Springston (2005) present two main underlying reasons why emerging adult college women should be aware of breast cancer risk, particularly. The authors cite the first reason involving the fact that that breast cancer in younger women is often a more aggressive form than in older women. And since younger women generally do not undergo annual mammography screening, they should appreciate the potential advantages of performing breast self-examinations and having clinical exams. The authors' second point rests on the notion that the college environment provides a "teachable moment." With initiatives of established organizations like the Susan G. Komen Foundation and the American Cancer Society targeting college students with fundraising and awareness campaigns, most researchers agree that the college years could potentially be an effective time for health behavior intervention strategies (Jones et al., 2005). Further, in recent years, our country has witnessed an increase in the number of students enrolling at institutions of higher education (U.S. Census Bureau, 2008).

Even though college-aged women are not likely to be at immediate risk for breast cancer, these women are an essential target audience because of the cumulative effects lifestyle choices and preventive heath behavior practices can have throughout the lifespan. Hence, these behaviors, in turn, can significantly impact their risk of eventually developing breast cancer (Wendt, 2005). Thus, the underlying basis of this research study is the notion that investigating factors that could potentially impact knowledge, attitudes, and behaviors associated with breast cancer and breast cancer screening behaviors in college women—could help health professionals

create interventions that are better suited specifically for this populations, which, in turn, could ultimately result in altering their actual breast cancer risks. Moreover, impacting these women in this extensive approach could lead to positive effects on the health behaviors of their families, as well.

College Student Health

On average, Americans are currently living longer than ever before, yet adolescents and young adults experience their share of life-threatening problems. Adolescents and young adults are considered to be those individuals who fall into the 15-to 24-year-old range (McKenzie et al., 2008). The people in this age group represent the future of our nation and are, therefore, considered to be a vital component of American society. In 2005, adolescents and young adults comprised over 14% of the U.S. population (U.S. Census Bureau, 2007). Meanwhile, the proportion of adolescents and young adults in the general population is projected to increase, and the racial and ethnic makeup will become increasingly more diverse (U.S. Census Bureau, 2007; NIH, 2009).

Since 1997, the number of 18-24-year-olds in the U.S. rose from 25.5 million to 29.5 million, an increase of 16% (USDE, 2009). Moreover, approximately 18.2 million students—39% of the 18-24-year-old population—are currently enrolled in America's over 4,200 colleges and universities, indicating that between 1997 and 2007, college enrollment has increased by 26% (U.S. Department of Education, 2009). Even more, the National Center for Education Statistics (NCES) projects that from 2006 to 2017, American society will see a rise of 10 percent in enrollment in institutions of higher learning of people under the age of 25 (USDE, NCES, 2009).

The combined period of adolescence and young adulthood is a critical one in terms of health status, for it is during this period that many health-related beliefs, attitudes, and behaviors are adopted and consolidated (McKay, Fingerhut, & Duran, 2000). Specific lifestyles choices are made during this stage, which will have long-term impacts on these individuals' health in later years of life. While young people at this stage in life have increasing access to health-compromising substances and experiences—such as sexual risk-taking, sleep deprivation, alcohol, tobacco, and other drugs—fortunately, they also have access to health-enhancing opportunities like healthful diets, proper early detection methods, and regularly scheduled exercise. Although this period is oftentimes combined throughout previous literature, the focus of the present discussion was college years, and therefore examined mainly the health behaviors common to young adults.

The college years present individuals opportunities for development of identity, new experiences, and newly-found personal freedom (Scott-Sheldon, Carey, & Carey, 2008). The college years have also been widely noted for the surfacing of risky health behaviors; such behaviors put college students at high risk for a myriad of health problems and concerns. A substantial amount of research has examined the prevalence of issues such as sexually-transmitted diseases, alcohol and other substance use/abuse, tobacco use, and behavioral contributors to violence and unintentional injuries on college campuses (CDC, 2006). Several primary factors have been found to influence college students' choice of engaging in certain health-related behaviors: gender, ethnicity, personal knowledge, age, self-esteem, peer relationships, self-efficacy, family/parental relationships, and perceived susceptibility and vulnerability (Kolodinsky, Gree, Michahelles, & Harvey-Berino, 2008).

In their exploratory study examining several important health behaviors as a function of membership in fraternity or sororities, Scott-Sheldon et al. (2008) made two initial evidenced-based assumptions: (a) that young adults self-select into peer groups (McCabe et al., 2005), and (b) that socialization processes promote greater alcohol use. Particularly, the authors investigated alcohol use, cigarette smoking, drug use, sexual behavior, eating, physical activity, and sleeping. Study participants were comprised of 1,595 undergraduate students at a major university in New York. Of the participants, 64% were female; 81% were White; 17% were fraternity/sorority members; and the mean age was 19.5 years. A written questionnaire was administered to groups of students in introductory psychology courses. Researchers utilized various instruments including a modified version of the Daily Drinking Questionnaire (Collins et al., 1985), a cigarette smoking assessment adapted from the National College Health Risk Behavior Survey (CDC, 1995), as well as questions adapted from the National Household Survey on Drug Abuse (Substance Abuse and Mental Health Services Administration, 2000). Study findings were compliant with the two overarching assumptions made based on evidence from previous research: student involvement in social organizations was directly correlated with increased alcohol consumption (McCabe et al., 2005).

In a similar fashion, Gieck & Olsen (2007) raised the question of how to develop a lifestyle approach to health maintenance behavior among college students. In this study, researchers recruited 41 college students from a medium-sized western U.S. university to examine the influence of a holistic model of health and wellness on physical activity level among obese and sedentary college students. Participants recorded daily walking totals (using a pedometer) and completed 5 bimonthly classes in which holistic wellness principles were discussed. Study authors developed a 31-item measure that assessed participants' knowledge of

principles of holistic wellness, their self-efficacy regarding their ability to use the principles in their daily lives, as well as their activity levels. Authors also developed pre- and post measures for use in bimonthly classes and a 1-month follow up questionnaire for the program. Results of this study suggested that a holistic model of health is useful for increasing activity and at least short-term adherence to a lifestyle approach to health (Gieck & Olsen, 2007). Participants who completed the 11-week intervention experienced a decrease in body fat and an increase in self-efficacy and knowledge concerning principles of holistic wellness. Moreover one-month follow up data indicated that the majority of participants who completed the intervention continued to engage in behaviors consistent with a holistic model of wellness. Researchers have previously shown that knowledge and self-efficacy are important elements in individuals' ability to incorporate concepts of holistic wellness into their daily lives (Rimal, 2001). The study conducted by Gieck and Olsen (2007) resulted in conclusions consistent with previous findings.

Citing osteoporosis, heart disease, and cancer as the three most serious diseases to have an adverse effect on women, Ford, Bass, Turner, Mauromoustakos, & Graves (2004) argued the existence of a clear relationship between young women who are osteopenic (osteopenia being the precursor of osteoporosis) and not having attained a "high" peak bone mineral density (BMD), and an elevated risk of developing osteoporosis. They also asserted that young adult women tend to be generally unaware of the protective benefits physical activity can have on bone mineral density and future bone health (Ford et al., 2004). This argument clearly influenced the authors' primary objective of this research study: to ascertain the effect of physical activity—both past and present—on bone mineral density in college women. Researchers surveyed a total of 157 female college women at a public university on Arkansas regarding past and present physical activity levels, nutritional habits, contraceptive usage, milk consumption, and

demographic information. Researchers also collected bone density measurements from each participant. Study findings showed that women who had not previously participated in sports during their high school years were seven times more likely to have low bone mineral density than those who had participated in high school sports. Overall, this study demonstrated a protective effect of past and present physical activity on bone mineral density among college women. Moreover, authors of this study suggested that this population be encouraged to be physically active because it helps in osteoporosis risk reduction later in life (Ford et al., 2004). Similarly, numerous studies have also shown that increased physical activity could help reduce risk factors for breast cancer, as well (ACS, 2008; CDC, 2009).

Although most studies on college student health behavior have involved White subjects, ethnicity is an important factor that differentially affects health behavior (Harris, Gordon-Larsen, Chantala, & Udry, 2006). Ethnic minorities comprise a large and increasing proportion of the U.S. population and continue to face disparities in the incidence of several chronic diseases (Zekeri & Habtemariam, 2006). Behavioral and psycho-social factors have been shown to increase the risk of chronic health conditions. This notion may partly explain why ethnic minorities tend to develop certain chronic diseases—cancers, diabetes, and coronary heart disease—at disproportionate rates (National Center for Chronic Disease Prevention and Health Promotion, 2007).

Differences in levels of acculturation within certain ethnic groups may also contribute to disparities in health and health behaviors (Despues & Friedman, 2007). Acculturation refers to the extent to which an individual adopts or takes on the values, customs, beliefs, attitudes, and behaviors of the mainstream culture. Health behaviors can be potentially impacted both positively and negatively by acculturation (Ebin et al., 2001).

A research study examining the relationship between ethnicity and acculturation on the health behavior practices of college students at a multi-ethnic, selective public university was conducted in the western region of the U.S. (Despues & Friedman, 2007). This study addressed the following two primary questions: (a) how is ethnicity associated with health prevention behaviors in a current large cohort on a multi-ethnic college campus? and (b) are there differences in acculturation that have a consequent impact on health practices? The study authors designed a written questionnaire assessing the relationship between ethnicity, acculturation, and health behaviors in a sample of 521 undergraduate college students. Of the participants, 21.1% identified themselves as European American, 29.4% as Asian American, 13.2% as African American, 26.5% as Hispanic American, 6.5% as multi-ethnic, and 3.3% as belonging to an ethnic group that was not listed. Participants completed a questionnaire that assessed eating habits (eating vegetables, fruits, and salads vs. French fries and hamburgers), preventive health behaviors (physical exams, dental visits, and exercise), and health-harming behaviors (smoking and drinking). Participants also completed a modified acculturation scale (Marin et al., 1987), which was composed of 12 items. Study authors also assessed participants' age, gender, ethnicity, income, parental income, mother's education, father's education, and living accommodations in the demographics portion of the questionnaire.

The results of this study revealed Asian Americans college students were less likely to report getting physical exams, exercising, going to the dentist, eating fruits, and eating salads, controlling for parental income—as compared to the culturally dominant European American college students (Despues & Friedman, 2007). The study also showed African American students to be more likely to report eating French fries and smoking cigarettes than their European American counterparts. However, African American college students were also less

64

likely to report drinking and binge drinking than European American college students, controlling for parental income. The study also showed Hispanic American college students as less likely to report going to the dentist, exercising, and eating salad, and less likely to report drinking and binge drinking that were European American college students, controlling for parental income. Overall, this study revealed that ethnicity and acculturation likely have both positive and negative effects on health behaviors. Findings highlight the importance of examining ethnic differences in health behaviors among college students when attempting to understand contributing factors to chronic disease disparities among ethnic minority groups (Despues & Friedman, 2007).

A large number of research studies have provided strong evidence that consuming alcohol is a risk factor for primary liver cancer.   Moreover, over 100 research studies have indicated an increased risk of breast cancer is associated with increased alcohol intake (Baan et al., 2007; CDC, 2009). Alcohol consumption is commonly viewed as part of the normal college experience (Usdan et al., 2008). Alcohol is the most widely used drug among youth and causes grave and potentially life-threatening problems for adolescents and young adults (American Medical Association, 2008). Several health interventions have been shown to successfully lower alcohol usage among college students; yet these interventions have not been shown to address negative consequences related to alcohol consumption among this population (Borsari & Carey, 2000; Larimer, Turner, Anderson, Fader, Kilmer, & Palmer, 2001). Therefore, strategies to educate college students to guard themselves from possible negative consequences of alcohol consumption may be a suitable alternative to lessen the harmful effects of heavy drinking (Usdan et al., 2008).

Usdan et al. (2008) conducted a qualitative study investigating this very issue of negative consequences of heavy alcohol consumption among college students. Researchers conducted a total of four focus group sessions at one private and one public university in the southeastern region of the U.S. among 80 undergraduate students aged 18-22. Participants were recruited through a number of methods including flyers posted throughout each campus, advertisements placed in each school's newspaper, and announcements made during classes. To be eligible to participate in the study, students had to report having had an alcohol drink on at least two days within the previous month. During the focus group sessions, students were probed concerning their drinking behavior, the people with whom they drank, where they drank, how much, etc. Researchers taped and transcribed the sessions, producing 39 stories of student intoxication (Usdan et al., 2008).

Usdan and colleagues (2008) found that students experienced negative consequences of heavy drinking related to nine key areas: physical illness, financial consequences, legal troubles, academic consequences, impaired driving, memory loss, violence, emotional consequences, and consequences with relationships. Over half (56%) of the intoxication incidents involved more than one negative consequence. Moreover, on 28 occasions, study participants alluded to actual physical consequences of heavy drinking such as falling down, vomiting, injury, violence, and alcohol poisoning (Usdan et al., 2008). The authors concluded from their investigation that research studies like this one can reveal detailed information concerning the drinking environment on specific college campuses. Comparable studies can also help identify and understand the circumstances in which heavy drinking and subsequent negative outcomes can arise (Usdan et al., 2008). Thus, research studies such as the one described can be very helpful to health professionals, in particular, in designing and implementing health interventions aimed

66

at reducing harm and facilitating positive health behaviors among this emerging adult population.

The National College Health Assessment (NCHA) and Monitoring the Future are the two major data sources currently available regarding college student health behavior (McKenzie et al., 2008). The NCHA is a nation-wide, nonprofit research initiative that was initially implemented in 2000, is supported by the American College Health Association, and examines a wide range of health behaviors among college students. Monitoring the Future was initiated in 1975 at the University of Michigan's Institute for Social Research and had been funded by the National Institute on Drug Abuse. Unlike the NCHA, Monitoring the Future examines drug behaviors and related attitudes, specifically. Evidence has shown both sources to be helpful for developing and implementing health promotion and education services to the general college student population (McKenzie et al., 2008).

Health Issues Among Underserved Populations

Health disparities are known as avoidable differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among certain population groups in the U.S. (NIH, 2004). Previous studies have illustrated that individuals who reside in rural areas experience poorer health status, higher obesity prevalence, more activity limitations, and higher mortality rates than those who live in urban locations (Bailey, 2009). Approximately 20 percent of the American population lives in rural areas (Hartley, 2004). These communities have higher rates of chronic illness and disability, as well as poorer overall health status than urban communities (Rural Health Office, Mel & Enid Zuckerman College of Public Health, The University of Arizona, 2010). Potential reasons for health

disparities in rural areas include limited transportation, lack of physicians, lack of services, lack of health insurance, and low-income levels (Gamm et al., 2004).

The Kaiser Commission on Medicaid and the Uninsured found that rural residents actually receive comparable or less health care in many measures when compared to residents in more metropolitan areas of the country (Bailey, 2009). This finding was quite compelling, especially given the higher rates of chronic illness and disability among this population, which should actually require higher healthcare costs. This phenomenon seems to suggest that rural residents, in general, may not be receiving sufficient care. Specifically, rural residents receive fewer regular medical check-ups, blood pressure checks, pap tests, and mammograms than they medically should (Bailey, 2009).

Individuals who reside in rural areas also report a higher prevalence of cancer, as compared to those in urban populations (Gosschalk & Carozza, 2009). According to the *Rural Healthy People 2010* survey examining rural health priorities, cancer tied with nutrition and overweight for 10th and 11th rankings among *Healthy People 2010* focus areas (Gamm, Hutchison, Linnae, & Dabney, 2005). In addition, differences also exist between urban and rural populations in terms of the stage of disease at initial diagnosis (Williams, Khoury, Lisovicz, & Graham, 2009). As noted earlier, staging refers to the spread or growth of cancerous cells and/or tumors. Several studies have examined the relationship between rurality and cancer staging and have shown rural residents to be at particular risk for late stage cancer diagnosis (Gamm et al., 2005). These findings suggest that at least in a general sense, rural cancer patients may be deficient when compared to their urban counterparts.

Another key factor in analyzing rural cancer disparities centers on the observation that populations living in rural areas tend to be underrepresented in clinical trials (Williams et al.,

2009). One study conducted at Wake Forest University (2006) indicated that a potential reason for low trial participation among rural women is conflicting attitudes and beliefs these women have about such clinical trials. Some women reported feelings of mistrust about the researchers conducting the trials, as well as overall fear of the trials, in general (Williams et al., 2009).

Similarly, studies have also shown that women who reside in rural locations may be less likely to receive evidence-based screenings than their urban counterparts (Gosschalk & Carozza, 2009). Doescher & Jackson (2008) conducted a research project examining trends in cervical and breast cancer screening practices of women residing in rural areas, compared to those living in urban areas of the United States. The researchers utilized data obtained from the Behavioral Risk Factor Surveillance System (BRFSS) from 1994 through 2004 to examine differences in receipt of screening tests according to rural-urban residence location. Trained interviewers administered computer-aided interviews in all 50 states, as well as the District of Columbia, Guam, Puerto Rico, and the Virgin Islands. Rural residence was ascertained by categorizing county Federal Information Processing Standards (FIPS) codes available on BRFSS. These were broadly grouped as metropolitan (urban) or non-metropolitan (rural) county of residence. In addition to questions related to cervical health, each female respondent was asked whether she had ever had a mammogram, and if so, when they had received their last mammogram. Other measures assessed included race/ethnicity, sex, age, educational attainment, annual household income, and employment status. Results of the study showed that even though overall participation in mammography screening increased over time (from 1994-2004), a persistent rural-urban gap was identified (Doescher & Jackson, 2008). By 2004, 70.8% of rural and 75.7% of urban respondents had received timely mammography. The gap was even greater among women in the more remote rural locations, as compared to the urban women. This study

highlighted the need for more concerted efforts among health care providers, funding agencies, and public health organizations to improve the receipt and utilization of cancer screening among high-risk women living in rural America (Doescher & Jackson, 2008).

The southeastern region of the U.S. has been widely known to contain significant rural populations as recently as the 1940s. In Alabama, specifically, at least 45 counties can be classified as being rural, echoing the need for better-suited health programs among individuals in this region of our country (OMB, 2008).

Conclusion

The recent controversy surrounding breast cancer screening guidelines that has flooded various media outlets in our country resonates as a great reminder of the tremendous significance breast cancer has come to claim in the lives of so many American women. Perhaps unlike any time in previous years, public health professionals are forced to acknowledge the remarkable impact that basic knowledge can potentially have on health beliefs, health behaviors, and, in turn, health status. Such occurrences have also been grave reminders to health professionals that the earlier in life an individual adopts positive health behaviors, the better the likelihood he/she will go on to live a healthy life in the long-term.

Investigating the levels of knowledge, beliefs, and screening behaviors among emerging adult college women seems a likely step in the journey towards breast cancer incidence and mortality reduction. While numerous research studies have applied the Health Belief Model to their assessment of breast cancer-related beliefs and behaviors, studies that have presented emerging adult college women are virtually nonexistent. It may also be of interest to examine HBM and breast cancer-related knowledge, beliefs, and behaviors of college women in

70

geographic areas besides those studied in prior research. By addressing this topic among

emerging adult women in the southeastern U.S., this research study has attempted to fill this

void.

CHAPTER 3

METHODOLOGY

Introduction

This study measured the degree of breast cancer-related knowledge, beliefs, and screening behaviors among a sample of undergraduate college women located at a major university in the southeastern region of the United States. Although previous scholars have applied the Health Belief Model (HBM) to their investigation of breast cancer awareness among college women, this study was unique in two major ways: it was conducted in a geographic region, the southeastern U.S., that has not been widely examined in previous HBM-related breast cancer knowledge/screening behavior research, and it focused specifically on emerging-adult college women.

Purpose

The purpose of this study was to investigate the level of breast cancer knowledge, beliefs, and screening behaviors among undergraduate college women by measuring perceived susceptibility, severity, benefits, barriers, self-efficacy (constructs of the Health Belief Model), as well as participants' degree of worry in relation to breast cancer.

The researcher submitted this study to the Institutional Review Board (IRB) of The University of Alabama for review and did not begin the data collection phase of the project until IRB approval from this institution was obtained.

Research Questions

This research study addressed the following seven research questions:

1. To what extent are female undergraduate college students conducting breast self-examination?

2. Is there a relationship between scores on a breast cancer knowledge test and frequency of performing breast self-examination?

3. Is there a relationship between items comprising a breast cancer worry test and frequency of performing breast self-examination?

4. Is there a relationship between demographic factors--ethnicity, cumulative grade average, year in school, and family history of breast cancer-- and level of breast cancer knowledge?

5. Is there a relationship between demographic factors--ethnicity, cumulative grade average, year in school, and family history of breast cancer-- and breast cancer beliefs regarding perceived susceptibility and perceived severity?

6. Is there a relationship between demographic factors, ethnicity, cumulative grade average, year in school, and family history of breast cancer--and the worry item "how worried are you about getting breast cancer someday"?

7. Are the individual Health Belief Model constructs, confidence, health motivation, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers, significant predictors of breast self-examination performance?

Study Setting

The study was conducted at a major public university located in southeastern region of the U.S. A total student population of approximately 28,807 students--according to the Fall 2009

records, the most recent enrollment records available to date-- makes this university the largest university in the state. A total of 23,702 students were classified as undergraduate, 52.4% of which were female. Moreover, 82.9% of the undergraduate students were White; 11.8% reported being African American; 1.1% identified as Asian/Pacific Island; 2.2% as Hispanic; 0.6% as American Indian/Alaska Native; and the remaining 1.4% were categorized collectively as Non-Resident Alien. The majority of the undergraduate student population was White, with the remainder of the student population being predominantly Black non-Hispanic; this observation was directly proportional to the ethnic distribution of the greater Tuscaloosa region. And although the undergraduate student age range was 18 to 65 years, 91.7% of them fell between the ages of 18 and 25 years (Institutional Research and Assessment, Kraft, 2009).

Participants

This study utilized a convenience sample of female undergraduate students (n =342) currently enrolled in the Summer and Fall 2010 semesters. Inclusion criteria were as follows: female, undergraduate, college student, between the ages of 18 and 25, and enrolled in courses housed within the College of Human Environmental Sciences (HES). This sample size was comparable to what other researchers have used in professional literature (Gay & Airasian, 2003, p. 113).

After obtaining permission from course instructors, the researcher scheduled and recruited participants from the following courses: Life Span Development (HD 101), Child Development-Infancy/Toddler (HD 202), Personal Health (HHE 270), Community and Public Health (HHE 273), Drug Awareness Education (HHE 378), Understanding Stress Management (HHE 440), Intro to Human Nutrition (NHM 101), Nutrition in the Life Cycle (NHM 201), Food

Science (NHM 253), and Issues in Human Environmental Sciences (HES 310). Courses were

chosen based on the fact that they were all housed within the College of Human Environmental

Sciences, and that many did not have prerequisite requirements; therefore, these courses could

potentially consist of students from an array of majors. Moreover, these courses had been

previously observed contain a substantial female population; this observation was key to

achieving the study's main objective.

Assessment Battery

Participants were asked to complete a written 86-item questionnaire, using either a

question-specific multiple choice format, or a five-point Likert scale of (1) strongly disagree, (2)

disagree, (3) neutral, (4) agree, and (5) strongly agree; or (1) not at all, (2) rarely, (3) sometimes,

(4) often, and (5) almost all the time. Sample items are as follows: "I know how to perform

breast self-examination;" "Having a mammogram or x-ray of the breast will help me find lumps

early;" and "How worried are you about getting breast cancer someday?" Having already

obtained permission from survey authors, the researcher used the *Breast Cancer Knowledge Test*

(McCance et al., 1990); the *Revised Susceptibility, Benefits, and Barriers Scale for*

Mammography Screening

(Champion, 1999); and the *Breast Cancer Worry Scale* (Lerman et al., 1991) to compile the

assessment battery that will serve as the primary data collection instrument (see Table 2).

Each of the instruments had been rigorously tested for reliability and validity, and each

was considered to be a valid, reliable survey instrument. The researcher added supplementary

items assessing participants' family history of breast cancer and frequency of performing breast

self-examination. In addition, at the very end of the survey, participants were asked to give basic

demographic information such as age, educational level, ethnicity, and cumulative grade average. Completing the survey in its entirety took an estimated 20 minutes. There were no incentives offered to participants for agreeing take part in this research study.

Breast Cancer/Screening Knowledge Test

The *Breast Cancer Knowledge Test* was originally based on Stillman's (1977) *Knowledge Questionnaire*. Developed by McCance, Mooney, Smith, & Field (1990), the BCKT is a 19-item instrument that measures subjects' knowledge of breast cancer detection and screening practices. It consists of 18 items that focus on general information about breast cancer (early signs and symptoms, for example) as well as breast health practices (such as when and how breast self-examinations should be performed).

Revised Susceptibility, Benefits, and Barriers Scale for Mammography Screening

The *Health Belief Model Scale* was developed in 1984 and later revised by Champion to be applied specifically to mammography utilization. The *Revised Susceptibility, Benefits, and Barriers Scale for Mammography Screening* (Champion, 1999) is widely used for assessing women's beliefs about breast cancer screening. The RSBBSMS contains 58 items and utilizes a 5-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree." This instrument is comprised of a total of eight subscales: 5 items related to susceptibility, 7 related to seriousness, 6 related to benefits of BSE, 6 related to barriers to BSE, 11 related to confidence, 7 related to health motivation, 5 related to benefits of mammography, and 11related to barriers to mammography.

Breast Cancer Worry Scale

Caryn Lerman and colleagues (1991) constructed the *Breast Cancer Worry Scale* to study the degree to which women have anxiety or worry related to breast cancer. This concise scale consists of a total of three items: one that measures the frequency of worrying about "getting breast cancer some day," and two items measuring the impact worry has on mood and the performance of daily activities. The first item is rated on a 5 point response scale using 1 = not at all, 2 = rarely, 3 = sometimes, 4 = often, and 5 = almost all the time. The remaining two items are rated on a 4 point response scale in which 1 = not at all, 2 = a little, 3 = somewhat, and 4 = a lot.

Table 2.

Assessment Battery

Scale	Items	Variables	Reliability	Populations
Breast Cancer Knowledge Test	19	*Knowledge of breast cancer detection *Knowledge of BC screening practices *General breast health knowledge	Internal Consistency (Cronbach alpha): alpha = .81	*Older women *Urban college women
Revised Susceptibility, Benefits, & Barriers Scale For Mammography Screening	58	*BC seriousness *Susceptibility *Confidence/Efficacy *Health Motivation *Benefits/Barriers	*Test-retest reliability: r = .59 - .72 *Internal Consistency (Cronbach alpha): alpha = .75 - .88	*Low-income women *Post- menopausal women *Minority women *Urban college women
Breast Cancer Worry Scale	3	*BC worry & anxiety	Internal Consistency (Cronbach alpha): alpha = .86	*Women w family history of BC *Urban White women

Demographics

The self-report assessment also included items examining participants' current year in school, cumulative grade average, age, and ethnicity. Two additional items assessed frequency of performing breast self-examination, as well as the number of first and second-degree relatives affected by breast cancer. (See Appendix E).

Expert Panel Review

In order to ensure the overall accuracy, appropriate readability, and clarity of survey item sequencing, the primary researcher submitted the assessment instrument to an expert panel for review. This panel consisted of six individuals known to have expertise in an area directly related to cancer research, health behavior theory, communications, survey design, and cancer research. The researcher sent a letter to each member of the panel, attached with the study's abstract and survey instrument to obtain his or her expert opinion of the assessment battery. (See appendix A).

Upon receiving responses and feedback from the expert panel, the researcher modified the survey instrument according to their recommendations.

Procedure

This research was approved by the Institutional Review Board (IRB) of the university in which it was conducted (IRB# 10-OR-190). The study transpired in June and July of summer 2010 semester and extended to August of fall semester 2010.

At the beginning of each participating class, the researcher read the following script before distributing the surveys:

"I am a graduate student in the Department of Health Science at The University of Alabama. I am here to conduct a study that will measure your level of understanding of breast cancer and breast cancer screening. I will be surveying female college students who are enrolled in classes within the College of Human Environmental Sciences here at UA, and I will use this information as the basis for my Doctoral Dissertation. I may also use this information in articles that might be published, as well as in academic presentations.

Thank you for taking the time and thought to complete this survey. You are a vital asset to this study. Your input might help health professionals create interventions that are uniquely adapted for college females, potentially reducing their risk factors for breast cancer in the future. This survey is completely voluntary; you may choose not to participate or not answer any question with which you are not comfortable in answering. Completion of the survey should take no more than 20 minutes of your time.

The information that you provide will be kept strictly confidential. Only you will ever know that you participated in this research study. This survey is completely anonymous. Your name, campus ID number, or any other identifying information will not be asked or utilized at any point in this study. And at the conclusion of this study, your data will be destroyed. So, there is no foreseen harm associated with your participation in this research study.

IF YOU HAVE QUESTIONS, PLEASE FEEL FREE TO ASK THEM NOW. IF YOU HAVE QUESTIONS LATER, YOU MAY CONTACT ME AT GUILF001@CRIMSON.UA.EDU OR BY PHONE AT (205) 348-9717. *Again, thank you for your time and your participation."*

Once students consented to participate, the assessment battery was distributed to the class. Each survey contained a detachable information sheet that explicitly outlined the study's purpose, participants' rights, risks and benefits associated with the study, and contact information of the researcher. Participants were encouraged to detach this sheet and take it with them at the survey's conclusion. On average, completion of the survey took 7-13 minutes. Students who had completed the survey in a previous class were advised not to do so a second time. The researcher offered no incentives to the students for their participation.

The primary researcher personally administered and collected each survey. Data remained strictly anonymous throughout the duration of the study. At the beginning of this study, students were given a survey with a number on it. This simple strategy helped enable the

researcher to keep track of the total number of surveys. Students were asked not to record this number or associate any form of personal identification with it.

Anonymity was maintained by having each student place his/her completed survey in a box at the front of the classroom. All completed surveys were stored in a locked and secured area. After survey responses were coded, all original surveys were shredded and destroyed.

Data Entry

Upon completion of administration of the questionnaire to study participants, the primary researcher entered all data in an Excel file. The initial step in data cleaning involved the researcher removing any survey in which one or more assessment scale was incomplete. Next, any surveys in which the respondent is outside of the 18-25 age range will also be removed from the study, as participants in such cases would not be classified as "emerging adults" (Arnette, 1999; 2000). A total of 349 surveys were collected, of which, seven were deemed unusable because of either incompleteness or discrepancy in age. Consequently, a total of 342 surveys were actually used in the analysis. The researcher completed validation checks of the surveys every tenth survey instrument. Any missing data, as well as all variables, were then coded appropriately.

Data Management

The researcher completed all data analyses utilizing the Statistical Analysis Software SAS$^{®}$ 9.0. Electronic data files were stored on a drive in a locked office at the university where the study was conducted. Hardcopies of completed surveys were stored in a locking file cabinet

in a secured office. And at the conclusion of this research study, all completed questionnaires were shredded and destroyed.

Statistical Analysis

The researcher utilized univariate analysis to describe demographic factors of the study sample, including age, ethnicity, grade average, year in school, and breast cancer family history. Descriptive statistics were also obtained for study variables.

A frequency analysis was conducted to address the first research question, "to what extent are undergraduate females conducting breast self-examination."

Another main factor examined between variables was the strength of the correlation. Essentially, the correlation coefficient is a measure of the strength of the linear association between two variables (Kuzma & Bohnenblust, 2001). It may represent values ranging from -1 to +1. A correlation coefficient of zero will symbolize no relationship between variables. The closer the coefficient comes to +1 or -1, the stronger the relationship and the more closely it resembles a straight line (Kuzma & Bohnenblust, 2001).

Correlations, chi-square tests, t-tests, ANOVAs and ANCOVAs were all used to determine the degree of relationship among variables in addressing the research questions "is there a relationship between scores on a breast cancer knowledge test and frequency of performing BSE," "is there a relationship between items comprising a breast cancer worry test and BSE frequency," "is there a relationship between demographic factors and level of breast cancer knowledge," "is thee a relationship between demographic factors and breast cancer beliefs regarding perceived susceptibility and perceived severity," "is there a relationship

between demographic factors and worry item 'how worried are you about getting breast cancer someday?"

Linear regression is a prediction equation that estimates the value of Y for any given X, utilizing means to describe a linear relationship between two variables. Of all types of regression analysis, linear regression was the first rigorously examined (Cohen et al., 2003). It has been used extensively in practical application concerning a myriad of topics in the social and health sciences.

Essentially, linear regression is typically utilized in the effort to predict or forecast, and to quantify the strength of relationship between variables (or assess which variables may have no relationship at all (Cohen et al., 2003). For the purposes of the present study, linear regression was utilized in addressing the research question "is there a relationship between demographic factors and the worry item "how worried are you about getting breast cancer someday," "is there a relationship between demographic factors and breast cancer beliefs regarding perceived susceptibility and perceived severity," and "are the individual HBM constructs, confidence, health motivation, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers, significant predictors of breast self-examination performance. Associated independent and dependent variables are identified in Table 3.

Table 3.

Variables

Dependent Variables	Independent Variables
Breast Cancer knowledge	Age
Breast Self-Exam	Ethnicity
Worry	Breast cancer family history
Breast cancer beliefs	Year in school
Individual HBM constricts	BSE frequency
	Grade average

Additionally, Cronbach's alpha was utilized to assess the degree of internal consistency among subscales of the assessment battery. This coefficient is a helpful tool when investigating the reliability of test results. Reliability is an estimate of the consistency of a set of items when they are administered to a particular group of students at a specific time under particular conditions for a specific purpose (Daniel, 1999). Cronbach alpha is used to estimate the proportion of variance that is systematic or consistent in a set of test scores (Pallant, 2007). A reliability coefficient of .70 or higher is widely considered to be acceptable social science research (Daniel, 1999). Results of all statistical procedures were interpreted and reported accordingly.

CHAPTER 4

RESULTS

The purpose of this study was to assess breast cancer knowledge, beliefs, and screening behaviors among undergraduate college women in the southeastern U.S. In addition, this study examined perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy (constructs of the Health Belief Model), as well as level of worry in relation to breast cancer. The present study utilized a self-reporting questionnaire—specifically based on McCance's (1990) *Breast Cancer Knowledge Test*, Champion's (1999) *Revised Susceptibility, Benefits, and Barriers Scale for Mammography Screening*, and Lerman's (1991) *Breast Cancer Worry Scale.*

This chapter first presents the descriptives of the sample and study variables. Next, the statistical analyses used to address each of the seven research questions this study addressed are presented.

Descriptives

Sample

This study included 342 women who attended a selected course in the College of Human Environmental Sciences during the Summer and Fall 2010 semesters at a large public university in the southeastern region of the U.S. The questionnaire was initially given to a total of 349 students; however, seven surveys were deemed as unusable and, therefore, eliminated due to either incompleteness or ineligible age. The majority (72%) of the participants were White, non-Hispanic; were between 20 and 22 years of age (51%); had an overall grade average of B+

(55%); reported being between sophomore and junior status; and had no known family history of breast cancer (56%).

Table 4.1 portrays the demographics of the study sample. As previously referenced, the sample was 72% White. Twenty five percent of the sample identified as Black, non-Hispanic-- an indication of a greater percentage of African-American students who participated in the study, as compared to the African-American make-up of the entire student population—roughly 12%. Five respondents (2%) described themselves as Biracial, and an equal proportion (2%) of respondents reported being Asian/Pacific Islander.

Table 4.1

Demographic Characteristics of the Study Sample

Demographic	n	%	M (yrs)	SD (yrs)
Age:			20.4	1.9
18-19 yrs	129	38%		
20-22 yrs	174	51%		
23-25 yrs	39	11%		
Grade Average:				
A	81	24%		
B	189	55%		
C	62	18%		
D & N/A	10	3%		
Year in School			2.8	1.0
Freshman	31	9%		
Sophomore	111	32%		
Junior	91	27%		
Senior	109	32%		
Known Breast Cancer Family History				
0	192	56%		
1	90	26%		
2	40	12%		
3	16	5%		
4	4	1%		
Ethnicity				
White	246	72%		
Black	84	25%		
Latina	2	1%		
Asian/Pacific Islander	5	2%		
American Indian/Alaska Nat.	0	0%		
Biracial/Multiracial	5	2%		
Other	0	0%		

n = 342

Study Variables

Breast Cancer Knowledge Test

Table 4.2 displays responses for breast cancer and breast cancer screening knowledge. The majority of respondents (87%) viewed breast self-examination as an effective breast cancer screening method, and roughly 77% believed BSE would greatly assist in curing the disease. Additionally, 80% were aware that breast cancer risk increases with age. However, approximately 48% of respondents correctly believed that BSE should be performed once per month. A comparable 45% did not know that looking at one's breasts in the mirror is an important aspect of properly conducting breast self-examination.

Only 35% of participants were aware that nipple discharge is abnormal, and only 28% correctly stated that that BSE should not be conducted during the menstrual cycle. And although 44% of the women were aware of current mammography recommendations, a significant percentage (21%) were not aware of current recommendations regarding mammography screening.

A breast cancer knowledge test index was created by summing the number of correct responses, with a possible score ranging from 0 to 19. The index had a mean of 10.89 and a standard deviation of 3.08.

Table 4.2

Breast Cancer Knowledge Test ($n = 342$)

Item	% Correct
BSE should be performed how often	48%
*Once a month	
Most breast lumps found by whom	64%
*Women themselves	
How much difference regular BSE screening makes in chance of cure	77%
*A great deal	
BSE is effective method of cancer detection	87%
* True	
Mammography can detect unfelt lumps	86%
*True	
Beginning age for BSE	80%
*20	
Mammography cancels out BSE & CBE	89%
*False	
Current mammography recommendations	44%
*False	
Using palm of hands is effective	54%
*False	
BSE should be done during menstrual cycle	28%
*False	
Looking in mirror is part of good BSE	34%
*True	
Looking at breasts is not necessary in BSE	49%
*False	
Nipple discharge is normal	35%
*False	
Feeling underarm is part of good BSE	78%
*True	
Squeezing of nipple is part of good BSE	19%
*True	
Frequency of BSE if postmenopausal	27%
*Once a month	
Palpating the breast with pads or tips of fingers	55%
*Pads of fingers	
Examples of abnormal breast changes	62%
*All (discharge, lump or thickening, & dimpling of skin)	
Breast cancer risk increases with age	80%
*True	

* = correct answers; $n = 342$; $M = 10.89$; $SD = 3.08$

Health Belief Model Characteristics based on Champion's (1999) Revised Susceptibility,

Benefits, and Barriers Scale for Mammography Screening

The present study examined breast cancer beliefs and screening behaviors in relation to each concept comprising the Health Belief Model, so for each individual HBM concept, the researcher created a construct for it based on applicable items of the assessment battery.

Confidence (Self-efficacy)

Table 4.3 provides a profile of the first construct—confidence. This construct was based on the following items: I know how to perform breast self-examination, I am confident I can perform breast self-examination, If I were to develop breast cancer I would be able to find a lump by performing breast self-examination, I am able to find a breast lump if I practice breast self-examination alone, I am able to find a breast lump that is the size of a quarter, I am able to find a breast lump that is the size of a dime, I am able to find a breast lump that is the size of a pea, I am sure of the steps to follow for doing breast self-examination, I am able to identify normal and abnormal breast tissue when I do breast self-examination, When looking in the mirror, I can recognize abnormal changes in my breasts, and I can use the correct part of my fingers when I examine my breasts.

The confidence construct was an additive scale with a range of 0-44, with a higher score representing greater degree of perceived confidence in performing breast self-examination. The study sample had a mean of 20.13 and standard deviation of 8.33 for the confidence construct, which suggests that participants had a moderate degree of confidence in their ability to correctly perform breast self-examination.

Respondents were asked to indicate the degree to which they agreed or disagreed with statements regarding self-efficacy of breast cancer screening. Forty-five percent of respondents

felt they were capable of recognizing abnormal changes in their breasts upon looking in the mirror. Ironically, however, 41% disagreed that they would be able to find a lump the size of a pea. Most (37%) neither agreed nor disagreed that they could find a lump the size of a dime. In addition, a significant number of women (33%) disagreed with the notion of being confident to perform BSE correctly. And 37 percent of respondents were not sure of the steps to follow in doing BSE.

Table 4.3

Profile of Confidence

Item	Response	*n* (%)
I know how to perform BSE.	Strongly Disagree	9%
	Disagree	24%
	Neutral	21%
	Agree	34%
	Strongly Agree	12%
I am confident I can perform BSE correctly.	Strongly Disagree	14%
	Disagree	33%
	Neutral	23%
	Agree	22%
	Strongly Agree	8%
If I were to develop breast cancer, I would be able to find a lump by performing BSE.	Strongly Disagree	9%
	Disagree	27%
	Neutral	38%
	Agree	23%
	Strongly Agree	3%
I am able to find a breast lump if I practice BSE alone.	Strongly Disagree	10%
	Disagree	28%
	Neutral	33%
	Agree	26%
	Strongly Agree	3%
I am able to find a breast lump that is the size of a quarter.	Strongly Disagree	11%
	Disagree	23%
	Neutral	30%
	Agree	31%
	Strongly Agree	5%
I am able to find a breast lump that is the size of a dime.	Strongly Disagree	13%
	Disagree	30%
	Neutral	38%
	Agree	18%
	Strongly Agree	1%
I am able to find a breast lump that is the size of a pea.	Strongly Disagree	22%
	Disagree	41%
	Neutral	31%
	Agree	6%
	Strongly Agree	1%

n = 342

Item	Response	n (%)
I am sure of the steps to follow for doing BSE.	Strongly Disagree	14%
	Disagree	37%
	Neutral	21%
	Agree	23%
	Strongly Agree	5%
I am able to identify normal and abnormal breast tissue when I do BSE.	Strongly Disagree	19%
	Disagree	39%
	Neutral	21%
	Agree	18%
	Strongly Agree	3%
When looking in the mirror, I can recognize abnormal changes in my breasts.	Strongly Disagree	7%
	Disagree	20%
	Neutral	19%
	Agree	46%
	Strongly Agree	8%
I can use the correct part of my fingers when I examine my breasts.	Strongly Disagree	6%
	Disagree	20%
	Neutral	25%
	Agree	40%
	Strongly Agree	9%

$n = 342$

Health Motivation

Table 4.4 presents details regarding health motivation. This construct was based on the following items: I want to discover health problems early, Maintaining good health is extremely important to me, I search for new information to improve me health, I feel it is important to carry out activities that will improve my health, I eat well-balanced meals, I exercise at least 3 times a week, and I have regular check-ups even when I am not sick.

Health Motivation was also an additive scale, and it had a range of 0-28. A higher score corresponded with higher motivation for health, and a lower score corresponded with lower health motivation. The mean for this construct was 21.44 with a standard deviation of 3.19. Thus, overall, participants indicated a positive motivation for health.

A substantial portion of women (83%) strongly indicated that maintaining good health was, indeed, extremely important to them. A large percentage (79%) also strongly agreed with wanting to discover health problems early. A little over half of participants (52%) strongly agreed that it was important to carry out activities that will improve health status, yet only around 22% strongly agreed that hey actually search for new information to improve health.

Table 4.4
Profile of Health Motivation

Item	Response	*n* (%)
I want to discover health problems early.	Strongly Disagree	1%
	Disagree	1%
	Neutral	2%
	Agree	17%
	Strongly Agree	79%
Maintaining good health is extremely important to me.	Strongly Disagree	0%
	Disagree	0%
	Neutral	1%
	Agree	16%
	Strongly Agree	83%
I search for new information to improve my health.	Strongly Disagree	1%
	Disagree	8%
	Neutral	26%
	Agree	42%
	Strongly Agree	23%
I feel it is important to carry out activities that will improve my health.	Strongly Disagree	0%
	Disagree	0%
	Neutral	3%
	Agree	45%
	Strongly Agree	52%
I eat well-balanced meals.	Strongly Disagree	1%
	Disagree	7%
	Neutral	1%
	Agree	42%
	Strongly Agree	49%
I exercise at least 3 times a week.	Strongly Disagree	2%
	Disagree	20%
	Neutral	17%
	Agree	35%
	Strongly Agree	26%
I have regular health check-ups even when I am not sick.	Strongly Disagree	4%
	Disagree	23%
	Neutral	24%
	Agree	33%
	Strongly Agree	16%

n = 342

Perceived Susceptibility

Table 4.5 provides a profile of perceived susceptibility. The following survey items were used to create this construct: It is extremely likely I will get breast cancer in the future, I feel I will get breast cancer in the future, There is a good possibility I will get breast cancer in the next 10 years, My chances of getting breast cancer are great, and I am more likely than the average woman to get breast cancer.

Calculation of this construct was also additive, with a possible score ranging from 0 to 20. A greater score represented greater perceived susceptibility for breast cancer. The sample had a mean of 6.30 and standard deviation of 5.0 for this construct, which indicates quite a low perceived susceptibility towards breast cancer among this group of college women.

Forty-three percent of respondents disagreed that their chances of getting breast cancer are great. Similarly, 46% disagreed with the idea that their chances of getting breast cancer were higher than the average woman. In addition, 45% disagreed with the statement that they felt they would get breast cancer in the future. And only 2% of respondents strongly felt they were more likely than the average woman to get breast cancer.

Table 4.5
Profile of Perceived Susceptibility

Item	Response	*n* (%)
It is extremely likely I will get breast cancer in the future.	Strongly Disagree	20%
	Disagree	37%
	Neutral	35%
	Agree	7%
	Strongly Agree	1%
I feel I will get breast cancer in the future.	Strongly Disagree	22%
	Disagree	39%
	Neutral	33%
	Agree	6%
	Strongly Agree	0%
There is a good possibility I will get breast cancer in the next 10 years.	Strongly Disagree	19%
	Disagree	45%
	Neutral	32%
	Agree	4%
	Strongly Agree	0%
My chances of getting breast cancer are great.	Strongly Disagree	19%
	Disagree	43%
	Neutral	28%
	Agree	9%
	Strongly Agree	1%
I am more likely than the average woman to get breast cancer.	Strongly Disagree	21%
	Disagree	46%
	Neutral	22%
	Agree	9%
	Strongly Agree	2%

n = 342

Perceived Severity

Table 4.6 shows details of perceived severity as it relates to breast cancer. This construct was based on the following items: The thought of breast cancer scares me, When I think about breast cancer, my heart beats faster, I am afraid to think about breast cancer, Problems I would experience with breast cancer would last a long time, Breast cancer would threaten a relationship with my boyfriend, husband, or partner, If I had breast cancer my whole life would change, and If I developed breast cancer, I would not live longer than 5 years.

Perceived severity was also an additive scale with a range of 0-28. A greater number was representative of an overall perception of breast cancer as being serious. The sample had a mean of 14.46 and standard deviation of 4.63 for this construct, which suggests that participants' general view of breast cancer was low to moderately serious.

Table 4.12 represents perceived seriousness as it relates to breast cancer.

Respondents were asked to indicate the degree to which they agreed or disagreed with statements concerning their perceived seriousness of breast cancer. The substantial number of respondents (42%) agreed with the statement that the thought of breast cancer is scary; 41% also strongly agreed with the same statement. When posed with the statement that problems related to breast cancer would last a long time, 40% of women agreed with this statement. Forty-eight percent of women disagreed with the notion that they would not live longer than five years if they developed breast cancer.

Table 4.6
Profile of Perceived Severity

Item	Response	*n* (%)
The thought of breast cancer scares me.	Strongly Disagree	2%
	Disagree	6%
	Neutral	9%
	Agree	42%
	Strongly Agree	41%
When I think about breast cancer, my heart beats faster.	Strongly Disagree	8%
	Disagree	26%
	Neutral	30%
	Agree	25%
	Strongly Agree	11%
I am afraid to think about breast cancer.	Strongly Disagree	12%
	Disagree	31%
	Neutral	24%
	Agree	23%
	Strongly Agree	10%
Problems I would experience with breast cancer would last a long time.	Strongly Disagree	4%
	Disagree	12%
	Neutral	35%
	Agree	40%
	Strongly Agree	9%
Breast cancer would threaten a relationship with my partner.	Strongly Disagree	29%
	Disagree	37%
	Neutral	20%
	Agree	11%
	Strongly Agree	3%
If I had breast cancer, my whole life would change.	Strongly Disagree	3%
	Disagree	27%
	Neutral	28%
	Agree	32%
	Strongly Agree	10%
If I developed breast cancer, I would not live longer than 5 years.	Strongly Disagree	23%
	Disagree	48%
	Neutral	27%
	Agree	1%
	Strongly Agree	1%

n = 342

Perceived Benefits

Characteristics regarding perceived benefits of breast self-examination are given in Table 4.7. The following items were utilized in creating this construct: When I do breast self-examination I feel good about myself, When I complete monthly breast self-examination I don't worry as much about breast cancer, Completing breast self-examination each month will allow me to find lumps early, If I complete breast self-examination monthly during the next year I will decrease my chance of dying from breast cancer, If I complete breast self-examination monthly I will decrease my chances of requiring radical or disfiguring surgery if breast cancer occurs, and If I complete monthly breast self-examination it will help me find a lump that might be cancer before it is detected by a doctor or nurse.

Calculation of the perceived benefits construct was also additive, ranging from 0-24. A higher score represented a greater degree of respondents' perceived advantages of breast self-examination and an overall positive view of this breast cancer screening method. The mean for perceived benefits of breast self-examination was 15.64 with a standard deviation of 3.06. This score suggests a relatively positive view of perceived benefits of breast self-examination among the study sample.

An overwhelming 54 percent of respondents neither agreed nor disagreed with the statement that they feel good about themselves when doing BSE. Sixty-six percent if women sampled agreed that completing BSE each month would help in finding lumps early. Similarly, most respondents (67%) agreed that monthly BSE could help detect lumps before a doctor or nurse detects them, and 52% agreed that monthly BSE would reduce chances of requiring radical or disfiguring surgery.

Table 4.7
Profile of Perceived Benefits

Item	Response	*n* (%)
When I do BSE I feel good about myself.	Strongly Disagree	2%
	Disagree	10%
	Neutral	54%
	Agree	30%
	Strongly Agree	4%
When I complete monthly BSE I don't worry as much about cancer.	Strongly Disagree	2%
	Disagree	12%
	Neutral	50%
	Agree	32%
	Strongly Agree	4%
Completing BSE each month will allow me to find lumps early.	Strongly Disagree	1%
	Disagree	2%
	Neutral	13%
	Agree	66%
	Strongly Agree	18%
If I complete BSE monthly during the next year, I will decrease my chance of dying from breast cancer.	Strongly Disagree	2%
	Disagree	8%
	Neutral	23%
	Agree	54%
	Strongly Agree	13%
If I complete monthly BSE I will decrease my chances of requiring radical or disfiguring surgery if breast cancer occurs.	Strongly Disagree	2%
	Disagree	9%
	Neutral	26%
	Agree	52%
	Strongly Agree	11%
If I complete monthly BSE, it will help me find a lump that might be cancer before it is detected by a doctor or nurse.	Strongly Disagree	1%
	Disagree	2%
	Neutral	15%
	Agree	67%
	Strongly Agree	15%

n = 342

Perceived Barriers

The final construct of the Health Belief Model was perceived barriers to breast self-examination, and related details are displayed in Table 4.8. This construct was based on the following survey items: I feel funny doing breast self-examination, Doing breast self-examination during the next year will make me worry about breast cancer, Breast self-examination will be embarrassing to me, Doing breast self-examination will take too much time, Doing breast self-examination will be unpleasant, and I don't have enough privacy to do breast self-examination.

Like all preceding HBM constructs, calculation of perceived barriers to BSE was additive. The possible score for this construct ranged from 0 to 24, with a higher score representing more barriers to breast self-examination performance. The mean for perceived barriers to breast self-examination was 6.40 with a standard deviation of 4.21. Thus, overall, participants reported relatively few perceived barriers to breast self-examination performance.

A significant fraction of women (49%) disagreed with the idea that performing BSE within the next year would lead to worry about breast cancer. Forty-seven percent of respondents also disagreed that BSE would be embarrassing, and exactly half (50%) of respondents disagreed with the statement that BSE would take too much time. Likewise, almost half (47%) disagreed with the statement that they did not have enough privacy to perform screening. Additionally, 42% disagreed that BSE would be unpleasant. And less than one percent (.29%) of participants strongly agreed with not having enough privacy to perform BSE.

Table 4.8
Profile of Perceived Barriers

Item	Response	*n* (%)
I feel funny doing BSE.	Strongly Disagree	16%
	Disagree	35%
	Neutral	24%
	Agree	21%
	Strongly Agree	4%
Doing BSE during the next year will make me worry about breast cancer	Strongly Disagree	16%
	Disagree	49%
	Neutral	26%
	Agree	8%
	Strongly Agree	1%
BSE will be embarrassing to me.	Strongly Disagree	34%
	Disagree	48%
	Neutral	12%
	Agree	5%
	Strongly Agree	1%
Doing BSE will take too much time.	Strongly Disagree	37%
	Disagree	50%
	Neutral	9%
	Agree	4%
	Strongly Agree	0%
Doing BSE will be unpleasant.	Strongly Disagree	32%
	Disagree	42%
	Neutral	14%
	Agree	11%
	Strongly Agree	1%
I don't have enough privacy to do BSE.	Strongly Disagree	42%
	Disagree	48%
	Neutral	8%
	Agree	2%
	Strongly Agree	0%

n = 342

Summary of Health Belief Model Constructs

Table 4.9 presents a summary of all HBM constructs utilized in the present research study. As aforementioned, this study examined breast cancer knowledge, beliefs, and screening behaviors among a sample of emerging adult women in relation to each concept comprising the Health Belief Model. Thus, each of the HBM concepts served a critical role in the scope of this investigation. Moreover, all reliability coefficients for HBM subscales were found to be within acceptable range (.70 or higher).

Table 4.9
Summary of Health Belief Model Constructs

Construct	M	SD	Cronbach's Alpha
Confidence (Breast Self-Exam)	20.13	8.33	.86
Health Motivation	21.44	3.19	.85
Susceptibility	6.30	5.00	.85
Severity	14.46	4.63	.85
Benefits (Breast Self-Exam)	15.64	3.06	.86
Barriers (Breast Self-Exam)	6.40	4.21	.85

Pearson correlations are presented in Table 4.10. The constructs were relatively independent and were generally not highly correlated with each other. Therefore, the research concluded that each construct could be included in subsequent regression models with no worries about multicollinearity.

Table 4.10
Correlations of HBM Constructs

	Confidence	Motivation	Susceptibility	Severity	Benefits	Barriers
Confidence						
Motivation	.129*					
Susceptibility	.042	.025				
Severity	-.051	.068	.256**			
Benefits	.213**	.137*	-.026	.082		
Barriers	-.153**	-.137*	.064	.196**	-.230**	

* $p < .05$;
** $p < .01$

Worry

Table 4.11 provides a profile of worry related to breast cancer. Participants were asked to respond to statements concerning frequency and overall impact of worry concerning breast cancer. The majority of respondents (83%) indicated that worry had no effect on their ability to perform daily activities. In a similar fashion, 56% indicated that worry had no effect on mood. However, almost half (44%) of respondents indicated that they sometimes worried about getting breast cancer one day. And 1% indicated they worried about getting the disease almost all the time.

Table 4.11

Profile of Worry

Item	Response	*n* (%)
Worried about getting breast cancer someday	Not at all	11%
	Rarely	30%
	Sometimes	44%
	Often	14%
	Almost all the time	1%
Effect of worry on mood	Not at all	56%
	A little	32%
	Somewhat	11%
	A lot	1%
Effect of worry on daily activities	Not at all	83%
	A little	11%
	Somewhat	6%
	A lot	0%

n = 342

Research Questions

The following section contains a discussion of each of the research questions addressed during this study.

Research Question #1: To what extent are female undergraduate college students conducting breast self-examination (BSE)?

The researcher examined frequency responses to the question "how often do you perform breast self-examination" to address this question. These results are recorded in Table 4.12. The response categories were indicated as follows: 1= Hardly ever/ not at all, 2 = Once a year, 3 = 3 to 4 times a year, 4 = Once a month, 5 = Every two weeks, 6 = Once a week, and 7 = Once a day or more.

As reported in Table 4.16, a significant number of participants, or 34% ($n = 116$) indicated that they performed BSE once a month, which complies with current breast cancer screening recommendations. Eighty-two women (24%) reported performing BSE once a year. Only 31 respondents (9%) reported hardly ever doing BSE, or not performing it at all. Additionally, no respondents reported doing BSE once a week or once day or more. Thus, the most frequently respondents reported performing BSE was once every two weeks.

Table 4.12
Frequency of BSE Performance

Response	n	%
Hardly ever/not at all	31	9%
Once a year	82	24%
3 to 4 times a year	71	21%
Once a month	116	34%
Once every two weeks	42	12%
Once a week	0	0%
Once a day or more	0	0%

$n = 342$

Research Question #2: Is there a relationship between scores on a breast cancer knowledge test

and frequency of performing breast self-examination?

Pearson correlations were used to determine whether there was a significant relationship

between participants' overall breast cancer-related knowledge and frequency of performing BSE

($r = .28, p < .0001$). Results of this analysis indicated a positive correlation between the two

variables. Overall, there was a positive correlation between respondents' general level of

knowledge concerning breast cancer and the rate at which they engaged in breast self-

examination performance.

Correlations were also computed to assess the relationship of individual items of the

Breast Cancer Knowledge Test (McCance, 1990) and the frequency at which respondents

performed breast self-examination. Knowledge of the beginning age for breast self-exam was

negatively correlated with breast self exam performance ($r = -.128, p = .018$). Similarly, there

were also small negative correlations suggested between knowledge of current mammography

screening recommendations ($r = -.117,\ p = .031$), knowledge that looking in the mirror is vital to

breast self-exam ($r = -.192,\ p = .0004$), knowledge that looking at one's breasts is important to

breast self-exam ($r = -.177,\ p = .0011$), knowledge that feeling under the arm is part of a good

breast self-exam ($r = -.138,\ p = .011$), and knowledge of breast self-exam frequency for

postmenopausal women ($r = -.145,\ p = .008$) in relation to actual breast self-exam performance.

Details of these results are reported in Appendix D.

Research Question #3: Is there a relationship between items comprising a breast cancer worry

test and frequency of performing BSE?

Pearson correlations and chi-square analyses were used to assess the relationship between

each of the three items comprising the breast cancer worry test. and the frequency at which study

participants performed breast self-examination. These results are presented in Table 4.13

For the first item (how worried are you about getting breast cancer some day), no

significant association with breast self-exam was indicated in the chi-square test (χ^2 (12) = .012,

p = .273). Similar findings were observed for subsequent worry items (χ^2 (9) = .293, p = .521)

and (χ^2 (9) = .468, p = .622). Corrrelations were also low between the worry items and BSE

frequency: (r = .044, -.057, and -.012 for the items, respectively). Thus, overall, respondents'

level of worry about breast cancer did not positively or negatively influence the degree to which

they performed breast self-examination.

.

Table 4.13
Correlation of Worry and BSE Frequency

Worry Subscale Item	r	p	χ^2
Worry about getting breast cancer someday	.044	.273	.012
Effect of worry on mood	-.057	.521	.293
Effect of worry on daily activities	-.012	.622	.468

n = 342; *p* < .05

Research Question #4: Is there a relationship between demographic factors (ethnicity, grade average, year in school, and family history of breast cancer) and level of breast cancer knowledge?

Independent t-tests, one way ANOVAs, linear regression, and chi-square analyses were conducted in order to address this research question. Ethnicity was dichotomized as Whites versus Others. T-test analysis indicated no significant difference in the means of Whites ($M = 10.96$, $SD = 2.92$) and Others ($M = 10.97$, $SD = 3.10$) in terms of level of knowledge concerning breast cancer ($p = .979$). T-test analysis did, however, suggest a significant difference ($p = .003$) in the means of those with a family history of breast cancer and those without a family history (dichotomized as yes versus no) in terms of breast cancer knowledge.

Results of one way ANOVAs also revealed no significant difference in the means of levels of grade average (A, B, C, or D—coded as 1, 2, 3, and 4 respectively) ($F = .92$, $p = .45$) and years in school (freshmen, sophomores, juniors, or seniors—coded as 1, 2, 3, and 4 respectively) ($F = 1.25$, $p = .56$) in terms of level of knowledge

Next, a linear regression procedure was conducted and yielded similar results. Family history ($p = .015$) was found to have a significant association with participants' level of breast cancer knowledge. The model explained 6.89 % ($R^2 = .0689$) of the variance in breast cancer knowledge among this sample. Results of this analysis are given in Table 4.14.

Chi-square analyses were also utilized to identify relationships between respondents' background factors (ethnicity, grade average, year in school, and family history of breast cancer) and individual items assessing breast cancer knowledge. Generally, there were no significant differences observed. Some of the individual items were statistically significant, based on

individual chi-square tests, but most were not. The results of these tests are reported in

Appendix E.

Generally, there were no significant associations suggested between ethnicity,

cumulative grade average, or current year in school and respondents' overall level of breast

cancer knowledge. Thus, aside from known family history of breast cancer, individual women's

demographic factors had neither a positive nor negative effect on their level of breast cancer-

related knowledge. As the number of relatives affected by breast cancer increased, so did

participants' overall level of knowledge about the disease.

Table 4.14
Linear Regression Model of Demographic Factors and Knowledge

	β	SE	*p*
Ethnicity	-.121	.375	.746
Grade Average	1.676	2.065	.386
School Year	.314	.087	.330
Family History	.416	.170	**.015**

$n = 342$; adj $R^2 = .0689$ $p < .05$; significant values in **bold**.

Research Question #5: Is there a relationship between background factors (ethnicity, grade

average, year in school, and family history of breast cancer) and breast cancer beliefs regarding

perceived susceptibility and perceived severity?

First, independent t-tests and one way ANOVAs were used to assess the association

between demographic factors and perceived susceptibility and severity of breast cancer. Next,

linear regression analysis was used to examine the relationship between ethnicity, grade average,

year in school, and family history of breast cancer—and breast cancer beliefs perceived

susceptibility and perceived severity. For this analysis, ethnicity was coded as Whites versus

Others, with 0 representing White and 1 representing Others.

Results of an independent t-test indicated a significant difference in the means of Whites

as compared to Others ($p < .0001$), suggesting an association between ethnicity and level of

perceived susceptibility to breast cancer, with Whites showing a higher mean than Others.

Results of a one way ANOVA also revealed a slightly significant difference in the means of

school year categories ($F = .76$, $p = .04$) in terms of perceived susceptibility.

Table 4.15 displays results of a linear regression procedure for perceived susceptibility.

Results of this analysis found year in school to be negatively associated with perceived

susceptibility ($\beta = -.481$; $p = .014$). So, for each increase in year in school, there was an

indicated decrease in respondents' level of perceived susceptibility towards breast cancer.

Family history was also found to have a positive, highly significant relationship with the

outcome variable ($\beta = 1.387$; $p < .0001$). As the number of family members affected by breast

cancer increases by one increment, it is related to an increase in perceived susceptibility towards

breast cancer. Ethnicity was also found to be negatively associated with perceived susceptibility

($\beta = -1.999$; $p = <.0001$), suggesting that Whites had a higher level of perceived susceptibility to

breast cancer than Others. The model explained 20.9% ($R^2 = .209$) of the variance in perceived

susceptibility among this sample of emerging adult women.

Table 4.15
Linear Regression Model of Demographic Factors and Perceived Susceptibility

	β	SE	p
Ethnicity	-1.999	.745	**<.0001**
Grade Average	.038	.286	.896
School Year	-.481	194	**.014**
Family History	1.387	200	**<.0001**

$n = 342$; adj $R^2 = .209$ $p < .05$; significant values in **bold**.

Results of an independent t-test also suggested a significant difference in the means of Whites and Others in terms of perceived severity ($p < .0001$), with Whites having a slightly higher perceived severity. Results of an ANOVA procedure revealed no significance differences in terms of grade average, but did reveal a significant difference in terms of year of school ($F = .82$, $p = .002$).

Table 4.16 shows results concerning perceived severity. The linear regression procedure found only year in school ($\beta = -.709$; $p = .006$) and ethnicity ($\beta = -2.302$; $p < .0001$) to have a statistically significant relationship with the dependent variable. Each increase in school year was associated with a decrease in participants' level of perceived seriousness of breast cancer. Although family history was positive, it was small and not significant, suggesting no relationship between known family history of breast cancer and how serious participants perceived the disease to be. The model explained 8.2% ($R^2 = .082$) of the variability in perceived severity in this sample of emerging adult women.

Table 4.16
Linear Regression Model of Demographic Factors and Perceived Severity

	β	SE	p
Ethnicity	-2.302	.576	**<.0001**
Grade Average	-.007	.380	.985
School Year	-.709	.258	**.0063**
Family History	.209	.266	.0531

$n = 342$; adj $R^2 = .082$; $p < .05$; significant values in **bold**.

Research Question #6: Is there a relationship between demographic factors (ethnicity, grade average, year in school, and family history of breast cancer) and the worry item, "how worried are you about getting breast cancer someday"?

First, independent t-tests and ANOVAs, followed by linear regression analysis were utilized to assess the association between demographic factors (ethnicity, year in school, grade average, and family history of breast cancer) and level of breast cancer-related worry. Specifically, item #78 of the survey instrument (how worried are you about getting breast cancer someday?) was extrapolated to represent the dependent variable worry. The researcher used White as the reference point for ethnicity, coding White as 0 and Others as 1. Also, in terms of year in school, freshmen were coded as 1, sophomores as 2, juniors as 3, and seniors as 4.

Results of the independent t-test found a significant difference in the means of Whites versus Others ($p = .0018$) and those with a family history of breast cancer versus those without ($p < .0001$) regarding level of worry about breast cancer, with Others displaying a slightly lower degree of worry than Whites, and women with a breast cancer family history having a slightly higher level of worry than those with no family history of the disease. Results of an ANOVA indicated a significant difference in the means of year in school categories in terms of worry ($F = .022$, $p = .013$), with Sophomores ($M = 14.67$, $SD = 2.32$) displaying a higher means than other school years.

The linear regression model explained 12.7% ($R^2 = .127$) of the variance in the dependent variable. Table 4.17 shows results of this procedure. Ethnicity was found to have a significant, negative association with this particular worry item ($\beta = -.278$; $p = .010$). Thus, much like in the results of the independent t-test, Other ethnic groups were found to have a lower level of worry than Whites. Year in school was also found to

112

have a significant, positive association with level of worry ($p = .034$) indicating that increase in school year was related to increased levels of worry among the sample.

Family history was also highly, positively associated with level of worry. An increase in the number of relatives affected by breast cancer was related to increase in how worried respondents were about someday getting the disease ($\beta = .253$; $p < .0001$).

Table 4.17

Linear Regression Model of Demographic Factors and Worry

	β	SE	*p*
Ethnicity	-.278	.108	**.010**
Grade Average	-.071	.071	.313
School Year	.275	.181	**.034**
Family History	.253	.050	**<.0001**

$n = 342$; adj $R^2 = .127$; $p < .05$; significant values in **bold**.

Research Question #7: Are the individual HBM constructs confidence, health motivation, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers significant predictors of breast self-examination performance?

First, results of an ANCOVA revealed confidence ($F = 91.79$, $p < .0001$) and perceived barriers ($F = 14.47$, $p = .0002$) to have a significant association with breast self-exam performance. Next, linear regression analysis was also employed to assess the relationship using the following model:

Y = ethnicity + grade average + school year + family history + confidence + health motivation + perceived susceptibility + perceived severity + perceived benefits + perceived barriers + ε

Again, the researcher used White as the reference point for ethnicity, coding White as 0 and Others as 1. The survey item "how frequently do you perform breast self-examination"

represented the dependent variable breast self-exam performance. Response categories were as

follows: 1 = hardly ever/ not at all; 2 = once a year; 3 = 3 to 4 times a year; 4 = once a month; 5

= once every two weeks; 6 = once a week;

and 7 = once a day or more. The model explained 34% of the variance in the dependent variable,

breast self-examination. A summary of the results of this analysis is presented in Table 4.18.

Linear regression analysis revealed only confidence (β = .076, p <.0001) and perceived

barriers (β = -.059, p = .0002) to be significant predictors of breast self-examination

performance. As participants' level of confidence in performing BSE increased, their actual

performance of BSE increased, as well. And as participants' level of perceived barriers to BSE

decreased, the rate at which they performed BSE increased. Thus, among this sample of

emerging adult college women, Health Belief Model constructs were generally not found to be

significant predictors of breast self-exam performance.

Table 4.18
Linear Regression Model to Predict BSE Performance

	B	SE	*p*
Confidence	.076	.008	**<.0001**
Health Motivation	.007	.020	.724
Susceptibility	.020	.019	.284
Severity	.012	.014	.380
Benefits	.011	.021	.603
Barriers	-.059	.016	**.0002**
Ethnicity	.201	.154	.193
Grade Average	.314	.811	.699
School Year	-.212	.252	.389
Family History	.076	.073	.297

n = 342; adj R^2 = .344; p < .05; significant values in **bold**.

CHAPTER 5

DISCUSSION

Introduction

Cancer currently remains among the leading three most prevalent, expensive, and avoidable of all health problems in the US. Many of the risk factors associated with this disease are clearly linked to health behavior and lifestyle choices. Breast cancer, in particular, is unique from other cancers because of the related financial constraints and issues surrounding sexuality, body image, depression and anxiety, and chronic pain. The U.S. Department of Health and Human Services (USDHHS, 2010) set proposed goals of decreasing the incidence of late-stage disease breast cancer and reducing breast cancer mortality rates among females in our country. Early detection has been shown to significantly lower mortality and promote women's overall quality of life. Thus, making cancer screening information and services available to women is essential for reducing high rates of cancer and cancer deaths (Loerzel & Bushy, 2005; NCI, 2009).

The purpose of the present study was to assess breast cancer knowledge, beliefs, and screening behaviors—with a special emphasis on a population known to be in the midst of establishing lifelong habits: emerging adult women. Relying on the Health Belief Model as a theoretical framework, this study also examined perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy in relation to breast cancer; another component this study examined is breast cancer-related worry.

This chapter presents a discussion of the study's key findings relative to previous research, limitations of the study, implications for health education/health promotion practice, and recommendations for future research

Summary of Target Population

The sample for this study was comprised of emerging adults ($n = 342$) who were presently attending a major public university located in the southeastern U.S. This sample sufficiently represented the greater population from which it was extracted. Additionally, the ethnic and age mix was consistent with that of the university from which the sample was selected.

Summary of Procedures

Data for this research study were collected via a classroom-based, self-reported assessment battery. Participants were asked a series of questions related to breast cancer knowledge and beliefs, compliance of breast cancer screening behaviors, level of worry concerning breast cancer, and demographics. Univariate statistical analysis was used to describe study participants and reported screening beliefs and behaviors. Frequency analyses, correlations, and simple regression analyses were used to explore the seven research questions this study sought to answer:

1. To what extent are female undergraduate college students conducting breast self-examination (BSE)?

2. Is there a relationship between scores on a breast cancer knowledge test and frequency of performing breast self-examination?

3. Is there a relationship between items comprising a breast cancer worry test and frequency of performing breast self-examination?

4. Is there a relationship between demographic factors --ethnicity, grade average, year in school, and family history of breast cancer-- and level of breast cancer knowledge?

5. Is there a relationship between demographic factors--ethnicity, grade average, year in school, and family history of breast cancer--and breast cancer beliefs regarding perceived susceptibility and perceived severity?

6. Is there a relationship between demographic factors--ethnicity, grade average, year in school, and family history of breast cancer-- and the worry item, "how worried are you about getting breast cancer someday"?

7. Are the individual Health Belief Model constructs, confidence, health motivation, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers, significant predictors of breast self-examination performance?

Synopsis of Key Findings

Demographic Characteristics

1. The majority of participants were White (72%) and African-American (25%), with Asian/Pacific Islander and Biracial participants comprising 2% of the study population per category, and Latina women comprising 1%.

2. The majority of respondents reported senior (32%) and sophomore (32%) school status. Juniors represented 27% of the population, and freshmen only 9%.

3. Over half of respondents (51%) reported being 20-22 years of age, with the average age being 20.4 years ($SD = 1.9$).

4. Over half of participants (55%) indicated having a cumulative grade average of B, followed by 24% reporting an A average, 18% reporting an average of C, and 3% reporting a grade average of D.

5. Participants of this study predominantly indicated no known first or second-degree relatives affected by breast cancer (56%); 26% indicated having 1 relative with breast cancer, 12% reported 2, 5% reported 3, and 1% reported having 4 relatives affected by the disease.

Breast Cancer Knowledge

As aforementioned, a knowledge index was created to measure study participants' level of knowledge about breast cancer. This index was based on the number of correct answers on the *Breast Cancer Knowledge Test* (McCance et al., 1990). The knowledge index yielded a mean score of 10.89 with a standard deviation of 3.08. Thus, study participants generally answered just over half (57%) of the knowledge questions correctly. This finding suggests that these college women have relatively low overall knowledge regarding breast cancer. Similar studies examining breast cancer knowledge and beliefs also found lack of knowledge to be a barrier to screening (Farmer et al., 2007; Royse & Dignan, 2009).

Breast Cancer Beliefs

Consistent with findings of previous research, results from the present study indicate that college women have a very low level of perceived susceptibility towards breast cancer (Champion, 1992, 1984; Regan & Durvasula, 2009). One possible underlying reason is the notion that chronic diseases such as breast cancer are not very common among young age groups. The majority of women participants in the present study correctly identified increased age as a primary risk factor for breast cancer. Thus, this sample of emerging adult women may have felt less susceptible to the disease simply because of their youth.

The majority of women in this study overwhelmingly believed breast self-examination to be an effective means of breast cancer detection and that they could recognize abnormal changes in their breasts. This finding was consistent with findings from earlier studies on the efficacy of breast self-examination among older adult women (Farmer et al., 2007; Rowe et al., 2005)

Another key finding in this study was that worry about breast cancer did not have a significant impact on mood or daily activities. However, a substantial proportion of women (44%) indicated that they sometimes worried about getting breast cancer one day. Despite this observation, however, there was no indication that worry had any impact on the women's performing breast self-examination. Interestingly, Gasablberti (2002) found worry about breast cancer to serve as an actual barrier to breast self-examination performance.

A significant number of participants, or 34% ($n = 116$) reported performing breast self-examination once a month, which is in compliance with breast cancer screening recommendations. However, an almost equal portion of women (33%) reported performing breast self-examination hardly ever, not at all, or once a year. Still, the study sample generally had a moderately high degree of confidence in their ability to perform breast self-examination correctly.

Research Questions

The research questions in this study were directed by breast cancer knowledge, beliefs, as well as screening guidelines compliance for women currently enrolled in college. The following summary discusses the central findings for each of the research questions addressed by this study.

Research Question 1: To what extent are female undergraduate college students conducting breast self-examination (BSE)?

As aforementioned, formerly, the medical literature strongly recommended that women conduct breast self-examinations each month and undergo a clinical breast examination every one to three years beginning at the age of 20 (ACS, 2005). However, more recent breast cancer screening recommendations only suggest that women be informed about both potential benefits and disadvantages associated with breast self-examinations, have a discussion with her healthcare provider, and, in turn, make the choice to perform breast self-examination regularly (as recommended), occasionally, or not at all (ACS, 2009; Smith, Cokkinides, & Brawley, 2009).

Despite the conflicting views regarding breast self-examination, many researchers and health practitioners still emphasize that a significant percentage of breast cancer is discovered by chance and that women who perform monthly BSE often recognize a mass in their breasts earlier than women who do not perform monthly BSE (Wood, 2009). Thus, because breast self-examination continues to be accepted as one of the best protections against breast cancer (Regan & Durvasula, 2009), examining this behavior among emerging adult women in the southeastern U.S. was a major focal point of the current research study.

The researcher conducted a frequency analysis to determine the extent to which emerging adult college women are performing breast self-examination. Results indicated that of all the women sampled, 34% ($n = 116$) reported that they performed breast self-examination once a month. Thus, 34% of women complied with breast cancer screening recommendations. Although this percentage seemed promising initially, when compared to the percentage of women who performed breast self-examination hardly ever or not at all, the proportions were

virtually identical; a comparable 33% ($n = 113$) of women reported hardly ever engaging in BSE performance.

Unlike the findings of the present study, in her study examining breast cancer screening behaviors among a sample of women aged 35 or older, Champion (1990) reported breast self-exam compliance among the majority of these women. Aside from the twenty year difference between these studies, a possible rationale for the varying results could be attributed to conflicting opinions regarding the efficacy of breast self-examination published since the early 1990s.

Research Question 2: Is there a relationship between scores on a breast cancer knowledge test and frequency of performing breast self-examination?

Results of the present study suggested a significant association between participants' overall knowledge about breast cancer and the frequency with which they engaged in breast self-examination performance. These findings were consistent with findings of earlier research studies (Champion, 1999; Kressin et al., 2010; Regan & Durvasula 2006).

It is important to note, however, that a significant, negative correlation was suggested between knowledge of current mammography screening guidelines and breast self-examination. These results seem to indicate that an increase in knowledge of mammography screening guidelines was associated with a decrease in breast self-exam performance. Given the current controversy surrounding screening guidelines, however, such inconsistencies seem likely.

Research Question 3: Is there a relationship between items comprising a breast cancer worry test and frequency of performing breast self-examination?

Research in the area of fear appeals has suggested a number of variables that might mediate the worry-behavior relationship (Boehm et al., 1993; Champion, 1999; Davy, Benes, & Driskell, 2006). Previous research studies have shown a positive association between women's overall level of worry regarding breast cancer and breast self-examination performance (Champion, 1992). Contrary to these findings, however, the current study indicated no significant relationship between study participants' level of worry about breast cancer and the frequency at which they were conducting breast self-examination. Thus, according to the findings of the present study, respondents' level of worry about breast cancer did not positively or negatively impact the degree to which they performed self-examination.

A plausible cause for this finding may be related somehow to the overall level of perceived susceptibility towards breast cancer among these emerging adult women, as well. College years represent a time of newly found freedom and opportunity for exploring new things. Not surprisingly, these emerging adults oftentimes engage in risk-taking behavior with little to no thought regarding long-term consequences. It is this mode of thinking that may very well help to explain the overall lack of worry about breast cancer, as well as the notion of not being susceptible to the disease among college women, in particular.

These results were also inconsistent with findings of a previous study by Norman & Brain (2005), which found a significant, positive association between level of worry and frequency of breast self-exam performance. And in another study by Ackerson & Preston (2009) worry was also found to have a significant impact on women's breast cancer screening behaviors.

122

Research Question 4: Is there a relationship between demographic factors --ethnicity, grade average, year in school, and family history of breast cancer-- and level of breast cancer knowledge?

A significant association was seen only between family history of breast cancer and overall level of breast cancer knowledge. According to these results, as the number of relatives with breast cancer increased, so did the general level of knowledge about breast cancer. This finding was a relatively logical one and was consistent with findings in previous research studies (Rowe et al., 2005; Royse & Dignan, 2009). Personal experience with a sickness or disease usually tends to prompts one's interest in attaining more knowledge and raising awareness about that particular health issue. Thus, it seems plausible that women who have had personal experience with breast cancer, via a first or second-degree relative, will, in turn, have a higher level of knowledge about the disease, whether intentionally or unintentionally.

When examining knowledge items individually, however, more associations were revealed. Chi-square analysis revealed an association between knowledge of how often breast self-examination should be performed and ethnicity. This finding seems to echo the notion emphasized in previous literature that cultural beliefs and ideas have a direct influence on breast cancer screening knowledge and behaviors (Kressin et al., 2010; Simon, 2006).

There was also a positively significant association indicated between respondents' belief in how much difference breast self-exam can make in the chance of curing breast cancer and known family history of breast cancer. This finding suggests that as the number of known relatives affected by breast cancer increases, so does the belief that breast self-examination makes a great difference in the odds of curing the disease.

123

There was also a relationship indicated between how much difference breast self-exam is believed to make in the chance of curing breast cancer and known breast cancer family history ($\chi^2 = .009$). Thus, this indicates that women's having relatives affected by breast cancer influences their view as to whether breast cancer can be cured or not. This finding was consistent with conclusion drawn in earlier studies, which found known breast cancer family history influenced women's attitudes about breast cancer and their willingness to engage in breast cancer screening behaviors (Bird et al., 2010; Rowe et al., 2005)

Similar associations were also indicated between knowledge of how often breast self-exam should be performed and grade average ($\chi^2 = .002$). There was also a relationship suggested between the knowledge that breast cancer risk increases with age and grade average. Again, overall, however, grade average was not significantly associated with level of breast cancer knowledge.

Despite such findings regarding individual items of the knowledge test, however, in general, results of the present study suggested that aside from breast cancer family history, demographic factors had neither a positive nor negative influence on participants' overall level of breast cancer knowledge.

Research Question 5: Is there a relationship between demographic factors--ethnicity, grade average, year in school, and family history of breast cancer-- and breast cancer beliefs regarding perceived susceptibility and perceived severity?

Linear regression analysis indicated that participants' current year in school, known family history of breast cancer, and ethnicity were both associated with perceived breast susceptibility to breast cancer. For each increase in year in school, respondents showed a

124

systematic decrease in their level of perceived susceptibility to breast cancer. This finding seemed to be unique to the present study, as previous studies found perceived susceptibility towards breast cancer increased with age (Jones et al., 2005; Plesnicar et al., 2009). Also for each increase in the number of first and second-degree relatives with breast cancer, there was an increase in participants' level of perceived susceptibility towards breast cancer. These findings were consistent with previous studies, which found an overwhelming connection between family history of breast cancer and perceived threat of the disease (Champion, 1999; Katapodi et al., 2010).

Whites also indicated a higher level of perceived susceptibility to breast cancer than ethnic minority women. This finding was also consistent with previous studies, which suggested that members of minority groups often approach healthcare differently and that cultural values and beliefs influence attitudes about breast cancer, as well as their decisions to engage in screening behaviors (Hall et al., 2005; Isaac et al., 2007; Lee-Lin et al., 2007).

The same analysis found year in school to have a significant, negative association with perceived severity. Thus, this finding suggests that among this sample of emerging adult women, as school year increases, perceived severity of breast cancer decreases. Results also showed a significant, negative relationship between ethnicity and perceived severity. Thus, much like perceived susceptibility, ethnic minority women were found to display overall lower levels of perceived severity of breast cancer as compared to White women.

Research Question 6: Is there a relationship between demographic factors--(ethnicity, grade average, year in school, and family history of breast cancer—and the worry item "how worried are you about getting breast cancer someday?"

Linear regression analysis revealed a significant association between ethnicity, year in school, and family history of breast cancer and participants' general degree of breast cancer-related worry. The results of the present study indicated that among this sample of emerging adult college women, those who reported being members of a minority group had overall lower degrees of breast cancer-related worry than White women participants. Although ethnic minority background has commonly been previously associated with elevated breast cancer risk, lower breast cancer knowledge, and lower rated of screening (Lee & Cubin, 2002; Simon, 2006; Wendt, 2005) the finding of the current study linking minority status to lower breast cancer-related worry is unique.

An increase in the number of relatives affected by breast cancer was significantly associated with an increase in participants' overall level of worry regarding breast cancer. This finding, in particular, was not very surprising. Several previous studies have yielded similar findings. Katapodi et. al. (2010) found that women with a family history of breast cancer may overestimate their breast cancer risk, may suffer unnecessary stress, and anxiety, and may overuse health services.

Another finding of this analysis was that increased school year was associated with higher degrees of breast cancer worry. Although the age difference among women in varying school years was minimal in the present study, it is important to note that previous studies have reported an association between older women and breast cancer worry (Champion, 1992, 1999).

126

Research Question 7: Are the individual Health Belief Model constructs, confidence, health motivation, perceived susceptibility, perceived severity, perceived benefits,, and perceived barriers, significant predictors of breast self-examination performance?

Results of an ANCOVA and a linear regression procedure indicated that of the HBM constructs, only confidence (self-efficacy) and perceived barriers were significantly associated with breast self examination performance among this sample. Confidence was positively associated with breast self-examination performance, suggesting that as women's general level of confidence in their ability to perform breast self-examination increased, so did their actual performance of breast self-examination. This finding was consistent with results of previous studies (Champion, 1992, 1999; Karayurt et al., 2009).

Not surprisingly, results of the current study suggested the opposite finding regarding perceived barriers. Study participants' level of perceived barriers to breast self-examination was found to be negatively associated with their performance of breast self-examination. Thus, as perceived barriers decreased, the women's level of breast self-examination increased. This finding was also consistent with findings of previous studies (Champion, 1999; Karayurt et al., 2009). In general, however, other constructs of the Health Belief Model were not found to be significant predictors of breast self-exam performance among this particular sample of emerging adult college women—a finding inconsistent with that of earlier studies (Champion, 1999). Still, the HBM served as a valid framework to study breast cancer knowledge and beliefs among this sample.

Limitations

There are a number of limitations associated with this research study. First, it is important to note that the results of the current study were based on responses from current female college students in the southeastern U.S. Therefore, the findings reflecting relationships among this demographic sample are not comparable to studies that include all females.

Additionally, the use of convenience sampling as the primary method of data collection for this study may have, in turn, introduced bias. Criteria for participation in this study required that respondents were female, at least 18 years old, and currently enrolled in a course housed within one particular college in a large public university in the southeastern U.S. It is imperative to note that most courses surveyed were introductory-level courses, mainly 100 and 200-level. Surprisingly, significant portions of the sample were seniors and sophomores, rather than freshmen (as anticipated). This study sample, therefore, was not very "normal" as compared to the composition of traditional introductory college courses, which tend to contain a higher percentage of freshman students. Thus, conclusions drawn from this study may not be generalizable to other populations of college students or even other populations in general. A more varied recruitment strategy could reduce this bias in future studies. Possible strategies include recruiting from several colleges across the university, expanding recruitment to include several colleges/universities, or increasing recruitment opportunities further by including a range of geographical locations, such as a tri-state area. It is also worth indicating, however, that such strategies are much more difficult to coordinate and far more expensive. Still, however, convenience sampling has been widely used in health education/health promotion research, and is to date considered a valid data collection strategy among social science research at large (Gilmore & Campbell, 2006).

Another limitation of this study was the utilization of self-report measures. In such measures, there is no definitive method of ensuring accuracy and honesty in participants' responses. Respondents may attempt to present themselves in a more desirable fashion, intentionally or unintentionally. Despite these drawbacks, self-report surveys remain an excellent way to gain information about a particular group of people as their results can represent the true opinions or values of a given population (Cottrell & McKenzie, 2005). Therefore, the use of self-report measure in the present study was vital to the process of obtaining breast cancer information from study participants.

One self-report scale, in particular, that could potentially be viewed as a limitation is the *Revised Susceptibility, Benefits, and Barriers Scale for Mammography Screening* (Champion, 1999). This scale was originally developed for a sample of older adult women and, therefore, included several questions regarding mammography screening compliance. The present study focused on emerging adult college women whose primary concerns regarding breast cancer screening were breast self-examination and clinical breast examination. Unfortunately, the scale did not contain items related to clinical breast exam. Still, however, because of the overall inclusion of the major Health Belief Model constructs as a way of assessing breast cancer knowledge, beliefs, and behaviors, Champion's scale was still vital to the scope of this study.

Additionally, the cross-sectional, descriptive correlational design of the study did not allow causal deduction. A larger study comprising more participants from diverse areas may provide data for more complex forms of analysis. A longitudinal cohort study designed to examine change in breast cancer knowledge, beliefs, and screening compliance would possibly give a richer, more accurate picture of breast cancer-related preventive behaviors among these

women. Nonetheless, cross-sectional studies have proven to generate substantial data on a myriad of subjects in social science research (McKenzie, Pinger, & Kotecki, 2009).

Implications for Practice

Promoting healthy behaviors among emerging adults is a unique opportunity to facilitate lifelong healthy living and an overall enhanced quality of life. College and university settings hold a crucial position to aid in the prevention of chronic disease. Although health beliefs have consistently been linked to health behaviors, in general, this study did not provide support for all constructs of the Health Belief Model as a framework for investigating breast cancer knowledge, beliefs, and behaviors among this particular sample of emerging adult college women.

Given the relatively low levels of perceived susceptibility and severity regarding breast cancer associated with its findings, the present study highlights a great need for breast cancer education intervention programs that are designed to meet the unique needs of college women, specifically. Interventions should focus on removing perceived barriers to screening and enhancing self-efficacy among this population.

Early detection has been overwhelmingly cited as a primary element in the fight against breast cancer. Thus, increasing knowledge and overall awareness of breast cancer at an earlier age could lead to a positive, long-lasting effect on these women's quality of life. More education-based programming targeting emerging adult college women should be a primary consideration among health education/health promotion practitioners.

Recommendations for Future Research

As aforementioned, the HBM had been widely utilized in studies examining various factors related to breast cancer beliefs and screening compliance among different populations of women (mainly older than that of the present study). And although this model was helpful in exploring breast cancer-related issues in the present study, aside from confidence and perceived barriers, significant relationships were not indicated between the remaining HBM components and breast cancer screening behaviors. A possible future research direction might include the use of other health behavior theories as a framework, in conjunction with components of the HBM. The Theory of Planned Behavior Model and Social Ecological Model are both examples of alternative theoretical frameworks that have potential to predict and/or explain breast cancer screening beliefs and behaviors of college women.

Other recommendations for future research include designing larger studies with more varied populations. Participants in this study were predominantly White—an observation consistent with most major public universities in the southeast. Conducting a similar study at a major Historically Black College/University (HBCU) and subsequently doing a comparative analysis would allow for greater diversity and a deeper understanding of breast cancer issues among a more culturally varied population of women.

It is also important to note that this study did not include clinical breast examination as one of its areas of focus. Because breast self-exam and clinical breast exam are the two main forms of breast cancer screening behaviors recommended for women in this age group, future research should examine both behaviors in terms of breast cancer screening compliance.

Lastly, it should also be indicated that although it is rare, breast cancer among men is increasing and, therefore, warrants further investigation. In addition, because men are certainly

directly linked to women in some way—sister, mother, daughter, or significant other—it is important for men to be kept abreast of breast cancer knowledge and screening recommendations just as women. Thus, future research strategies should include men within the target population in order to assess their overall knowledge and beliefs regarding breast cancer, in addition to women.

References

Ackerson, K. & Preston, S. D. (2009). A decision theory perspective on why women do or do not decide to have cancer screening: systematic review. (2009). *Journal of Advanced Nursing*, 65, 1130-1140.

Adler, N. & Epel, E. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: preliminary data in healthy white women. *Health Psychology*, 19, 586-592.

Al-Ghazal, S. K., Fallowfield, L., & Blamey, R.W. (2000). Comparison of psychological Aspects and patient satisfaction following breast conserving surgery, simple Mastectomy, and breast reconstruction. *European Journal of Cancer*, 36, 1938-1943.

Al-Ghazal, S. K., Fallowfield, L., & Blamey, R.W. (1999). Does cosmetic outcome from treatment of primary breast cancer influence psychosocial morbidity? *European Journal of Surgical Oncology,*25, 571-573.

American Cancer Society (2007a). Breast *Cancer Facts and Figures 2007-2008*. Atlanta: American Cancer Society. [Electronic Version]. p. 1-26.

American Cancer Society (2007b). *Cancer Facts and Figures 2007*. Atlanta: American Cancer Society. [Electronic Version]. p. 1-11.

American Cancer Society (2007c). *Cancer Prevention and Early Detection Facts and Figures 2007.* Atlanta: American Cancer Society. [Electronic Version]. p. 1-2, 30-50.

American Cancer Society. Cancer Facts and Figures 2008. Atlanta: American Cancer Society; 2008. [Electronic Version]. P. 1-11.

Andrulis, D.(2005). Moving beyond the status quo in reducing racial and ethnic disparities in children's health. *Public Health Reports.* 120: 370-377.

Arnett, J.J.(2007). Suffering, selfish, slackers? Myths and reality about emerging adults. *Journal of Youth Adolescence*, 36: 23-29.

Arora, N.K. & McHorney, C.A. (2000). Patient preference in medical decision making: who really participates. *Medical Care*, 38, 335-341.

Arozullah, A.M., Calhoun, E.A., Wolf, M., Finley, D.K., Fitzner, K.A., Heckinger, E.A., Gorby, N.S., Schumock, G.T., & Bennett, C.L. (2004). The financial burden of cancer: estimates from a study of insured women with breast cancer. *Journal of Supportive Oncology,*2:3, 271-278.

Ashton, L., Karnilowicz, W., & Fooks, D. (2001). The incidence and belief structures associated with breast self-examination. *Social Behavior and Personality*, 29, 223-230.

Baan R, Straif K, Grosse Y, Secretan B, El Ghissassi F, Bouvard V, Altieri A, Cogliano (2007). Carcinogenicity of alcoholic beverages.WHO International Agency for Research on Cancer Monograph Working Group. *Lancet Oncology* 2007;8:292–293.

Bailey, J.M. (2009). *The Top 10 Rural Issues for Health Care Reform.* Center for Rural Affairs, Lyons, NE. 2: March 209.

Barron, C.R., Houfek, J.F., & Foxall, M.J. (1997). Coping styles, health beliefs, and breast self-exam. *Issues in Mental Health Nursing*, 18(4), 331-350.

Batchelor, D. (2001). Hair and cancer chemotherapy: consequences and nursing care—a Literature study. *European Journal of Cancer Care,* 10, 147-163.

Becker, M. H., ed. (1974). The Health Belief Model and Personal Health Behavior. *Health Education Monographs* 2:324–473.

Bennett, K.J., Olatosi, B., & Probst, J.C. (2008). Health disparities: a rural-urban chartbook. South Carolina Rural Health Research Center, Rural Health Research & Policy Centers.

Bird, Y., Moraros, J., & Banegas, M.P. Breast cancer knowledge and early detection Among Hispanic women with a family history of breast cancer aling the U.S.-Mexico border. *Journal of Health Care for the Poor and Underserved*, 21 (2), 475-488.

Bodenheimer, T., Chen, E., & Bennett, H.D. (2009). Confronting the growing burden of chronic disease: Can the U.S. health care workfoce do the job? *Health Affairs, 28(1),* 64-74.

Borsari, B., & Carey, K. (2000). Effects of a brief motivational intervention with college student drinkers. *Journal of Counseling and Clinical Psychology, 68,* 728-733.

Bradley, G. & Wildman, K. (2002). Psychosocial predictors of emerging adults' risk and reckless behaviors. *Journal of Youth and Adolescence.* 31:4, 253-269.

Burbie, G.E. & Polinsky, M.L. (1992). Intimacy and sexuality after cancer treatment: restoring a sense of wholeness. *Journal of Psychosocial Oncology*. 10: 19-33.

Centers for Disease Control and Prevention (2005). The Burden of Chronic Diseases and Their Risk Factors: National and State Perspectives 2004. Atlanta (GA): Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention (2008). *Overview: Breast Cancer*. Available at www.cdc.gov/cancer/data. Accessed December 2009.

Centers for Disease Control and Prevention (2010). National Program of Cancer Registries. Available at http://apps.nccd.cdc.gov/USCS. Accessed August 2010.

Champion, V. L. (1984). Instrument development for health belief model constructs. *Advances in Nursing Science*, 73-87.

Champion, V. L. (1990). Breast self-examination in women 35 and older: A prospective study. *Journal of Behavioral Medicine*, 13(6), 523-539.

Champion, V.L. & Miller, T.K. (1992). Variables related to breast self-exam: model Generation. *Psychology of Women Quarterly*, 16(1), 81-96.

Champion, V.L. (1999). Revised susceptibility, benefits, and barriers scale for mammography screening. *Research in Nursing & Health*, 22, 341-348.

Champion, V. L. (2003). Breast self-examination: What now? [Electronic Version]. *Oncology Nursing Forum, 30*(5), 723-724.

Choumanova, I., Wanat, S., Barrett, R., & Kooper, C. (2006). Religion and spirituality in coping with breast cancer: perspectives of Chilean women. *Breast Journal*, 12(4), 349-352.

Cohen, J., Cohen P., West, S.G., & Aiken, L.S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences.* (2nd ed.) Hillsdale, NJ: Lawrence Erlbaum Associates.

Cohen, M. & Azaiza, F. (2005). Early breast cancer detection practices, health beliefs, and cancer worries in Jewish and Arab women. *Preventive Medicine*, 41(5-6) 852-858.

Daniel, W. W. (1999). *Biostatistics: A Foundation for Analysis in the Health Sciences* (7th ed.). Hoboken, NJ: John Wiley & Sons, Inc.

Despues, D. & Friedman, H.S. (2007). Ethnic differences in health behaviors among college students. *Journal of Applied Social Psychology.* 37(1), 131-142.

DeVol, R. & Bedroussian, A. (2007). An unhealthy america: The economic burden of chronic disease. *Medical Benefits,* 24(22): 1-2.

Doescher, M.P. & Jackson, J.E. (2008). Trends in cervical and breast cancer screening practices among women in rural and urban areas of the United States. *Rural Health Research & Policy Centers*, 1-14.

Ebin, V. J., et al. (2001). Acculturation and interrelationships between problem and health-promoting behaviors among Latino adolescents. *Journal of Adolescent Health,* 28(1), 62–72.

Erblich, J., Bovbjerg, D.H., & Valdimarsdottir, H.B. (2000). Psychological distress, health beliefs, and frequency of breast self-examination. *Journal of Behavioral Medicine*, 23, 277-292.

Feig, A. (2002). Effect of service screening mammography on population mortality from breast carcinoma. *Cancer*, 95, 451-457.

Ford, M.A., Bass, M.A., Turner, L.W., Mauromoustakos, A., & Graves, S.B (2004). Past and recent physical activity and bone mineral density in college-aged women. *Journal of Strength and Conditioning Research*,18(3), 405-409.

Freedman, T.G. (1994). Social and cultural dimensions of hair loss in women treated for breast cancer. *Cancer Nursing*, 17: 4: 334-341.

Friedman, S. R. & Weissbrod, C.S. (2005). Work and family commitment and decision-Making status among emerging adults. *Sex Roles,* 53:5/6, 317-326.

Glanz, K., Rimer, B., & Lewis, F. M. (2002). *Health Behavior and Health Education, 3rd ed.* San Francisco: Jossey-Bass.

Gosschalk, A. & Carozza, S. (2005). Cancer in rural areas. *Rural Healthy People 2010 A companion document to Healthy People 2010.* A report prepared by the S.W. Rural Health Research Center School of Public Health, The Texa A & M System.

Hall, C.P., Hall, J.D., Pfriemer, J.T., Wimberley, P.D., & Jones, C.H. (2007). Effects of a culturally sensitive education program on the breast cancer knowledge and beliefs of Hispanic women. *Oncology Nursing Forum*, 34, 1195-1202.

Hamilton, R., Williams, J.K., Bowers, B.J., & Calzone, K. (2009). Life trajectories, genetic testing, and risk reduction decisions in 18-39 year old women at risk for hereditary breast and ovarian cancer. *Journal of Genetic Counseling*, 18: 147-14-59.

Harris, K.M., Gordon-Larson, P., Chantala, K., & Udry, R. (2006). Longitudinal trends in race/ethnic disparities in leading health indicators from adolescence to young adulthood. *Archives of Pediatrics and Adolescent Medicine.* 160(1), 74-81.

Hartley, D. (2004). Rural health disparities, population health, and rural culture. *American Journal of Public Health,* 94:10, 1675-1678.

Helms, R.L., O'Hea, E.L., & Corso, M. (2008). Body image issues in women with breast cancer. *Psychology, Health & Medicine*, 13:3, 313-325.

Henson, H. (2002). Breast cancer and sexuality. *Sexual Disability*. 2002: 20-24.

Hochbaum, G.M. (1958). *Public participation in medical screening programs: A sociopsychological study* (PHS Publication No. 572). Washington, DC: U.S. Government Printing Office.

Hoeman, S.R. & Ku, Y.L. (1996). Health beliefs and early detecion among Chinese women. *Western Journal of Nursing Research*, 18(5), 518-533.

Insel, P.M. & Roth, W.T. (2009). *Core concepts in health* (11th ed.). New York: McGraw-Hill.

Institute of Medicine. (2002). *Speaking of health: Assessing health communication strategies for diverse populations.* Washington, DC: National Academies Press.

Isaac, E.P., Rowland, M., & Blackwell, L.E. (2007). Fighting health disparities: The educational role of the African-American Church. *Crosscurrents*. 57(2), 261-265.

Janz, N.K. & Becker, M.H. (1984). The health belief model: A decade later. *Health Education & Behavior, 11(1),* 1-47.

Janz, N. K., Champion, V. L., & Strecher, V. J. (2002). The Health Belief Model. In K. Glanz, B.K. Rimer, & F.M. Lewis (Eds.), *Health Behavior and Health Education: Theory, Research, and Practice 3rd Edition* (pp.45-66). Jossey-Bass. San Francisco,CA 2002.

Joint Committee on Health Education and Promotion Terminology (2001). "Report of the 2000 Joint Committee on Health Education and Promotion Terminology." *American Journal of Health Education*, 32(2): 89-103.

Jones, K.O., Denham, B.E., & Springston, J.K. (2007). Differing effects of mass and interpersonal communication on breast cancer risk estimates: an exploratory study of college students and their mothers. *Health Communication*. 21(2), 165-175.

Kahn, M.A., Sehgal, A., Mitra, B., Agarwal, P.N, & Malik, V.K. (2000). Psychobehavioral impact of mastectomy. *Journal of the Indian Academy of Applied Psychology,* 26:1-2, 65-71.

Karayurt, O., Dicle, A., & Malak, A.T. (2009). Effects of peer and group education on knowledge, beliefs and breast self-examination practice among university students in Turkey. *Turkish Journal of Medical Science*. 39:1: 59-66.

Katapodi, M.C., Dodd, M.J., Facione, N.C., Humphreys, J.C., & Lee, K.A. (2010). Why some women have an optimistic or pessimistic bias about their breast cancer risk. *Cancer Nursing*, 33, 64-73.

Kiger, H. (2003). Outreach to multiethnic, multicultural, and multilingual women for breast cancer and cervical cancer education and screening. *Family & Community Health*, 26, 307-318.

Kravitz, R.L. & Feldman, M.D. (2010). From the editor's desk: the science and politics of screening. *Journal of General Internal Medicine*, 25: 2, 99.

Kressin, N.R., Manze, M., Russell, S.L., Katz, R.V., Claudio, C., Green, B.L., & Wang, M.Q. (2010). Self-reported willingness to have cancer screening and the effects of Sociodemogrphic factors. *Journal of the National Medical Association*, 2010;102: 219-227.

Kuzma, J. W., & Bohnenblust, S. E. (2001). *Basic Statistics for the Health Sciences* (4th ed.). Mountain View, CA: Mayfield Publishing Company.

Larimer, M., Turner, A., Anderson, B., Fader, J., Kilmer, J., & Palmer, R. (2001). Evaluating a brief alcohol intervention with fraternities. *Journal of Studies on Alcohol,62,* 370-380.

Larson, R. (1990). The solitary side of life: an examination of the time people spend alone from childhood to old age. *Dev Rev*, 10: 155-183.

Laska, M.N., Pasch, K.E., Lust, K., & Story, M. (2009). Latent class analysis of lifestyle Characteristics and health risk behaviors among college youth. *Preventive Science*, 10: 376-386.

Lee-Lin, F., Menon, U., Pett, M., Nail, S. L., & Mooney, K. (2007). Breast cancer beliefs and mammography screening practices among Chinese-American immigrants. *Journal of Obstetric, Gynecologic, & Neonatal Nursing,* 36, 212-221.

Lee, C.H., Dershaw, D.D., Kopans, D., Evans, P., Monsees, B., Monticciolo, D., Brenner, J., Bassett, L., Berg, W., Feig, S., Hendrick, E., Mendelson, E., D'Orsi, C., Sickies, E., & Burhenne, L.W. (2010). Breast cancer screening with imaging: Recommendations from the Society of Breast Imaging and the ACR on the use of mammography, breast ultrasound, and other technologies for the detection of clinically occult breast cancer. *Journal of American College of Radiology* 2010;7:18-27.

Lee, R.E. & Cubbin, C. (2002). Neighborhood context and youth cardiovascular health behaviors. *American Journal of Public Health*, 92(3), 428-436.

Lerman, C., Trock, B., Rimer, B.K., Jepson, C., Brody, D., & Boyce, A. (1991). Psychological side effects of breast cancer screening. *Health Psychology,* 10, 259-267.

Loerzel, V. & Busby, A. (2005). Interventions that address cancer health disparities in women. *Family & Community Health*, 28(1), 79-89. Retrieved from CINAHL Plus with Full Text database.

Ludwig, R.L. & Turner, L.W. (2002). Effective patient education in medical imaging: public perceptions of radiation exposure risk. *Journal of Allied Health*, 31:3, 159-164.

Marin, G., Sabogal, F., & Marin, V. (1987). Development of a short acculturation scale for Hispanics. *Hispanic Journal of Behavioral Sciences*, 9(2), 183-205.

McCance, K.L., Mooney, K.H., Smith, K.R., & Field, R. (1990). Validity and reliability of a breast cancer knowledge test. *American Journal of Preventive Medicine*, 6, 93-98.

McKay, A.P., Fingerhut, L.A., & Duran, C.R. *Adolescent health chartbook. Health*, *United States*, *2000*. Hyatsville, MD: National Center for Health Statistics, 2000.

McKenzie, J.F., Pinger, R.R., & Kotecki, J.E. (2008). *An Introduction to Community and Public Health* (6th ed.). Boston, Massachusetts: Jones and Bartlett Publishers.

McPhee, S. J., Stewart, S., Brock, K. E., Bird,J. A., Jenkins,C.N.H., & Pham, G. Q. (1997). Factors associated with breast and cervical cancer screening practices among Vietnamese American women. *Cancer Prevention and Detection, 21,* 510-521.

National Cancer Institute. (2005). *Theory at a Glance.* Washington, DC: National Instiues of Health.

Nelson, H.D., Tyne, K., Naik, A., Bougatsos, C., Chan, B.K., & Humphrey, L. (2009). Screening for breast cancer: an update for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*, 151:10, 727-745.

Nelson, H.D., Huffman, L.H., Fu, R., & Harris, E.L. (2005). Genetic risk assessment and BRCA mutation testing for breast and ovarian cancer susceptibility: systematic evidence review for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*, 143:5, 362-382.

Nelson, M.C., Story, M, Larson, N.I., Neumark-Sztainer, D., & Lytle, L.A. (2008). Emerging Adulthood and College-aged Youth: An Overlooked Age for Weight-Related behavior. *Obesity*, 16:10, 2205-2211.

Norman, P. & Brain, K. (2005). An application of an extended health belief model to the prediction of breast self-examination among women with a family history of breast cancer. *British Journal of Health Psychology*, 10, 1-16.

Pallant, J. (2007). *SPSS Survival manual* (3rd ed.). United Kingdom: McGraw Hill.

Peek, M., Sayaa, J., & Markwardt, R. (2008). Fear, fatalism and breast cancer screening in low-income African-American women: the role of clinicians and the health care system. *Journal of General Internal Medicine*, 23 (11), 1847-184-53.

Powe, B.D., Daniels, E.C., Finnie, R., & Thompson, A. (2004). Perceptions about breast cancer among African-American women: do selected educational materials challenge them? *Patient Education and Counseling*, 56, 197-204.

Rajaram, S. S., & Rashidi, A. (1998). Minority women and breast cancer screening: The role of cultural explanatory models. *Preventive Medicine, 27,* 747-764.

Regan, P. & Durvasula, R.S. (2009). Predictors of breast cancer screening in Asian and Latina university students. *College Student Journal.* 42.4, 1152-1161.

Roid, G. & Fitts, W. (1998). *Tennessee Self Concept Scale: Revised Manual*. Los Angeles, CA: Western Psychological Services, 1998.

Rosenstock, I.M. (1974). The health belief model and preventive health behavior. *Health Education Monographs , 2*: 328-335

Rothman, A.J. & Kiviniemi, M.T. (1999). Treating people with information: an anlaysis and review of approaches to communicating health risk information. *Journal of the National Cancer Institute. Monographs*, 25, 44-51.

Royse, D. & Dignan, M. Improving cancer knowledge and screening awareness: test of A telephone interviewer intervention. *Journal of Cancer Education*, 24: 315-318.

Schwartz, S.J., Zamboanga, B.L., Ravert, R.D., Kim, S.Y., Weisskirch, R.S., Williams, K Bersamin, M., & Finley, G.E. (2009). Perceived parental relationships and health-risk behaviors in college attending emerging adults. *Journal of Marriage and Family*, 71: 727-740.

SEER Cancer Statistics. Available at http://seer.cancer.gov/statistics/html/breast.html. Accessed January 15, 2010.

Sheppard, L.A. & Ely, S. (2008). Breast cancer and sexuality. *The Breast Journal*, 14: 176-181.

Shifren, K., Furnham, A., & Bauserman, R.L. (2003). Emerging adulthood in American and British samples: individual personality and health risk behaviors. *Journal of Adult Development*, 10, 75-88.

Simon, C.E. (2006). Breast Cancer Screening: Cultural Beliefs and Diverse Populations. *Health & Social Work*, 31, 36-43.

Simons-Morton, B.G., Green, W.H., & Gottlieb, N.H. (1995). *Introduction to Health Education and Health Promotion* (2nd ed.). Prospect Heights, Il. Waveland Press.

Sinicrope, P.S., Pattern, C.A., Clark, L.P., Brockman, T.A., Frost, M.H., Petersen, L.R., Vierkant, R.A., Vachon, C.M., Frederickson, Z.S., Janney, C.A., Sellers, T.A., & Cerhan, J.R. (2008). Adult daughters' reports of breast cancer risk reduction and early detection advice received from their mothers: an exploratory study. *Psycho-Oncology*, 18, 169-178.

Smith, R.A., Cokkinides, V., & Brawley, O.W. (2009). Cancer screening in the United States, 2009: a review of current American Cancer Society guidelines and issues in cancer screening. *CA: A Cancer Journal for Clinicians*, 59, 27-41.

Smith, M.D. & McGhan, W.F. (1996). Financial facts about treating breast cancer. *Business & Health*, Dec, 1996.

Sugarek, N., Deyo, R. & Holmes, B. (1988). Locus of control and beliefs about **cancer** in A multi-ethnic clinic population. *Oncology Nursing Forum, 15*(4), 481-486.

Trochim, W. M. (2006). *Correlation.* Retrieved November 19, 2010, from Research Methods: Knowledge Base:http://www.socialreserachmethods.net/kb/statcorr.php

Usdan, S., Martin, R., Mays, D., Cremeens, J., Weitzel, J.A., & Bernhardt, J. (2008). Self-reported consequences of intoxication among college students: implications for harm reduction approaches to high-risk drinking. *J. Drug Education*, 38(4), 377-387.

U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute: What you need to know about breast cancer. (2009).

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (November 2010). www.healthypeople.gov. Accessed December 1, 2010.

Vaeth, J.M. (1986). *Body image, self-esteem, and sexuality in cancer patients.* 2nd edition San Francisco, CA: Karger, 1986.

Vahabi, M. (2005). Knowledge of breast cancer and screening practices. *Health Education Journal*, 64, 218-228.

Welch, C., Miller, C.W., & James, N.T. (2008). Sociodemographic and health-related determinants of breast and cervical cancer screening behavior, 2005. *Nursing Research*, 2010: 59, 51-57.

Wendt, S.J. (2005). Perception of future risk of breast cancer and coronary heart disease in female undergraduates. *Psychology, Health & Medicine*, 10 (3): 253-262.

Wood, M. E. (2008). Theoretical framework to study exercise motivation for breast cancer risk reduction. *Oncology Nursing Forum*, 35, 89-95.

Zekeri, A.A. & Habtemariam, T. (2006). African American college students' perceptions of psychosocial factors influencing racial disparities in health. *College Student Journal*. 40: 4.

APPENDICES

APPENDIX A

EXPERT PANEL REVIEW

Breast Cancer Knowledge, Beliefs, and Screening Behaviors of College Women: Utilization of the Health Belief Model

Dear Dr. _____,

You are being contacted because you have been identified as an expert in the area of communication, health education theory, cancer research, adolescent health, women's health, or health disparities. I am a Doctoral student in the Department of Health Science at The University of Alabama, and I am requesting your assistance in the evaluation phase of compiling an instrument to assess the level of breast cancer knowledge, beliefs, and screening behaviors among undergraduate college women.

Having already obtained permission from survey authors, I have used three existing survey instruments, each of which has been rigorously tested and confirmed for validity and reliability: the Breast Cancer Knowledge Test (McCance et al., 1990); the Revised Susceptibility, Benefits, and Barriers Scale for Mammography Screening (Champion, 1999); and the Breast Cancer Worry Scale (Lerman et al., 1991). In compliance with current literature, I have added supplementary items assessing participants' family history of breast cancer and frequency of performing breast self-examination. Additionally, at the very end of the survey, participants are asked to provide basic demographic information such as age, educational level, ethnicity, and cumulative grade average. Completing the survey in its entirety will take an estimated 20 to 30 minutes.

Specifically, I am asking you to please review and comment on the attached survey instrument. (I have also attached the abstract in the attempt to give you additional information you may find helpful). I anticipate that this undertaking should consume roughly 15 minutes of your time.

I greatly appreciate your time and feedback!

Please contact me at (205) 348-9717 or at guilf001@crimson.ua.edu should you have any questions or concerns.

Respectfully,

Kendra Guilford
Doctoral Student
Department of Health Science
The University of Alabama

APPENDIX B

REQUEST FOR THE APPROVAL OF RESEARCH

INVOLVING HUMAN SUBJECTS

REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

Title of Research Project: *Breast Cancer Knowledge, Beliefs, and Screening Behaviors of College Women: Utilization of the Health Belief Model*

Procedures

Purpose:

There are two purposes to the proposed research project. The <u>first</u> is to measure the level of breast cancer knowledge, beliefs, and screening behaviors among female undergraduate college students at The University of Alabama. The <u>second</u> purpose of this study is to examine participants' degree of worry, perceived susceptibility, severity, benefits, barriers, and self-efficacy in relation to breast cancer. Specifically, the proposed research study will address the following research questions:

1. Is there a correlation between breast cancer knowledge and age, ethnicity, family history of breast cancer, and/or educational level?
2. Does a relationship exist between worry and breast cancer-screening behaviors?
3. Is there an association among breast cancer beliefs and age, ethnicity, family history of breast cancer, and/or educational level?
4. Are individual Health Belief Model (HBM) constructs significant predictors of breast self-examination, clinical breast exam, and mammography?
5. Do individual HBM constructs correlate with breast cancer knowledge?

Design:

This research project will utilize a cross-sectional, descriptive design. Its purpose is to investigate the level of breast cancer knowledge, beliefs, and behaviors among college women. This study will also examine worry, perceived susceptibility, severity, benefits, barriers, and self-efficacy in relation to breast cancer. A convenience sample of approximately 300 female undergraduate students who are currently enrolled in the College of Human Environmental Sciences will comprise the target population. Participants will be identified according to the classes in which they are enrolled. (see list of these classes given below). Kendra Guilford, the proposed principal investigator, will conduct all research activities, upon first obtaining permission from course instructors to enter their classes and administer the survey instrument to students who agree to participate. Those students who meet the criteria for participating in this study will be asked to complete an informed consent for the study (See Attached "Informed Consent for Research Study").

The participants will be asked to complete a written 86-item questionnaire, using either a question-specific multiple choice format, or a five-point Likert scale of (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree; or (1) not at all, (2) rarely, (3) sometimes, (4) often, and (5) almost all the time. Sample items are as follows: "I know how to perform breast self-examination;" "Having a mammogram or x-ray of the breast will help me find lumps early;" and "How worried are you about getting breast cancer someday?" Having obtained permission from survey authors, the researcher will use the Breast Cancer Knowledge Test (McCance et al., 1990); the Revised Susceptibility, Benefits, and Barriers Scale for Mammography Screening (Champion, 1999); and the Breast Cancer Worry Scale (Lerman et al., 1991) to compile the survey that will serve as the primary data collection instrument. Each of

147

these instruments has been rigorously tested for reliability and validity, and each is considered to be a valid, reliable survey instrument. The researcher will add supplementary items assessing participants' family history of breast cancer and frequency of performing breast self-examination. Also, at the very end of the survey, participants will be asked to give basic demographic information such as age, educational level, ethnicity, and cumulative grade average. Completing the survey in its entirety will take an estimated 20 to 30 minutes.

The primary researcher will administer and collect each survey. Confidentiality and anonymity will be maintained by having each student place his/her completed survey in a provided manila envelope and place it in a box at the front of the classroom. Moreover, no identifying information will be collected. The researcher will personally safeguard all completed surveys by storing them in a locked and secured area located at The University of Alabama. After survey responses have been coded, all original surveys will be shredded and destroyed.

Participants:

This research project will be conducted on the campus of The University of Alabama. Specifically, the project will use a convenience sample of 300 female undergraduate students (N≈300), which will be derived from classes housed within the College of Human Environmental Science. These students will have the opportunity to participate in the study, Breast Cancer Knowledge, Beliefs, and Screening Behaviors of College Women: Utilization of the Health Belief Model. This sample size is compliant with recommendations suggested in professional literature (Gay & Airasian, 2003, p. 113).

After obtaining permission from course instructors, the researcher will schedule a time to complete the proposed research study's survey instrument in the following courses: Personal Health (HHE 270), Community and Public Health (HHE 273), Drug Awareness Education (HHE 378), Understanding Stress Management (HHE 440), Career Development/Planning (HES 250), Issues in Human Environmental Sciences (HES 310), Self-Managed Mentoring (HES 485), Management Strategies (HES 459), and Sport Management (HES 460). The underlying reasons for choosing these courses include the fact that they are all housed within the College of Human Environmental Sciences, and many do not have prerequisites; therefore, these courses could potentially consist of students from an array of majors. Moreover, the notion that these courses will contain an appropriate number of female students is key to the proposed research study.

Site for Research:

The Principal Investigator, Kendra Guilford, will conduct the actual research for the proposed study at The University of Alabama. More specifically, Moore Hall rooms 1 and 2, Bryant Hall room 147, and Doster Hall rooms 104, 203, and 302 will serve as the research study sites, as courses will be held in each room listed.

Time:

Completion of the survey instrument will take an estimated 20 to 30 minutes of the students' class time. (see attached instrument).

Incentives:

There are no incentives associated with this research project, other than the participants' willingness to add to the pool of research needed on college students and breast cancer.

Participant Information:

The Basic Elements of Participant Information (taken directly from the informed consent form) are outlined below. (See Participant Information attached below for further details).

What is this study about?

There are two purposes to the proposed research project. The <u>first</u> is to measurethe level of breast cancer knowledge, beliefs, and screening behaviors amongundergraduate college students at The University of Alabama. The <u>second</u> purpose of this study is to examine participants' degree of worry, perceived susceptibility, severity, benefits, barriers, and self-efficacy in relation to breast cancer

Why is this study important--What good will the results do?

It is widely known and accepted that early diagnosis of breast cancer can reduce mortality significantly and will promote women's overall health (Sutherland, 2001). Additionally, women have been shown to be more likely to actively participate in making health-related decisions than men (Arora & McHorney, 2002). They also play a critical role in making healthcare decisions for the family unit. Specifically, those women who are in the process of transitioning from adolescence to adulthood offer a unique, critical window of opportunity for change in (or impact on) health behavior. The proposed research study will target these exact women. They represent a category labeled as "emerging adults," which includes individuals ranging in age from 18 to 25 (Shifron, Firnham, & Bauserman, 2003). Thus, assessing factors that impact knowledge, attitudes, and behaviors in relation to breast cancer and breast cancer screenings among college women could help health professionals develop programs and interventions that are uniquely adapted for this population, which, in turn, could ultimately result in altering their actual breast cancer risk factors.

Participant Information

Why have I been asked to take part in this study?

The purpose of this research study is to assess the level of breast cancer knowledge, beliefs, and screening behaviors among college women. You are a vital asset to this study. Your input will help health professionals create interventions that are uniquely adapted for college females, potentially reducing their risk factors for breast cancer.

If you are willing to participate, you will be asked to complete a survey used for the study *Breast Cancer Knowledge, Beliefs, and Screening Behaviors of College Women: Utilization of the Health Belief Model.*

Your participation in this study will help add to the research on breast cancer and college-aged students, particularly at The University of Alabama. All of your information will be kept confidential. Your name, campus wide identification, or other identifying information will not be asked. If at any time you do not wish to be a part of this study, please feel free to stop.

How many people besides me will be in this study?

Female undergraduate students at UA, enrolled in The College of Human Environmental Sciences, will have the opportunity to participate in this research study if they wish to do so. The research study will be comprised of around 300 students.

Students will be identified according to classes in which they are enrolled in The College of Human Environmental Sciences. Kendra Guilford (principal investigator) will conduct this study. After obtaining permission from course instructors, the researcher will schedule a time to administer the proposed research study's survey instrument in the following courses: Personal Health (HHE 270), Community and Public Health (HHE 273), Drug Awareness Education (HHE 378), Understanding Stress Management (HHE 440), Career Development/Planning (HES 250), Issues in Human Environmental Sciences (HES 310), Self-Managed Mentoring (HES 485), Management Strategies (HES 459), and Sport Management (HES 460).

What will I be asked to do in this study?

If you agree to participate in this study, you will be asked to fill out a written survey. On this survey, you will be asked your age in years, current class standing, approximate cumulative grade average, family history of breast cancer, frequency of performing breast self-examination, and ethnic background. If you choose to be in this study, you should know that all your answers will be strictly confidential. Your name, campus wide identification, or any other personal information will never be asked or utilized.

How much time will I spend being in this study?

You will be asked to spend about 20 minutes of your scheduled class time for this study. After you have completed and turned in the survey, you will never be contacted again.

Will I be paid for being in this study?

You will not be paid for being in this research study.

Will being in this study cost me anything?

There are no costs to you besides your time in filling out the survey. You will complete the survey during your regularly scheduled class time.

Can the researcher take me out of this study?

The researcher may take you out of the study if she feels the study is causing you any amount of distress or if you do not meet the requirements for the study.

What are the benefits (good things) that may happen to me if I am in this study?

There are no direct benefits to you for being in this study. However, some individuals may perceive indirect benefits from this study: Participation in this study may alert you to the importance of good breast health. Filling out the survey instrument may help prompt you to comply with recommended breast cancer screening guidelines now and/or in the future. You may also find an overall interest in breast cancer awareness and feel compelled to increase you own knowledge on the subject and share the gained information with the people important to you**.**

What are the benefits to scientists or society?

This study will help health researchers, health educators, doctors, nurses, and any individual concerned or interested in breast cancer related information. There is little information available on the topic of   and college students. This research will help understand the breast cancer-related knowledge, attitudes, and behaviors of college-aged females, and add to the pool of research on breast cancer.

What are the risks (dangers or harm) to me if I am in this study?

There are no direct risks to you for being in this study. The researcher may take you out of the study if she feels the study is upsetting you or if you do not meet the requirements for the study. Some individuals may feel uncomfortable answering questions relating to their personal breast health. You should know that as a student in this study, you are free to stop the study at anytime. No questions will be asked of you. This study is private and no identifying information will asked of you. There is no way to link any individual to his/her survey, and there is no risk for loss of confidentiality.

How will my confidentiality (privacy) be protected? What will happen to the information the study keeps on me?

Surveys will be kept in a locked file cabinet in the department chair's office. She is the only one who has access to the key, which opens this cabinet. They will remain in the locked cabinet throughout the duration of the study. After the data has been used, the files will be destroyed.

This study is also anonymous. The researcher will not, at any time, ask questions regarding your identity, including campus wide identification, your name, social security number, etc. There is no way for the researcher to trace your survey to you once you have completed it. No one, including the researcher, will ever know which survey is yours.

What are the alternatives to being in this study? Do I have other choices?

The alternative choice that you have is to not participate in this research study.

What are my rights as a participant?

Participating in this study is 100% voluntary. It is your choice to participate or to not participate. If you have second thoughts during the study, you are free to stop at any time.

The University of Alabama Institutional Review Board (IRB) is the committee that protects the rights of people in research studies. IRB may review study records to be sure that students in this research study are treated fairly and that the study is being carried out as planned. This procedure is followed for the protection of the researcher and participants.

Who do I call if I have questions or problems?

If you have any questions about the study right now, please ask them. If you have any questions about the study later on, please call the principal investigator, Kendra Guilford, at (205)-348-9717. If you have any questions about your rights as a research participant, you may contact Ms. Tanta Myles, The University of Alabama Research Compliance Officer, at (205)-348-5152.

<u>*Risks and Benefits*</u>:

Potential Risks:

There are no predicted anticipated risks (physical, psychological, social, legal, or other) to students participating in the proposed research study. Students may experience individual discomfort from answering questions related to their personal breast health and breast cancer family history. There is also the possibility of an unforeseen situation occurring and the study may be jeopardized of its anonymity agreement. The researcher may remove a student from the study in case of observed distress or failure to meet study requirements.

Risk Minimization:

The research study will not ask students for any personal information besides their age, cumulative grade average, family history of breast cancer, frequency of performing breast self-examination, and ethnic background. They will not be asked their name, social security number, or campus wide identification number. Thus, their survey will be anonymous. Students will fill out their survey and place it in a drop box located at the front of the classroom to ensure confidentiality and anonymity.

There is a potential risk that researchers and student participants may know each other, but to reduce this risk, they will be assured that their participation is strictly confidential and there will be no discussion of this study outside of the room where the research takes place. At anytime if the student feels uncomfortable, he or she has the opportunity to stop the study without penalty. Again, the researcher may remove a student from the study in case of observed distress or failure to meet study requirements.

Benefits:

Although there are no direct benefits to participants of this study, some individuals may perceive benefits from this study as including a reminder to take better care of their breast health. This would occur only if the information in the survey triggered them to increase individual action. They may be reminded of the importance of maintaining good breast health and be cued to be more aware of any changes within their breasts, make an appointment with their healthcare provider, or simply seek to increase their knowledge of breast cancer in general.

This study might also potentially help health researchers, health educators, doctors, nurses, and any individual concerned or interested in breast cancer related information. This research will also help understand the breast cancer related knowledge, attitudes, and behaviors of college female students, specifically at The University of Alabama.

Risk/Benefit Ratio:

The benefits of assessing and understanding individuals' knowledge, attitudes, and behaviors associated with breast cancer and breast cancer screening far outweigh the risks listed above. Participants in this study are not anticipated to experience any serious effects as a result of this study, for they have the option to withdrawal at anytime. If an unforeseen case arises, the researcher may remove a student from the research study if she feels the study is upsetting for the student or if he or she does not meet the requirements for the study.

Confidentiality:

  Data collected during this study will be kept strictly anonymous during the study. At the beginning of this study, students will be given a survey with an information number on it. This strategy serves simply to enable the researcher to keep track of the total number of surveys. Students will not be asked to record this number or associate any form of personal identification with this number.

  Again, students will not be asked to give any form of personal information besides their age in years, cumulative grade average, family history of breast cancer, frequency of performing breast self-examination, and ethnic background. All surveys will be locked in a file cabinet in the office of the researcher's supervisor to ensure data security. Results from this study may be published for scientific purposes, but participants' identity will not be revealed.   At the end of the study, all surveys will be destroyed.

Information Sheet

You are being asked to take part in a research study, Breast Cancer Knowledge, Beliefs, and Screening Behaviors of College Women: Utilization of the Health Belief Model at The University of Alabama. Kendra Guilford, who is a doctoral student at The University of Alabama, is conducting the study. Dr. Lori Turner, Ph.D., RD, who is the Department Chair of Health Science in the College of Human Environmental Sciences, will supervise the researcher.

What is this study about?

This study has two purposes. The <u>first</u> is to measure the level of breast cancer knowledge, beliefs, and screening behaviors among female undergraduate college students at The University of Alabama.   Additionally, this study will look at things such as the amount of worry about breast cancer, what factors help or hinder breast cancer screenings, and how seriously college women take breast cancer. You were selected as a possible participant for this study because you are a female who is a currently enrolled college student.

Why is this study important--What good will the results do?

It is widely known and accepted that early diagnosis of breast cancer can reduce mortality significantly and will promote women's overall health. Women have been shown to be more likely to actively participate in making health-related decisions than men. They also play a critical role in making healthcare decisions for the family unit. Specifically, those women who are in the process of transitioning from adolescence to adulthood offer a unique, critical window of opportunity for change in (or impact on) health behavior. The proposed research study will target these women; they represent a category labeled as "emerging adults," which includes individuals ranging in age from 18 to 25. Thus, assessing factors that impact knowledge, attitudes, and behaviors in relation to breast cancer and breast cancer screenings among college women could help health professionals develop programs and interventions that are uniquely adapted for this population, which, in turn, could ultimately result in altering their actual breast cancer risk factors.

Why have I been asked to take part in this study?

The purpose of this research study is to assess the level of breast cancer knowledge, beliefs, and screening behaviors among college women. You are a vital asset to this study. Your input will help health professionals create interventions that are uniquely adapted for college females, potentially reducing their risk factors for breast cancer. If you are willing to participate, you will be asked to complete a survey used for the study Breast Cancer Knowledge, Beliefs, and Screening Behaviors of College Women: Utilization of the Health Belief Model.
Your participation in this study will help add to the research on breast cancer and college-aged students, particularly at The University of Alabama. All of your information will be kept confidential. Your name, campus wide identification, or other identifying information will not be asked. If at any time you do not wish to be a part of this study, please feel free to stop.

How many people besides me will be in this study?

Female undergraduate students at UA, enrolled in The College of Human Environmental Sciences, will have the opportunity to participate in this research study if they wish to do so. The research study will be comprised of around 300 students.

Students will be identified according to classes in which they are enrolled in The College of Human Environmental Sciences.

What will I be asked to do in this study?

If you agree to participate in this study, you will be asked to fill out a written survey. On this survey, you will also be asked your age in years, current class standing, approximate cumulative grade average, family history of breast cancer, frequency of performing breast self-examination, and ethnic background. If you choose to be in this study, you should know that all your answers would be strictly confidential. Your name, campus wide identification, or any other personal information will never be asked or utilized.

How much time will I spend being in this study?

You will be asked to spend about 20 minutes of your scheduled class time for this study. After you have completed and turned in the survey, you will never be contacted again.

Will I be paid for being in this study?

You will not be paid for being in this study.

Will being in this study cost me anything?

There are no costs to you besides your time in filling out the survey. You will complete the survey during your regularly scheduled class time.

Can the researcher take me out of this study?

The researcher does not feel the need to remove anyone from this study, as long as he or she meets the study requirements.

What are the benefits (good things) that may happen to me if I am in this study?

There are no direct benefits to you for being in this study. However, you may perceive indirect benefits from this study: Participation in this study may alert you to the importance of good breast health. Filling out the survey instrument may help prompt you to comply with recommended breast cancer screening guidelines now and/or in the future. You may also find an overall interest in breast cancer awareness and feel compelled to increase you own knowledge on the subject and share the gained information with the people important to you

What are the benefits to scientists or society?

This study might help health researchers, health educators, doctors, nurses, and any individual concerned or interested in breast cancer related information. There is little information available on the topic of breast cancer among southern college students located in a rural area. This research will help understand the breast cancer-related knowledge, attitudes, and behaviors of college-aged females, and add to the pool of research on breast cancer.

What are the risks (dangers or harm) to me if I am in this study?

There are no direct risks to you for being in this study. The researcher may take you out of the study if she feels the study is upsetting you or if you do not meet the requirements for the study. Some individuals may feel uncomfortable answering questions relating to their personal breast health. You should know that as a student in this study, you are free to stop the study at anytime. No questions will be asked of you. This study is private and no identifying information will asked of you. There is no way to link any individual to his/her survey, and there is no risk for loss of confidentiality.

How will my confidentiality (privacy) be protected? What will happen to the information the study keeps on me?

Surveys will be kept in a locked file cabinet in the department chair's office. She is the only one who will have access to the key, which opens this cabinet. Surveys will remain in the locked cabinet throughout the duration of the study. After the data has been used, the files will be destroyed.

This study is also anonymous. The researcher will not, at any time, ask questions regarding your identity, including campus wide identification, your name, social security number, etc. There is no way for the researcher to trace your survey to you once you have completed it. No one, including the researcher, will ever know which survey is yours.

What are the alternatives to being in this study? Do I have other choices?

The alternative choice that you have is to not participate in this research study.

What are my rights as a participant?

Participating in this study is 100% voluntary. It is your choice to participate or to not participate. If you have second thoughts during the study, you are free to stop at any time.

The University of Alabama Institutional Review Board (IRB) is the committee that protects the rights of people in research studies. IRB may review study records to be sure that students in this research study are treated fairly and that the study is being carried out as planned. This procedure is followed for the protection of the researcher and participants.

Who do I call if I have questions or problems?

If you have any questions about the study right now, please ask them. If you have any questions about the study later on, please call the principal investigator, Kendra Guilford, at (205) 348-9717, or her advisor and chair, Dr. Lori Turner, at (205) 348-9087. If you have any questions about your rights as a research participant, you may contact Ms. Tanta Myles, The University of Alabama Research Compliance Officer, at (205)-348-8461.

APPENDIX C

PARTICIPANT INFORMATION SHEET

<u>Participant Information Sheet:</u>

Breast Cancer Knowledge, Beliefs, and Screening Behaviors of College Women: Utilization of the Health Belief Model

In exchange for participation in College of Human Environmental Sciences subject pool, you will personally contribute to the research collected on breast cancer/screening related knowledge, attitudes, and behaviors among your colleagues at The University of Alabama. Each person asked to be in a research study has rights. As a research participant, your rights are as follows:

- If you wish to withdraw from the present research study, you have the right to do so at any given time.
- It is important that you be aware of any risks from your participation, and that you understand how the research may affect you.
- As a participant, you may have questions about the study even after you have given your consent. Do not hesitate to discuss these questions with the Principal Investigator, research personnel, or department chair. It is important for you to understand exactly what the study is about and why it is being conducted.
- You have the right to completely refuse to participate in the study.
- If you change your mind about participation even after the study has begun, you can withdraw from the study with no questions asked.
- You have the right to be told who to contact with questions about the research study and about your rights as a research participant.
- If you, for whatever reason, are not comfortable participating in health related studies you may choose not to do so, with no questions asked.
- Any additional questions relating to your rights and the presented study are encouraged.

If you have any questions or concerns, please contact Kendra Guilford or Dr. Lori Turner.

Kendra Guilford:
Principal Investigator
111 EAST ANNEX
(205) 348-9717
guilf001@crimson.us.edu

Dr. Lori Turner:
Faculty Supervisor & Department Chair, Department of Health Science
210 East Annex
(205) 348-9087
lwturner@ches.ua.edu

APPENDIX D

**SUPPLEMENTAL CORRELATION RESULTS OF BREAST CANCER KOWLEDGE
AND BSE FREQUENCY**

Correlation between Breast Cancer Knowledge and Frequency of BSE

Breast Cancer Knowledge Item	r	p
BSE should be performed how often	.045	.410
Most breast lumps found by whom	-.061	.266
How much difference regular BSE screening makes in chance of cure	-.070	.198
BSE is effective method of cancer detection	-.074	.172
Mammography can detect unfelt lumps	-.028	.611
Beginning age for BSE	**-.128**	**.018**
Mammography cancels out BSE & CBE	.046	.398
Current mammography recommendations	**-.117**	**.031**
Using palm of hands is effective	-.074	.172
BSE should be done during menstrual cycle	-.098	.071
Looking in mirror is part of good BSE	-.192	**.004**
Looking at breasts is not necessary in BSE	**-.177**	**.001**
Nipple discharge is normal	-.068	.213
Feeling underarm is part of good BSE	**-.138**	**.011**
Squeezing of nipple is part of good BSE	-.100	.065
Frequency of BSE if postmenopausal	**-.145**	**.008**
Palpating the breast with pads or tips of fingers	-.097	.076
Examples of abnormal breast changes	.058	.291
Breast cancer risk increases with age	<.001	.986

n = 342; *p*< *.05*; significant values in **bold**.

APPENDIX E

**RESULTS OF CHI-SQUARE ANALYSIS OF DEMOGRAPHIC FACTORS AND
BREAST CANCER KNOWLEDGE**

Chi-Square Analysis of Ethnicity/Family History and Breast Cancer Knowledge

Item	χ^2 Ethnicity	χ^2 History
BSE should be performed how often	**.001**	.301
Most breast lumps found by whom	.372	.189
How much difference regular BSE screening makes in chance of cure	.311	**.009**
BSE is effective method of cancer detection	.201	.314
Mammography can detect unfelt lumps	.280	.166
Beginning age for BSE	.330	.554
Mammography cancels out BSE & CBE	.342	.783
Current mammography recommendations	.090	.206
Using palm of hands is effective	.625	.370
BSE should be done during menstrual cycle	.407	**.019**
Looking in mirror is part of good BSE	.170	.269
Looking at breasts is not necessary in BSE	.295	**.028**
Nipple discharge is normal	.715	**.025**
Feeling underarm is part of good BSE	.355	.943
Squeezing of nipple is part of good BSE	**.020**	.294
Frequency of BSE if postmenopausal	**.026**	.983
Palpating the breast with pads or tips of fingers	**.001**	.934
Examples of abnormal breast changes	.822	.621
Breast cancer risk increases with age	.982	.706

$n = 342$; $p < .05$; significant values in **bold type**.

Chi-Square Analysis of Grade Average/Year in School and Breast Cancer Knowledge

Item	χ^2 Grade Average	χ^2 School Year
BSE should be performed how often	**.002**	.134
Most breast lumps found by whom	.718	.781
How much difference regular BSE screening makes in chance of cure	.813	.634
BSE is effective method of cancer detection	.095	**.008**
Mammography can detect unfelt lumps	.664	.654
Beginning age for BSE	**.017**	.181
Mammography cancels out BSE & CBE	.460	.002
Current mammography recommendations	.343	.028
Using palm of hands is effective	.169	**.020**
BSE should be done during menstrual cycle	.138	**.0006**
Looking in mirror is part of good BSE	.093	**.033**
Looking at breasts is not necessary in BSE	.269	.581
Nipple discharge is normal	.181	.048
Feeling underarm is part of good BSE	.234	**.0004**
Squeezing of nipple is part of good BSE	.546	.045
Frequency of BSE if postmenopausal	.675	.461
Palpating the breast with pads or tips of fingers	.724	.816
Examples of abnormal breast changes	**.012**	.200
Breast cancer risk increases with age	**.008**	.111

$n = 342$; $p < .05$; significant values in **bold type**.

APPENDIX F

ASSESSMENT BATTERY

Breast Cancer Knowledge, Beliefs, and Screening Behaviors of College Women: Utilization of the Health Belief Model

Thank you for taking the time to complete this survey. The purpose of this research study is to assess the level of breast cancer knowledge, beliefs, and screening behaviors among college women. You are a vital asset to this study. Your input may help health professionals create interventions that are uniquely adapted for college females, potentially reducing their risk factors for breast cancer. This survey is completely voluntary; you may choose not to participate or not answer any question with which you are not comfortable in answering.

The information that you provide will be kept strictly confidential, and this survey is completely anonymous. Your name and campus ID number will not be asked. After completion of this study, your data will be destroyed.

Again, thank you for your participation!

****

This first section of the survey concerns your general level of knowledge about breast cancer.
Please circle one (1) answer for each of the following questions:

1. How often should a breast self-examination be performed?
   a) Every 6 months   b) Once a month   c) Once a week   d) Don't know

2. Most breast lumps are found by:
   a) Women themselves   b) Physician   c) Mammography   d) Don't know

3. How much difference does regular breast cancer screening make in the chance of curing breast cancer?
   a) A great deal   b) Some difference   c) Little or no difference   d) Don't know

4. A woman who regularly feels her breasts is doing one of the most effective cancer detection.
   a) True   b) False   c) Don't know

5. Mammography can detect lumps that can't be felt.
   a) True   b) False   c) Don't know

6. At what age should a woman begin breast self-examination?
   a) 20   b) 30   c) 35   d) Don't know

7. If a woman gets regular mammography, she does not need to do breast self-examination or have a clinical breast examination (examination of breasts by doctors or nurses).
   a) True   b) False   c) Don't know

8. Mammography is recommended every 2 years for women 50 years and over.
   a) True   b) False   c) Don't know

9. Using the palm of your hands is the most effective method for detecting a breast lump.
   a) True   b) False   c) Don't know

10. Breast self-examination should be performed during your period when lumps are most easily detected.
   a) True   b) False   c) Don't know

11. An important part of breast self-examination is looking at your breasts in the mirror.
    a) True   b) False   c) Don't know

12. It is not necessary to look at your breasts during breast self-examination.
    a) True   b) False   c) Don't know

13. Some nipple discharge is expected as you get older when you squeeze the nipple during breast self-examination.
    a) True   b) False   c) Don't know

14. Breast self-examination should include feeling for lumps under your arm.
    a) True   b) False   c) Don't know

15. Squeezing the nipple is necessary for a good examination.
    a) True   b) False   c) Don't know

16. If you are postmenopausal, how often should you do breast self-examination?
    a) Each week   b) Once a month   c) Every 3 months   d) Don't know

17. When feeling (palpating) the breast, you should:
    a) Use the pads of your fingers   b) Use the tips of your fingers   c) Don't know

18. Abnormal breast change includes the following:
    a) Discharge   b) Lump, hard knot, or thickening   c) Dimpling of skin

    d) All of the above   e) None of the above   f) Don't know

19. The risk of getting breast cancer increases with age.
    a) True   b) False   c) Don't know

This section contains items concerning susceptibility, benefits, and barriers with respect to breast cancer screening.
Please circle one (1) response following each statement, using the following scale:

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

20. I know how to perform breast self-examination.
    1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

21. I am confident I can perform breast self-examinations correctly.
    1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

22. If I were to develop breast cancer I would be able to find a lump by performing breast self-examination.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

23. I am able to find a breast lump if I practice breast self-examination alone.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

24. I am able to find a breast lump that is the size of a quarter.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

25. I am able to find a breast lump that is the size of a dime.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

26. I am able to find a breast lump that is the size of a pea.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

27. I am sure of the steps to follow for doing breast self-examination.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

28. I am able to identify normal and abnormal breast tissue when I do breast self-examination.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

29. When looking in the mirror, I can recognize abnormal changes in my breasts.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

30. I can use the correct part of my fingers when I examine my breasts.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

31. I want to discover health problems early.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

32. Maintaining good health is extremely important to me.

    1　　　　　2　　　　　3　　　　　4　　　　　5
    (SD)　　　(D)　　　　(N)　　　　(A)　　　　(SA)

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

33. I search for new information to improve my health.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

34. I feel it is important to carry out activities that will improve my health.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

35. I eat well-balanced meals.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

36. I exercise at least 3 times a week.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

37. I have regular health check-ups even when I am not sick.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

38. If I get a mammogram and nothing is found, I will not worry as much about breast cancer.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

39. Having a mammogram will help me find breast lumps early.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

40. If I find a lump through a mammogram, my treatment for breast cancer may not be as bad.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

41. Having a mammogram is the best way for me to find a very small lump.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

42. Having a mammogram will decrease my chances of dying from breast cancer.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

43. I am afraid to have a mammogram because I might find out something is wrong.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

44. I am afraid to have a mammogram because I don't understand what will be done.

       1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

45. I don't know how to go about getting a mammogram.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

46. Having a mammogram would be too embarrassing.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

47. Having a mammogram would take too much time.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

48. Having a mammogram would be too painful.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

49. People doing mammograms are rude to women.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

50. Having a mammogram would expose me to unnecessary radiation.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

51. I would not remember to schedule a mammogram.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

52. I have other problems more important than getting a mammogram.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

53. Having a mammogram would cost too much money.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

54. It is extremely likely I will get breast cancer in the future.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

55. I feel I will get breast cancer in the future.

1	2	3	4	5
(SD)	(D)	(N)	(A)	(SA)

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

56. There is a good possibility I will get breast cancer in the next 10 years.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

57. My chances of getting breast cancer are great.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

58. I am more likely than the average woman to get breast cancer.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

59. The thought of breast cancer scares me.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

60. When I think about breast cancer, my heart beats faster.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

61. I am afraid to think about breast cancer.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

62. Problems I would experience with breast cancer would last a long time.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

63. Breast cancer would threaten a relationship with my boyfriend, husband, or partner.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

64. If I had breast cancer my whole life would change.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

65. If I developed breast cancer, I would not live longer than 5 years.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

66. When I do breast self-examination I feel good about myself.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

67. When I complete monthly breast self-examination I don't worry as much about breast cancer.
     1   2   3   4   5
    (SD)   (D)   (N)   (A)   (SA)

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

68. Completing breast self-examination each month will allow me to find lumps early.

   1   2   3   4   5
  (SD)   (D)   (N)   (A)   (SA)

69. If I complete breast self-examination monthly during the next year I will decrease my chance of dying from breast cancer.

   1   2   3   4   5
  (SD)   (D)   (N)   (A)   (SA)

70. If I complete breast self-examination monthly I will decrease my chances of requiring radical or disfiguring surgery if breast cancer occurs.

   1   2   3   4   5
  (SD)   (D)   (N)   (A)   (SA)

71. If I complete monthly breast self-examination it will help me find a lump that might be cancer before it is detected by a doctor or nurse.

   1   2   3   4   5
  (SD)   (D)   (N)   (A)   (SA)

72. I feel funny doing breast self-examination.

   1   2   3   4   5
  (SD)   (D)   (N)   (A)   (SA)

73. Doing breast self-examination during the next year will make me worry about breast cancer.

   1   2   3   4   5
  (SD)   (D)   (N)   (A)   (SA)

74. Breast self-examination will be embarrassing to me.

   1   2   3   4   5
  (SD)   (D)   (N)   (A)   (SA)

75. Doing breast self-examination will take too much time.

   1   2   3   4   5
  (SD)   (D)   (N)   (A)   (SA)

76. Doing breast self-examination will be unpleasant.

   1   2   3   4   5
  (SD)   (D)   (N)   (A)   (SA)

77. I don't have enough privacy to do breast self-examination.

   1   2   3   4   5
  (SD)   (D)   (N)   (A)   (SA)

This next set of questions concerns worries you may have related to breast cancer.
Please circle one (1) answer for each of the following questions:

78. How worried are you about getting breast cancer someday?
        1) Not at all   2) Rarely   3) Sometimes   4) Often   5) Almost all the time

79. How much does your worry affect your mood?
        1) Not at all   2) A little   3) Somewhat   4) A lot

80. How much does your worry affect your ability to perform your daily activities?
        1) Not at all   2) A little   3) Somewhat   4) A lot

This final section concerns how you would describe yourself.
Please mark the appropriate response to the following items:

What is your current year in school?
        1) Freshman   2) Sophomore   3) Junior   4) Senior

What is your approximate cumulative grade average?
        1) A   2) B   3) C   4) D/F   5) N/A

Please indicate your age in years. _____

How frequently do you perform breast self-examination?
1) Hardly ever/ not at all
2) Once a year
3) 3 to 4 times a year
4) Once a month
5) Once every two weeks
6) Once a week
7) Once a day or more

Please indicate the number of first and second-degree relatives (parents, siblings, grandparents, cousins, aunts, or uncles) affected with breast cancer. _____

How do you usually describe yourself? (Please mark all that apply).
1) White, non Hispanic (includes middle Eastern)
2) Black, non Hispanic
3) Hispanic or Latina
4) Asian or Pacific Islander
5) American Indian, Alaska Native, or Native Hawaiian
6) Biracial or Multiracial
7) Other

Thank You for Your Time!