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Are Women Aware? : Factors Related to Women's Knowledge of Risk and Preventive Factors in Breast Cancer

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ABSTRACT

ARE WOMEN AWARE? FACTORS RELATED TO WOMEN'S KNOWLEDGE OF RISK AND PREVENTIVE FACTORS IN BREAST CANCER

by

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ABSTRACT OF GRADUATE STUDENT RESEARCH

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Title: ARE WOMEN AWARE? FACTORS RELATED TO WOMEN'S KNOWLEDGE OF RISK AND PREVENTIVE FACTORS IN BREAST CANCER

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Problem

Women have a one-in-eight chance of being diagnosed with breast cancer in their lifetime. In the past decade, there has only been a decrease of less than 1% in breast cancer morbidity and mortality rates. Breast cancer continues to be a feared disease that ravages even its survivors, and grips many with fear. Furthermore, breast cancer remains the highest cost of care among cancers. In 1990 the overall cost of care for breast cancer was $4.2 billion. In 2010, the total cost of breast cancer care rose to almost $17 billion, and by 2020 the cost trends show an increase of up to 27%. Breast cancer continues to be a crisis for women and a significant concern to health-care providers.

A crucial factor in the fight to decrease breast cancer and its effects has been to increase knowledge of breast cancer risk and preventive factors and women's use of that

knowledge. This knowledge is important for women to have so they can practice intentional preventive self-care. Ambiguous knowledge may lead to apathetic or disengaged self-care.

The purpose of this study was to develop a model that would predict women who were most likely to lack breast cancer self-care knowledge and effective practice, and identify those women who need to make changes in lifestyle choices. This study was guided by Dorothea Orem's inter-related theories of self-care and self-care deficit. Orem's theory is useful for connecting the disease process (breast cancer) to limitations in women's health care (resources, education, awareness, prevention).

Research Design

This quantitative, ex post facto study measured women's knowledge of breast cancer risk and preventive factors then correlated with their personal characteristics. A web-based survey was developed with experts to collect data on the independent variables: demographics, physical and emotional health, health practices, and fear. A modified snowball technique was used via email distribution to 20 potential participants. Each survey participant was asked to take the survey and forward the email link to women they knew over 18 years of age, including self-disclosure. Anonymity and confidentiality were enhanced by the use of the web-based survey. Due to the distribution technique utilized, the representativeness was undeterminable.

Two hundred and ninety-one women responded to demographic questions, statements about unchangeable risk factor knowledge, statements about changeable lifestyle-related risk factors knowledge, and statements about ways to decrease the risk of breast cancer. A scoring rubric was developed to quantify these responses using a

procedural testing methodology, a new term applied to the process of refining the rubrics. This process consisted of mock surveys being distributed, scored, analyzed, revised, and redistributed until the rubrics were reworked to decrease bias or prejudice. A trained panel reached 100% agreement for the finalization of the rubrics.

Research from the American Cancer Society and the National Cancer Institute was used to develop the rubrics. The focus for the rubrics was on the three breast cancer risk and preventive factors survey questions: list breast cancer risk factors that cannot be changed; list lifestyle-related breast cancer risk factors that one has control over; and list health recommendations likely to decrease the risk of breast cancer. The rubrics have four main categories: *elements* which are the breast cancer risk or preventive factors, an ordinal *score* that measures the detail of knowledge, the *detail narrative* describing the specificity as it relates to the element, and the *scoring detail* that determines to which classification category (best, good, fair, or poor) the score belongs.

Findings

The results were alarming given the fact that no matter the variable (age, race, education, professional status, household income, or other demographic independent variables), there was a deficit of breast cancer knowledge. As for personal risk, many felt they were not at risk for developing breast cancer yet had anywhere from one to nine risk factors. These overall knowledge deficits were not just for the lay population of women, but for women health-care providers as well. Over 99% of the women participants scored Fair to Poor as they were unable to report more than minimal detail relating to the three survey questions relating to breast cancer risk and prevention. The limited knowledge and preventive practice related to breast cancer were sobering, especially given that a

majority of women, over 95%, had health insurance. It is likely many of these women had health plans that would offer breast cancer risk education and support in preventive self-care practices. Interestingly, 65.8% of these respondents feared being diagnosed with breast cancer and 77% feared treatment for breast cancer.

Given the limited variability in women's responses to breast cancer risk and preventive factors (dependent variables), this study was not able to produce a model that could predict women's breast cancer risk and prevention awareness. The absence of significant variability in awareness made the internal consistency reliability estimates difficult to obtain. Survey participants also were not reporting engagement of intentional self-care related to breast cancer, suggesting a serious crisis of knowledge and practice in this sample. As important were the overall study conclusions.

Conclusions and Recommendations

Survey findings led to three major conclusions:

1. Women in the study did not know breast cancer risk and preventive factors.
2. Women in the study were gravely unaware of their own personal risk of breast cancer.
3. No model was developed that could significantly predict women likely not to have knowledge of breast cancer risk factors as nearly all women in the study were unable to give adequate responses.

These conclusions support the call for a new approach to how breast cancer information is communicated to women as well as defining roles for health-care providers, business leaders, and researchers in helping to raise knowledge that supports health self-care.

Several recommendations can be made. First, women need to be reminded of the need to take ownership of learning about breast cancer risk factors. Second, direct health-care providers, including advanced nurse practitioners, need to communicate a clear, concise, and consistent breast cancer risk and prevention message. Finally, researchers need to do more to uncover the reasons for women's lack of knowledge. First they could replicate this study to see if this lack of knowledge is prevalent among other populations, given that this population had higher education and greater access to health care. My findings may have been more liberal than a more representative sample of those of the general population. For future studies, a *qualitative approach* with adding mental and emotional health questions and more specific questions on *fear* may ascertain enough detail about women's knowledge of breast cancer risk and preventive factors and why the results in this study are so alarming.

Andrews University

School of Education

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A Dissertation

Presented in Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

Sandra M. Walther

October 2013

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APPROVAL BY THE COMMITTEE:

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To my husband, Roger, for demonstrating
ongoing encouragement and unconditional love.

In loving memory of my mom,
Joan, for her unbelievable strength with
diagnosis and treatment of breast and lung cancer.

To my children, Brian and Melissa, for
their love and support during times of adversity.
You are and will always be the cornerstone of my life.

I love you.

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LIST OF ABBREVIATIONS

ACR	American College of Radiology
ACS	American Cancer Society
ACA	Affordable Care Act
ANOVA	Analysis of Variance; *F*-test
BC	Breast Cancer
BCF	Basic Conditioning Factors
BI-RADS	Breast Imaging and Reporting and Data System
BMI	Body Mass Index
BRCA1	Breast Cancer 1, early onset gene from chromosome 17
BRCA2	Breast Cancer 2, early onset gene from chromosome 13
BSE	Breast Self-Exam
CDC	Centers for Disease Control and Prevention
DNA	Deoxynucleic Acid
FDA	Food and Drug Administration
GED	General Education Development
HRT	Hormone Replacement Therapy
n	Sample Size
NBCAM	National Breast Cancer Awareness Month
NCI	National Cancer Institute
NIH	National Institutes of Health

NHR	National Health Care Reform
OBSSR	Office of Behavior & Social Science Research
REAP	Resources, Education, Awareness, Prevention
SPSS	Statistical Package for the Social Sciences
U.S.	United States
USDHHS	United States Department of Health and Human Services

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I would like to personally thank my fellow participants at Andrews University and especially my regional group. “The Learning Tree” continued to provide ongoing support and words of inspiration during the process of completing my dissertation studies.

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Most of all, I want to thank my husband Roger for his understanding of my time limitations and constraints with family and friends, whether at our home in Troy or up north at Little Bear Lake. My commitment became his commitment, as was evidenced by his compassionate words and thoughtful actions.

CHAPTER 1

INTRODUCTION

Background to the Problem

Years of experience working with women diagnosed with breast cancer was the reason behind becoming an advocate for women's health. Whether the interactions were with women just diagnosed with breast cancer, as a professional nurse giving chemotherapy, as a liaison coordinating care for a bone marrow transplant program, as a certified case manager helping women cope with disease complications, or as a concerned family member or friend supporting their needs, the message was always the same. Women did not understand the factors that made them at risk for breast cancer, and when asked about risk factors, they said the same thing, "I really don't know." This lack of awareness and real knowledge deficit was a message reiterated through my 30 years of nursing experience and became the central focus for doing this research.

The literature confirmed my suspicions about women's lack of knowledge of breast cancer. In layman's terms, women were not getting it. Despite the growth of a hopeful campaign through the years (Breast Cancer Awareness Month), statistics suggested little had changed.

Statistics from Breastcancer.org (2013) note there are more than 1.6 million women diagnosed with breast cancer each year worldwide. This number has doubled since 1980. According to the Centers on Disease Control and Prevention (2013a), breast

cancer remains the leading cancer among women for all races. Business leaders were searching for answers.

The U.S. Department of Health and Human Services (USDHHS, 2001) responded to these concerns by introducing a set of national health objectives where overall goals were to increase quality and years of healthy life. USDHHS identified leading health objective indicators, which included sedentary lifestyle, obesity, and alcohol, all of which are classified as risky behaviors and relate to breast cancer risk factors, and support Dorothea Orem's (1995) basic conditioning factors (BCF). These national health objectives were identified to promote health preservation and avoidance of disease. These approaches align with Orem's theory of self-care and the Healthy Workforce 2010 Partnership for Prevention (USDHHS, 2001).

The Healthy Workforce 2010 Partnership for Prevention's (USDHHS, 2001) alliance was created as a cooperative effort committed to improving overall community health and similar programs to reduce illness through self-care management and health education. The effort included approaches to correct and change unhealthy behaviors, thus improving health. Health promotion programs can lead to a healthier workforce and community. This directly correlated with corporate leadership's financial impact and concerns for improving productivity, reducing absenteeism, and lowering health-care costs by promoting health beyond the worksite. "Prevention health services are underused in the United States and we want to put prevention into practice" (USDHHS, 2001, p. 23). The Institute of Medicine (2011) discussed the magnitude of change with the Patient Protection and Affordable Care Act of 2010 (referred to as ObamaCare). The article

references “closing the gap” for clinical prevention services for women to foster optimum health. The question is: Where does prevention start?

The American Cancer Society (ACS, 2012g) defines National Breast Cancer Awareness Month as “a program dedicated to increasing awareness about the importance of early detection of breast cancer through a nationwide campaign held in October.” The Centers for Disease Control and Prevention (CDC, 2012) and the Koman Foundation (Cornforth, 2002) all share the message of early detection; risk and prevention education is not the focus. Prevention does not start with awareness for early detection. Prevention needs to start with knowledge of risk factors and acting on that knowledge, simultaneously while early detection screenings occur. Outreach to educate the lay population of women is paramount to decrease morbidity and mortality rates. From this, the logical and rational new message for breast cancer awareness campaigns is to be aware of everyday prevention opportunities to identify and limit breast cancer risk. This study produced a population of women who were not aware of breast cancer risk and preventive factors, and who needed to be provided with education and information on this subject.

The ACS (2009c) reported that increased awareness campaigns, early detection through screening, decreased use of hormone replacement therapy, and improved medical treatments were likely responsible for the decrease in morbidity and mortality, yet 40,230 women died in 2010 compared to 40,600 in 2001. This was less than a 1% decrease in 9 years, and of questionable significance. Also, the one-in-eight lifetime risk of being diagnosed with breast cancer has not changed (ACS, 2009c; MedlinePlus 2012). This supports the problem of the study.

Statement of the Problem

Women have a lack of knowledge with breast cancer risk and preventive factors. Since a woman's lifetime risk of developing breast cancer remains one-in-eight, the need to identify these women to reduce morbidity and mortality rates is crucial.

Purpose of the Study

The purpose of this study was to develop a model that predicted women's awareness and baseline knowledge level for breast cancer risk and prevention factors. Such a model promised to inform business leaders and health-care providers about those women who were less likely to know about prevention, early diagnosis, and breast cancer risk and preventive factors.

Research Questions

The study has nine basic research questions:

1. Do women know breast cancer risk factors?
2. Do women know breast cancer preventive factors?
3. What is the relationship between women's own personal risk and their knowledge of breast cancer risk factors?
4. Is there a difference in women's knowledge levels for breast cancer risk factors according to age, race, household income, education, breast self-exams, mammogram testing, work status, and health insurance status?
5. Is there a difference in women's knowledge levels for breast cancer preventive factors according to age, race, household income, education, breast self-exams, mammogram testing, work status, and health insurance status?
6. Are women fearful of being diagnosed with breast cancer?

7. Are women fearful of receiving treatment for breast cancer?

8. Do women who have health insurance use their medical benefits for preventive practice?

9. Do women without health insurance get screenings for preventive practice?

The research questions encompass Orem's (1995) basic conditioning factors: age, gender, developmental state, health status, sociocultural orientation, health-care system factors, family system factors, environmental factors, patterns of living, and resource availability. Because Orem's factors correlate with breast cancer risk and preventive factors, logically specific research questions reflective of these factors were produced.

Theoretical Framework

Dorothea Orem's (1995) theory of self-care guided this study. Orem's theory has guided nurse practice for over five decades. Her concepts of nursing practice were described extensively for nursing care and are divided into two inter-related theories: self-care and self-care deficit.

Self-Care

Orem's theory of self-care connected the disease process to limitations in health. I see this connection as the disease process of breast cancer to the limitations of health-care needs such as resources, education, awareness, and prevention. Orem's nursing theory had a central idea of learned behavior and a rational response to need. Examples of breast cancer self-care learned behavior are getting an annual mammogram if age 40 or older and performing monthly breast self-exams; however, learned behavior should also include practicing prevention with lifestyle changes to limit risk of breast cancer. In Orem's theory, everyday life is considered self-care and no health care interventions are

needed, but self-care deficits do occur. Orem's (1995) requisites or needs include universal (maintenance of life), developmental (developmental processes), and health deviation (structural and functional deviations). I believe the requisites represent risk factors, the diagnoses of a disease process, and body/life changes.

Self-Care Deficit

Orem's theory of self-care deficit (Orem, 1995) recognizes that deviations in health occur. Once the health deficit is identified, then the relationship is developed, which is inclusive of three elements: (a) patient, (b) nurse, and (c) care that is needed. The care that is needed is substantiated by Orem's basic conditioning factors (BCF) and is what parallels breast cancer risk factors. The breast cancer risk factors that cause the health deviation are what impact the self-care deficit model.

Basic Conditioning Factors

Making decisions and being proactive are initiatives that foster self-care. Orem's BCF relate to the world we live in and the ability to execute self-care and are influenced by specific internal and external factors. These internal and external factors are the BCF and correspond with the definitions (Orem, 1995) which are explained and analyzed more in Chapter 2. The BCF are shown to be the foundation for breast cancer risk and prevention and include: age, gender, developmental state, health status, sociocultural orientation, health-care system factors, environmental factors, patterns of living, and resource availability.

Research Design

This was a quantitative study examining women's awareness and knowledge levels of breast cancer risk and prevention. It used an online survey to assess women's knowledge of risk and preventive factors and sought to relate them to demographic characteristics. The findings of the study were used to develop a predictive model of women who lacked breast cancer risk and preventive knowledge.

The research design used in this study was ex post facto, with hypotheses that controlled for alternate explanations (Newman & McNeil, 1998). This "after the fact or retrospective" approach looked at and compared, without manipulation, women's knowledge and awareness of breast cancer risk and preventive factors against independent variables that aligned with Orem's BCF. Furthermore, a distinction of ex post facto research was that it contained an attribute, or assigned variable, which only demonstrated relationships, not causation.

This research study used an electronic, anonymous online website survey host, surveymonkey.com. This web-based method was convenient for surveying a large, diverse number of participants. An email list of 20 potential woman participants was developed. Each prospective participant was sent an email with the link to surveymonkey.com. Additionally, I requested that each participant forward the electronic survey invitation to someone else, including the surveymonkey.com link, thus initiating a modified snowball technique to maximize the possible distribution and response rate of the survey. This electronic and web-based method utilizing the modified snowball technique was the most practical manner to achieve a convenience sample of respondents (Newman & McNeal, 1998).

An extensive literature review of breast cancer risk and preventive factors was used to populate the three categories of breast cancer risk and prevention used for the core questions of the survey: Breast cancer risk factors that cannot be changed, lifestyle-related breast cancer risk factors that one has control over, and health recommendations likely to decrease the risk of breast cancer. The resulting survey had seven parts: (a) demographics, (b) breast cancer risk factors, (c) breast cancer preventive factors, (d) risk assessment, (e) individual personal risk, (f) fear rating scale, and (g) miscellaneous.

A scoring rubric was developed to quantify these responses using a procedural testing methodology, a new term applied to the process of refining the rubrics. This process consisted of mock surveys being distributed, scored, analyzed, revised, and redistributed until the rubrics were reworked to decrease bias or prejudice. The most critical piece of the rubric refinement process was in agreement of *like or similar* terms that were acceptable as responses to the rubric questions. A trained panel reached 100% agreement for the finalization of the rubrics.

Research from the ACS (2009d) and the National Cancer Institute (2009) was used to develop the rubrics. The focus for the rubrics was from the three breast cancer risk and preventive factors survey questions: *breast cancer risk factors that cannot be changed; lifestyle-related breast cancer risk factors that one has control over;* and *health recommendations likely to decrease the risk of breast cancer.* The rubrics have four main categories: *elements* which are the breast cancer risk or preventive factors, an ordinal *score* that measures the detail of knowledge, the *detail narrative* describing the specificity as it relates to the element, and the *scoring detail* that determines to which classification category (best, good, fair, or poor) the score belongs. Refinement of

participants' scoring was a developmentally crucial element in rubric creation, which confirmed consistency existed with like or similar terms considered acceptable by the reviewers. Rubric development was the essential piece of creating a predictive model and the main contribution of the study. More about this process will be explained in Chapter 3.

Significance of the Study

However, the significance of this study was linked to the potential of creating a predictive model of women least likely to know breast cancer risk and preventive factors. This promised to help health-care providers and business leaders have a better understanding of women who needed to be targeted for outreach regarding specific breast cancer risk and preventive factor education. Orem's theory, due to alignment with the breast cancer risk and preventive factors, was to be used to interpret the data. A 2006 study by Callaghan, *The Influence of Basic Conditioning Factors on Healthy Behaviors, Self-efficacy, and Self-care in Adults*, used Orem's BCF and showed successful results in identifying statistically significant relationships. Using Orem's BCF (as the independent variables of the Callaghan study) proved to make it possible to identify the adult population with limited knowledge. In association with this study, the goal was to identify women who had limited knowledge of breast cancer risk and preventive factors and who may be at a greater risk of breast cancer. This group of women could then be identified for targeted outreach and educational opportunities. The possible related effects for business leaders were to (a) reduce employee absenteeism, and (b) have more effective expenditure of health-care dollars. Determining the correlation between the level of knowledge of breast cancer risk and preventive factors and actually having risk

factors would be another research element directly impacting lifestyle change for prevention and decreased morbidity and mortality rates.

When breast cancer is diagnosed early, the initial cost of care is not eliminated, but the long-term complications of radical surgery and additional intensive treatments due to metastasis (chemotherapy or radiation therapy) and other complications, if avoided, could result in dramatic savings. If breast cancer is prevented, the cost of care would be eliminated.

In addition to creating a model to determine women who may not understand breast cancer risk, and to support the broad research on breast cancer awareness, this study may help individuals, especially women, to better understand the knowledge of risks in breast cancer and to motivate more proactive care of their own health needs. This research may help to find *a better way* by developing a predictive model that will help business leaders and health-care providers allocate resources to target outreach and education efforts to at-risk groups, implement more effective breast cancer awareness, and help to reduce morbidity and mortality rates, increase knowledge, and decrease women's personal risks for breast cancer.

Delimitations

Several delimitations exist. Twenty women, friends and family, were the initial recipients of the email invitation link, and no specific population was targeted. There was no control over who did or did not receive a survey invitation link. The snowballing technique delimited the sample as this technique is determined not to be a random sample and not representative of the population (Newman & McNeil, 1998). There is no way to

know the total number of women who actually received a survey. This will also be raised as a limitation at the end of the study.

Definitions of Terms

Included are frequent research-associated terms and corresponding definitions:

Alcohol (CDC, 2013b): Ethyl alcohol, or ethanol, is an intoxicating ingredient found in beer, wine, and liquor. Alcohol is produced by the fermentation of yeast, sugars, and starches.

At Risk ("At Risk," 2013): Personal exposure to the chance of injury or loss; a hazard or dangerous chance (see Risk and Risk Factors below).

Breast Cancer (Harvard Medicine, 2008): A type of uncontrolled growth of abnormal cells that can develop in several areas of the breast.

Basic Conditioning Factors (Orem, 1995): Specific internal and external factors that influence a person's ability to perform self-care and include age, gender, developmental state, sociocultural orientation, health-care system factors, family system factors, patterns of living, environmental factors, and resource availability.

Breast Disease/Density (ACS, 2013): Breasts with a lot of fibrous or glandular tissue but not much fat.

Benign (ACS, 2013): Not cancer; not malignant.

Breast Self-Exams (ACS, 2013): A way to check your own breasts for lumps or suspicious changes.

Cancer (NCI, 2013b): A term for diseases in which abnormal cells divide without control.

Chromosomes (NIH, 2013): A structure in the nucleus of a cell, which contains genes.

Cyst (NCI, 2013b): A sac or capsule filled with fluid.

Deoxyribonucleic Acid (DNA) (NCI, 2013b): The molecules inside cells that carry genetic information and pass it from one generation to the next.

Estrogen (ACS, 2013): A hormone found in women; often called the female sex hormone, it is made mostly by the ovaries.

Gene (NIH, 2013): The functional and physical unit of heredity passed from parent to offspring.

Health Deviation (Orem, 1995): In relation to genetic and constitutional defects, human structural and functional deviations and their effects.

Hormone Replacement (NIH, 2013): Therapeutic use of hormones to alleviate the effects of hormone deficiency.

Hormone Therapy (NIH, 2013): Various treatment modalities that produce the desired therapeutic effect by means of change of hormone/hormones level.

Hyperplasia (NIH, 2013): Abnormal multiplication of otherwise normal cells, leading to tissue enlargement.

In-situ (ACS, 2013): Localized and confined to one area; a very early stage of cancer.

Malignant (NIH, 2013): Cancerous; a growth with a tendency to invade and destroy nearby tissue and spread to other parts of the body.

Mammogram (NIH, 2013): Radiographic examination of the breast.

Menopause (NIH, 2013): The natural cessation of menstruation.

Menstruation (NIH, 2013): Periodic discharge of blood and tissue from the uterus.

Metastasis (NIH, 2013): A tumor that has spread from its original (primary) site of growth to another site, close to or distant from the primary site.

Morbidity (ACS, 2013): The incidence of disease within a population.

Mortality (ACS, 2013): The death rate associated with disease.

Mutation (NIH, 2013): Any alteration in a gene from its natural state; may be disease-causing or a benign, normal variant.

Nulliparity (ACS, 2013): Never having given birth to a child.

Obesity (ACS, 2013): A condition marked by an abnormally high, unhealthy amount of body fat.

Oral Contraceptive (CDC, 2013c): A method of birth control to reduce the risk of unintended pregnancy.

Prevention (NCI, 2013c): An action taken to lower the risk or chance of getting a disease.

Preventive Factors (ACS, 2013): The reduction of cancer risk by eliminating or reducing contact with things known to cause cancer; by changing conditions that contribute to cancer.

Risk ("Risk," 2013): The proportion of cases of a disease that result from exposure to a specific risk factor.

Risk Factors (ACS, 2013): A habit, trait, condition, or hazard that increases a person's chance of developing a disease.

Screening (NIH, 2013): Testing designed to identify individuals in a given population who are at higher risk of having or developing a particular disorder.

Tissue (ACS, 2013): A collection of cells that work together to perform a particular function.

Summary and Organization of the Study

This chapter detailed the research plan to measure breast cancer knowledge among women. Breast cancer continues to kill hundreds of thousands of women each year. High morbidity and mortality rates, loss of productivity with employers, and my own 30-year career as a nurse led me to seek this study topic. This chapter described the significance of this study by creating a predictive model of women least likely to know breast cancer risk and preventive factors for educational outreach. This chapter outlined Orem's theoretical framework of self-care and self-care deficit. It also identified the research questions and reviewed the research design, an ex post facto design with an online survey.

Chapter 2 will provide a comprehensive literature review, including the introduction and current perspectives of breast cancer. Focus was given to costs of breast cancer care and breast cancer awareness. Research on breast cancer risks and preventive factors will be reviewed along with Orem's theory. The risk factor review will be divided into (a) risk factors that cannot be changed (age, gender, family history, breast disease, lifelong exposure to estrogen); and (b) lifestyle-related risk factors that one has control over (hormone replacement therapy, obesity, oral contraceptives, alcohol). In addition, Orem's theory of self-care and self-care deficit will be summarized and linked to breast cancer. Strategies for prevention and lifestyle changes will be discussed.

Chapter 3 will provide research methodology, including: (a) introduction, (b) research hypotheses, (c) research design, (d) description of population and sample,

(e) survey design, (f) rubric creation, (g) definition of variables, (h) data collection processes and procedures, (i) statistical analysis, (j) schedule, and (k) budget.

Chapter 4 will provide results of the study with (a) frequency for general characteristics of sample population, (b) frequency of basic health practices and fears of sample population, (c) rubric descriptive statistics of sample population, (d) predictive model indicators of sample population, (e) detection of at-risk status of sample population, and (f) statistics of sample population.

Chapter 5 will provide summary of the study with findings including (a) background and problem, (b) purpose of the study, (c) conceptual framework and Orem, (d) research design, (e) sample, (f) review of research questions, (g) evaluation of hypotheses, (h) findings with key discoveries, (i) conclusions, and (j) recommendations for women, health-care providers, leaders, and future research.

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter is an overview of the literature as it relates to breast cancer risk and preventive factors. Areas of research and discussion include a current perspective of breast cancer, cost of breast cancer care, breast cancer awareness, detailed breast cancer risk and preventive factors, as well as the theoretical framework. The last section thoroughly reviews Orem's theory of self-care, self-care deficit, and basic conditioning factors.

Current Perspective of Breast Cancer

Breast cancer data from the ACS (2001a) have remained steady for the last decade. In 2001, 192,200 women were diagnosed and 40,600 women died from breast cancer. Almost 10 years later it was essentially the same morbidity and mortality rates: 207,090 and 40,230 respectively (ACS, 2010b), while the breast cancer deaths have decreased approximately 1% since 2001 (n=370). The change is not what we hoped for. The NCI (2012d) estimated for 2012 that 226,870 would be diagnosed with breast cancer, and the NCI (2013a) estimates 232,340 for 2013. The incidence of breast cancer through the year 2020 remains constant, as does the lifetime risk for females (ACS, 2009c; NCI, 2012c, 2012d). One staggering statistic found from 2005 through 2009 was that more than 93% of the women dying from breast cancer were age 45 or older (ACS, 2010a).

The NCI *Cancer Trends Progress Report* (2008b, 2010) stated that general prevention, early detection, incidence/diagnosis, and mortality rates were "static" in regard to progress and improvement of the breast cancer statistics from previous years.

Cost of Breast Cancer Care

The human cost is not the only concern. Leaders have been concerned with the high cost of health care related to breast cancer. Allen (2010) reported that in the 1990s, direct breast cancer costs were estimated to be $4.2 billion. The NCI (2008b) reported for 2004 that breast cancer costs doubled to $8.1 billion. Current research from the National Institute of Health NCI (2011) notes the total cost of breast cancer care has risen to almost $17 billion. In 3 decades, the cost of care for breast cancer increased substantially. In contrast, in the past 8 years, there has been less than a 1% decrease in mortality rates. It is estimated by NCI (2011) that costs between 2010 and 2020 will increase by 27%, and the National Institutes of Health (NIH, 2011) published that cost of cancer care could reach an all-time high of between $158-$207 billion, with breast cancer remaining the highest cost of cancer care. These were disconcerting statistics and certainly supported the need for a new tactic to how breast cancer is approached. The *Journal of the National Cancer Institute* (2011) wrote how a more versatile construct view is needed to decrease risk of various types of cancer and determine the probable community experience. The study addressed a starting point for a predictive model: women's baseline knowledge of breast cancer risk and preventive factors.

Breast Cancer Awareness

The World Health Organization's (2003) estimates predict cancer rates increasing by 50% by 2020; this includes breast cancer. "Governments, physicians, and health

educators at all levels could do more to help people change their behavior to avoid preventable cancers" (p. 2). Where does *helping people change their behavior* start? It needs to start with communication and awareness.

Furthermore, Quillin (2005) discussed research results pertaining to communicating breast cancer information. Quillin noted that when communicating breast cancer risk factors, avoiding ambiguity is a necessary requirement. Information must be clear, concise, and consistent during delivery in order to achieve topic clarity and consistency.

Some researchers have tried to measure the knowledge level of women regarding breast health. Cornforth (2002) writes that the Susan G. Komen Breast Cancer Foundation conducted a 2002 survey to explore exactly this: Women's knowledge of breast health. The survey consisted of 522 women, ages 20 to 39, and resulted in alarming percentages. Approximately half the women surveyed were not aware of basic breast cancer information as Table 1 details. The 2002 Komen survey findings appear to support Quillin's (2005) concern that ambiguity influenced the dissemination of breast cancer information.

Guerra, Sherman, and Armstrong (2009) studied breast cancer risk assessment in primary-care practices. The objective was to determine the prevalence of the adoption of breast cancer risk assessment by primary-care physicians. Of the 351 internists, family practitioners, and obstetricians/gynecologists who were surveyed, 88% reported discussing breast cancer risk at least once during the previous 12 months. Physicians in general have an opportunity to identify risk and communicate risk reduction strategies to increase breast cancer knowledge. However, this study illustrates practice of breast

Table 1

Lack of Knowledge in Breast Health

Survey Statement	%
Women who do not do monthly breast self-exams	50
Women who do not believe they are at risk for breast cancer	60
Women who believe that a mammogram prevents breast cancer, rather than provides screening	40
Women who rely on television, newspapers, and magazines for breast health and breast cancer information	50
Women who turn to family and friends for breast health and breast cancer information	40
Women who believe that breast cancer is preventable	[a]

[a]Reported as "many" from citation.

cancer risk communication in primary care, but the content of the communication, confirmation the women understood the information, and whether self-care practice was performed are still valid concerns.

Annually, October is Breast Cancer Awareness Month and the typical media focus has been on early detection since that is the focus by definition. While this focus reported by the media is indeed important, little attention has been given to risk factors that women may be able to control. There seems to be a gap in breast cancer risk and preventive factor awareness in ways that lay-women are able to become fully informed and educated (Cornforth, 2002). In agreement with this thought, Visco (2007) defined breast cancer awareness as "public knowledge about breast cancer, that research was equally important as public knowledge because it paints a different picture uncovering a significant gap in breast health information" (p. 1). Particularly, the gap referenced was the continued high incidence and mortality rates despite past and current *awareness* campaigns that have occurred each October. The implication of Visco's statement was

that by sharing research processes, purposes, and results, more information will be offered to women regarding breast health, thus providing a more thorough set of information and possibly filling in missing links to existing gaps.

Jacobsen (2011) comments on an article in the *Journal of Health Economics* where "breast cancer awareness was one of the oldest and most well-established awareness campaigns in U.S. history. However, November diagnoses following the October awareness event found little evidence of increased diagnosis" (p. 1). This information was from a study that reviewed more than 30 years of cancer registry information. The National Breast Cancer Awareness Month (NBCAM) organization has commented that they "remain dedicated to educating and empowering women to take charge of their own breast health and encourage women to learn more about breast cancer, breast health, and research developments" (NBCAM, 2012, p. 1). This and other organizations, such as the CDC, ACS, NIH, and the Komen Foundation, traditionally support early detection. Enhanced education that relates to lifestyle-related risk factors that a woman has control over may close the gap that Visco (2007) identifies.

Moreover, breast cancer remains the most feared disease among women (Breastcancer.org, 2012b; Society for Women's Health Research, 2005). The fear is twofold: the breast cancer diagnosis itself and the breast cancer treatment, complications, and side effects of the treatment (National Women's Health Resource Center, 2009). Breastcancer.org (2012b) writes that women avoid going to the doctor because they fear being diagnosed with breast cancer. They encourage women to never let the fear of diagnosis deter from making a good choice when it comes to health care. Fear and lack of knowledge can be considerable impacts for women. The following are published studies

on breast cancer awareness, knowledge, and perceptions:

1. Amin, Al-Mulhim, and Al-Meqihwi (2009) write that Saudi women regardless of their educational status had breast cancer risk knowledge deficits and underutilized recommended screenings.

2. Jarvandi, Montazeri, and Harirchi (2002) cite that 89.2% of Iranian female teachers had poor breast cancer knowledge.

3. Seif and Aziz (2000) describe that 89.4% of Egyptian working women had poor breast cancer knowledge.

4. Qiuping, Hooper, Jimenez, and Edminston (2006) found that immigrant women in the United States had lower knowledge of breast cancer risk, breast exams, and mammography with 74% never having had a mammogram.

5. Skinner, Kreuter, Kobrin, and Strecher (1998) discussed perceived and actual breast cancer risk in the U.S. Findings from the study showed 31% of women underestimated risk and 26% overestimated risk. Of those who overestimated risk, the respondents were mainly smokers; however, overestimated risk decreased with those respondents who were more educated.

The lack of breast cancer awareness appears to be a global issue, and breast cancer communication and education have become the common denominator. Viswanath (2005) states that “the Internet is mass media for cancer information but major challenges are the accuracy and interpretation of information” (p. 1). Having information available and being able to act on the information can be impacted by various education levels. Blumenfield, Suojanen, and Weiss (2012) saw that in certain demographic groups there was a greater need for targeted health education outreach in order to reach various at-risk

populations. Also Kwok and White (2011) described the study findings with a lack of consideration of a woman's culture and language as a gap in awareness. This study generally relates to the two aforementioned studies in that the goal for the predictive model was to identify specific demographic groups for targeted breast cancer education outreach. The survey did specify race as a demographic; however, it was not specifically identified as a research question for cultural or language gaps as they relate to knowing and understanding breast cancer risk and preventive factors.

Specifically, what is risk? Risk is the likelihood of disease from exposure to a specific risk factor (Tabors, 2013). This could be considered relative risk or probability. With breast cancer, there is lifetime risk: A woman has a one-in-eight chance of being diagnosed with breast cancer in her lifetime. Now what is *at risk*? *At-risk* students are those who have made poor choices or decisions that impact them negatively (Walsh, 2003). Taking this definition of *at risk* and overlaying students with women with breast cancer risk, you have the same result: poor choices and decisions related to breast cancer risk and preventive care which can lead to impacting women negatively.

Another way of looking at this is by delving into *at-risk* scenarios. At-risk scenarios are the lifestyle breast cancer risk factors that one has control over and health recommendations to likely decrease the risk of breast cancer. When a woman has exposure or does not limit risk, this could be considered making a poor choice. Some examples include taking hormone replacement therapy, maintaining obesity, taking oral contraceptives, drinking alcohol, and not participating in self-care (obtaining mammograms and performing breast self-exams).

Just as important, recognizing these *at-risk* scenarios is an important consideration. If women do avoid lifestyle breast cancer risk factors and limit risk by following the health recommendations to likely decrease the risk of breast cancer, are they preventing breast cancer or attenuating risk? The NCI (2013c) defines breast cancer prevention as "the action taken to lower the risk or chance of getting cancer" (p. 1).

Whether an individual has a perceived or actual breast cancer risk, risk is the likelihood that the individual will experience a certain event. None of these sources say you can prevent breast cancer, one can only decrease the risk. Breast cancer risk factors are noted in the next section.

Research on Breast Cancer Risk Factors

The ACS (2009d) classifies breast cancer risk factors into three categories: (a) risk factors that cannot be changed, (b) lifestyle-related risk factors that one has control over, and (c) potential risk factors. Risk factors that cannot be changed include age, gender, family history, breast disease, and lifelong exposure to estrogen. Lifestyle-related risk factors that one has control over include hormone replacement therapy, obesity, oral contraceptives, and alcohol. Potential risk factors included pollutants, smoking, second-hand smoke, use of antibiotics, and other environmental components, which are currently being examined but the results remain inconclusive to date. Potential risk factors are not included in this study. Mental and emotional health, adverse life experiences, and stress were other areas of breast cancer research that may be linked to immune system suppression; these remain inconclusive and are not included in this study.

ACS (2011) defined lifetime risk as the probability that a woman, over the course of her lifetime, will be diagnosed or die from breast cancer. Through the span of a

woman's lifetime, there was a one-in-eight lifetime risk of developing breast cancer (ACS, 2009c; NCI, 2012a). Educating women about different categories of risk, especially lifestyle-related risk, appeared to require the proactive approach. This proactive approach can lead to women becoming aware of risk and making informed decisions related to lifestyle behaviors to limit lifestyle risk exposure.

A study on breast cancer risk factor and detection (Darrow, Schoenfeld, Cummings, Wilkes, & Madoff, 1987) found that "although knowledge about breast cancer has improved, women have not adopted recommended early detection practices" (p. 1). In a 1999 document, Hutcheson Medical Center stated, "The lifestyle choices a woman makes may decrease her risk of breast cancer" (p. 2). These factors appear to remain true today as other research suggests there continues to be knowledge deficits with breast cancer risk and prevention awareness.

Cohen (2011) writes that women can decrease their risk of breast cancer by knowing the risks, getting screened, and making healthy lifestyle changes. Education on breast cancer risk is key as there is still a gap almost 25 years later. A 2006 study by Webster and Austoker noted that 64% of women did not know their lifetime risk, and study conclusions showed variable and incorrect responses. A 2002 study by Grunfeld, Ramieriz, Hunter, and Richards specifically asked two questions of relevance to this study: What is the risk estimation for developing breast cancer? and What are the risk factors for breast cancer? More than 66% of women responded that their risk of developing breast cancer was between 1:100 and 1:1000. This is a very optimistic view and certainly does not reflect current statistics of one-in-eight lifetime risk. More than 33% did not recognize *getting older* as a risk factor.

An extensive literature review was performed and resulted in distinguishing the most common risk factors for breast cancer. ACS (2001c, 2003, 2009d, 2012f), NCI (2001a, 2009), and the affluent medical center Johns Hopkins (2012) all agree on the breast cancer risk factors. The risk factors are discussed in detail in this research study:

1. Risk factors that cannot be changed: age, gender, family history, breast disease and density, and lifelong exposure to estrogen.

2. Lifestyle-related risk factors: hormone replacement therapy, obesity, oral contraceptives, and alcohol.

Risk Factors That Cannot Be Changed

Breast cancer risk factors that cannot be changed are age, gender, family history, breast disease and density, and lifelong exposure to estrogen. These factors are discussed below.

Age

The ACS (2009d), NCI (2009), and the CDC (2008) documented that the probability of developing breast cancer increased with age. The ACS (2011) writes:

> From 2004-2008, the median age for breast cancer diagnosis was 62 years. This means that 50% of women who developed breast cancer were 61 years of age or younger. Breast cancer incidence and death rates generally increase with age. Ninety-five percent of new cases and 97% of breast cancer deaths occurred in women 40 years of age or older. (p. 2)

No literature disputes this fact. See Table 2 for occurrence details.

Gender

It is undisputed that women have an increased incidence of breast cancer versus men, almost 100 times (ACS, 2009d; NCI, 2009). “Even though women have more breast

Table 2

Age Statistics for Breast Cancer Occurrence

Age	Statistic
30	1 out of 2,000 develop breast cancer
40	1 out of 230 develop breast cancer
50	1 out of 53 develop breast cancer
60	1 out of 22 develop breast cancer
70	1 out of 13 develop breast cancer
80	1 out of 9 develop breast cancer
Lifetime	1 out of 8 develop breast cancer

cells than men, the main reason they develop more breast cancer is because their breast cells are constantly exposed to the growth-promoting effects of female hormones estrogen and progesterone" (ACS, 2009d, p. 1). Only 5% of all women diagnosed with breast cancer are under age 40 according to MedicineNet (2012), but all ages are impacted by breast cancer (CDC, 2008).

Family History

There was no documentation found disputing that family history was a risk factor for breast cancer, meaning those with family members with breast cancer were more at risk. ACS (2009d; NCI, 2009) showed that women who had family history of breast cancer had a higher risk of developing breast cancer, up to five times greater. Again, the fact that most women who developed breast cancer had no family history solidified the need for a predictive model.

There may be two aspects of family history at work to increase breast cancer risk. The first is genetics and the second is often that families share similar habits that increase risk. Additionally, the ACS (2009b, 2009d) reported that a mother having breast cancer

increased a daughter's risk by two-fold, and having both a mother and sister increased the risk five-fold. Jardines et al. (2013) write that "the relative risk of breast cancer in a woman with a positive family history in a first-degree relative (mother, daughter, or sister) is 1.7. When a first-degree relative has bilateral disease, there is a five-fold increase in risk" (p. 3). It is noted that less than 15% of women with breast cancer have a family history, which means that more than 85% of women *do not* have a family history (ACS, 2013). The composition of heredity is from our family genes that are embedded in the body's 23 pairs of chromosomes.

According to NIH (2013), the genes specific to breast cancer were: (a) Breast Cancer 1, early onset gene (BRCA1) and (b) Breast Cancer 2, early onset gene (BRCA2) from chromosomes 13 and 17. The two classes of genes, BRCA 1 and BRCA 2, have been verified as links to susceptibility in families with the hereditary pattern and played a critical role in breast cancer development. In normal circumstances, these chromosomes help to suppress cell growth. When a woman has either BRCA 1 or BRCA 2, these two genes increase the risk of developing breast cancer. It is the mutation of these genes that was associated with the increased risk; 1,000 (BRCA 1) and 800 (BRCA 2) mutations have been found to date.

Families usually have similar eating and exercising habits, and for girls, breast health could be impacted as well. Gustafson (2009) states, "Kids learn mostly by example. They model their own behavior after their parents, actions speak louder than your words" (p. 1). Ironically, the overwhelming majority of women who developed breast cancer have no family history. ACS (2009d) reported that more than 80% of women who were diagnosed with breast cancer did not have a family history. Similarly,

the U.S. Breast Cancer Statistics (Breastcancer.org, 2012b) reported 85% of those diagnosed with breast cancer do not have a family history.

Breast Disease and Density

Breast cancer is dense tissue, and finding breast cancer in dense breasts is very difficult. This is the rationale behind the increased risk of breast cancer in women with dense breast tissue (ACS, 2009d; NCI, 2009). Dr. John Wolfe first defined dense breast patterns in 1976 (Sickles, 2007). Similarly, Hersh (2004) and Nicholson et al. (2006) categorize breast density by the *Breast Imaging Reporting and Data System* (BI-RADS) which is used for diagnosing dense breasts:

Grade 1: Less than 25% of breast tissue is dense (mostly fatty breast tissue).

Grade 2: 25-50% of breast tissue has scattered density.

Grade 3: 51-75% of breast tissue has obscure visualization.

Grade 4: More than 75% of breast tissue has obscure visualization.

Other substantiating research on breast density includes Heine et al. (2012) who note "increased levels of breast density have been shown in multiple studies to be correlated with elevated risk of breast cancer" (p. 2). Harvard Health (2011) reports that "one of the strongest known risk factors for breast cancer is breast density and the risk of breast cancer was higher for women with higher breast densities" (p. 2). Harvey and Bovbjerg (2004) write:

> Plausible explanations for the association of breast density with increased breast cancer risk may be the development of premalignant lesions such as atypical hyperplasia, elevated growth factors, or increased estrogen production within the breast due to overactive aromatase. The amount of breast density may be due in part to genetic heredity. However, unlike other risk factors, breast density may be influenced. Specifically, breast density is very hormonally responsive and potentially may be influenced by lifestyle factors such as alcohol and diet. (p. 1)

White (2000) writes, “women with dense breasts have been shown to have a four- to six-fold increased risk of developing breast cancer, only age and BRCA1 and BCRA2 mutations increase risk more” (p. 1).

Specifically, hyperplasia is considered dense, not fatty tissue. Having atypical breast hyperplasia occurs when abnormal cells are in excess in the breast lobules or ducts, thus increasing a woman’s risk for developing breast cancer. The risk for developing breast cancer is estimated to be four to five times greater in women with hyperplasia than for women without hyperplasia (ACS, 2009d).

Hormone replacement therapy (HRT) also increases breast density, making diagnoses of breast cancer through mammography difficult. The more dense the breast tissue, the more difficult it is to confirm the visibility of a tumor. NCI (2006) cited that breast density was a high-indicator risk factor for breast cancer, almost as much as the risk factor of age. Breast density carried a three to four times greater associated risk for breast cancer than women absent breast density because it made breast cancer detection more difficult (NCI, 2008a).

As noted above, research states breast density is a major risk factor for breast cancer. There is no dispute by any researchers. Mammogram visualization may be difficult because of breast density, but breast density is a real issue for women. The type of breast tissue itself, atypical hyperplasia, breast tissue changes due to elevated growth factors, and/or increased estrogen production within the breast, all impact this risk.

Lifelong Exposure to Estrogen

The ACS (2001b) reported, as early as 1955, that a woman’s lifetime exposure to reproductive hormones was also a link to breast cancer. Charles Huggins won the Nobel

Prize in 1966 for this very discovery (ACS, 2001b). In the 1970s, Brian McMahon reconfirmed the link between breast cancer and a woman's lifetime exposure to reproductive hormones (ACS, 2001b). The longer a woman was exposed to estrogen produced in the body, the greater her risk of breast cancer.

Lifelong exposure to naturally occurring reproductive hormones is one of the more heightened risk factors correlated with developing breast cancer. Thus, menses before age 12 and reaching menopause after age 55 are considered lifelong exposures to estrogen, and women who had livelong exposure had a 1.5 to 4 times greater risk for developing breast cancer (ACS, 2009d; NCI, 2009) as opposed to women who did not have this type of exposure to estrogen. Estrogen has been implicated in tumor development in breast cancer for a number of reasons related to exposure to estrogen. The ACS (2009d) revealed that certain events of reproductive life were found to influence a woman's risk of breast cancer: (a) risks were higher in postmenopausal women who had elevated estrogen levels (commonly associated with obesity); (b) risks were higher in women who had their first pregnancy after age 30; and (c) risks were higher in women who had never been pregnant (which raised awareness and medical curiosity about the association between nulliparity and lesbian women).

As opposed to understanding breast cancer risk factors that cannot be changed and why, the next section provides information on how women can limit risk by knowing and responding to lifestyle-related risk factors.

Lifestyle-Related Risk Factors That One Has Control Over

Lifestyle-related risk factors that one has control over are hormone replacement therapy, obesity, oral contraceptives, and alcohol (ACS, 2012d). These factors are discussed below.

Hormone Replacement Therapy

ACS (2009d) and NCI (2009) confirmed hormone replacement therapy (HRT) to be a risk for women in developing breast cancer. The risk of developing breast cancer increased with the length of therapy, but decreased after HRT ceased. Five years after stopping hormone replacement therapy, a woman's added risk of developing breast cancer from HRT almost vanished. The NCI (2001b) explained that

> use of both estrogen and progestin, which was termed combined therapy, resulted in a 24% increase of breast cancer after five years of use. When estrogen was followed in the monthly cycle by progestin, termed sequential combined therapy, risk increased to 38% for each five years of use, concluding women who took estrogens for longer periods, tended to have breast cancer risk increased up to 50%. (p. 1)

Avoiding or limiting HRT was a lifestyle change to decrease risk.

Obesity

Obesity and insufficient quantities of physical activity were associated with breast cancer risk (ACS, 2009d). Increased activity reduced the risk of breast cancer by influencing weight loss. The NCI (2009) reported that walking as little as 75 to 150 minutes weekly decreased risk by 18%. Several studies substantiated obesity as a breast cancer risk, and more notably, the NCI (2009) stated the heavier a woman is, especially after menopause, the greater her risk to develop breast cancer. It was determined that fat carried out chemical reactions that resulted in estrogen production, thus increasing a

woman's exposure to the hormone. Although most of a woman's estrogen is produced by her ovaries, fat tissue changed some other hormones into estrogen, and having more fat tissue increases a woman's estrogen levels and her likelihood of developing breast cancer. Obese women have an 18% to 40% risk of developing breast cancer after menopause.

Obesity can be measured by body mass index (BMI), which is the measurement of the relative percentage of fat and muscle mass in the body and is calculated by a person's height and weight. Online BMI calculators are readily available to perform this calculation. BMI ranges are defined by *Web*MD (2012c) as: Underweight—Greater than 18.5; Normal healthy weight—18.5 to 24.9; Overweight—25 to 29.9; Obese—Greater than 30; and Extremely Obese—Greater than 40.

Oral Contraceptives

The ACS (2009d) and NCI (2009) previously stated that some risk factors for breast cancer were related to natural hormones. Oral contraceptives work by manipulating these same hormones. There was concern regarding possible effects oral contraceptives had on breast cancer risk, especially in women taking them for many years. Several studies conclusively linked breast cancer risks to taking the *Pill*. While taking an oral contraceptive, there was a 1.25% greater risk of developing breast cancer (Collaborative Group, 1996). ACS (2009d) confirmed this statistic by citing studies where women who used oral contraceptives had a slight increase in breast cancer over women who never used them. Past use carried no long-term risk, thus when oral contraception is stopped, the risk decreased. It is documented that 10 years after stopping

oral contraceptives, the risk of developing breast cancer returned to the same level as if the women had never used the Pill.

Alcohol

Alcohol is considered another major risk factor in breast cancer. Reflections from various studies supported that the more alcohol consumed, the higher the risk, even if it were smaller portions over longer periods of time. The ACS (2009d) and NCI (2009) agreed that alcohol consumption was a risk factor in breast cancer. Drinking two to five servings of beer, wine, or liquor per day increased a woman's chance of developing breast cancer by 40%. This increase was almost as high as having a family history of the disease. The risk was noted because moderate to high levels of alcohol intake increased estrogen levels that can damage DNA in cells. The NCI (2003) and the National Breast Cancer Center (2001) defined alcohol consumption in three categories: responsible, hazardous, and harmful:

1. Responsible consumption was drinking fewer than two drinks per day.
2. Hazardous consumption was drinking two to three drinks per day.
3. Harmful consumption was drinking four or more drinks per day.

The study showed that if a woman consumed hazardous and harmful amounts of alcohol, her risk increased 31% and 68% respectively. Also, grams of alcohol correlated with quantity of drinks. One standard drink equates to 10 grams of alcohol, which had a 10% relative risk. This research study revealed an intake of 30 to 60 grams of alcohol per day increased risk to 41% compared to nondrinkers. According to the National Breast Cancer Center (2001) the definition of one drink is equal to 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of hard alcohol. The type of alcohol beverage was insignificant. It

was the amount of alcohol in the beverage that made the difference. The BeAware Foundation (2012) states, "Averaging more than three drinks over 24 hours is associated with an increased risk that is equivalent to taking hormones after menopause" (p. 1). It was found that 4% of all breast cancer was attributed to alcohol. The NCI (2008b, 2010a) reported that alcohol consumption was rising, and was interpreted to mean this statistic was moving in an unfavorable direction that would harm women.

Tables 3 and 4 summarize the preceding literature review on the amount of risk that may impact women for (a) breast cancer risk factors that cannot be changed, and (b) lifestyle-related breast cancer risk factors.

Healthy lifestyle can be an indicator that prevents disease and promotes health. The U.S. Food and Drug Administration (FDA, 2006) reported that, through choice, people could have a greater impact on improving health and global mortality rates. Strategies on breast cancer preventive factors positively correlate with lifestyle-related risk factors as the conduit on how to modify lifestyle behaviors.

Table 3

Breast Cancer Risk: Women's Risk for Breast Cancer Risk Factors That Cannot Be Changed

Risk Factor	Rationale	Risk
Age	Increased age increases lifetime risk	1-in-8
Gender	Female over male	100 times more likely
Family History	Mother diagnosed	2-3 times greater risk
	Mother and sister diagnosed	5 times greater risk
Breast Disease and Density	Hyperplasia (type of cells)	4-5 times greater risk
	Breast density	3-4 times greater risk
Lifelong Exposure to Estrogen	Menses before age 12	1.5-4 times greater risk
	Menopause after age 55	1.5-4 times greater risk
	Never been pregnant	1.5-4 times greater risk
	First pregnancy age 30+	1.5-4 times greater risk

Table 4

Breast Cancer Risk: Women's Risk Level for Lifestyle-Related Risk Factors

Risk Factor	Rationale	Risk
Obesity	After menopause	18-40% greater risk
Oral Contraceptive	While actively taking the pill	Up to 50% greater risk
Alcohol	Consuming 2-3 servings/day	40% greater risk
Hormone Replacement Therapy	Estrogen alone	24% greater risk
	Sequential therapy	38% greater risk
	Combination therapy	50% greater risk

Health Recommendations Likely to Decrease the Risk of Breast Cancer

Given the risk that these lifestyle factors create for women, the focus that prevention has in breast cancer research is understandable. The NCI (2003) described prevention as "avoiding the risk factors and increasing preventive factors that are controlled so that the chance of developing breast cancer decreases" (NCI, 2003, p. 1).

Many breast cancer risk factors can be reduced or even eliminated by making lifestyle modifications, thus lowering risk of breast cancer (ACS, 2012b; NCI, 2012e). Lifestyle modifications are the health recommendations likely to decrease the risk of breast cancer and include decreased daily alcohol consumption, losing weight, obtaining a mammogram per age recommendations, performing monthly breast self-exams, and avoiding hormone replacement therapy (ACS, 2009a). Gotay, McCoy, Dawson, and Ragaz (2012) support this premise and suggest that as many as 40% of breast cancer diagnoses could be avoided by changing lifestyle risk factors. Duncan (2004) believes nutrition plays a leading role in cancer prevention.

As far back as 1999, Hutcheson cited five strategies for reducing breast cancer

risk, and these remain consistent today with the ACS (2012c) and NCI (2012e) recommendations:

1. Reduce or cease drinking alcohol.
2. Manage weight with a BMI of less than 25.
3. Obtain regular breast screenings/mammograms.
4. Perform monthly breast self-exams.
5. Eat foods that can counter the effects of estrogen.

Other ACS (2012c) and NCI (2012e) recommendations include BCRA 1 and 2 testing and anti-estrogen drugs if a family history of breast cancer exists, discuss HRT with the physician to balance pros and cons of regimen, have first pregnancy before age 30, and limit oral contraceptive timeframe.

Alcohol

It is reported that 4% of all breast cancer is attributed to alcohol, and with alcohol consumption rising, this breast cancer statistic could be moving in the wrong direction (NCI, 2008b). To limit breast cancer risk, the ACS (2009d), NCI (2009), and the Mayo Clinic (2012a, 2012b) recommend limiting alcohol to no more than one drink a day.

Weight Management

Obesity and insufficient quantities of physical activity were associated with breast cancer risk. Fat carries out a chemical reaction that results in estrogen production, thus increasing a women's exposure to the hormone. Women who are overweight by 20 pounds have an 18% increased risk and those who are 45 pounds overweight, a 40% increase. Recommendations from the ACS (2009d), the NCI (2009), and the Mayo Clinic

(2012a, 2012b) to limit breast cancer risk were: lose weight and maintain a BMI of less than 25, be physically active, and maintain a healthy diet.

Screenings

Breast cancer found early through a mammogram can lead to more successful treatment (NCI, 2012b). Chillemi (2012) tells us that the death rate could decrease by 30% if all women age 50 or older got a mammogram. The Komen Foundation (2010) notes the following statistics:

> Only 50% of women aged 40-85 obtain mammograms in any given year; aged 40-85 get two or more mammograms over four years; and the average annual mammogram rates are as follows: 47% women aged 40-49, 54% women aged 50-64, and 45% for women aged 65 or older. (p. 1)

The NCI (2012b) reports screening mammography can help reduce the number of deaths from breast cancer among women ages 40 to 70, and *Web*MD (2012b) supports mammography as the most effective way to detect breast cancer. ACS (2009d) and NCI (2009) support breast cancer screenings.

The National Breast Cancer Foundation (2012) supports women of all ages to perform breast self-exams and states that 40% of breast cancers are detected when a lump is found during these self-exams. *Web*MD (2012a) notes that monthly screening is the supplemental screening between annual mammograms and has proven effective as an essential part of the early detection of breast cancer because screeners can detect any changes that occur before it becomes too late.

> The ACS (2012a) recommends that self-breast exams should be performed monthly over the age of 20. If you do find any changes in your breasts by performing a self-breast exam then you should speak to your doctor as soon as possible so that they can perform a clinical breast exam and any other necessary tests to work out whether cancer is present. (p. 1)

Nutrition and Exercise

The National Breast Cancer Center (2001) reported mounting evidence that nutritional dietary changes strongly influence the reduction of breast cancer risk. Nutritional support that combats breast cancer includes consuming fruits, vegetables, whole grains, and beans, along with reducing the consumption of fats and alcohol. Also, by ingesting a high-fiber diet, the body is given protection against breast cancer risk.

Breastcancer.org (2012a) has published several articles on nutrition and reducing breast cancer risk and makes similar recommendations including eating a diet rich in fruits, vegetables, and whole grains, and low in fat. The ACS (2012c) published *American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention*. The publication states:

> Many studies have shown that moderate to vigorous physical activity is linked with lower breast cancer risk. A diet that is rich in vegetables, fruit, poultry, fish, and low-fat dairy products has also been linked with a lower risk of breast cancer in some studies. But it is not clear if specific vegetables, fruits, or other foods can lower risk. Most studies have not found that lowering fat intake has much of an effect on breast cancer risk. At this time, the best advice about diet and activity to possibly reduce the risk of breast cancer is to reduce lifetime weight gain by limiting your calories, getting regular physical activity, and voiding or limiting your alcohol intake. (pp. 13-14)

In this section, I explain lifestyle modifications and steps in prevention that impact risks for breast cancer. While prevention is crucial—as the adage says, an ounce of prevention is worth a pound of cure—even the best vigilance can still result with breast cancer. Once a woman is diagnosed with breast cancer, there is still significant action she can take to prevent further loss of health or life. To guide us in understanding both the previous preventive stage of illness and the work of health maintenance, Orem's theory of self-care and self-care deficit will be discussed in detail.

Theoretical Framework

Many nursing theoretical frameworks exist, but only a few concentrate on concepts of health promotion. Nola Pender's health promotion model is one. Pender (1982) believed quality of life could be improved and health-care dollars saved by a proactive approach of promoting a healthier lifestyle. This health behavior model had five key concepts: person, environment, nursing, health, and illness. At a high level, Pender's theory of health promotion could have conceivably worked as the theoretical framework for this study. However, Pender's theory failed to bring the depth of specificity that correlated to breast cancer risk factors. Dorothea Orem's multi-dimensional theory had an additional concept that made Orem's theory more attractive: the basic conditioning factors that align specifically with the breast cancer risk and preventive factors. This adjunct concept met the objective and scope of the study.

In addition, Hartweg (1989) discusses health promotion as a component of Orem's model, partially challenging Orem's concept as a medical model, yet agreeing that health promotion is embedded in Orem's theory.

> Health promotion self-care is continuous activity which is self-initiated and deliberately performed to increase an individual's well-being. It is viewed as different from illness prevention and health maintenance, and does not require the antecedent of absence of disease. Self-care activities lead to the promotion of well-being. (Hartweg, 1989, p. 38)

The premise of using Orem's theory was to utilize the concept of health promotion as a tool for self-care activity, and thus identify and limit risk. Wellness activities like walking, riding a bike, and exercising as well as eating a healthy diet are examples that support *how life is lived*. Making choices that impact well-being are influenced by Orem's basic conditioning factors. When thinking of health promotion as increasing an individual's well-being, as Hartweg (1989) describes, awareness and

knowledge of identifying and limiting risk can be supported. More clarity is given to self-care and self-care deficit theories.

Dorothea Orem's concepts of nursing practice described two inter-related theories: self-care and self-care deficit (Orem, 1995). Her nursing theoretical framework has been guiding nursing leadership since the 1950s. Orem's theoretical framework supported life at all stages: young and old, healthy and sick. Fawcett (1995) shared Orem's definition of nursing as a human service designed to overcome limitation. Nursing activity was derived from nursing judgments and supported her two inter-related theories of self-care and self-care deficit.

1. Self-care related activities of women maintaining life, health, and well-being with basic breast cancer diagnostic testing and preventive screening for autonomy and independence.

2. Self-care deficit noted limitations of the disease process of breast cancer, complications, and various treatments.

3. Self-care deficit assessed women's needs for assistance and intervention of skilled care and ongoing education. The ultimate goal is to return to optimal self-care with autonomy and independence post-treatment.

Self-Care

Orem's theory of self-care connected the disease process (breast cancer) with limitations of health-care. As identified in this study, health-care limitations are resources, education, awareness, and prevention related to knowledge deficit in breast cancer. In Orem's theory, everyday life is considered self-care and no health-care interventions are needed. The theory had a central idea of learned behavior and a rational

response to need, to prepare one for health deviation and optimal recovery (Orem, 1995). Examples of breast cancer self-care learned behavior are getting an annual mammogram if age 40 or older and performing monthly breast self-exams.

Orem's three categories of requisites or needs were labeled universal, developmental, and health deviation (Orem, 1995). These categories represent maintenance of life, developmental processes, and structural and functional deviations. Universal is defined as hazards of human life, functioning, and well-being. An example would be lack of awareness of breast cancer risk and preventive factors. The definition of developmental is to prevent or overcome the effects of life events/experiences that can impact human development. An example would be the alteration of social conditions associated with breast cancer that affect life, health, or well-being. Additionally, they support risk factors, the diagnosis of a disease process, and body/life changes as the end result. The definition of health deviation is those who are ill, injured, or have a specific pathology. A health deviation example is being diagnosed with breast cancer confirmed by pathology or a surgical biopsy. Table 5 summarizes the three categories of requisites related to breast cancer and cites examples per requisite.

Orem's theory of self-care has closely been associated with Maslow's Hierarchy of Needs. Hartweg (1991) compared Orem's theory to Maslow's hierarchy as both models address fundamental capabilities necessary for deliberate action, power components necessary for general self-care, and capabilities for specific self-care. Orem's three-part hierarchical structure was defined as:

1. Base Tier—Foundational Capabilities represented deliberate action.

Table 5

Orem's Requisites Related to Breast Cancer

Requisite	Definition	Example
Universal	Hazards of human life, functioning, and well-being	Lack of awareness of breast cancer risk and preventive factors
Developmental	Prevents or overcomes the effects of life events/experiences that can impact human development	Alteration in social conditions associated with breast cancer that affects life, health, or well-being
Health Deviation	For individuals who are ill, injured, or have specific pathology	Genetic conditions known to produce a specific pathology, i.e., women who are at risk for breast cancer

Specifically, Maslow's hierarchy is parallel to basic physiological needs encompassing deliberate action of eating, drinking, and sleeping.

2. Middle Tier—Power Components represented motivation, knowledge, attitudes, and skills. Maslow's hierarchy echoed with safety, love, and esteem, and, by his definition, included security, health, confidence, achievement, and respect.

3. Top Tier—Capabilities for Specific Self-Care represented an ability to judge and decide. Maslow's hierarchy followed suit with self-actualization supporting the ability to judge and decide with problem solving.

Given the tiers, it was crucial to see the lower tiers as essential, but not complete without the higher tiers for fulfillment.

Self-Care Deficit

When a woman is diagnosed with an illness like breast cancer, a deficit has occurred and health-care interventions are needed to support and supplement self-care. Self-care deficit means a deviation in the health status has occurred (Nursing Theories,

2012) and a relationship for care needs to be established. The relationship consists of a patient, a nurse, and the care needed. Table 6 shows examples of Orem's theory of self-care deficit applied in research, establishing the relationship.

Table 6

Application of Orem's Theory in Research

Author	Publisher	Title
Wengstrom	Sweden, 1999	*Nursing Interventions in Radiation Therapy: Studies on Women With Breast Cancer*
Soivong, Mai, and Hanucharurnkul	Thailand, 2000	*Patterns: Exploration of Patterns of Nausea and Vomiting, Associated Factors, and Self-Care Among Breast Cancer Patients Receiving Chemotherapy*
Williams and Schreier	United States, 2004	*The Effect of Education in Managing Side Effects in Women Receiving Chemotherapy for Breast Cancer*

Basic Conditioning Factors

Additionally, basic conditioning factors (BCF) impact both self-care and self-care deficit. Making decisions and being proactive initiate and foster self-care and can influence results of care with self-care deficit. Owens (2007) described Orem's theory of self-care as "human endeavor and learned behavior, identified as deliberate, purposive action individuals engage in to care for themselves by influencing internal and external factors to regulate their own functioning and development" (p. 384). Thus, Orem's BCF and the ability to execute can be influenced by specific internal and external factors which influence how life is lived (Orem, 1995). Srikan (2012) writes, "Internal and external conditioning of human and external influences are also called basic conditioning factors and are characteristics that can either positively or negatively influence an

individual" (Srikan, 2012, p. 12). The BCF and definitions in Table 7 are the basis for breast cancer risk and prevention.

Table 7

Orem's Basic Conditioning Factors With Definitions for Use in Study

Factor	Definition
Age	Length of someone's existence
Gender	Sex of a person
Developmental state	Knowledge of breast cancer risk and prevention, individual risk, fear
Health status	General health state, breast cancer diagnosis
Sociocultural orientation	Education, work status, race, household income
Health care systems factors	Basic diagnostic testing, mammograms
Family system factors	Familial tendency
Environmental factors	Relating to, or caused by, one's surroundings
Patterns of living	Activities regularly engaged in

Orem's Theory and Health-Care Leadership

Moore and Pichler (2000) provided a rationale for use of Orem's theory of self-care from a leadership perspective:

> Health care recipients and health care providers are being encouraged to work collaboratively towards disease prevention and health promotion as health care costs increase, health care reform is considered, and Healthy People 2000 (U.S. Department of Health and Human Services, 1991) goals are addressed. Orem's Self-Care Theory (1995) is particularly valuable for examining disease prevention and health promotion because of its emphasis on individual responsibility for both activities. (p. 137)

Denyes, Orem, and Bekel (2001) discussed Orem's self-care theory and stated a useful philosophical summary: "This practice model makes clear that persons engaged in self-care must maintain a focus on, and attend to, self and the environment relating to the internal and external influences" (p. 54). Orem's model of self-care focuses on health and

prevention. The self-care deficit aspect focuses on the disease process of breast cancer, complications, and various treatments associated with the diagnosis. Self-care deficit assesses a woman's need for assistance and intervention of skilled care and ongoing education. The ultimate goal is to return to an optimal self-care state with autonomy and independence post-treatment.

Summary

This chapter focuses on the overview of the literature as it relates to breast cancer risk and preventive factors and intimately describes the theoretical framework for the study. Morbidity and mortality rates associated with breast cancer and the literature not only identify the risk and preventive factors but bring to light the rationale why they impact women. Areas of research and discussion included: current perspective of breast cancer regarding morbidity and mortality rates and current trends; the substantial increase in the cost of breast cancer care over the past three decades; current breast cancer awareness focus on early detection, not education on prevention; breast cancer risk factors related to risk that cannot be changed, and lifestyle-related risk factors fully defined as well as health recommendations likely to decrease the risk of breast cancer with preventive factors and strategies for prevention. It is well documented that women still exhibit a lack of awareness and knowledge deficit regarding breast cancer risk and preventive factors. Associations of how Orem's model has impacted breast cancer is also discussed. Orem's theoretical framework guided the study with self-care and necessary interventions when a self-care deficit occurs and how Orem's BCF align with breast cancer risk factors.

CHAPTER 3

METHODOLOGY

Introduction

This chapter describes the methodology used in this study. An ex post facto design was used to examine women's knowledge of breast cancer. An online survey of women's knowledge of risk and preventive factors and demographic characteristics was used to create a model of women who were least likely to be aware of breast cancer risk and preventive factors. First, I review the research questions and hypotheses. Subsequently, the research design, description of population and sample, survey design, rubrics creation, definitions of variables, data collection processes, and procedures are reviewed. Last, an explanation of the statistical analysis that was used is provided.

Research Questions

The study has nine basic research questions:

1. Do women know breast cancer risk factors?
2. Do women know breast cancer preventive factors?
3. What is the relationship between women's own personal risk and their knowledge of breast cancer risk factors?
4. Is there a difference in women's awareness of breast cancer risk factors according to age, race, household income, education, breast self-exams, mammogram testing, work status, and health insurance status?

5. Is there a difference in women's awareness of breast cancer preventive factors according to age, race, household income, education, breast self-exams, mammogram testing, work status, and health insurance status?

6. Are women fearful of being diagnosed with breast cancer?

7. Are women fearful of receiving treatment for breast cancer?

8. Do women who have health insurance use their medical benefits for preventive practice?

9. Do women without health insurance get screenings for preventive practice?

Research Hypotheses

The hypotheses were useful in guiding the data collection and analysis. The hypotheses contained variables and relationships aligned with Orem's BCF and promised to help create a model to predict individuals who were more likely not to understand breast cancer risk factors.

Research Design

The research design used in this study was robust ex post facto. According to Kerlinger (1973):

> Ex post facto research is systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable. Inferences about relations among variables are made, without direct intervention, from concomitant variation of independent and dependent variables. (p. 379)

As Newman and McNeil (1998) write, there are three types of ex post facto design: (a) with hypotheses, (b) without hypotheses, and (c) the type that is used in the study with hypotheses controlling for alternate explanations. Another distinction made regarding ex post facto research is that it contains an attribute or assigned variable which

can only demonstrate relationships, not causation. Concerning research design, Newman, Newman, Brown, and McNeely (2006) stated:

> In ex post facto research, causation is sometimes improperly inferred because some people have a propensity for assuming that one variable is likely to be the cause of another because it precedes it in occurrence. (p. 101)

Also, there are three sizable weaknesses in ex post facto design for research studies: (a) inability to manipulate independent variables, (b) lack of power to randomize, and (c) risk of improper interpretation due to lack of control (Kerlinger, 1973, p. 390). Despite these limitations, ex post facto design was used to best critique the hypotheses in this study.

Description of Population and Sample

The study sample was a collection of women with a minimum age of 18. A total of 291 women participated.

Survey Design

Only a few breast cancer surveys were identified through research. The Breast Cancer Perceptions and Knowledge Survey used by Parsa and Kandiah (2005) was a 10-question survey asking for an "Agree, Disagree" response. None of the 10 questions correlated with the research in this study; however, from a breast cancer perceptions perspective, the conclusions of the study were that the Iranian "women were not well informed on pertinent issues surrounding breast cancer" (p. 23). Another study by Ahmed, Mahmud, Hatcher, and Khan (2006) focused on three risk factor areas, thus limited in breast cancer scope: family history, late age at first pregnancy, and myths for breast cancer. The survey identified responses categorized by "poor, fair, and good" for knowledge levels that corresponded with ranking scores of 0-7, 8-10, and 11-15,

respectively. The participants were Pakistani registered nurses, and 65% scored in the fair to poor range.

A ProQuest and Medline search was performed several times during the dissertation process, looking for studies that had rubrics that were similar or the same in structure and content to the rubrics that were developed for this study. Specifically, the search was based on the three breast cancer risk and preventive questions (breast cancer risk factors that cannot be changed; lifestyle-related breast cancer risk factors that one has control over, and health recommendations likely to decrease the risk of breast cancer) with subsequent corresponding details and scoring. In April 2013, a final search in ProQuest (1993-2013) and Medline (1983-2013) was performed, and no study was found on breast cancer risk or preventive factors that used rubrics that were similar or the same in structure or content.

The survey was developed after an extensive literature review was conducted on breast cancer risk and preventive factors. In correlation with the ACS-supported classifications of breast cancer risk factors, the survey collected data in the first two of the three classifications: breast cancer risk factors that cannot be changed (age, gender, family history, breast disease/density, and life exposure to estrogen) and lifestyle-related breast cancer risk factors (hormone replacement therapy, obesity, oral contraceptives, and alcohol). The third category, potential risk factors, was not included in this survey. In addition, the survey also collected data on preventive measures that have a direct correlation to breast cancer preventive factors and categorized as health recommendations likely to decrease the risk of breast cancer.

To assess the knowledge of participants, a seven-part electronic survey was developed. Both ACS (2009d) and NCI (2009) were referenced to create the survey and the open-ended questions on risk and preventive factors that are referenced in the rubric development.

The seven-part electronic survey was developed to ascertain responses regarding breast cancer risk and preventive factors. To complete the survey, the participants were required to either select the appropriate response from a drop-down box of multiple-choice, click the radio icon button for the appropriate answer from a multiple choice selection, or fill in the blanks with a narrative response. Participants were instructed to write "I don't know" if unsure of the correct answer or truly did not know the answer to a question requiring a narrative response.

Part I of the survey, Demographics, asked participants to select responses from a drop-down box to gather specific demographic information related to the independent variables: race, gender, household income, highest completed education, basic diagnostic testing (self-breast exams), mammogram testing, work status, health-care provider status, and health insurance status. Coding was "0, 1." The demographic of age was coded as continuous data.

Part II of the survey, Breast cancer risk factors that cannot be changed and Lifestyle-related breast cancer risk factors, and Part III of the survey, Health recommendations likely to decrease the risk of breast cancer, asked participants to fill in the blanks with narrative responses. Again, responses were coded and scored using rubrics that were developed for each question. Examples of the rubrics can be found in Appendix B.

Part IV of the survey, Risk Assessment, was a series of questions that required participants to choose responses from a series of multiple choices, reflecting individual circumstantial responses to questions relating to or not relating to breast cancer risk and preventive factors. Coding was "0, 1."

Part V of the survey, Individual Personal Risk, asked participants to select from a drop-down box or choose from a series of multiple choices to identify specific personal risk responses. Coding was "0, 1."

Part VI of the survey, Fear Rating Scale, asked participants to choose from a series of multiple choices to identify individual responses to fear of breast cancer diagnosis and treatment. Responses included: (a) I am not afraid, (b) I am somewhat afraid, and (c) I am very afraid. Coding was "0, 1."

Part VII of the survey, Miscellaneous, listed several interrogatories that required participants to select from a drop-down box, choose from a series of multiple choices, or provide a narrative response to answer the questions. All questions that were used in the study (relating to health-care provider and physical/emotional health), aside from asking which state or country participants lived in, used the coding "0, 1." The purpose for these miscellaneous questions was to find if any bias existed. Bias would have included a respondent having previous knowledge of breast cancer risk and preventive factors due to being a health-care provider. Additionally, asking miscellaneous questions would ascertain the self-reported general health status for physical and emotional health.

One method used to estimate validity was by thoroughly researching ACS (2009d) and NCI (2009) to develop the survey. The second method was having two experts in the field review the survey. Both experts made similar recommendations. The

recommendations were to change the Part III heading in the survey from Breast Cancer Preventive Factors to a more generic heading. The rationale for the change was that preventive measures were more likely to limit breast cancer risk, not guarantee breast cancer prevention. The Part III heading was changed to Health Recommendations Likely to Decrease the Risk of Breast Cancer.

Furthermore, the rationale for this varied survey format was to verify what women believed to be breast cancer risk and preventive factors, and then associate their responses with their own personal risk. The correlation between knowledge of risk and preventive factors, and literally *having* risk, was the element of research that genuinely correlated with the predictive model and could lead to prevention and decreased morbidity and mortality rates.

Rubrics Creation

Research from the ACS (2009d) and the NCI (2009) was used to develop the rubrics. The focus for the rubrics was from the three breast cancer risk and preventive factors survey questions: *breast cancer risk factors that cannot be changed; lifestyle-related breast cancer risk factors that one has control over;* and *health recommendations likely to decrease the risk of breast cancer*. The rubrics have four main categories: *elements,* which are the breast cancer risk or preventive factors; an ordinal *score,* which measures the detail of knowledge; the *detail narrative, w*hich describes the specificity as it relates to the element; and the *scoring detail*, which determines to which classification category (best, good, fair, or poor) the score belongs.

A scoring rubric was developed to quantify the responses using a procedural testing methodology, a new term applied to the process of refining the rubrics. This

process consisted of mock surveys being distributed, scored, analyzed, revised, and redistributed until the rubrics were reworked to decrease bias or prejudice and took reliability and validity estimates into consideration. Three estimates of content variability were used for the rubrics in reviewing the mock surveys. After the third mock survey was reviewed, there was 100% agreement from the panel on the process and procedure for the finalization of the rubrics. Refinement of participants' scoring was a developmentally crucial element in rubric creation. This is further discussed in rubric scoring, details on rubric scoring, and procedural testing methodology later in this chapter.

Rubric Scoring

Participants' responses were scored depending on the detail of the response. Each rubric had a different possible total score. *Breast cancer risk factors that cannot be changed* had a possible score of 15. *Lifestyle-related breast cancer risk factors that one has control over* had a possible score of 12. *Health recommendations likely to decrease the risk of breast cancer* had a possible score of 15. The scoring was broken down by the following scoring detail:

1. A "best" understanding reflected a specific response supported by research and is scored as "3."
2. A "good" understanding is a general related response that may be related to the element, but not specific enough to ascertain the knowledge required, and is scored as "2."
3. A "fair" understanding is the minimum expected response and is scored as "1."
4. A "poor" understanding is the inability to respond with the correct answer, did

not answer the question, or responded “I don’t know,” and is scored as “0.”

Details on Rubric Scoring

The rubrics have four main categories: *elements*, which are the breast cancer risk or preventive factors; an ordinal *score* that measures the detail of knowledge, the *detail narrative* that describes the specificity as it relates to the element, and the *scoring detail* that determines to which classification category (best, good, fair, or poor) the score belongs. The survey question, elements, detail narrative, and scoring detail were categorized and defined as:

1. List five (5) breast cancer risk factors that cannot be changed: age, gender, family history, estrogen, and breast disease/density.
    a. Age: Other or no response (0), Reference to age (1), Reference to post-menopausal (2), Getting older (3)
    b. Gender: Other or no response (0), Reference to both male or female (1), Gender/Sex (2), Female (3)
    c. Family history: Other or no response (0), Reference to genetics/heredity/DNA (1), Reference to family history (2), Mother/sister diagnosed (3)
    d. Estrogen: Other or no response (0), Reference to hormones (1), Reference to lifelong exposure (2), Examples of lifelong exposure to estrogen (3)
    e. Breast disease/density: Other or no response (0), Reference to breast disease (1), Dense breasts (2), Hyperplasia (3)
2. List four (4) breast cancer lifestyle risk factors that one has control over: hormone replacement therapy, obesity, oral contraceptives, and alcohol.

a. HRT: Other or no response (0), Reference to hormones (1), Reference to estrogen/progesterone (2), Reference to hormone replacement therapy (3)

b. Obesity: Other or no response (0), Reference to being fat, heavy, or overweight (1), Reference to poor diet/lack of exercise (2), Obesity (3)

c. Oral Contraceptives: Other or no response (0), Reference to birth control (1), Reference to past use (2), Current use (3)

d. Alcohol: Other or no response (0), reference to alcohol (1), Cites number of drinks per day two or more (2), Cites number of drinks per day less than two (3)

3. List five (5) health recommendations likely to decrease the risk of breast cancer: decrease alcohol intake, lose weight, have annual mammograms, perform monthly breast self-exams, and stop/avoid hormone replacement therapy.

a. Decrease alcohol intake: Other or no response (0), Reference to alcohol (1), Alcohol consumption two to five drinks per day (2), Alcohol consumption less than two drinks per day (3)

b. Lose weight: Other or no response (0), Reference to health diet (1), Reference to losing weight, dieting, or exercising (2), BMI in balance for height and weight (3)

c. Have an annual mammogram: Other or no response (0), Reference to breast x-ray or breast testing (1), Reference to mammogram (2), reference to annual mammogram age 40 or older (3)

d. Perform monthly breast self-exam: Other or no response (0), Reference to breast checks (1), Reference to breast self-exams (2), Breast self-exams monthly (3)

e. Stop/Avoid hormone replacement therapy: Other or no response (0), Reference to not taking hormones (1), Reference to not taking estrogen or progesterone (2), Stop/Avoid hormone replacement therapy (3).

Procedural Testing Methodology

A scoring rubric was developed to quantify these responses using a procedural testing methodology, a new term applied to the process of refining the rubrics. This process consisted of mock surveys being distributed scored, analyzed, revised, and redistributed until the rubrics were reworked to decrease bias or prejudice and took reliability and validity estimates into consideration. This process of refining the scoring rubrics was the most crucial piece of development, confirming that consistency existed with like or similar terms as acceptable responses. It was the rubrics' consistency that determined the estimates of validity and was essential for the predictive model.

Coding of the survey responses and scoring with the use of the rubrics was critical for the predictive model and supported the need for specific outreach and educational opportunities when scores resulted in the Fair to Poor range for most questions. The rubric scoring produced the criteria for developing the predictive model and enhanced the possibility that prevention and decreased morbidity and mortality rates could be achieved. Details on the procedural testing methodology that led to the predictive model development are explained in the mock survey process.

The mock survey process consisted of the three survey questions which needed a narrative response. The three question categories were: *breast cancer risk factors that cannot be changed, lifestyle-related breast cancer risk factors,* and *health recommendations likely to decrease the risk of breast cancer.* A three member panel, two medical and one non-medical professional was used to score the mock surveys. The rationale in having this diverse panel of professionals was to ascertain accuracy of the technique and clarity of the scoring detail. The panel was trained on how to use the rubrics for scoring purposes.

The first mock survey consisting of the three question categories was distributed to 15 women of various ages, education levels, and ethnicity. Demographics were not obtained during the mock survey process. Only 13 of the 15 surveys were returned. Using the rubrics that were developed for each question category by the researcher, the surveys were scored by the trained panel. The scores all fell within the Fair to Poor range for each question and each participant. A discussion regarding "like or similar" terms ensued to confirm what terms were acceptable as responses. Examples of the "like or similar" terms were:

Age: A specific number (i.e., 45 or 69) or 'Any'

Gender: Female, Male or 'Any or Either'

Family history: Grandmother, Mother, Sister

Breast disease: Cysts

Estrogen: Hormones.

This discussion supported the intent of my design of the rubrics' scoring methodology. The rubrics were revised for consistency of scoring detail using the best,

good, fair, and poor classification categories. The best understanding (scored with a number 3) reflected a specific response that indicated what was stated in the research. A good understanding (scored with a number 2) was a general response that may be related to risk or prevention, but is not specific enough to ascertain the knowledge required. A fair understanding (scored with a number 1) was the minimum expected response, and poor understanding (scored with a 0) was the inability to respond or respond with the wrong answer. A response of "I don't know" was scored with a zero.

The second mock survey was distributed to five peers, both women and men, of various ages, education levels, and ethnicity. The rationale in distributing the survey to both men and women was to rework each rubric without bias or prejudice. I scored the second survey. All five mock surveys were returned, and each question was again scored separately. All scores fell within the *Fair* to *Poor* range. Once scored, the responses were discussed with the peer participants. One issue identified was: What if a risk factor was identified but put under the wrong question as a response? The response is truly considered a wrong answer but it has been determined that some baseline knowledge of breast cancer risk or preventive factors needs to be considered, even if categorized under the wrong question. If a response is correct but the participant put the response under the wrong question, it would be scored with half a point (1/2) only.

The rubrics were finessed to include the additional scoring of half a point (1/2) for each breast cancer risk or preventive factor that was a response under the wrong question. This was noted as *unclassified* breast cancer risk factors, as it was identified as a true risk but the participant was unable to classify whether it was a risk factor that cannot be changed or a lifestyle-related risk factor that the participant has control over.

The first mock survey was re-scored individually by the panel using the revised rubrics. It was identified that some of the participants had unclassified responses but also answered as correct response under the appropriate question. It was thus determined that the *unclassified* response would not be scored if this scenario exists and the half a point (1/2) scoring would be removed from the rubrics. Consistency of the scoring methodology was again discussed looking for additional 'like or similar' terms. A few other terms were considered acceptable as responses. Some additional examples of 'like or similar' terms included:

Age-Aging

Family history-DNA

Alcohol-Drinking

Mammograms-Breast screening.

The scoring changed minimally, but remained in the *Fair* to *Poor* range. There was 100% agreement among the panel for finalization of all three rubrics.

Definitions of Variables

Independent variables of this study were organized into demographic categories (age, race, gender, annual household income, highest level of education, basic diagnostic testing, mammograms, work status, and health insurance status). Various specifications were collected from participants as related to the demographic or miscellaneous categories:

1. Race: White, Black, or Other; coded 0, 1
2. Age: measured in years; coded this as continuous data
3. Annual household income: <$25,000; $25-29,999; $30-39,999; $40-49,999;

$50-59,999; $60-69,999; $70-79,999; $80-89,999; $90-99,999; >$100,000; >$150,000; coded 0, 1

4. Highest completed education/degree: High school; GED, Technical school; Associate degree; Bachelor's degree; Master's degree; Doctorate degree; coded 0, 1

5. Work status: Employed, Not employed; coded 0, 1

6. Health-care provider: I am a health-care provider, I am not a health-care provider; coded 0, 1

7. Health insurance status: I have or I do not have health insurance, coded 0, 1

8. Basic diagnostic test, Self-breast exams: Monthly, Occasionally, Never: coded 0, 1

9. Mammograms under age 40: Every year; Every other year; Every 3-5 years; Every 6-10 years; Never; coded 0, 1

10. Mammograms age 40 or older: Every year; Every other year; Every 3-5 years; Every 6-10 years; Never; coded 0, 1

11. Fear of being diagnosed with breast cancer: Not afraid; Somewhat afraid; Very afraid; coded 0, 1

12. Fear of treatment for breast cancer: Not afraid; Somewhat afraid; Very afraid; coded 0, 1

13. Physical and Mental health: I am very healthy, I am somewhat healthy, I am not healthy; coded 0, 1

14. Body Mass Index: Underweight; Normal; Overweight; Obese; Extremely obese; coded 0, 1.

Data Collection Processes and Procedures

This research study was conducted using an electronic online survey via surveymonkey.com. This web-based method was used as a convenient way to access a large volume of participants. An email list of 20 potential participants was compiled. The list included friends, family, acquaintances, neighbors, peers, and colleagues. Each participant was requested to forward the survey link to another person, called a modified snowball technique, including self-disclosure, to maximize distribution and response rate. The survey remained open for 6 months.

Survey data were collected by surveymonkey.com. Anonymity and confidentiality were included by this survey engine. Features were built into the online survey development, including: (a) once a question was answered, a participant was unable to go back to change a response, and (b) an email address by participant had the ability to take the survey only once. Collected data were imported to a statistical program for analysis, the Statistical Package for the Social Sciences (SPSS). SPSS was utilized to analyze demographics and general information, and then coded and scored data according to rubric categories. The electronic online survey had a disclaimer statement that participants completing the survey were simultaneously providing consent.

Statistical Analysis

The *F* test was used to challenge the statistical significance of the proposed relationships in the hypotheses. The *F* test was chosen because it is robust. The assumptions of random selection of subjects and normal distribution of the variables could be violated without doing serious harm to the procedure (Newman et al., 2006).

Multiple linear regressions were used in analyzing the variance in predicting one

variable to another. Also, the linear regressions were used in co-varying several variables to test optional alternate hypotheses (Newman & McNeil, 1998). Multiple linear regression was chosen because it was more flexible than traditional analysis of variance. With multiple linear regression, models can be written which reflect the specific research question being asked. In addition, McNeil, Newman, and Kelly (1996) highlighted that with multiple linear regressions, relationships between categorical variables, between categorical and continuous variables, or between continuous variables can be tested.

The Bonferroni correction was used to control for Type 1 errors for the multiple comparisons (Newman et al., 2006).

Two-tailed test of significance was used to evaluate the relationships of those variables where the direction of the correlation may have been uncertain. The .1 Level of Significance was used because the consequences of rejecting a true null hypothesis are not serious enough to warrant a more stringent confidence level and the fact that this was an exploratory study. A power analysis was calculated for Cohen's (1988) medium size effect (f^2) of .15 for an alpha level of .1 (n=291) power determined to be .99.

Summary

This chapter focuses on the overview of the methodology used in the study. This quantitative study used an ex post facto research design focusing on hypotheses controlling for alternate explanations. A total of 291 women participated, with a minimum age of 18, in a seven-part electronic survey using the snowball technique for distribution. Rubrics were developed for analysis of the breast cancer risk and preventive factor responses, and statistical analysis was identified.

CHAPTER 4

RESULTS OF THE STUDY

Introduction

The purpose of this study was to develop a model to predict women's awareness of breast cancer risk and preventive factors. Such a model promised to be helpful to business leaders and health-care providers in aiding them to target specific populations of women who could be at greater risk of being diagnosed with breast cancer due to ignorance about risk and preventive factors. This information could then in turn help in planning prevention education, a new message for breast cancer campaigns, and eventually lead to lower morbidity and mortality rates, decreased health-care costs, and improved access to care related to breast cancer.

The need for such a study was supported by research and statistics that suggest the current focus of breast cancer early-detection campaigns was having minimal, if any, impact decreasing morbidity and mortality rates. This, coupled with the increased expenditure on breast cancer awareness and the increase in health-care costs for breast cancer care, suggested that something may be wrong with today's approach to breast cancer awareness education and campaigns. Thus the goal in developing a predictive model is to help identify women who are not aware of breast cancer risk and preventive factors, so they may receive supplemental breast cancer education. This study promised to give us more specifics about breast cancer knowledge among women and link those characteristics to possible predictive factors that would help in the *fight* against breast

cancer for a strategic move “to increase quality and years of healthy life” in keeping with the goals of the DHHS.

The results of the study are presented in this chapter. Both descriptive and inferential statistics are used to report the data. SPSS was utilized to organize and summarize much of this material in tables with descriptions. Six sections are presented in this chapter:

1. Frequency for General Characteristics of Sample Population
2. Frequency for Basic Health Practices and Fears of Sample Population
3. Rubric Descriptive Statistics of Sample Population
4. Predictive Model Indicators of Sample Population
5. Detecting At-Risk Status of Sample Population
6. Statistics of Sample Population.

The survey respondents were a convenience sample of 291 adult women, minimum age of 18, who responded to the online survey via surveymonkey.com using a modified snowball technique.

Frequency of General Characteristics of Sample Population

This section reports general demographic data about the sample. Reported independent variables are as identified in the survey: gender, race, age, annual household income, highest level of education, employment, health-care provider, as well as the self-reporting of physical and mental health, and BMI from self-reported height and weight. Table 8 demonstrates details of general demographic statistics for the sample population.

There were a total of 291 women respondents. Not every woman responded to all demographics. Most respondents were White at 91% (*n*=265). The lowest income

Table 8

Percentages of Demographic Characteristics of Sample Population (n=291)

Variable		*N*	%
Race (*n*=291)	White	265	91.0
	Black	10	3.4
	Other	16	5.6
Age Range (*n*=291)	20-29	49	16.8
	30-39	63	21.6
	40-49	64	21.9
	50-59	79	27.3
	60-69	30	10.3
	70-79	4	1.4
	80-89	2	0.7
Income (*n*=291)	Less than $25,000	21	7.2
	$25,000-$29,999	9	3.1
	$30,000-$39,999	26	8.9
	$40,000-$49,999	29	10.0
	$50,000-$59,999	27	9.3
	$60,000-$69,999	26	8.9
	$70,000-$79,999	24	8.2
	$80,000-$89,999	26	8.9
	$90,000-$99,999	25	8.6
	Over $100,000	55	18.9
	Over $150,000	23	7.9
Level of Education (*n*=291)	High school	46	15.8
	GED	2	0.7
	Technical school	10	3.4
	Associate's degree	41	14.1
	Bachelor's degree	103	35.4
	Master's degree	79	27.1
	Doctorate	10	3.4
Employment (*n*=291)	Employed	223	76.6
	Not employed	68	23.4
Health Care Provider (*n*=255)	I am a health care provider	113	44.3
	I am not a health care provider	142	55.7
Physical Health (*n*=179)	Very healthy	64	35.7
	Average health	109	60.9
	Poor health	6	3.4
Emotional Health (*n*=179)	Very healthy	95	53.1
	Average health	80	44.7
	Poor health	4	2.2

reported was <$25,000 at 7.2% (*n*=21) and the highest income reported was >$150,000 at 7.9% (*n*=23). The highest level of education obtained was a Doctorate at 3.4% (*n*=10) and the lowest level of education was the GED at 0.7% (*n*=2). The youngest participant was age 20 and the oldest participant was age 84. The 291 women participants were predominately employed (*n*=223). As a separate note, the self-reporting of physical and emotional health determined that 96.7% (*n*=173) and 97.8% (*n*=175) of women felt they were very healthy or in average health, respectively. Table 9 shows the measure of central tendency for some of the general demographics of the sample population.

Table 9

Central Tendency of General Demographic Characteristics of Sample Population

Variable	Mean	Median	Mode	*SD*	Sum
Income	6	7	10	3.074	291
Education	5	6	6	1.737	291

Note. Income was coded as follows: 1=less than $25,000; 2=$25-29,999; 3=$30-39,900; 4=$40-49,999; 5=$50-59,999; 6= $60-69,999; 7=$70-79,999; 8=$80-89,999; 9=$90-99,999; 10=greater than $100,000; 11=greater than $150,000. Education was coded as follows: 1=Did not graduate; 2=High school; 3=GED; 4=Technical school; 5=Associate's degree; 6=Bachelor's degree; 7=Master's degree; 8=Doctorate.

In summary, the demographic descriptors reveal that the women participants were predominantly White, 92% (*n*=265), and 70% (*n*=207) of women were ages 30-59. The education level revealed 83.5% (*n*=243) had some type of education post high school. All ranges for annual household income were noted. The majority of the participants were employed and felt they were very healthy or in average health from a physical and emotional perspective.

Frequency of Basic Health Practices and Fears of Sample Population

This section reviews data reported by respondents for health practices: health insurance, breast self-exams, mammograms, and body mass index. Data of women who fear being diagnosed with and treatment for breast cancer were also reviewed. Table 10 demonstrates details of health practices for the sample population.

There were 291 women participants surveyed; however, not every woman responded to all questions. There were 95.2% (*n*=277) who had health insurance. The percentage of women who performed a BSE was 22% (*n*=64) as compared to the percentage of women who did not perform or never performed a monthly BSE at 78% (*n*=227). The percentage of women who had an annual mammogram at age 40 or older was 1.1% (*n*=2), compared to the percentage of women who did not get annual mammograms, 17.3% (*n*=31), or never had a mammogram, 81.5% (*n*=146). When reviewing the responses to the mammogram question on the survey, a gap was found. It appears because of the way the responses were written, the participants may have selected the wrong age response (age 40 or older vs. under age 40) for their answer. The demographics were confirmed by extracting the real age, and the actual response for obtaining a mammogram is reported in Table 10.

Women participants had their body mass index (BMI) calculated by the researcher using the participant's self-reported height and weight. The BMI results showed that 61.8% (*n*=171) were either overweight, obese, or extremely obese. The women were asked if they feared being diagnosed with or having treatment associated with breast cancer. There were 65.8% (*n*=170) who responded they were either somewhat

Table 10

Percentages of Health Practices of Sample Population

Variable	*N*	%
Health Insurance (*n*=291)		
I have health insurance	277	95.2
I do not have health insurance	14	4.8
Breast Self-Exam (*n*=291)		
Monthly	64	22.1
Every other month	40	13.7
1-5 months per year	117	40.2
7-11 months per year	8	2.7
I never perform breast self-exam	62	21.3
Mammograms Under Age 40 (*n*=112)		
Every year	68	60.7
Every other year	4	3.6
Every 3-5 years	8	7.1
Every 6-10 years	4	3.6
Never	28	25.0
Mammograms Age 40 or Older (*n*=179)		
Every year	2	1.1
Every other year	4	2.2
Every 3-5 years	11	6.2
Every 6-10 years	16	8.9
Never	146	81.6
Body Mass Index (*n*=277)		
Underweight	6	2.1
Normal	100	36.1
Overweight	81	29.2
Obese	85	30.8
Extremely obese	5	1.8
Fear of Being Diagnosed With Breast Cancer (*n*=258)		
Not afraid	88	34.1
Somewhat afraid	150	58.1
Very afraid	20	7.8
Fear Treatment Associated With Breast Cancer (*n*=291)		
Not afraid	67	23.0
Somewhat afraid	131	45.0
Very afraid	93	32.0

or very afraid of being diagnosed and 77% (*n*=224) who responded they were somewhat or very afraid of having treatment for breast cancer.

Table 11 represents the central tendency for some of the basic health practices of the sample population.

Table 11

Central Tendency of Basic Health Practices of Sample Population

Variable	Mean	Median	Mode	*SD*	Sum
Breast Self-Exam	2.750	2.0	2.0	1.4890	291
Mammograms	7.200	10.0	10.0	3.7980	291
Body Mass Index	27.736	26.3	25.8	6.0332	286

Note. Breast self-exams were coded as follows: 1=Never; 2=1-5 months per year; 3=7-11 months per year; 4=Every other month; 5=Monthly. Mammograms were coded as follows for age 40 or older: 1=Every year; 3=Every other year; 5=Every 3-5 years; 7=Every 6-10 years; 9=Never. Coding for younger than age 40: 2 Every year; 4=Every other year; 6=Every 3-5 years; 8=Every 6-10 years; 10=Never.

In summary, the basic health practices reported a majority of women have health insurance, 95.2% (*n*=277). There were 22% (*n*=64) of participants who performed monthly breast self-exams and 98.8% (*n*=177) who were age 40 or older and who did obtain annual mammograms. A majority of the participants had a higher than normal BMI at 61.8% (*n*=171). The majority of the women, 65.8% (*n*=170), fear being diagnosed with breast cancer, and 77% (*n*=224) fear the treatment for breast cancer. Ezzia (2013) notes that breast cancer does remain the most feared disease among women not just because of the cancer diagnosis but because of the treatment, complications, and medicine side effects.

Rubric Descriptive Statistics of Sample Population

One part of the survey asked women to list breast cancer risk and preventive factors. In short, they responded to these statements: breast cancer risk factors that cannot be changed, lifestyle-related breast cancer risk factors that one has control over, and health recommendations likely to decrease the risk of breast cancer. The open-ended responses sought to elicit knowledge of risk and preventive factors respondents were aware of. The goal was to determine each participant's degree of breast cancer knowledge awareness, a concept too often so general that it does not often link to specific issues and specific behaviors.

The 291 women participants responded to the survey, but only these three breast cancer risk and preventive questions were scored using rubrics. Detailed information on the rubric creation, rubric scoring, details on rubrics scoring, and the procedural testing methodology is presented in Chapter 3 and samples of the rubrics are found in Appendix C.

All Participants: Breast Cancer Risk Factors That Cannot Be Changed

The rubric responses were extracted from the data and analyzed. There was a total possible score of 15 for breast cancer risk factors that cannot be changed. The dissection of knowledge levels is as follows:

1. Nineteen women (6%) did not respond, which equates to an "I don't know" response.

2. Seventeen women (5.8%) scored 0 of 15 points. They reported none of the risk factors categorized as elements (age, gender, family history, breast disease, and lifelong exposure to estrogen) and all responses were "I don't know."

3. Ninety-three women (32%) scored 1 of 15 points. Each They reported one of the five risk factors categorized as elements (family history, age, gender, breast disease, or lifelong exposure to estrogen) and all other responses were “I don’t know,” duplicative, or incorrect.

4. Sixty-six women (22%) scored 2 of 15 points. They reported two of the five risk factors categorized as elements (any combination of two of the five aforementioned factors) and all other responses were “I don’t know,” duplicative, or incorrect.

5. Twenty-two women (7.5%) scored 3 of 15 points. Each They reported three of the five risk factors categorized as elements (any combination of three of the five aforementioned factors) and all other responses were “I don’t know,” duplicative, or incorrect.

6. Twenty-four women (8%) scored 4 of 15 points. They reported three of the five risk factors categorized as elements (any combination of three of the five aforementioned factors) and scored one additional point for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

7. Twenty-five women (8.5%) scored 5 of 15 points. They reported three of the five risk factors categorized as elements (any combination of three of the five aforementioned factors) and scored two additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

8. Ten women (3.5%) scored 6 of 15 points. They reported three of the five risk factors categorized as elements (any combination of three of the five aforementioned factors) and scored three additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

9. Five women (1.7%) scored 7 of 15 points. They reported three of the five risk factors categorized as elements (any combination of three of the five aforementioned factors) and scored four additional points for a more detailed response. All other responses were "I don't know," duplicative, or incorrect.

10. Nine women (2.7%) scored 8 of 15 points. They reported three of the five risk factors categorized as elements (any combination of three of the five aforementioned factors) and scored five additional points for a more detailed response. All other responses were "I don't know," duplicative, or incorrect.

11. One woman (<1%) scored 10 of 15 points. Respondent reported all five of the risk factors categorized as elements (family history, gender, age, lifelong exposure to estrogen, and breast disease) and scored five additional points for a more detailed response. All other responses were "I don't know," duplicative, or incorrect.

Curiosity demanded to see who this one woman (#11) was who scored in the *Good* range, and which demographic and health practice characteristics she had. She was a 31-year-old Caucasian, with an Associate's degree. She is employed (not a health-care professional), has an income of $90-99,999, and has health insurance. She believed she was at risk for breast cancer and had the following breast cancer risk: gender, obesity, dense breasts, menstruation before age 12 (lifelong exposure to estrogen). Her health practices are that she never had a mammogram and performs BSE every other month. She categorizes her physical and emotional health statuses as poor.

Table 12 reflects the responses for *breast cancer risk factors that cannot be changed*.

Table 12

List Five Breast Cancer Risk Factors That Cannot Be Changed: All Rubric Results (n=291)

Scoring Detail	Scores	*N*	%
Poor	No response	19	6.5
	0	17	5.8
	1	93	32.0
	2	66	22.7
	3	22	7.6
	4	24	8.3
Fair	5	25	8.6
	6	10	3.5
	7	5	1.7
	8	9	3.0
	9	0	0.0
Good	10	1	0.3
	11	0	0.0
	12	0	0.0
	13	0	0.0
	14	0	0.0
Best	15	0	0.0

All Participants: Lifestyle-Related Breast Cancer Risk Factors

The analysis of awareness levels for lifestyle-related risk factors that one has control over were as follows with a total possible score of 12:

1. Nineteen women (6%) did not respond, which equates to an "I don't know" response.

2. Forty-nine women (16%) scored 0 of 12 points. They reported none of the risk factors categorized as elements (hormone replacement therapy, obesity, oral contraceptives, and alcohol) and all responses were "I don't know."

3. Seventy-nine women (27%) scored 1 of 12 points. They reported one of the four risk factors categorized as elements (hormone replacement therapy, obesity, oral

contraceptives, or alcohol) and all other responses were “I don’t know,” duplicative, or incorrect.

4. Eighty-five women (29%) scored 2 of 12 points. They reported two of the four risk factors categorized as elements (any combination of two of the four aforementioned factors) and all other responses were “I don’t know,” duplicative, or incorrect.

5. Thirty-two women (11%) scored 3 of 12 points. They reported two of the four risk factors categorized as elements (any combination of two of the four aforementioned factors) and scored one additional point for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

6. Fourteen women (4.8%) scored 4 of 12 points. They reported two of the four risk factors categorized as elements (any combination of two of the four aforementioned factors) and scored two additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

7. Six women (2%) scored 5 of 12 points. They reported two of the four risk factors categorized as elements (any combination of two of the four aforementioned factors) and scored three additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

8. Three women (1%) scored 6 of 12 points. They reported two of the four risk factors categorized as elements (any combination of two of the four aforementioned factors) and scored four additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

9. Three women (1%) scored 7 of 12 points. They reported three of the four risk

factors categorized as elements (any combination of three of the four aforementioned factors) and scored four additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

10. One woman (<1%) scored 8 of 12 points. Respondent reported four of the four risk factors categorized as elements and scored additional four points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

Curiosity demanded to see who this woman (#10) was who scored in the *Good* range, and which demographic and health practice characteristics she had. She was a 43-year-old Caucasian, with a Master’s degree, who was employed as a health-care professional. Her income was >$150,000 and she had health insurance. She believed she was at risk of developing breast cancer but did not have any breast cancer risk factors. Her health practices were that she had a mammogram every other year and performed BSE monthly. She self-reported having good physical and mental health statuses and had a normal BMI.

Table 13 demonstrates the rubric scores for lifestyle-related risk factors that one has control over.

All Participants: Health-Care Recommendations Likely to Decrease the Risk of Breast Cancer

The categories of awareness levels for health recommendations likely to decrease the risk of breast cancer were with a total possible score of 15:

1. Twenty-five women (8.5%) did not respond, which equates to an “I don’t know” response.

2. Forty women (13.7%) scored 0 of 15 points. They reported none of the five risk factors categorized as elements (decreasing alcohol use, losing weight, getting a

Table 13

List Four Breast Cancer Lifestyle-Related Risk Factors That One Has Control Over: All Rubric Results (n=291)

Scoring Detail	Scores	*N*	%
Poor	No response	19	6.6
	0	49	16.6
	1	79	27.2
	2	85	29.3
	3	32	11.0
Fair	4	14	4.8
	5	7	2.4
	6	2	0.7
	7	3	1.0
Good	8	1	0.3
	9	0	0.0
	10	0	0.0
	11	0	0.0
Best	12	0	0.0

mammogram, performing BSE, and stopping HRT) or one of the responses was “I don’t know.”

3. Forty-two women (14.4%) scored 1 of 15 points. They reported one of the five risk factors categorized as elements (decreasing alcohol use, losing weight, getting a mammogram, performing BSE, or stopping HRT) and all other responses were “I don’t know,” duplicative, or incorrect.

4. Forty-eight women (16.4%) scored 2 of 15 points. They reported one of the five risk factors (decreasing alcohol use, losing weight, getting a mammogram, performing BSE, or stopping HRT) and scored one additional point for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

5. Seventeen women (5.8%) scored 3 of 15 points. They reported one of the five risk factors categorized as elements (decreasing alcohol use, losing weight, getting a

mammogram, performing BSE, or stopping HRT) and scored two additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

6. Forty-six women (15.8%) scored 4 of 15 points. They reported one of the five risk factors categorized as elements (decreasing alcohol use, losing weight, getting a mammogram, performing BSE, or stopping HRT) and scored three additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

7. Thirty-eight women (13.1%) scored 5 of 15 points. They reported two of the five risk factors categorized as elements (any combination of two of the five aforementioned factors) and scored three additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

8. Fourteen women (4.8%) scored 6 of 15 points. They reported two of the five risk factors categorized as elements (any combination of two of the five aforementioned factors) and scored four additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

9. Thirteen women (4.4%) scored 6 of 15 points. They reported two of the five risk factors categorized as elements (any combination of two of the five aforementioned factors) and scored four additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

10. Five women (1.7%) scored 7 of 15 points. They reported three of the five risk factors categorized as elements (any combination of three of the five aforementioned factors) and scored four additional points for a more detailed response. All other

responses were “I don’t know,” duplicative, or incorrect.

11. Three women (1%) scored 8 of 15 points. They reported four of the five risk factors categorized as elements (any combination of four of the five aforementioned factors) and scored four additional points for a more detailed response. All other responses were “I don’t know,” duplicative, or incorrect.

Table 14 demonstrates the rubric scores for health recommendations likely to decrease the risk of breast cancer and no woman scored in the *Good* range.

Table 14

List Five Health Preventive Factors That Are Likely to Decrease Risk of Breast Cancer: All Rubric Results (n=291)

Scoring Detail	Scores	*N*	%
Poor	No response	25	8.5
	0	40	13.7
	1	42	14.4
	2	48	16.6
	3	17	5.9
	4	46	15.8
Fair	5	38	13.1
	6	14	4.8
	7	13	4.5
	8	5	1.7
	9	3	1.0
Good	10	0	0.0
	11	0	0.0
	12	0	0.0
	13	0	0.0
	14	0	0.0
Best	15	0	0.0

Health-Care Provider Rubric Scores

A subset of women participants was 113 health-care providers, which included physician and non-physician practitioners. The same rubric scoring was used for all three

risk assessments in this subset. Tables 15, 16, and 17 demonstrate rubric scores for health-care providers by survey questions: breast cancer risk factors that cannot be changed; lifestyle-related breast cancer risk factors that one has control over; and health recommendations likely to decrease the risk of breast cancer.

All health-care provider scores with regard to knowledge of breast cancer risk factors that cannot be changed were: Poor, 77.9% (*n*=88); Fair, 22.1% (*n*=25); Good, 0% (*n*=0); and Best, 0% (*n*=0). There was no health-care provider who scored in the *Good* range.

Table 15

List Five Breast Cancer Risk Factors That Cannot Be Changed: Rubric Health-Care Providers (n=113)

Scoring Detail	Scores	*N*	%
Poor	No response	0	0.0
	0	8	7.2
	1	27	23.9
	2	30	26.5
	3	11	9.7
	4	12	10.6
Fair	5	12	10.6
	6	6	5.3
	7	1	0.9
	8	6	5.3
	9	0	0.0
Good	10	0	0.0
	11	0	0.0
	12	0	0.0
	13	0	0.0
	14	0	0.0
Best	15	0	0.0

All health-care provider scores with regard to knowledge of breast cancer risk factors that one has control over were: Poor, 88.4% (*n*=100); Fair, 10.6% (*n*=12); Good,

.9% (*n*=1); and Best, 0% (*n*=0). There was no health-care provider who scored in the *Good* range.

Table 16

List Four Breast Cancer Lifestyle-Related Risk Factors That One Has Control Over: Rubric Health-Care Providers (n=113)

Scoring Detail	Scores	*N*	%
Poor	No response	0	0.0
	0	25	22.1
	1	21	18.5
	2	38	33.6
	3	16	14.2
	4	6	5.3
Fair	5	3	2.7
	6	1	0.9
	7	2	1.8
	8	1	0.9
	9	0	0.0
Good	10	0	0.0
	11	0	0.0
Best	12	0	0.0

All health-care provider scores with regard to knowledge of breast cancer preventive factors that are likely to decrease impact of breast cancer were: Poor, 67.2% (*n*=76); Fair, 32.7% (*n*=37); Good, 0% (*n*=0); and Best, 0% (*n*=0). There was no health-care provider who scored in the *Good* range.

Predictive Model Indicators of Sample Population

The predictive model indicators are frequency distribution data representing independent variables that were weighted from survey responses and include: race, age, annual household income, highest level of education, employment, health insurance,

Table 17

List Five Breast Cancer Preventive Factors That Are Likely to Decrease Impact of Breast Cancer: Rubric Health-Care Providers (n=113)

Scoring Detail	Scores	*N*	%
Poor	No response	0	0.0
	0	17	15.0
	1	13	11.5
	2	15	13.2
	3	8	7.2
	4	23	20.3
Fair	5	16	14.2
	6	7	6.2
	7	7	6.2
	8	4	3.5
	9	3	2.7
Good	10	0	0.0
	11	0	0.0
	12	0	0.0
	13	0	0.0
	14	0	0.0
Best	15	0	0.0

breast self-exams, mammograms, body mass index, and health-care provider. The rubric statements were used not only to ascertain knowledge level for each respondent but for the development of the predictive model. The following are the rubric statements with the scoring for all independent variables.

Q1. *Breast cancer risk factors that cannot be changed*. Categories include race, age, gender, family history, estrogen, and breast disease/density. The rubric scoring was 0-4 Poor, 5-9 Fair, 10-14 Good, and 15 Best.

Q2. *Lifestyle-related breast cancer risk factors that one has control over*. Categories include hormone replacement therapy, obesity, oral contraceptives, and alcohol. The rubric scoring was 0-3 Poor, 4-7 Fair, 8-11 Good, and 12 Best.

Q3. *Health recommendations likely to decrease the risk of breast cancer*. Categories include decrease alcohol use, lose weight, have mammograms, perform breast self-exams, and stop hormone replacement therapy. The rubric scoring was 0-4 Poor, 5-9 Fair, 10-14 Good, and 15 Best.

Table 18 notes rubric scores and percentages from the Fair to Poor range related to race and presents each subgroup's knowledge deficit. Results for all three questions related to race show between 90% and 100% of respondents scored in the Fair to Poor range.

Table 18

Respondents' Rubric Scores in the Fair to Poor Range Related to Race

	Q1		Q2		Q3	
Race	*N*	%	*N*	%	*N*	%
Hispanic	8	100.0	8	100.0	8	100.0
Asian	2	100.0	2	100.0	2	100.0
Middle Eastern	2	100.0	2	100.0	2	100.0
Other	4	100.0	4	100.0	4	100.0
White	246	92.8	246	92.8	240	90.5
Black	10	100.0	10	100.0	10	100.0

Table 19 displays rubric scores and percentages from the Fair to Poor range related to age and presents each subgroup's knowledge deficit. Results for all three questions related to age show between 87% and 100% of respondents scored in the Fair to Poor range. One caveat: The age range 80-89 scored 50%, but the quantity of respondents for this subgroup was very small, just two respondents.

Table 20 presents rubric scores and percentages from the Fair to Poor range related to annual household income and presents each subgroup's knowledge deficit.

Results for all three questions related to annual household income show between 84% and 100% of respondents scored in the Fair to Poor range.

Table 19

Respondents' Rubric Scores in the Fair to Poor Range Related to Age

	Q1		Q2		Q3	
Age	*N*	%	*N*	%	*N*	%
20-29	46	93.8	46	93.8	45	91.8
30-39	59	95.1	59	95.1	59	95.1
40-49	58	90.6	59	92.1	59	92.1
50-59	74	92.5	73	91.2	70	87.5
60-69	28	93.3	28	93.3	28	93.3
70-79	4	100.0	4	100.0	4	100.0
80-89	2	100.0	2	100.0	2	100.0

Table 20

Respondents' Rubric Scores in the Fair to Poor Range Related to Annual Household Income

	Q1		Q2		Q3	
Income	*N*	%	*N*	%	*N*	%
<$25,000	19	90.4	19	90.4	19	90.4
$25-29,999	9	100.0	9	100.0	9	100.0
$30-39,999	26	100.0	26	100.0	25	96.5
$40-49,999	27	93.1	27	93.1	27	93.1
$50-59,999	25	92.5	25	92.5	23	85.1
$60-69,999	23	88.4	23	88.4	22	84.6
$70-79,999	22	91.6	24	96.0	21	87.5
$80-89,999	24	92.3	24	92.3	24	92.3
$90-99,999	23	92.0	22	91.6	23	92.0
>$100,000	52	94.3	52	94.5	51	92.7
>$150,000	21	91.3	20	86.9	22	84.6

Table 21 details rubric scores and percentages from the Fair to Poor range related to employment status and presents each subgroup's knowledge deficit. Results for all

three questions related to employment show between 86% and 94% of respondents scored in the Fair to Poor range.

Table 21

Respondents' Rubric Scores in the Fair to Poor Range Related to Employment

	Q1		Q2		Q3	
Status	*N*	%	*N*	%	*N*	%
Employed	209	93.7	209	93.7	207	92.8
Not employed	62	91.1	62	91.1	59	86.7

Table 22 notes rubric scores and percentages from the Fair to Poor range related to each education level and presents each subgroup's knowledge deficit. Results for all three questions related to education level show between 82% and 100% of respondents scored in the Fair to Poor range.

Table 22

Respondents' Rubric Scores in the Fair to Poor Range Related to Education Level

	Q1		Q2		Q3	
Education Completed	*N*	%	*N*	%	*N*	%
GED	2	100.0	2	100.0	2	100.0
Technical School	10	100.0	10	100.0	10	100.0
High School	39	84.7	39	84.7	38	82.6
Associate's Degree	38	92.6	40	97.5	39	97.5
Bachelor's Degree	97	94.1	96	93.2	96	93.2
Master's Degree	75	94.9	74	93.6	72	91.1
Doctorate	10	100.0	10	100.0	10	100.0

Table 23 lists scores and percentages from the Fair to Poor range related to health insurance and presents each subgroup's knowledge deficit. Results for all three questions

related to health insurance show between 89% and 100% of respondents scored in the Fair to Poor range.

Table 23

Respondents' Rubric Scores in the Fair to Poor Range Related to Health Insurance

	Q1		Q2		Q3	
Status	*N*	%	*N*	%	*N*	%
No health insurance	14	100.0	14	100.0	14	100.0
Has health insurance	257	92.7	257	92.7	249	89.9

Table 24 highlights rubric scores and percentages from the Fair to Poor range related to and presents each subgroup's knowledge deficit. Results for all three questions related to BMI show between 84% and 100% of respondents scored in the Fair to Poor range.

Table 24

Respondents' Rubric Scores in the Fair to Poor Range Related to Body Mass Index

	Q1		Q2		Q3	
BMI	*N*	%	*N*	%	*N*	%
Normal	98	98.0	96	96.0	94	94.0
Overweight	80	98.7	81	100.0	77	95.0
Obese	73	85.8	74	85.8	72	85.7
Extremely Obese	5	100.0	5	100.0	5	100.0

Table 25 documents rubric scores and percentages from the Fair to Poor range related to being a health-care provider (or not) and presents each subgroup's knowledge

deficit. Results for all three questions, whether a health-care provider or not, show between 97% and 100% of respondents scored in the Fair to Poor range.

Table 25

Respondents' Rubric Scores in the Fair to Poor Range Related to Being a Health-Care Provider

	Q1		Q2		Q3	
Status	*N*	%	*N*	%	*N*	%
Health care provider	112	99.1	112	99.1	113	10.0
Not a health care provider	141	99.2	141	99.1	142	100.0

Detecting At-Risk Status of Sample Population

The survey asked women to respond to the statement: I am at risk to develop breast cancer. Of the 91% (*n*=265) of participants who responded, 40% (*n*=106) believed they were not at risk. The rubrics developed for the three questions were used to assess answers of these 106 respondents. Table 26 lists the criteria available from the survey and considered breast cancer risk factors that were used to identify whether these women were actually at risk. Table 26 also describes the quantity and percentages of respondents who were unaware of their own risk of breast cancer per criterion.

These women had the following risk factor results: do not perform monthly breast self-exams, 69.85 (*n*=74); body mass index greater than normal, 66% (*n*=70); 66% (*n*=70); never had a mammogram greater than age 40, 55.6% (*n*=59); menstruation before age 12, 46.2% (*n*=49); age 50 or older, 42.4% (*n*=45); first pregnancy after age 30, 37.7% (*n*=40); dense breasts, 36% (*n*=38); mother with breast cancer, 22.6% (*n*=24); currently on oral contraceptive pill, 19% (*n*=38); two or more alcohol drinks per day, 12.2%

(*n*=13); sister with breast cancer, 5.6% (*n*=6); currently on hormone replacement therapy, 5.6% (*n*=6); menopause after age 55, 5.6% (*n*=6); sister and grandmother with breast cancer, 1.8% (*n*=2); did not get annual mammograms greater than age 40, 1.8% (*n*=2); both menstruation before age 12 and menopause after age 55, 1.8% (*n*=2); both sister and mother with breast cancer, 0.9% (*n*=1).

Table 26

Respondents' Rubric Scores Demonstrating Lack of Awareness of Breast Cancer Risks

Risk Factor	*n*	%
Do not perform breast self-exams monthly	74	69.8
Body Mass Index > normal	70	66.0
Never had a mammogram greater than age 40	59	55.6
Menstruation before age 12	49	46.2
Age 50 or older	45	42.4
First pregnancy after age 30	40	37.7
Dense breasts	38	36.0
Grandmother with breast cancer	24	26.4
Mother with breast cancer	24	22.6
Currently on oral contraceptives	38	19.0
Two or more alcohol drinks per day	13	12.2
Sister with breast cancer	6	5.6
Currently on hormone replacement therapy	6	5.6
Menopause after age 55	6	5.6
Sister and grandmother with breast cancer	2	1.8
Do not get annual mammograms greater than age 40	2	1.8
Menstruation before age 12 and menopause after age 55	2	1.8

After isolating the lack of risk factor awareness, it was determined that 67% of the 106 women (*n*=71) had between four and six breast cancer risk factors that they were unaware of. This was determined by isolating this population and reviewing their responses to the survey questions. Table 27 describes women who have a lack of awareness of one or multiple breast cancer risk factors.

Table 27

Respondents With Lack of Awareness of Multiple Breast Cancer Risk Factors

Risk Factors	*n*	%
1	5	4.7
2	4	3.7
3	14	13.2
4	26	25.0
5	27	25.4
6	18	16.9
7	10	6.6
8	1	0.9
9	1	0.9

The following describes each participant's individual risk factor results: five women (4.7%) had one risk factor; four women (3.7%) had two risk factors; 14 women (13.2%) had three risk factors; 26 women (25%) had four risk factors; 27 women (25.4%) had five risk factors; 18 women (16.9%) had six risk factors; 10 women (6.6%) had seven risk factors; one woman (0.9%) had eight risk factors; one woman (0.9%) had no risk factors.

Table 28 details the age ranges for women who showed lack of awareness of their own breast cancer risk. All age ranges except the 80-89 range showed lack of awareness: 50-59, 29.2% (*n*=31); 30-39, 25.4% (*n*=27); 20-29, 17.9% (*n*=19); 40-49, 14.1% (*n*=15); 60-69, 11.3% (*n*=12); and 70-79, 1.8% (*n*=2).

In summary, for all age groups except 80-84, scores in the rubrics suggest women were unaware of their own risk on all types of breast cancer risk factors: risk factors that cannot be changed (age, gender, family history, breast disease/density, lifelong exposure to estrogen) and lifestyle-related risk factors (hormone replacement therapy, obesity, oral contraceptives, alcohol). All breast cancer risk factors were identified for these age

groups, ranging from one to nine risk factors for participants who were unaware, and all of these women scored in the *poor* to *fair* range on both of the rubric questions related to breast cancer risk:

1. Breast cancer risk factors that cannot be changed
2. Lifestyle-related breast cancer risk factors that one has control over.

Table 28

Respondents Age Ranges With Lack of Awareness of Their Own Risk

Age	*N*	%
20-29	19	17.9
30-39	27	25.4
40-49	15	14.1
50-59	31	29.2
60-69	12	11.3
70-79	2	1.8
80-89	0	0.0

Statistics of Sample Population

The "Rubric Scores" category was used as the dependent variable for the multiple linear regression analysis, which also used analysis of variance (ANOVA or *F*-test), *t*-test, and Pearson's Correlation to analyze the specific hypotheses:

1. Multiple linear regression analysis is used to identify the strength, magnitude, and significance of the relationship between the dependent and multiple independent variables. The *R* Square represents the proportion of the variance accounted for by the predictor variable predicting the dependent variable (rubric scores).

2. ANOVA was used to determine if the multiple linear regression equation used to test the hypotheses was significant. The *t*-test identified whether the specific

independent variable accounted for unique variance in the dependent variable. The Unstandardized Coefficients indicate relative weights of the independent variables in the model. The significance level denotes whether the independent variables were statistically significant predictors. The confidence level used was .1.

3. Pearson's correlation was used to examine the strength, magnitude, significance, and direction of the linear relationship between two variables.

Results of the regression analysis determine which independent variables actually predicted the variability in the dependent variables. The purpose of this analysis was to determine if the identified variables in the study would predict women's level of awareness or baseline knowledge level to influence prevention, predict earlier diagnosis, lower the morbidity and mortality rates, decrease health-care costs, and improve access to care. The outcomes of these statistical analysis procedures will be delineated within this chapter.

The rubric scores examine the relationships (simple correlations) of the rubric responses for all question categories and the independent variables. Significant relationships were not found between independent variables and the rubric scores (dependent variables) when controlling for Type 1 error buildup (Bonferroni correction).

The relationships were stated from the following hypotheses:

1. There is a relationship between age (in years) and knowledge level of breast cancer risk factors as measured by the rubric.

2. There is a relationship between race (White, Black, Other) and knowledge level of breast cancer risk factors as measured by the rubric.

3. There is a relationship between annual household income (as measured by

Question 4 on the instrument) and knowledge level of breast cancer (BC) risk factors as measured by the rubric

4. There is a relationship between education (as measured by Question 5 on instrument) and knowledge level of BC risk factors as measured by the rubric.

5. There is a relationship between basic diagnostic testing (breast self-exams as measured by Question 6 on the instrument) and knowledge level of BC risk factors as measured by the rubric.

6. There is a relationship between mammogram testing (as measured by Question 7) and knowledge level of BC risk factors as measured by the rubric.

7. There is a relationship between work status (employed and not employed) and knowledge level of BC risk factors as measured by the rubric.

8. There is a relationship between health insurance status (has insurance, does not have insurance) and knowledge level of BC risk factors as measured by the rubric.

The independent variables for five breast cancer risk factors that cannot be changed are: age, gender, family history, estrogen, and dense breasts. The F value is 1.84, the df 1 is 19, and the df^2 is 234. The p value of $\leq .02$ is significant at the .1 alpha level and no independent variables significant. Using Bonferroni's correction of .0062 level of significance, there were no significant relationships found. All of the predictive variables in the model as indicated by Table 29 accounted for 13% of the variance of the rubric for the relationship between selected demographic and the rubric scores for breast cancer risk factors that cannot be changed.

The significance level at alpha level of .1 when controlling for Type 1 error buildup is .0058. No significance is noted in the correlations of sample demographics and

risk factor variables to rubric—breast cancer risk factors that cannot be changed. Table 30 provides detail.

The independent variables for four lifestyle-related breast cancer risk factors that one has control over are: hormone replacement therapy (HRT), obesity, oral contraceptives, and alcohol. The *F* value is .960, the *df* 1 is 19, and the *df* 2 is 234. The *p* value of $\leq$.509 is significant at the .1 alpha level and shows that seven out of 16 independent variables are significant: *p* value for race White equals .489; *p* value for race Asian equals .344; *p* value for race Middle Eastern equals .078; *p* value for annual income equals .359; *p* value for education equals .367; *p* value for breast self-exams equals .318; and the *p* value for mammograms equals .248. Using Bonferroni's correction of .0062 level of significance, no significant relationships were found. All of the predictive variables in the model, as indicated by Table 31, accounted for 7.2% of the variance of the rubric score for the relationship between selected demographic and the rubric scores for lifestyle-related breast cancer risk factors that one has control over. Table 31 provides detail. The significance level at alpha level .1 when controlling for Type 1 error buildup is .0083. Significance was noted for mammograms (.009) in the correlations of sample demographic and risk factor variables to rubric—lifestyle-related breast cancer risk factors. Table 32 provides detail.

For preventive factors, the relationships were stated from eight hypotheses:

1. There is a relationship between age (in years) and knowledge level of BC preventive factors as measured by the rubric.

2. There is a significant difference between race (White, Black, Other) and knowledge level of BC preventive factors as measured by the rubric.

Table 29

Relationship Between Selected Demographics and the Rubric Scores for Breast Cancer Risk Factors That Cannot Be Changed (n=291)

Model Summary			
R	R^2	Adjusted R^2	Std. Error of the Estimate
0.360	.030	0.059	1.952

Change Statistics				
R^2 Change	*F* Change	*df1*	*df2*	Sig. *F* Change
.030	1.840	19	234	0.020

ANOVA b					
Model	*SS*	*df*	*MS*	*F*	Sig.
Regression	136.582	19	7.189	1.439	.010
Residual	1169.024	234	4.996		
Total	1305.606	253			

Coefficients-Unstandardized Coefficients			
Model	B	*t*	Sig.
(Constant)	-2.583	-1.443	.050
Real Age	-0.020	-1.284	0.200
Race White	0.923	1.147	0.253
Race Hispanic	2.027	1.780	0.076
Race Asian	1.668	0.912	0.362
Race Middle Eastern	1.836	1.015	0.311
Race Other	0.080	0.063	0.949
Annual Income	-0.064	-1.160	0.247
Education	.006	1.132	0.259
Breast Self-Exams	-0.060	-0.604	0.546
Mammogram	0.088	1.718	0.087
Employment	-0.217	-0.558	0.578
Health Insurance	0.015	-0.022	0.842
BMI Overweight	-.049	-.093	0.847
BMI Obese	.039	.078	0.859
BMI Extreme	0.650	0.747	0.450
Health Care Provider	-0.051	-2.191	0.029

Note. Participant scoring utilized rubric tables. Table measures all independent variables against rubric scores for dependent variables. Independent variables include real age, race, annual income, highest level of education, breast self-exams, mammogram, employment, health insurance, BMI, and health care provider. Excluded variable = Black (race).

Table 30

Correlations of Sample Demographic and Risk Factor Variables to Rubric: Breast Cancer Risk Factors That Cannot Be Changed (n=291)

Variable	Pearson *r*	Sig. (2-tailed)	*N*
Race	0.044	0.468	272
Income	.057	0.009	272
Education	0.069	0.258	272
Breast Self-Exams	.024	0.042	272
Mammograms	.038	0.023	272
Employment	0.008	0.889	272
Health Insurance	0.013	0.835	267
Body Mass Index	-0.065	0.292	267
Family History—sister	0.047	0.451	260
Currently on HRT	-0.011	0.860	260
Oral contraceptives	-0.028	0.656	260
First PG >30	-.000	0.006	260
Family History—mother	-0.062	0.323	260
Dense Breasts	-0.091	0.042	260
Menopause >55	-0.052	0.405	261
Menses <12	-0.050	0.410	261
Age	0.017	0.785	272

1. There is a significant difference between annual household income (as measured by Question 4 on the instrument) and knowledge level of BC preventive factors as measured by the rubric.

2. There is a significant difference between education (as measured by Question 5 on the instrument) and knowledge level of BC preventive factors as measured by the rubric.

3. There is a significant difference between basic diagnostic testing (breast self-exams as measured by Question 6 on the instrument) and knowledge level of BC preventive factors as measured by the rubric.

4. There is a significant difference between mammogram testing (as measured

by Question 7 on the instrument) and knowledge level of BC preventive factors as measured by the rubric.

Table 31

Relationship Between Selected Demographics and the Rubric Scores for Lifestyle-Related Breast Cancer Risk Factors That One Has Control Over (n=291)

Model Summary

R	R^2	Adjusted R^2	Std. Error of the Estimate
0.269a	0.072	-0.003	1.429

Change Statistics

R^2 Change	*F* Change	*df1*	*df2*	Sig. F Change
0.072	0.960	19	234	0.509

ANOVA b

Model	*SS*	*df*	*MS*	*F*	Sig.
Regression	37.283	19	1.962	0.960	0.509a
Residual	478.091	234	2.043		
Total	515.374	253			

Coefficients-Unstandardized Coefficients

Model	B	*t*	Sig.
(Constant)	1.613	1.409	.060
Real Age	0.002	0.230	0.819
Race White	0.357	0.693	0.489
Race Hispanic	0.440	0.604	0.546
Race Asian	1.107	0.947	0.344
Race Middle Eastern	2.044	-1.768	0.078
Race Other	-0.398	-0.450	0.653
Annual Income	0.032	0.920	0.359
Education	-0.504	-0.904	0.367
Breast Self-Exams	0.064	1.002	0.318
Mammogram	0.038	1.158	0.248
Employment	-0.094	-0.378	0.705
Health Insurance	-0.002	-0.006	0.996
BMI Overweight	0.324	0.658	0.511
BMI Obese	.059	0.317	0.751
BMI Extreme	0.061	.010	0.913
Health Care Provider	0.004	0.274	0.784

Note. Participant scoring utilized rubric tables. Table measures all independent variables against rubric scores for dependent variables. Independent variables include real age, race, annual income, highest level of education, breast self-exams, mammogram, employment, health insurance, BMI, and health care provider. Excluded variable = Black (race).

Table 32

Correlations of Sample Demographic and Risk Factor Variables to Rubric: Lifestyle-Related Breast Cancer Risk Factors That One Has Control Over (n=291)

Variable	Pearson *r*	Sig. (2-tailed)	*n*
Age	0.014	0.087	272
Race	0.024	0.696	272
Income	0.091	.034	272
Education	-0.034	0.577	272
Breast Self-Exams	.013	0.063	272
Mammograms	.059	0.009	272
Employment	-0.041	0.497	272
Health Insurance	-0.041	0.496	272
HRT	-0.018	0.775	260
Oral Contraceptives	0.060	0.335	260
Body Mass Index	-0.003	-0.963	265
Alcohol	.041	0.203	260

5. There is a significant difference between work status (employed, not employed) and knowledge level of BC preventive factors as measured by the rubric.

6. There is a significant difference between health insurance status (has or does not have insurance) and knowledge level of BC preventive factors as measured by the rubric.

All of the independent variables for health recommendations likely to decrease the risk of breast cancer were: decrease alcohol use, lose weight, have mammograms, perform breast self-exams, and stop hormone replacement therapy. The *F* value is 1.439, the *df* 1 is 19, and the *df* 2 is 234. The *p* value of $\leq$ .110 is significant at the .0 alpha level and shows three out of 16 independent variables were significant: *p* value for race Hispanic equals .076, *p* value for mammograms equals .087, and the *p* value for health care provider equals .029. Using Bonferroni's correction of .0062 level of significance, there were no significant variables. All of the predictive variables in the model, as

indicated in Table 33, accounted for 10.5% of the variance of the rubric score for the relationship between selected demographic and rubric scores for health recommendations likely to decrease the risk of breast cancer. Table 33 provides detail.

The significance level at alpha level .1 when controlling for Type I error buildup is .0090. Significance is noted in the correlations of sample demographics and risk factor variables to rubric: health recommendations likely to decrease the risk of breast cancer. Table 34 provides detail.

Bonferroni's correction was calculated to control for Type I error buildup. The overall correction was made to keep the .1 alpha level constant. Bonferroni correction was calculated for specific tables: Table 29 is .0062; Table 30 is .0058; Table 31 is .0062; Table 32 is .0083; Table 33 is .0062; Table 34 is .0090. Using Cohen's (1988) estimate power, the power was determined to be 0.98+ when little f^2 is at a .1 significance level (n=266).

Summary

In this chapter, general descriptive statistics for each independent variable were reported: gender, race, age ranges, annual household income, highest level of education, employment, health insurance, breast self-exams, and mammograms. Other independent variables included in the frequency distribution are health-care provider and body mass index. The rubric frequency for predictive model indicator data for general health practices was reported using the rubric responses and represents independent variables that were rated and include: race, age, annual household income, highest level of education, employment, health insurance, breast self-exams, mammograms, body mass index, and health-care provider.

Table 33

Relationship Between Selected Demographics and the Rubric Scores for Health Recommendations Likely to Decrease the Risk of Breast Cancer (n=291)

Model Summary

R	R^2	Adjusted R^2	Std. Error of the Estimate
0.323a	.005	0.032	2.235

Change Statistics

R^2 Change	*F* Change	*df1*	*df2*	Sig. *F* Change
000.005	1.439	19	234	.010

ANOVA b

Model	*SS*	*df*	*MS*	*F*	Sig.
Regression	136.582	19	7.189	1.439	.010a
Residual	1169.024	234	4.996		
Total	1305.606	253			

Coefficients-Unstandardized Coefficients

Model	B	*t*	Sig.
(Constant)	2.583	1.443	.050
Real Age	0.020	1.284	0.200
Race White	0.923	1.147	0.253
Race Hispanic	2.027	1.780	0.076
Race Asian	1.668	0.912	0.362
Race Middle Eastern	1.836	1.015	0.311
Race Other	0.080	0.063	0.949
Annual Income	-0.064	-1.160	0.247
Education	.006	1.132	0.259
Breast Self-Exams	-0.060	-0.604	0.546
Mammogram	0.088	1.718	0.087
Employment	-0.217	-0.558	0.578
Health Insurance	0.015	-0.022	0.842
BMI Overweight	-.049	-.093	0.847
BMI Obese	.039	.078	0.859
BMI Extreme	0.650	0.747	0.450
Health Care Provider	-0.051	-2.191	0.029

Table 34
Correlations of Sample Demographic and Risk Factor Variables to Rubric: Health Recommendations Likely to Decrease the Impact of Breast Cancer (n=291)

Variable	Pearson *r*	Sig. (2 tailed)	*N*
Age	.0750	0.004	266
Race	-0.0001	0.985	266
Income	0.0310	0.611	266
Education	0.0450	0.467	266
Employment	-0.0020	0.970	266
Health Insurance	-0.0180	0.773	266
Mammograms	.0880	0.002	266
Breast Self-exams	0.0260	0.669	266
Fear Breast Cancer Diagnosis	0.0560	0.371	258
Fear Breast Cancer Treatment	0.0350	0.575	258

The at-risk frequency distribution data show women who were unaware of their own risk of breast cancer as well as potential ways to prevent or alleviate the disease. The *risk factors* from the rubrics were used: age 50 or older, sister with breast cancer, mother with breast cancer, grandmother with breast cancer, sister and mother with breast cancer, sister and grandmother with breast cancer, first pregnancy after age 30, more than two alcohol drinks per day, menstruation before age 12, menopause after age 55, both menstruation before age 12 and menopause after age 55, and BMI. In addition to these risk factors, several other factors that placed individuals at greater risk were the failure to follow *health recommendations from the rubrics:* perform monthly breast self-exam, obtain annual mammogram greater than age 40.

The reported rubric frequency distribution data corresponded with the three rubric statements: *Breast cancer risk factors that cannot be changed, lifestyle-related breast cancer risk factors that one has control over,* and *health recommendations likely to decrease the risk of breast cancer.*

The reported rubric regression data used multiple linear regression, ANOVA (analysis of variance), *t*-test, and *F*-test. Multiple regression was performed on each hypothesis and the results reported.

Chapter 5 will present results from Chapter 4, discuss the findings, provide conclusions, and make recommendations for outreach, education, and future research.

CHAPTER 5

SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter reviews this study's research process, and summarizes and discusses findings. It also provides concise recommendations. First, a brief summary of the background and problem is provided. Second, the purpose is stated. Third, the conceptual framework is reviewed which guided the overall thinking during this research. Special attention is paid to the work of Orem and her theory of self-care and self-care deficit. Fourth, the main research design is explained. Fifth, findings related to the research questions and hypotheses are reviewed. Sixth, the main findings are summarized, highlighting some key discoveries. Also, a sample description is provided, basic results are reported, and specific information related to the characteristics of survey respondents is shared. Seventh, findings are interpreted and breast cancer awareness is linked to Orem's theory. In short, specific conclusions are made and, finally, eighth, recommendations are made for women, health-care providers, business leaders, and researchers.

Background and Problem

Hundreds of women. Thirty years. Dozens of similar questions. Shared confusion and lack of information. One disease. These were the reasons behind becoming an

advocate for women's health. Years of nursing experience and coming into contact with women diagnosed with breast cancer have led to the necessity of this breast cancer awareness research. Casual communication with women having breast cancer identified that not one of them knew the cause of her breast cancer; and when asked about risk factors or preventive measures, the identical response was repeated: "I really don't know." The need to develop a model that predicts women's awareness of breast cancer risk and preventive factors has been supported by many breast cancer statistics, current breast cancer trends, the cost of breast cancer care, current scope of breast cancer awareness, and the ongoing efforts of how breast cancer information is disseminated. A predictive model that targets a specific population of women with lack of knowledge in breast cancer risk and preventive factors can eventually impact breast cancer statistics, alter future trends, enhance the scope of awareness, and ultimately have a more effective approach and delivery of breast cancer information.

Despite the research statistics reported by ACS claiming that the incidence of breast cancer has decreased, U.S. women are still being diagnosed with and dying from breast cancer in record numbers, and it has remained as the second overall cause of death for women (CDC, 2013a). Breast cancer data from the ACS (2001a) have remained steady: In 2001, 192,200 women were diagnosed and 40,600 women died from breast cancer. In 2009, the ACS (2009c) reported that 193,370 women were diagnosed and 40,170 women died from breast cancer. The 2010 statistics by ACS (2010b) showed women's increased morbidity rates (207,090) and mortality rates (40,230). The lifetime statistic has not changed; it remains that the chance of a women developing breast cancer in her lifetime is one-in-eight (ACS, 2009c, 2012e; MedlinePlus, 2012), which suggests

that risky behaviors continue to have a major impact for breast cancer morbidity and mortality. Breast cancer deaths have decreased approximately 1% since 2001 (*n*=370); however, it was noted that this was merely an example of a trivial change of questionable significance.

Breast cancer awareness campaigns promote early detection, not specific breast cancer risk factors, and they have not provided specific information on limiting risk. The same message is shared for early detection and fundraising. Television, internet, and other media throughout the month of October support the same premise. Unless an individual specifically initiates research regarding breast cancer risk and preventive factors, the risks and preventive factors are typically unknown and are not included in the standard message of the breast cancer awareness campaign.

Purpose of the Study

The purpose of this study was to develop a model that predicted women's awareness and baseline knowledge level for breast cancer risk and prevention factors. Such a model promised to help target groups of women who needed more education and intervention (self-care) to lower morbidity and mortality rates.

Conceptual Framework and Orem

Dorothea Orem's theory of self-care and self-care deficit (Orem, 1995) guided this study. To explain, Orem was a renowned nurse theorist. Her concepts of nursing practice were described in two inter-related theories: self-care and self-care deficit. Her timeless nursing theoretical framework has been guiding nursing leadership since the 1950s. Fawcett (1995) summarized by stating that "the initial impetus for public articulation of Orem's theory of self-care and basic conditioning factors was to formulate

a framework of general internal and external elements that give definition to and organization for accruing knowledge for research" (Fawcett, 1995, p. 278).

Self-Care

Orem's (1995) theory of self-care connected the disease process (breast cancer) to limitations in health care (awareness, education, resources, and prevention). Orem's nursing theory had a central idea of learned behavior and a rational response to need. Women making conscious decisions and being proactive are initiatives that foster self-care.

Self-Care Deficit

Orem's (1995) theory of self-care deficit recognizes that deviations in health occur. Once the health deficit is identified, then the relational framework develops, which is inclusive of three elements: (a) patient, (b) nurse, and (c) care that is needed. Orem focuses on self-care as the central idea and prepares the patient for health deviations and optimal recovery.

Basic Conditioning Factors

Basic conditioning factors substantiate why limitations occur. According to Orem (1995), they include age, gender, developmental state, health status, sociocultrual orientation, health-care system factors, environmental factors, patterns of living, and resource availability. Many of these factors parallel breast cancer risk factors.

Research Design

The study was quantitative, examining women's knowledge of breast cancer. It assessed women's knowledge of risk and preventive factors, and related their

demographic characteristics to their own risk. The findings of the study were also to be used to develop a predictive model that could have guided business leaders and health-care providers in determining the gaps in breast cancer awareness among certain populations of women.

The research design for this study was ex post facto (Newman & McNeil, 1998), where variables are assigned and have already occurred. Since the variables could not have been manipulated, causation could not be determined. However, inferences could be made about relationships among the variables. The research study was conducted using an electronic, online survey via surveymonkey.com with a modified snowball technique. This technique provided maximum distribution and an opportunity for an increased response rate for the survey. The survey was open for 6 months and had 291 respondents.

The survey was developed after an extensive literature review was conducted on breast cancer risk and preventive factors. The survey was then reviewed by two field experts. In correlation with the ACS-supported classifications of breast cancer risk factors, the survey collected data in two risk categories: risk factors that cannot be changed (age, gender, family history, breast disease/density, and life exposure to estrogen) and lifestyle-related breast cancer risk factors (hormone replacement therapy, obesity, oral contraceptives, and alcohol). The survey also collected data in a preventive category: *Health recommendations likely to decrease the risk of breast cancer* (decrease alcohol intake, lose weight, have annual mammograms, perform monthly breast self-exams, and stop/avoid hormone replacement therapy).

Rubrics were used as part of the analysis process. They were used to create a common score for the questions. Steps in developing the rubric instrument took reliability

and validity estimates into consideration, as previously noted in Chapter 3 in Survey Design. Content validity estimates for the instrument and rubrics were performed by a panel of three medical and non-medical professionals who reviewed and obtained similar scores in the *Fair* to *Poor* range. After the third mock survey was reviewed, there was 100% agreement on the process and procedure for the finalization of the rubrics.

The rubrics were developed using a procedural testing methodology, a new term applied to the process of refining the rubrics. This process consisted of mock surveys being distributed, scored, analyzed, revised, and redistributed until each rubric was reworked without bias or prejudice. The refinement of the scoring rubrics was the most crucial piece of development, confirming consistency existed with like or similar terms as acceptable responses. It was the rubrics' consistency which determined the specific outreach to women.

Sample

There were 291 women who participated in the study. Table 8 shows the percentages of demographic characteristics of the sample population. Table 10 shows the percentages of health practices reported by the sample population.

Review of Research Questions

This section reviews the research questions and summarizes the findings of the study that relate to each of the research questions. Further discussion is found later in the chapter in Breast Cancer Risk Factors That Cannot Be Changed, Lifestyle-Related Breast Cancer Risk Factors, and Health Recommendations Likely to Decrease the Risk of Breast Cancer.

RQ1: Do women know breast cancer risk factors? The answer is *no*. More than 99% of women were not aware of breast cancer risk factors, and the overall rubric scoring for both risk factor categories was in the *Fair* to *Poor* range. The rubric responses were extracted from the data and analyzed to answer this question.

RQ2: Do women know breast cancer preventive factors? The answer is *no.* More than 99% of women were not aware of breast cancer preventive factors, and the overall rubric scoring for both risk factor categories was in the *Fair* to *Poor* range. The rubric responses were extracted from the data and analyzed to answer this question.

RQ3: What is the relationship between women's own personal risk and their knowledge of breast cancer risk factors? The relationship is *not favorable*. There were 106 women who responded they were *not* at risk to develop breast cancer, yet all of these women had at least one, and up to nine, breast cancer risk factor(s).

RQ4: Is there a difference in women's awareness of breast cancer risk factors according to age, race, household income, education, breast self-exams, mammogram testing, work status, or health insurance status? The answer is *no.* There remained a lack of awareness of breast cancer risk factor knowledge for these women no matter the demographic, and the rubric scores were in the *Fair* to *Poor* range.

RQ5: Is there a difference in women's awareness of breast cancer preventive factors according to age, race, household income, education, breast self-exams, mammogram testing, work status, or health insurance status? The answer is *no.* There remained a lack of awareness of breast cancer preventive factor knowledge for these women no matter the demographic, and the rubric scores were in the *Fair* to *Poor* range.

RQ6: Are women fearful of being diagnosed with breast cancer? The answer is *Yes;* 65.8% of women responded that they do fear being diagnosed with breast cancer.

RQ7: Are women fearful of receiving treatment for breast cancer? The answer is *Yes;* 77% of women responded that they do fear the treatment associated with breast cancer.

RQ8: Do women who have health insurance use their medical benefits for preventive practice and early detection? The answer is *No*; there were 179 women age 40 or older who responded and only 1.1% (*n*=2) of these obtained an annual mammogram. More than 95% of these women had health insurance.

RQ9: Do women who do not have health insurance utilize community screenings that are available for preventive practice and early detection? It is undeterminable if these women obtained a mammogram for screening or diagnostic purposes. However, 73.2% (*n*=72) did have a mammogram. Only 26.8% (*n*=30) never had a mammogram.

Breast Cancer Risk Factors That Cannot Be Changed

Age, gender, family history, breast disease/density, and lifelong exposure to estrogen were the factors considered to be the baseline knowledge level for risk factors that cannot be changed. The highest score attainable was 15.

The rubric scoring that was developed for knowledge of breast cancer risk factors that cannot be changed was: 0-4 Poor; 5-9 Fair; 10-14 Good; 15 Best. While it was suggested that asking women to list only five element responses limited them, it was the detail within the narrative response that evaluated their knowledge level. The goal was to encourage responses. The participant scores were: Poor, 83.3% (*n*=241); Fair, 16.8% (*n*=49); Good, <1% (*n*=1); Best, 0% (*n*=0).

This rubric was developed to ascertain both reported responses as baseline knowledge level and assess if the responses had the details and specifics imbedded within these risk factor categories. The majority of self-reported responses were similar generalized statements with the same meaning as defined by the rubric, just stated in different terms: family history, genetics, and heredity. There was also a common occurrence of wrong responses, which included stress, smoking, breast size, air and water pollution, food additives, and drugs. A majority of responses were "I don't know." The "I don't know" responses, coupled with the duplicative and incorrect responses aforementioned, demonstrated that more than 99% of survey respondents were not aware of breast cancer risk factors that cannot be changed. There was a descriptive significance from the rubric scores, resulting in the *Fair* to *Poor* range for all categories.

Lifestyle-Related Risk Factors That One Has Control Over

Hormone replacement therapy, obesity, oral contraceptives, and alcohol were the factors considered to be the baseline knowledge level for lifestyle-related breast cancer risk factors. The highest score attainable was 12.

The rubric scores for knowledge of lifestyle-related risk factors that one has control over were: 0-3 Poor; 4-7 Fair; 8-11 Good; 12 Best. While it was suggested that asking women to list only four element responses limited them, it was the detail within the narrative response that evaluated their knowledge level. The goal was to encourage responses. The participant scores were: Poor, 84% (n=264); Fair, 9% (n=26); Good, <1% (n=1); Best, 0% (n=0).

This rubric was developed to ascertain both reported responses as baseline knowledge level and assess if the responses had the details and specifics imbedded within

these risk factor categories. The majority of self-reported responses were similar generalized statements with the same meaning as defined by the rubric, just stated in different terms: overweight, being fat, obesity. There was also a common occurrence of wrong responses, which included stress, smoking, breast feeding, breast implants, deodorant use, wearing wired bras, and caffeine use. A majority of responses were "I don't know." The "I don't know" responses, coupled with the duplicative and incorrect responses aforementioned, demonstrated that more than 99% of survey respondents were not aware of lifestyle-related breast cancer risk factors that one has control over. There was a descriptive significance from the rubric scores, resulting in the *Fair* to *Poor* range for all categories.

Health Recommendations Likely to Decrease the Risk of Breast Cancer

Decreasing alcohol use, losing weight, having annual mammograms, performing BSE monthly, and decreasing or stopping HRT were considered the baseline knowledge level for likely to decrease the risk of breast cancer. The highest score attainable was 15.

The rubric scoring that was developed for knowledge of likely to decrease the risk of breast cancer were: 0-4 Poor; 5-9 Fair; 10-14 Good; 15 Best. While it was suggested that asking women to list only five element responses limited them, it was the detail within the narrative response that evaluated their knowledge level. The goal was to encourage responses. The participant scores were: Poor, 66% (n=218); Fair, 24% (n=73); Good, <1% (n=1); Best, 0% (n=0).

This rubric was developed to ascertain both reported responses as baseline knowledge level and assess if the responses had the details and specifics imbedded within these risk factor categories. The majority of self-reported responses were similar

generalized statements with the same meaning as defined by the rubric, just stated in different terms: lose weight, lower body weight, eat healthier. There was also a common occurrence of wrong responses, which included stress, smoking, breast feeding, sun exposure, deodorant use, caffeine use, and medications. A majority of responses were "I don't know." The "I don't know" responses, coupled with the duplicative and incorrect responses aforementioned, demonstrated that more than 99% of survey respondents were not aware of health recommendations likely to decrease the risk of breast cancer. There was a descriptive significance from the rubric scores, resulting in the *Fair* to *Poor* range for all categories.

Evaluation of Hypotheses

The research hypotheses examined a variety of variables for the correlational relationship with Orem's BCF and the breast cancer risk and preventive factors.

Breast Cancer Risk Factors

Hypothesis 1: There is a relationship between age (in years) and knowledge level of BC risk factors as measured by the rubric.

Breast cancer risk factors that cannot be changed: Outcome: Given Bonferroni correction, no significant relationship was found between age and knowledge level. Without the Bonferroni correction, no significant relationship was found between age and knowledge level.

Lifestyle-related risk factors that one has control over: Outcome: Given Bonferroni correction, no significant relationship was found between age and knowledge level. However, without Bonferroni correction, a significant relationship was found between age and knowledge level, showing a positive linear relationship.

Hypothesis 2: There is a relationship between race (White, Black, Other) and knowledge level of BC risk factors as measured by the rubric.

Breast cancer risk factors that cannot be changed: Outcome: Given Bonferroni correction, no significant relationship was found between race and knowledge level. Without the Bonferroni correction, no significant relationship was found between race and knowledge level.

Lifestyle-related risk factors that one has control over: Outcome: Given Bonferroni correction, no significant relationship was found between race and knowledge level. Without Bonferroni correction, no significant relationship was found between race and knowledge level.

Hypothesis 3: There is a relationship between annual household income (as measured by Question 4 on instrument) and the knowledge level of BC risk factors as measured by the rubric.

Breast cancer risk factors that cannot be changed: Outcome: Given Bonferroni correction, no significant relationship was found between annual household income and knowledge level. However, without Bonferroni correction, a significant relationship was found between annual household income and knowledge level, showing a positive linear relationship.

Lifestyle-related risk factors that one has control over: Outcome: Given Bonferroni correction, no significant relationship was found between annual household income and knowledge level. Without Bonferroni correction, no significant relationship was found between annual household income and knowledge level.

Hypothesis 4: There is a relationship between education (as measured by Question 5 on instrument) and knowledge level of BC risk factors as measured by the rubric.

Breast cancer risk factors that cannot be changed: Outcome: Given Bonferroni correction, no significant relationship was found between education and knowledge level. Without Bonferroni correction, no significant relationship was found between education and knowledge level.

Lifestyle-related risk factors that one has control over: Outcome: Given Bonferroni correction, no significant relationship was found between education and knowledge level. Without Bonferroni correction, no significant relationship was found between education and knowledge level.

Hypothesis 5: There is a relationship between basic diagnostic testing (BSE as measured by Question 6 on the instrument) and knowledge level of BC risk factors as measured by the rubric.

Breast cancer risk factors that cannot be changed: Outcome: Given Bonferroni correction, no significant relationship was found between BSE and knowledge level. However, without Bonferroni correction, a significant relationship was found between BSE and knowledge level, showing a positive linear relationship.

Lifestyle-related risk factors that one has control over: Outcome: Given Bonferroni correction, no significant relationship was found between age and knowledge level. However, without Bonferroni correction, a significant relationship was found between BSE and knowledge level, showing a positive linear relationship.

Hypothesis 6: There is a relationship between mammogram testing (as measured by Question 7 on the instrument) and knowledge level of BC risk factors as measured by the rubric.

Breast cancer risk factors that cannot be changed: Outcome: Given Bonferroni correction, no significant relationship was found between mammogram and knowledge level. However, without Bonferroni correction, a significant relationship was found between mammogram and knowledge level, showing a positive linear relationship.

Lifestyle-related risk factors that one has control over: Outcome: Given Bonferroni correction, no significant relationship was found between mammogram and knowledge level. However, without Bonferroni correction, a significant relationship was found between household income and knowledge level, showing a positive linear relationship.

Hypothesis 7: There is a relationship between work status (employed and not employed) and knowledge level of BC risk factors as measured by the rubric.

Breast cancer risk factors that cannot be changed: Outcome: Given Bonferroni correction, no significant relationship was found between work status and knowledge level. However, without Bonferroni correction, no significant relationship was found between work status and knowledge level, showing a positive linear relationship.

Lifestyle-related risk factors that one has control over: Outcome: Given Bonferroni correction, no significant relationship was found between work status and knowledge level. However, without Bonferroni correction, no significant relationship was found between work status and knowledge level.

Hypothesis 8: There is a relationship between health insurance status (has insurance, does not have insurance) and knowledge level of BC risk factors as measured by the rubric.

Breast cancer risk factors that cannot be changed: Outcome: Given Bonferroni correction, no significant relationship was found between health insurance status and knowledge level. However, without Bonferroni correction, no significant relationship was found between health insurance status and knowledge level.

Lifestyle-related risk factors that one has control over: Outcome: Given Bonferroni correction, no significant relationship was found between health insurance status and knowledge level. However, without Bonferroni correction, no significant relationship was found between health insurance status and knowledge level.

Although the elements as identified as the specific breast cancer risks for *breast cancer risk factors that cannot be changed* were not included as hypotheses, with or without Bonferroni correction, there was no significant relationship between these elements (family history in general, family history mother, dense breasts, menopause greater than age 55, and menses before age 12) and knowledge level. For the elements identified as the specific breast cancer risks for *lifestyle-related breast cancer risk factors that one has control over*, again there was no significant relationship between these elements (hormone replacement therapy, oral contraception, body mass index, and alcohol use) and knowledge level.

Breast Cancer Preventive Factors

Hypothesis 9: There is a relationship between age (in years) and knowledge level of BC preventive factors as measured by the rubric.

Health recommendations likely to decrease the risk of breast cancer risk: Outcome: Given Bonferroni correction, a significant relationship was found between age and knowledge level, showing a positive linear relationship. In addition, without Bonferroni correction, a significant relationship was also found between age and knowledge level, showing a positive linear relationship.

Hypothesis 10: There is a relationship between race (White, Black, Other) and knowledge level of BC preventive factors as measured by the rubric.

Health recommendations likely to decrease the risk of breast cancer risk: Outcome: Given Bonferroni correction, no significant relationship was found between race and knowledge level. Without Bonferroni correction, no significant relationship was found between race and knowledge level.

Hypothesis 11: There is a relationship between annual household income (as measured by Question 4 on the instrument) and knowledge level of BC preventive factors as measured by the rubric.

Health recommendations likely to decrease the risk of breast cancer risk: Outcome: Given Bonferroni correction, no significant relationship was found between annual household income and knowledge level. Without Bonferroni correction, no significant relationship was found between annual household income and knowledge level.

Hypothesis 12: There is a relationship between education (as measured by Question 5 on the instrument) and knowledge level of BC preventive factors as measured by the rubric.

Health recommendations likely to decrease the risk of breast cancer:

Outcome: Given Bonferroni correction, no significant relationship was found between education and knowledge level. Without Bonferroni correction, no significant relationship was found between education status and knowledge level.

Hypothesis 13: There is a relationship between basic diagnostic testing (BSE as measured by Question 6 on the instrument) and knowledge level of BC preventive factors as measured by the rubric.

Health recommendations likely to decrease the risk of breast cancer:

Outcome: Given Bonferroni correction, no significant relationship was found between BSE and knowledge level. Without Bonferroni correction, no significant relationship was found between BSE and knowledge level.

Hypothesis 14: There is a relationship between mammogram testing (as measured by Question 7 on the instrument) and knowledge level of BC preventive factors as measured by the rubric.

Health recommendations likely to decrease the risk of breast cancer:

Outcome: Given Bonferroni correction, a significant relationship was found between mammogram and knowledge level, showing a positive linear relationship. In addition, without Bonferroni correction, a significant relationship was also found between mammogram and knowledge level, showing a positive linear relationship.

Hypothesis 15: There is a relationship between work status (employed, not employed) and knowledge level of BC preventive factors as measured by the rubric.

Health recommendations likely to decrease the risk of breast cancer:

Outcome: Given Bonferroni correction, no significant relationship was found between

work status and knowledge level. Without Bonferroni correction, no significant relationship was found between work status and knowledge level.

Hypothesis 16: There is a relationship between health insurance status (has insurance, does not have insurance) and knowledge level of BC preventive factors as measured by the rubric.

Health recommendations likely to decrease the risk of breast cancer:
Outcome: Given Bonferroni correction, no significant relationship was found between health insurance status and knowledge level. Without Bonferroni correction, no significant relationship was found between health insurance status and knowledge level.

Findings With Key Discoveries

This section presents a full narrative description of the findings addressed in the previous chapter. The sample was not representative of the population because of the snowball technique used for survey distribution.

General Demographic Characteristic Statistics

One main focus within the study is the demographic variables: gender, race, age ranges, annual household income, education, employment, health-care provider, and self-reported physical and emotional health. These results represent the overall survey participants:

1. Surveys submitted by women, age 18 or older, were included and analyzed.
2. There were 291 respondents, predominantly White (*n*=265, 92.3%).
3. The cumulative age range of respondents was 20 to 84; age 50-59 was most selected (*n*=79, 27.3%).

4. Annual household income most selected was greater than $100,000 (*n*=55, 18.9%).

5. The most commonly selected response to highest level of education was Bachelor's degree (*n*=103, 35.4%).

6. The majority of women were employed (*n*=223, 76.6%) and 48.8% of the employed women were not health-care providers (*n*=142).

7. The majority of women self-reported to be in good physical (*n*=173, 96.7%) and emotional health (*n*=175, 97.8%).

Health Practices and Fears

Another focus within the study was the demographic variables pertaining to basic health practices and fears: insurance status, BSE, mammograms, BMI, and fears. These findings represent the sample in regard to health practices and fears. The majority of respondents had health insurance (*n*=277, 95.2%). The most common response to performing BSE was one to five times per year (*n*=117, 40.2%). Regarding obtaining mammograms for under age 40, the most common response was annual mammogram (*n*=67, 59.8%) and the most common response for respondents age 40 or older was never had a mammogram (*n*=146, 81.5%). The majority of women had a higher than normal BMI (*n*=171, 61.8%). The majority of women feared being diagnosed with breast cancer (*n*=170, 65.8%) and feared treatment for breast cancer (*n*=224, 77%).

Rubric Descriptive Statistics

The majority of the respondents (*n*=291, 99%) and all of the health-care providers (*n*=113, 100%) scored *Fair* to *Poor* for all three rubric statements, confirming a knowledge deficit in all three rubrics. The total possible scores for the following

questions are 15, 12, and 15 for breast cancer risk factors that cannot be changed, lifestyle-related risk factors, and health recommendations likely to decrease the risk of breast cancer, respectively.

Predictive Model Indicators

An additional focus of the study centered on responses to ascertain the knowledge level for each respondent and categorize these responses. The overall scores were very high as they relate to knowledge deficit of breast cancer risk and preventive factors. Responses are noted below by demographics:

1. Race: All races had a knowledge deficit of 90%. Hispanic, Asian, Middle Eastern, and Other each had a 100% knowledge deficit.
2. Age: All ages had a knowledge deficit of 90%. Age ranges 80-89 and 70-79 each had a 100% knowledge deficit.
3. Annual household income: All annual household income levels had a knowledge deficit of 85%. For incomes $30-39,999 and $25-29,999, both had a 100% knowledge deficit.
4. Employment: Employed women had a greater knowledge deficit (86%) than women not employed (14%).
5. Highest education level: All education levels had a knowledge deficit of 82%. For education levels GED, Technical school, and Doctorate, respondents had a 100% knowledge deficit.
6. Health Insurance: Although respondents with health insurance had knowledge deficit of 90%, women with no health insurance had a knowledge deficit of 100%.
7. BMI: Overweight and obese participants had a total knowledge deficit

between 85% and 95%. Extremely obese respondents had a knowledge deficit of 100%.

8. Health-care providers: Providers had a knowledge deficit of 97%. Non-health-care providers had a knowledge deficit of 100%.

Women Unaware of Being at Risk

Respondents (*n*=265, 91%) responded to the statement: I am at risk to develop breast cancer, and 40% (*n*=106) of these respondents believed they were not at risk. Analysis of this question against breast cancer risk factors produced numerous discoveries:

1. Of the 40% of respondents who believed they were not at risk, all 106 of these women had at least one risk factor; some had as many as nine risk factors. Mode: five risk factors (25.4%); Median: seven risk factors (6.6%).

2. All age ranges, excluding 80-89, responded believing they were not at risk. Mode: 50-59 (29.2%); Median: 40-49 (*n*=15, 14.1%).

3. The risk factors mirrored the rubrics. The most frequent risk factor was not performing breast self-exam monthly (21.3%), next was having a high BMI (66%), and third was never having a mammogram (55.6%).

4. All women identified as at risk scored *Fair* to *Poor* when responses were evaluated using the rubrics developed for awareness of breast cancer risk and prevention.

5. The total *Good* and *Best* scores for breast cancer risk factors that cannot be changed was 0.4%, leaving 99.6% of women who scored *Fair* to *Poor*.

6. The total *Good* and *Best* scores for lifestyle-related risk factors that one has control over was 0.3%, with the remaining 99.7% of women scoring *Fair* to *Poor*.

7. The overall *Good* and *Best* scores for health recommendations likely to

decrease the risk of breast cancer was 1.1%, the difference being 98.9% of women who scored *Fair* to *Poor*.

Conclusions

Although the sample was not representative of the population, the findings of the study bring significant concern for women's knowledge of breast cancer risk and preventive factors. In addition, these findings are very frightening, and these results are more conservative when compared to the general population. There are three definitive conclusions resulting from this study: (a) Women in this study did not report knowing breast cancer risk and preventive factors, (b) from demographic data women did not know they were at risk, and (c) a predictive model could not be developed.

The research literature shows (Amin et al., 2009; Jarvandi et al., 2002; Seif & Aziz, 2000; Qiuping et al., 2006; Skinner et al., 1998) even from an international perspective as addressed earlier in this study (Chapter 2, p. 21), women do not know or understand breast cancer risk and preventive factors. These same studies supported the fact that women were at risk and were not aware. Because of the lack of variability in the rubric results, a predictive model could not be developed. No matter whether measured by age, race, household income, or another independent or demographic variable, the alarming truth states that 99% of these women had a knowledge deficit in regard to breast cancer risk and prevention. Was the scoring too hard? The answer is no. The rubrics have four main categories: *elements* which are the breast cancer risk or preventive factors, an ordinal *score* that measured the detail of knowledge, the *detail narrative* describing the specificity as it relates to the element, and the *scoring detail* that determines to which classification category (best, good, fair, or poor) the score belongs.

ACS (2009d) and NCI (2009) studies were examined to discover the elements and detail narrative. Could it really be that these women are not aware of breast cancer risk and preventive factors? The answer is yes. The rubrics calculated that the survey participants all scored in the *Fair* to *Poor* range for: (a) breast cancer risk factors that cannot be changed, (b) lifestyle-related breast cancer risk factors, and (c) health recommendations likely to decrease the risk of breast cancer. It appears that there is a universal crisis relating to women's lack of breast cancer risk and preventive awareness. These astonishing conclusions bring about concern related to outreach and education.

Limitations

Several limitations were identified: (a) Wording of the survey; (b) Participants' understanding the survey; (c) Rubric scoring; (d) Sample; and (e) Recipient of survey.

The Office of Behavioral & Social Science Research (OBSSR, 2013) states:

> A difficult task in creating a questionnaire is translating a researcher's questions into items that are succinct and simple for the respondent to understand and provide accurate answers. In general, a survey should contain only one idea per question; be written in neutral language to avoid leading the respondents to a specific answer; use simple language so less educated respondents understand the question; and contain response options that are simple, clear and consistent and have a full range of responses that might occur. (p. 11)

In reviewing the OBSSR list, be written in neutral language to avoid leading the respondent to a specific answer, use simple language so less educated respondent understand the question, and contain response options that are simple, clear and consistent and have a full range of responses that might occur are where limitations could occur.

Part II and Part III of the survey may be impacted by *written in neutral language to avoid leading* where a participant is asked to *list* their response. Is the word *list* too

general to elicit a more specific, detailed response? If *list* would have been quantified with *list a specific response,* would that have been leading the respondent? I believe the word *list* gave the participant more freedom to answer honestly what they did or did not know. Survey respondents were mostly educated women, and when discussing the *use of simple language so less educated respondent understands the question,* there is no way to tell if they even understood the questions as written. When reviewing the responses to the mammogram question on the survey, a gap was found. It appears because of the way the responses were written, the participants may have selected the wrong age response (age 40 or older vs. under age 40) for their answer. The demographics were confirmed after extracting the real age and the actual response for each participant for the mammogram question.

Some may say the rubric scoring was too difficult, even though the quantified detail for the element (risk or preventive factors) was based on research from the ACS (2009d) and NCI (2009). The scoring was dependent upon the survey responses, and when looking at Part II and Part III of the survey, where a participant is asked to *list* their response, if the question was not stated appropriately, the answer may not be what was intended, and the rubrics may have been more rigid than anticipated. It was determined through the procedural testing methodology and 100% agreement of the three-member panel in the rubric development; there was consistency and reliability of the rubrics even though there was no variability in the rubric scores to assist in developing a predictive model.

The sample size was not representative, thus it could not be generalized to the larger population. The distribution of the survey using the modified snowball technique

was the most practical manner to achieve a convenience sample of respondents, thus maximizing the possible distribution and response rate. Use of this method of distribution is considered bias and not random in the true sense of the word. The sampling was also considered vague as there was no way to determine the total size of the overall population (*n*) that received a survey. Using this method of distribution was an additional limitation as other methods may have obtained a larger number of respondents and a more diverse population sample.

These limitations are influences that cannot be controlled and may have placed restrictions on the study. Future research should take these limitations into consideration.

Recommendations

There is a gaping abyss between what breast cancer national statistics show, what women believe about breast cancer risk and prevention, and these breast cancer research results. A universal crisis is more than likely to occur. Without specific recommendations being made, the upper hand cannot be obtained on this disease, which is a war against women. A proposal, including specific recommendations, could bring forth opportunities and positive change for: (a) women, (b) health-care providers, (c) business leaders, and (d) researchers. The impact will be greatest for women. Retaining the same stagnant breast cancer statistics and high cost of breast cancer care has not worked. Since change is inevitable, implementing alternative strategies into breast cancer awareness campaigns and global communications will improve breast health and breast cancer statistics.

Education for Women

Orem believed that everyday life is considered self-care. Making decisions and being proactive with a healthier lifestyle are initiatives that foster self-care. To execute

self-care is to have control over personal and health-care choices, thus promoting overall health. Orem's theory of self-care connected a disease process (breast cancer) to the limitations of health care. Breast cancer is connected with and by resources, education, awareness, and prevention. Women need to understand the disease of breast cancer, along with the risk and preventive factors, well before a self-care deficit occurs. Presently, self-care deficit relates to being diagnosed with breast cancer. Women can become empowered and make informed choices if given accurate and concise information that increases their awareness and baseline knowledge of breast cancer risk factors and prevention methods. Additionally, women need to take ownership for all aspects of breast cancer health.

Breast cancer risk and preventive education should start with basics. All aspects of breast cancer risk and prevention need to be part of an all encompassing educative portfolio, not just the general and usual message to get annual mammograms. Each element in REAP the Benefits (REAP, an acronym for Resources, Education, Awareness, and Prevention) is equally important in the educative message and, by advocating and women acting upon this message, all aspects of risk and prevention would be more thoroughly covered. As evidenced by this research, it is true that the majority of women were not aware of any breast cancer risks or how to decrease the risk of breast cancer (beyond getting an annual mammogram as early detection). As women become more versed in breast cancer risk and preventive factors, they will begin to make a commitment to and become accountable for limiting risk. Even though research cannot identify exactly what causes breast cancer, research has confirmed that age and gender play significant roles in the disease. Research has also confirmed categorized risk factors:

breast cancer risk factors that cannot be changed, lifestyle-related breast cancer risk factors, and potential breast cancer risk factors. Women deserve to have available detailed, specific breast cancer risk information as part of their educational journeys. Breast cancer preventive factors that are likely to decrease the impact of breast cancer should also be part of the foundation in the educational breast cancer portfolio. In support, Orem recognizes that learned behavior can lead to a rational response to need; therefore, education on breast cancer (learned behavior) can lead to disease prevention.

Health-Care Providers and Business Leaders

Obvious changes need to be made in order to begin the reform process. TALK! Communication is the act of conveying and sharing information in various formats: verbal, non-verbal, written. Enhancing and refining breast cancer awareness communication is a vital step in addressing and overtaking this disease.

Guerra et al. (2009) studied breast cancer risk assessment in primary-care practices. This study showed practice of breast cancer risk communication in primary care. What this study did not show was: (a) Even though physicians discussed breast cancer risk, there was no indication or verification that the women understood the discussion; (b) whether the messaging on breast cancer risk from physician to physician was consistent; and (c) whether there was follow-up to ascertain if the women participated in self-care by performing breast self-exams, obtaining mammograms, and modifying their lifestyle to limit risk. Physicians in general have an opportunity to identify risk and communicate risk-reduction strategies to increase breast cancer awareness.

In addition, advanced nurse practitioners (ANPs) have a vital role in health care,

especially in regard to wellness and prevention. Fairman (2013) describes various roles of ANPs: nurse mid-wife, nurse anesthetist, nurse practitioner, and clinical nurse specialist. Since the 1980s, their breadth and scope of practice has evolved into a doctorate-level practice, Doctorate of Nursing Practice (DNP). ANPs are independent practitioners in almost every state. Patterson, Kaczorowski, Arthur, Smith and Mills (2003) discuss ANPs and complementary practitioners. This can be viewed as an adjunct to physician practice. Fairman, Rowe, Hassmiller, and Shalala (2011) discuss the Affordable Care Act (ACA), also known as ObamaCare. Although with millions more Americans having access to health insurance through ACA, this increases the gap in accessing health care. Iglehart (2013) continues to address the health-care access issue with the ACA. His question is: How will health-care providers deal with the anticipated growth in patient demand for health-care services? This gap includes wellness and preventive services that can impact breast cancer risk and prevention. It is more important than ever to ensure women have access to health-care providers, and ANPs can fill this gap.

Furthermore, decision-makers all need to "be on the same page." All health-care providers and business leaders must entertain a universal message. Information should be clear, concise, and consistent when communicated. Cornforth (2002) reported on a 2002 Susan G. Komen Breast Cancer study that 40% of women turn to family and friends and 50% of women relied on television, newspapers, and magazines for breast health and breast cancer information. Exposure to breast health and breast cancer information on television, in newspapers, and in magazines is fine, but information relayed should be relevant. The problem with the current media-delivered breast cancer information is that important facts regarding risk and decreasing risk are rarely communicated, if at all.

Again, information needs to be in simplistic terms, contain an all-inclusive list of breast cancer risk categories and preventive factors, and include any detailed information that would benefit women in making informed lifestyle choices. All women are already at risk just for being female (gender), by natural progression through the life process (aging), and by specific, detailed breast cancer risk information not being communicated. A woman's chance of getting breast cancer increases because of the absence of this preventive knowledge.

Breast cancer health should be a central topic of discussion at every provider's health-care visit. Health-care providers must focus on the details of breast cancer risk and prevention, specifically including the following: Breast cancer risk factors that cannot be changed, lifestyle-related breast cancer risk factors, and health recommendations likely to decrease the risk of breast cancer.

Breast Cancer Risk Factors That Cannot Be Changed

The following breast cancer risk factors that cannot be changed are of concern as all women are at risk for breast cancer. Those women who may be at greater risk should be counseled regularly and monitored more closely.

1. *Age*: Women need to be informed that breast cancer risk increases with age. There is a one-in-eight lifetime risk of developing breast cancer.

2. *Gender*: Women are 100 times more likely than men to be diagnosed with breast cancer because of the growth-promoting effects of female hormones.

3. *Family history*: Women who have a family history of breast cancer have an increased risk of developing breast cancer. If a woman's mother was diagnosed, there is a 2-3 times greater risk. If a woman's mother and sister are diagnosed, the risk increases to

5 times greater. Having a family history has not had an association confirmed with BRCA1 or BRCA2, but both antigens have been linked to susceptibility in families as it is the mutation of these genes that is associated with the increased risk.

4. *Breast disease and density*: Women who have excess abnormal cells because of a breast disease called atypical breast hyperplasia can have an increased risk of breast cancer. HRT can cause breast density, thus making diagnosis more difficult due to poor visualization. This inability to see a breast cancer tumor may increase breast cancer risk by 3-5 times that of the non-HRT population.

5. *Lifelong exposure to estrogen*: Women who have been exposed to reproductive hormones longer (via these factors: menses before age 12, menopause after age 55, first pregnancy after age 30, and women who have never been pregnant) have their risk increase by four times.

Lifestyle-Related Breast Cancer Risk Factors

The following lifestyle-related breast cancer risk factors are of concern as these risks can be minimized with increased awareness and action.

1. *HRT*: Women who are taking HRT (depending on the type: HRT alone, sequential, or combination therapy) have up to a 50% greater risk of developing breast cancer.

2. *Obesity*: Women who are obese after menopause have a 40% increased risk of developing breast cancer. Body fat carries out chemical reactions that result in estrogen production, thus excess body fat can result in increasing a women's exposure to risk-related hormones.

3. *Oral contraceptives*: Women taking oral contraceptives have up to a 50%

increased risk of developing breast cancer.

4. *Alcohol*: Women who drink more than 2-3 servings of alcohol per day increase breast cancer risk by 31%, no matter what alcohol type. If a woman drinks four or more drinks per day, there is a 68% increased risk. It is noted that 4% of all breast cancer is due to alcohol consumption.

Health Recommendations Likely to Decrease the Risk of Breast Cancer

Decreasing the risk of breast cancer can be defined as an opportunity to *prevent the risk of diagnosis* of breast cancer with lifestyle modifications or to *prevent the risk of advancing breast cancer disease* with an earlier diagnosis. The following recommendations may reduce these risks:

1. Decrease alcohol intake to less than 2 drinks per day.
2. Lose weight so BMI is less than 25, especially if post-menopausal.
3. Have mammograms annually for age 40 or greater.
4. Perform BSE monthly.
5. HRT should be discussed thoroughly with a physician to weigh pros and cons.

Education needs to be year-round, not just during Breast Cancer Awareness Month. Having the focus for a short period of time during the calendar year does not afford the time to address the obvious existing gaps between awareness and the significant morbidity and mortality rates (which continue year after year due to lack of outreach and education). Twitter, Facebook, MySpace, and other current social media venues are the latest communication portals to spread the news about everything. This networking opportunity should be utilized for more than making money through advertisements and finding a mate. Web-based companies make billions of dollars, and

these business leaders need to spread the word about pertinent social and health issues. It would be refreshing to see a Twitter, Facebook, or MySpace advertisement sponsored by these very companies touting the most current information on health-care issues without editorializing. Between these three social networking businesses alone more than 750 million people who have these social media accounts would get factual health-care information.

When women go online to take a breast cancer risk assessment, it assesses a woman's own personal medical health history. What is primarily included in breast cancer online assessments are current age, family history, menstruation age, whether diagnosed with atypical hyperplasia, and ethnicity. Many of the uncommonly shared risk factors, such as the very factors noted in this research, are not part of these assessments, and these lifestyle-related breast cancer risk questions may make more of an impact on awareness and prevention.

What is not included in the current online breast cancer risk assessments are age of menopause and specific questions on lifestyle-related breast cancer risk factors, such as current hormone replacement therapy, oral contraceptive use, the height and weight for BMI related to obesity, and alcohol use. Also, when the risk values are determined from current assessments, the risk score is noted, but typically without explanation. Fosket (2004) supports constructing the development of a standardized breast cancer risk assessment tool. Her emphasis is on high risk and chemoprevention as a model. Taking this concept into an online tool for women generally at risk would be a definite enhancement and benefit all women.

Business leaders must embrace and enhance breast cancer risk assessment surveys

to be all-inclusive of current, researched risks, as well as offer an explanation as to why women are determined to be at risk. Health-care providers must also advocate for what is right. An educational opportunity that addresses the depth and breadth of the issue is a change with a positive impact. This is reminiscent of a bumper sticker observed, stating, "To do what is popular is not always right. To do what is right is not always popular." Health-care providers must make the effort to begin to reform breast cancer awareness campaigns, even though it may not be a popular idea. Continuing with the current campaign may be the popular process, but that does not make it the right process.

Health-care providers and business leaders need to support Breast Cancer Awareness Month with a fresh campaign like REAP the Benefits. REAP, an acronym for Resources, Education, Awareness, and Prevention, is an important educative message. Health-care providers and business leaders who understand that there is more to breast health than just early detection will be the trailblazers of change. As an adjunct, leaders are needed to develop community agendas for health promotion programs. Local community centers and church halls are suggested venues to house educational sessions, regardless of health insurance status. Volunteers for staffing these sessions could be physicians and nurses in order to provide immediate feedback. After all, feedback is the key to learning and is an essential part of maximizing learning potential. National Health Care Reform (NHR), otherwise known as ObamaCare, may or may not be available, and preventive benefits could be at risk. Whether you do or do not work, have or do not have health insurance, women may not have access to NHR preventive benefits if the laws change. As leaders, these issues need to be discussed and actions taken to secure basic preventive benefits.

In summary, I have two main objectives for women and providers. The first, women need to be self-advocates. They need to openly discuss with their health-care providers the topic of breast cancer risk and prevention and not be afraid or intimidated to ask questions. Women need to understand they have some control over their choices and can easily modify their lifestyles to limit breast cancer risk. The second, from a provider perspective, is that providers need to openly discuss with their patients the topic of breast cancer risk and prevention and answer questions without minimizing the topic or intimidating the patient. Providers need to understand that women can have control and modify their lifestyle choices only if the risks and preventive measures are communicated.

Future Research

This study raises and confirms doubts about the effectiveness of the current breast cancer awareness campaigns. There is a need to check if what the campaigns are teaching is resulting in specific and tangible actions on the part of women. As one assessment, this research study reports results that provide evidence that the current awareness campaigns are not successful in impacting the target audience, women. Additionally, no matter what changes, updates, or strategies are part of future awareness campaigns, evaluations still need to be made throughout the process. A successful campaign will ultimately result in women: (a) knowing risk and preventive factors, (b) understanding the impact of the risk factors, and (c) understanding how to limit risk.

Furthermore, there are recommendations that would enhance the outcomes to a research study similar to this one. One such research recommendation is to replicate this study at 5-year intervals once educational opportunities have been addressed. If future

research obtains the same results, Bonferonni correction is not needed. Another recommendation is to add a qualitative component to the study, possibly a focus group, to validate the responses of women and ascertain additional response details related to breast cancer knowledge that may substantiate findings further.

Newman and Benz (1998a, 1998b) note that qualitative research is the effort to understand situations and their distinctiveness as part of a particular framework. The goal is to develop a theory that will explain what was experienced. The starting point would be to review the raw data and results of this study to then develop the qualitative interview or focus-group questions. This step is essential for the *effort to understand* and close the gap between breast cancer risk and preventive knowledge.

Conversely, there are problems identified with qualitative research studies: time constraints, masses of data to code, limited sampling, nominal data that are difficult, and difficulty in controlling the bias of the researcher (Saint-Germain, 2013). In contrast, the biggest problem identified with a quantitative research study is the lack of detail or specifics that cannot be generated from a survey.

Interestingly, this research process provoked moments of wonderment concerning the impact of breast cancer. I hypothesized possibilities that lie outside of the typical scope of breast cancer risk factors that cannot be changed, but potentially could be linked to lifestyle-related risk factors: lesbian women never being pregnant, mental and emotional health issues, and more focus on women's fear of breast cancer diagnosis and treatment. These still linger in my thoughts. They are inconclusive to-date as to whether or not they are breast cancer risks, but they are actively being researched. Having these components play a more active role could be another dimension of research.

Also, another area to explore and expand research is in areas of breast cancer risks that were not included in this study: personal history of breast cancer, concentration on race and ethnicity, lobular carcinoma in-situ, chest radiation, and diethylstilbestrol. These risks could add another dimension to the current research or be core risks in their own research study. One area of prevention not explored was chemoprevention.

Because of my own family history of breast cancer, I recently found an article in *Cure*, a lay magazine that touts combining science and humanity. The article discussed passing on genetic risk to children. Huff (2010) describes four sisters and their genetic bond in breast cancer. My mom just died from breast cancer and I have four siblings, three sisters and one brother, and we have daughters. This article hit home and since my mom's recent death, family history is of more concern than when I started this research. Familial tendencies, when to disclose to children, if/when to get children tested, prophylactic surgery and chemoprevention are all future research considerations in the realm of breast cancer risk and prevention as well as studying women's baseline knowledge in these areas.

With additional research advances, both the survey and the rubrics should be reviewed and updated. These tools are vital in the determination of levels of knowledge. New research could change the parameters of the research but not the overall scope and intent.

Next Steps

I started on my doctorate as a purely personal goal and had no specific plans from a professional perspective. It was my love for learning that has guided me down this educational path and my love for life that has guided my advocacy for women's health. I

have found this journey to be extremely rewarding, and this study is one reason for my change in plans. My passion remains being an advocate for women, and finding ways to proactively help the cause is first and foremost.

One way to help the cause is to author the breast cancer awareness campaign *REAP the Benefits* (resources, education, awareness, and prevention). Current research substantiates the need for a change to the current breast cancer awareness campaigns, and with the findings of this study, I feel confident this opportunity will help millions of women. I want to publish these findings in nursing and public health journals as well as lay magazines that address women's current health issues. My hope is to partner with health-care providers and business leaders to develop the overall communication strategy for breast cancer risk and prevention to get a consistent message out. This would include high schools so women are informed about proactive breast cancer risk and prevention measures at an earlier age. I also want to work on developing a different online breast cancer screening tool. The logic for the tool needs to encompass all breast cancer risk factors, which does not occur on versions found online today.

Getting my Ph.D. has now become a professional goal. Obtaining these credentials will give increased credibility to my mission and future endeavors.

APPENDIX A

TABLE OF VARIABLES

TABLE OF VARIABLES

Hypotheses	Variable	Description Name	How Measured	Metric	BC RF	Link to Orem's Theory
1a & 2a	Age	Length of someone's existense	Part 1 of survey, Q 1 Part IV of survey, Q 14 a	Years	Age	Age
1b & 2b	Race		Part 1 of survey, Q 2	White, Black, Other		Sociocultural orientation
	Gender (Only used as confirmation for survey purposes)	Sex of a person	Part 1 of survey, Q 3 Part IV of survey, Q 14 b	Male, Female	Gender	Gender
1c & 2c	Household income	Total annual household income	Part 1 of survey, Q 4	As described in H1d		Sociocultural orientation
1d & 2d	Education	Higest completed level of education/Degree	Part 1 of survey, Q 5	As described in H1e		Sociocultural orientation, Resource availability
1e & 2e	Basic diagnostic testing	Breast self exams	Part 1 of survey, Q 6	As described in H1f		Health care system factors, Resource availability
1f & 2f	Mammograms	Breast mammography	Part 1 of survey, Q 7	As described in H1g		Health care system factors, Resource availability
1g & 2g	Work status	Current employment status	Part 1 of survey, Q 8	Employed, Not employed		Sociocultual orientation
1h & 2h	Insurance status	Current health insurance status	Part 1 of survey, Q 9	Does Have, Does not have		Resource availability
1a-h & 2a-h	Knowledge level	Baseline level of knowledge of BC risk and preventive factors	Part IV of survey, Q 14 p-q Part IV of survey, Q 14 u-z, cc Part IV of survey, Q 14 r-s Part I of survey, Q 1 & Part IV of survey, Q 14 a Part I of survey, Q 3 & Part iV od survey, Q 14 b Part IV of survey, Q 14 c-e Part IV of survey, Q 14 g-i Part IV of	Self idenfied (all) Rubrics (all)	HRT Obesity Oral Contraceptives Alcohol Age Gender Family history Breast Disease/Density Estrogen	Patterns of living Patterns of living Patterns of living Patterns of living Age, Developmental state Gender Familial tendency Health status Health status, Patterns of living
1a-h & 2a-h	Individual risk	Various factors linked to Orem's theory that may increase risk	Part IV of survey, Q 14 c-e Part IV of survey, Q14 g-i Part IV of survey, Q 14 k-l, n-o	Self identified	Family history Breast Disease/ Density Estrogen	Familial tendency Health status Health status, Patterns of living
1e-f & 2e-f	Fear	The level of being afraid of BC diagnosis and/or treatment	Part V of survey, Q 15 & 16			Developmental State
1a-h & 2a-h	General	Miscellenous assessment factors that may or may not cause risk	Part IV of survey, Q 13 Part VI of survey, Q 14 f, j, m, t, aa, dd-gg, Q 17-19			Patterns of living, Environmental factors

APPENDIX B

SURVEY INSTRUMENT

SURVEY INSTRUMENT

This survey was administered using the on-line survey tool Surveymonkey.com. This is a list of the questions.

I have read the Informed Consent Letter and recognize that by completing and returning this survey that I am giving my informed consent to participate.

ARE WOMEN AWARE?
FACTORS THAT PREDICT WOMEN'S KNOWLEDGE OF RISK
AND PREVENTIVE FACTORS IN BREAST CANCER

Part I: Demographics
Directions: Using the drop downs, select your individual response for each category

Age: Your true age in years.

Race: White; Black; Hispanic; Asian; Other.

Gender: Female; Male.

Household income:<$25,000; $25-29,999; $30-39,999; $40-49,999; $50-59,999; $60,69,999; $70-79,999; $80-89,999; $90-99,999; >$100, 000; >$150,000.

Highest completed education level: Did not graduate; GED; High school; Technical school; Associate degree; Bachelor degree; Master degree; Doctorate.

Basic diagnostic testing for Breast Self-Exams: Monthly: Every other month; 1-5 months per year; 7-11 months per year; I never perform.

Routine Mammograms: Under age 40 - Every year; Every other year; Every 3-5 years; Every 6-10 years; Never. Age 40 or older - Every year; Every other year; Every 3-5 years; Every 6-10 years; Never.

Work status: Employed; Not employed.

Health insurance status: I have health insurance; I do not have health insurance.

Part II: Breast Cancer Risk Factors
Directions: Fill in the blanks with a narrative response

List five breast cancer risk factors that cannot be changed.
List four lifestyle-related breast cancer risk factors that one has control over.

Part III: Health Recommendations Likely to Decrease the Risk of Breast Cancer
Directions: Fill in the blanks with a narrative response

List five breast cancer preventive factors.

Part IV: Individual and Personal Risk
Directions: Choose only one response per statement.

Do you feel you are at risk for breast cancer	yes	no	
Individual personal risk:			
a. I am at _____ risk for breast cancer as I get older.	Lesser	Greater	
b. I am at _____ risk for breast cancer because I am a female.	Lesser	Greater	
c. Did your mother have breast cancer?	Yes	No	
d. Did your grandmother have breast cancer?	Yes	No	
e. Did a sibling have breast cancer?	Yes	No	NA
f. Are you a twin?	Yes	No	
g. Do you have cysts in your breasts?	Yes	No	
h. Do you have dense breasts?	Yes	No	
i. Do you have diseased breasts?	Yes	No	
j. Do you have any type of breast implants?	Yes	No	
k. Have you ever been pregnant?	Yes	No	
l. If yes to above, was your 1st pregnancy before or after age 30?	Before	After	
m. Did you breast feed?	Yes	No	NA
n. Did you start menstruation before or after age 12?	Before	After	
o. Did you reach menopause before or after age 55?	Before	After	
p. Are you currently on hormone replacement therapy?	Yes	No	
q. Have you ever taken hormone replacement therapy?	Yes	No	
r. Are you currently taking the pill?	Yes	No	
s. Have you ever taken the pill?	Yes	No	
t. Have you ever used social drugs?	Yes	No	
u. Are you a vegetarian?	Yes	No	
v. Do you eat fatty foods on a regular basis?	Yes	No	
w. Do you eat broccoli, cabbage, cauliflower, or radishes regularly?	Yes	No	
x. Do you eat a balanced diet as recommended by FDA?	Yes	No	
y. Do you have a sedentary lifestyle?	Yes	No	
z. Do you exercise at least 15-20 minutes, 3 times per week?	Yes	No	
aa. Do you currently smoke cigarettes?	Yes	No	
bb. Do you drink more than 1-2 drinks of any combination (beer, wine, or liquor) daily?	Yes	No	
cc. Are you overweight by more than 20 pounds?	Yes	No	
dd. Do you live within a few blocks of an industrial area?	Yes	No	
ee. Are you regularly around second-hand smoke?	Yes	No	
ff. Have you ever taken antibiotics?	Yes	No	
gg. Do you live near high tension wires?	Yes	No	

Part V: Fear Rating Scale

Directions: Rate each statement using the following scale

1=I am not afraid, 2=I am somewhat afraid, 3= I am very afraid

I am afraid of being diagnosed with breast cancer	1	2	3
I am afraid of the treatment associated with breast cancer	1	2	3

Part VI: Miscellaneous

Directions: Select only one response for each statement

I have been diagnosed with breast cancer.	yes		no
I am a health care provider.	yes		no
I am a health care leader.	yes		no
List the state do you live?			
My physical health is?	Very healthy	Average health	Poor health
My emotional health is?	Very healthy	Average health	Poor health

APPENDIX C

RUBRICS

RUBRICS

Rubric Category: Breast cancer risk factors that cannot be changed

Element	Score	Quantified Detail	Best Score: 15	Good Score: 10-14	Fair Score: 5-9	Poor Score: 0-4	References
Age	3	Getting older, aging	3				ACS, 2009d & NCI, 2009
	2	Reference to post-menopausal		2			
	1	Reference to age, any age			1		
	0	Any other or no response				0	
Gender	3	Female	3				ACS, 2009d & NCI, 2009
	2	Reference to Gender, Sex		2			
	1	Reference to both male and female			1		
	0	Any other or no response				0	
Family History	3	Grandmother, Mother, Sister with breast cancer	3				ACS, 2009d & NCI, 2009
	2	Reference to family history, father, parent		2			
	1	Reference to genetics, heredity, DNA,			1		
	0	Any other or no response				0	
Estrogen	3	Menses before age 12, menopause after age 55, pregnancy after age 30	3				ACS, 2009d & NCI, 2009
	2	Reference to lifelong exposure		2			
	1	Reference to hormones			1		
	0	Any other or no response				0	
Breast Disease/Density	3	Hyperplasia	3				ACS, 2009d & NCI, 2009
	2	Dense breasts		2			
	1	Reference to breast disease, cysts			1		
	0	Any other or no response				0	

Rubric Category: Lifestyle-related breast cancer risk factors that one has control over

Element	Score	Quantified Detail	Best Score: 12	Good Score: 8-11	Fair Score: 4-7	Poor Score: 0-3	References
HRT	3	Hormone replacement therapy	3				ACS, 2009d & NCI, 2009
	2	Reference to estrogen, progesterone		2			
	1	Reference to hormones			1		
	0	Any other or no response				0	
Obesity	3	Obesity/BMI for height/weight	3				ACS, 2009d & NCI, 2009
	2	Reference to poor diet/lack of exercise		2			
	1	Reference to being fat, heavy, overweight			1		
	0	Any other or no response				0	
Oral Contraceptives	3	Current use	3				ACS, 2009d & NCI, 2009
	2	Past use		2			
	1	Reference to birth control			1		
	0	Any other or no response				0	
Alcohol	3	Cites number of drinks per day (> 2)	3				ACS, 2009d & NCI, 2009
	2	Cites number of drinks per day (< 2)		2			
	1	Reference to alcohol, drinking			1		
	0	Any other or no response				0	

Rubric Category: Health recommendations likely to decrease the risk of breast cancer

Element	Score	Quantified Detail	Best Score: 15	Good Score: 10-14	Fair Score: 5-8	Poor Score: 0-4	References
Decrease alcohol use	3	Alcohol consumption < 2 drinks per day	3				ACS, 2009d & NCI, 2009
	2	Alcohol consumption > 2 drinks per day		2			
	1	Reference to alcohol			1		
	0	Any other or no response				0	
Lose weight	3	BMI for height/weight	3				ACS, 2009d & NCI, 2009
	2	Reference to losing weight, diet, exercise		2			
	1	Reference to healthy diet			1		
	0	Any other or no response				0	
Mammograms	3	Annual for age 40 or older	3				ACS, 2009d & NCI, 2009
	2	Reference to mammogram		2			
	1	Reference to breast x-ray, testing, screening			1		
	0	Any other or no response				0	
Breast self-exams	3	Monthly	3				ACS, 2009d & NCI, 2009
	2	Reference to breast self-exams		2			
	1	Reference to breast checks			1		
	0	Any other or no response				0	
HRT	3	Stop/avoid	3				ACS, 2009d & NCI, 2009
	2	Reference to not taking estrogen, progesterone		2			
	1	Reference to not taking hormones			1		
	0	Any other or no response				0	

REFERENCE LIST

REFERENCE LIST

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VITA

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1981	Associate of Applied Science (Nursing)—Macomb Community College
1976	Practical Nursing—Oakland Community College

Licensure/Certification

2013	Health Insurance, State of Michigan License
2006	Commission for Case Management Certification (Certified Case Manager)
1981	Registered Nurse, State of Michigan License
1976	Practical Nurse, State of Michigan License

Experience

1998-Current	Blue Cross Blue Shield of Michigan	
	2010-Current	Manager, Auto Marketing & Customer Relations
	2007-2010	Health Care Analyst, Credentialing
	2004-2007	Case Manager, High Level Disease Management
	2003-2004	Auto Accident, Unable to work
	2000-2002	Manager, Case Management
	1998-2000	Senior Account Representative, GM Control Plan
1996–1998	Option Care	
	Director of Nursing, Consultant, Staff Nurse	
1990–1996	The Medical Team	
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Academia

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