



The impact of breast self-examination education on breast self-examination practices
by Thelma Cade Albrecht

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Nursing
Montana State University

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Abstract:

Breast cancer is the most common type of cancer in American women. It will affect one out of eight American women sometime during her life span. Both the cause of breast cancer and the means for its cure are unknown. To date there is no recognized way to prevent breast cancer. The only proven risk factor for breast cancer is age with incidence rising sharply after age 40 (American Cancer Society, 1990). If detected early breast cancer can be treated effectively. Early detection and prompt treatment are the best protection. Practicing health behaviors that promote early detection then becomes a priority for women age 50 years and over who, because of their age, are considered most at risk for developing breast cancer.

The purpose of this study was to determine if 1 hour of small group instruction by a nurse educator, that provided cognitive information about breast cancer and procedural knowledge of breast self-examination, and was presented as a vitally important life style habit would influence subsequent breast self-examination practice. The specific practices surveyed were; (a) self-reported frequency of breast self-examination, (b) self-reported proficiency in breast self-examination, (c) perceived barriers to breast self-examination and (d) perceived self-confidence in performing breast self-examination.

This was a quasiexperimental 1 group, pretest and posttest design survey. The study included a convenience sample of forty-five women who met the criteria of being 50 years of age or older, with no previous history of diagnosed breast cancer, attended breast self-examination class and completed identical pre- and post-breast self-examination education surveys. Modifying demographic variables of age and educational level were assessed as the pretest was given. Each participant's breast self-examination practices before education were compared to their breast self-examination practices 3 months after education.

Survey results indicated that breast self-examination education influenced practices and values by increasing self-reported frequency and proficiency of examination. Perceived barriers to breast self-examination decreased while perceived self-confidence increased. Each of the four dependent variables were impacted at a statistically significant level demonstrating that breast self-examination education has a positive effect on breast self-examination practices of women 50 years of age or older.

This study indicates breast self-examination education is a vital role of nurses and should be included as part of a concerted effort to increase early detection of breast cancer.

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EDUCATION ON BREAST SELF-EXAMINATION PRACTICES

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APPROVAL

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This thesis has been read by each member of the graduate committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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ABSTRACT

Breast cancer is the most common type of cancer in American women. It will affect one out of eight American women sometime during her life span. Both the cause of breast cancer and the means for its cure are unknown. To date there is no recognized way to prevent breast cancer. The only proven risk factor for breast cancer is age with incidence rising sharply after age 40 (American Cancer Society, 1990). If detected early breast cancer can be treated effectively. Early detection and prompt treatment are the best protection. Practicing health behaviors that promote early detection then becomes a priority for women age 50 years and over who, because of their age, are considered most at risk for developing breast cancer.

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Survey results indicated that breast self-examination education influenced practices and values by increasing self-reported frequency and proficiency of examination. Perceived barriers to breast self-examination decreased while perceived self-confidence increased. Each of the four dependent variables were impacted at a statistically significant level demonstrating that breast self-examination education has a positive effect on breast self-examination practices of women 50 years of age or older. This study indicates breast self-examination education is a vital role of nurses and should be included as part of a concerted effort to increase early detection of breast cancer.

Chapter 1

INTRODUCTION

As defined by the American Cancer Society (1993), "cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells" (p. 1). Causal factors can be external or internal and may act together or sequentially to initiate or promote carcinogenesis. In some cancers, such as cancer of the breast, the cause is unknown. When the cause of cancer is known, as in radiation from the sun's rays in skin cancer, prevention is possible and successful in a high percentage of cases. For example, 90% of the skin cancers that will be diagnosed in 1993 could have been prevented by protection from the sun's rays (American Cancer Society, 1993). When the cause of cancer is not known, regular screenings and self-examination can be used to detect the cancer at an early stage when treatment is more likely to be successful.

This study seeks to add to the body of knowledge concerned with self-examination of the breast. Specifically, can breast self-examination education as taught and presented to groups of women impact their practice?

Problem Statement

According to the American Cancer Society, breast cancer is the most common type of cancer in American women. One out of eight women in the United States will develop breast cancer sometime during her life span (American Cancer Society, 1992). Both the cause of breast cancer and the

means for its cure are unknown (American Cancer Society, 1990). Breast cancer is considered a woman's disease with only 1,000 out of 182,000 estimated new cases in 1993 occurring in males. To date there is no recognized way to prevent breast cancer. Early detection and prompt treatment are the best protection. Every woman is at risk for breast cancer, and most breast cancers occur in women who have no identifiable risk factors other than age. The absence of family history for breast cancer gives little reassurance since 90% of cases occur in women with no family history (American Cancer Society, 1992). Before the age of 35 the risk of breast cancer is minimal. Incidence increases with age rising sharply after age 40. Breast cancers occur most often after menopause with women over age 50 accounting for 50% of the cases (American Cancer Society, 1990). According to studies by the National Cancer Institute (1989) women 65 years and older are six times more likely to develop breast cancer and seven times more likely to die from it than women under the age of 65. In their 1990 study, Pool & Judkins noted that 80% of breast cancer cases are in women over 40 years of age. Approximately 49% of breast cancer deaths occur in women 65 years of age or over (Vital Statistics of the United States, 1985).

If detected early, breast cancer can often be treated effectively with surgery that preserves the breast. The 5 year survival rate for localized breast cancer is 92%. If the breast cancer is in situ (not invasive), the survival rate approaches 100%. If the cancer has spread regionally, however, the survival rate is 71%. For persons with distant metastasis, the 5 year survival rate drops to 18% (American Cancer Society, 1992). It is

imperative then, that early detection becomes a priority for all women over age 35 (Champion, 1991).

According to conclusive evidence based on an 18 year follow-up of the Health Insurance Plan of New York Screening project (HIP study), detection of the disease (breast cancer) at an earlier than usual stage leads to substantial saving of lives. Our only means of accomplishing this end is through complete breast examination when a woman is apparently well. Mass screening is the only means we have to save the lives of many women with breast cancer (Strax, 1990, p. 1338).

Breast Self-Examination (BSE) is recommended for the early detection of breast cancer to facilitate early treatment and to reduce morbidity and mortality from the disease (Lauver, 1987). Although approximately 96% of women have heard of BSE, only an estimated 14 to 40% report doing it monthly (Alagna & Reddy, 1984; Lauver, 1989; Wyper, 1990). Studies continue to show that older women, those over 65 years of age, are least likely to perform BSE in spite of being at the greatest risk of developing breast cancer (Frank-Stromborg, 1986; O'Dell et al., 1991; Maddox, 1991). In addition, older women often lack confidence about being able to practice BSE successfully, and many know very little about methods of this self-care practice (Maddox, 1991).

Women need to perform monthly BSE to become familiar with how their breasts normally look and feel (Pool & Judkins, 1990). Any woman who regularly practices BSE monthly is probably 12 times more familiar with the geography of her breasts than a physician who generally performs a clinical breast examination once a year. It appears that women first detect the lump, pain, discharge, or breast changes and bring these

changes to the attention of their physicians. In fact, 90% of breast lumps are found by women themselves or by their partners (O'Dell et al., 1991; Pool & Judkins, 1990; Strax, 1990).

Providing BSE education is a means of teaching and encouraging women to take responsibility for their own breast health. Fostering early detection contributes to a high rate of cure and therefore a reduction in the present high breast cancer mortality rate (Pool & Judkins, 1990).

According to the American Cancer Society estimates for 1993, 46,000 women will die of this disease. Early detection depends in part on women having an increased awareness of their essential active role in performing BSE on a consistent basis, being correctly informed about breast cancer, and knowing what screenings are recommended and what services are readily accessible to them (Crooks & Jones, 1989).

Inadequate screening may explain why the death rate from breast cancer in elderly women has increased since 1975 (Silverberg & Lubera, 1988). However, evidence is still lacking from controlled studies that might conclusively show that breast cancer screening is effective in reducing mortality in older women (Robie, 1989). Robie concurred with the American Cancer Society's screening and guidelines for breast cancer in older women: (a) BSE each month, (b) professional breast examination each year, and (c) annual or biennial mammography. The three screening examinations are complementary, and together yield better cumulative results for the early detection of breast cancer than if only one or two of these examinations are performed (Robie).

Several studies indicated that health care professionals and clients are poorly trained to perform accurate breast examinations and may miss

small but significant breast lumps (Fletcher, O'Malley & Bunce, 1985; Richardson, Marks & Solis, 1987). According to Robie (1989) more education is required for health care professionals and clients to improve both the frequency and the accurate performance of breast examinations.

Research indicates a positive relationship between BSE practice and BSE instruction by a health care professional (Champion, 1985; Williams, 1988). Nurses in a variety of clinical practice settings such as acute care facilities, physicians' offices, or health maintenance clinics are in positions to teach and influence women regarding this self-care practice. Olson & Mitchell (1989) found few conclusions and little specific guidance in previous studies about what influences women to practice BSE on a regular basis. Their study determined that teaching programs that emphasize explanations and demonstration of BSE technique and that allow return demonstration with active feedback by the educator are essential (Olson & Mitchell).

This study examined the effectiveness of giving specific information about breast cancer and step by step instruction on how to systematically examine and palpate their own breasts to asymptomatic women 50 years of age and older with no previous history of breast cancer. The class was conducted by a registered nurse educator with 6 years of experience in planning, developing and delivering community education to the elderly. The study focused on BSE practices related to subject's self-reported frequency of BSE, perceived proficiency of BSE practice, perceived barriers to BSE and perceived self-confidence in BSE practice.

Purpose

The purpose of the study was to document the impact of BSE education on BSE practices of women 50 years of age or older, who had not been previously diagnosed with breast cancer. The BSE practices evaluated as dependent variables were self-reported frequency and proficiency of BSE in relation to perceived barriers and perceived self-confidence in BSE practice.

The independent variable was BSE education designed to introduce women to the knowledge and skills they need to understand and comply with recommended actions. The educational intervention was conducted by a registered nurse educator with a successful past history of planning, developing and delivering community health classes to adults who were 50 years of age and older. Periodic and ongoing breast care classes offered to the public and members of Yellowstone County Council of Aging served as a secondary prevention approach as described by Pender (1987). This method provides a way to focus on early detection of breast disease and educates women regarding BSE and available resources.

Increasing awareness and knowledge begins with important facts about breast cancer, including risk factors (perceived susceptibility), the importance of early detection (perceived seriousness), and statistical documentation of effectiveness of BSE practices (perceived benefits). The statistical risk factor of aging was emphasized as well as the importance of early detection because the occurrence of breast cancer is not related to health behavior, and there is no specific measure to decrease susceptibility (Champion, 1985).

Cues to action used to increase perception of possible threats of developing breast lumps included an invitation to and information about community breast cancer classes, newspaper articles about risk factors and statistics related to incidence and prevalence of breast cancer. This was intended as a focus effort to increase awareness and motivate prospective attenders to come to class. The vehicle used was the "Senior News," the official monthly newsletter for Yellowstone County Council on Aging. The emphasis was to stimulate further information seeking rather than to use the media to educate since mass media campaigns generally yield limited results with little or no attitude or behavior changes (Taylor, 1986).

Conceptual Framework

The Health Belief Model (HBM) provided the framework for this study which was concerned with promoting and evaluating protective health behaviors in women. The model was developed in the early 1950's by social psychologists employed by the U. S. Public Health Service. The conceptual focus of the HBM is understanding what motivates a person to participate or to refrain from participating in a wide range of health related actions (Janz & Becker, 1984). It was developed to explain health related behavior at the level of individual decision making. The HBM evolved from concern about the low levels of participation in free preventive health programs offered by the U. S. Public Health Service (Rosenstock, Strecher, & Becker, 1990). The model has a phenomenological orientation and assumes that the subjective world of the perceivers, rather than objective environment, determines behavior (Rosenstock, 1974). The primary proposal of the HBM

is that the probability of a person taking action in regard to a health condition is determined by readiness to take action, and by the perceived benefits of action weighed against the perceived cost of barriers (Salazar, 1991).

Rosenstock (1974) identified main components of the HBM, four of which were related to this study. For individuals to take action, such as monthly BSE, against the advancement of a disease such as breast cancer, they would need to believe that; (a) they were personally vulnerable to the disease (Perceived Susceptibility)--this belief would be influenced by demographic, sociopsychological and structural variables which condition these perceptions of vulnerability to the disease; (b) the occurrence of the disease would have moderate impact on some area of their lives (Perceived Seriousness); (c) taking a particular action would benefit them by reducing their vulnerability, or by decreasing its severity if the disease occurred (Perceived Benefits); (d) taking action would not entail surmounting significant barriers, such as expense, inconvenience, pain or embarrassment (Perceived Barriers). Wyper (1990) used the major variables and constructs of the HBM to conceptualize the effect of perceived threat of breast cancer and net perceived efficacy of BSE as shown in Figure 1 (see Appendix A for permission to reprint).

Wyper (1990) combined the modifying factors of perceived benefits of BSE weighed against perceived barriers of BSE to form the independent construct "net perceived efficacy of BSE" (see Figure 1). Wyper hypothesized that information on factors which influence the performance of BSE might suggest nursing strategies to minimize deterrents and

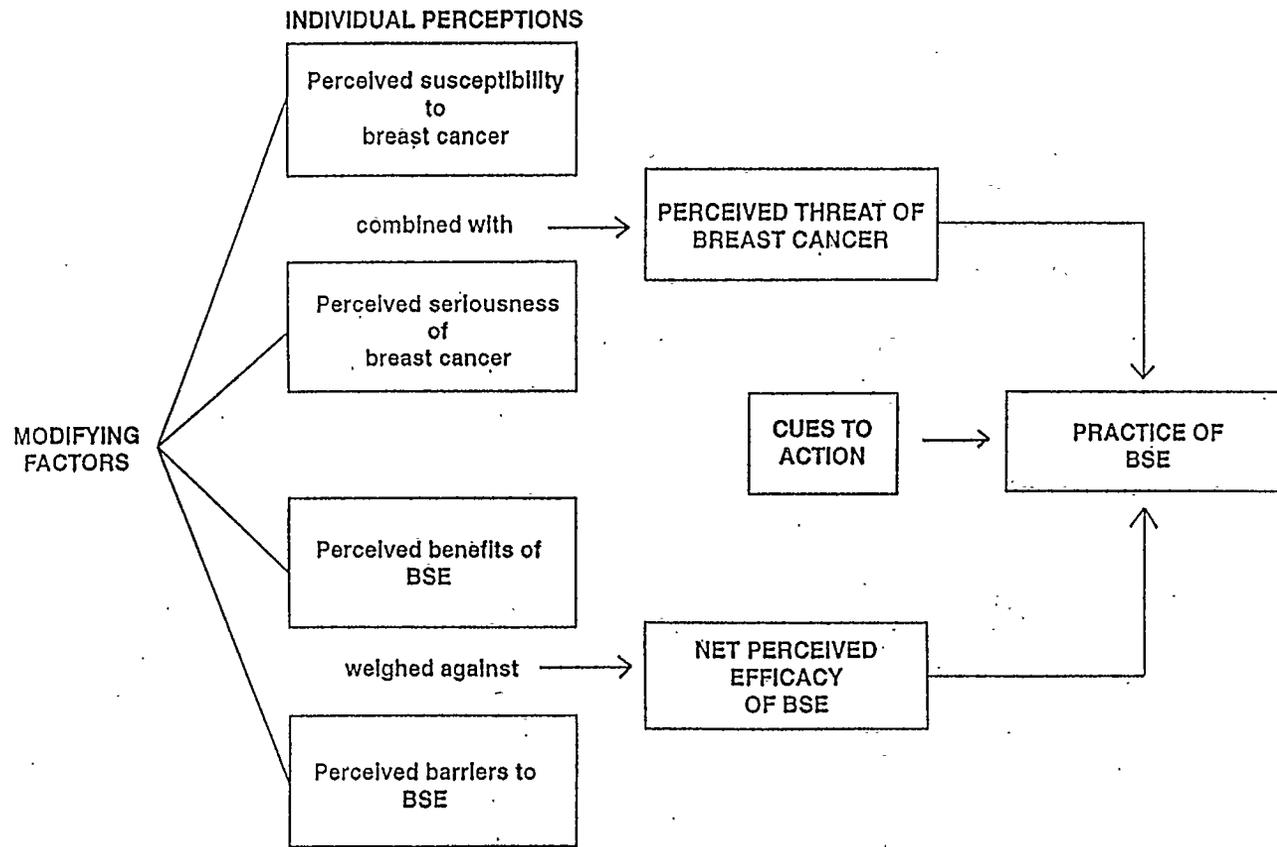


Figure 1. Major Variables and Constructs of the Health Belief Model Related to Breast Cancer and Breast Self-Examination.

Note: From "Breast Self-Examination and the Health Belief Model: Variations on a Theme." By M.A. Wyper. (1990). Research in Nursing and Health 50 p. 423. Copyright 1990 by John Wiley and Sons, Inc. Reprinted by Permission.

enhance the likelihood that women would learn this behavior and practice it indefinitely.

Another variable frequently associated with the HBM and often necessary to increase the likelihood of appropriate action is a cue or trigger. A health care professional can often have an impact in this area by providing cues that increase an individual's awareness of susceptibility, or by providing information that triggers perceptions of the seriousness of the disease (Pender, 1987). "Cues to action" as defined by Pender (1975) and used by Wyper (1990) are signals or instigating events which can be internal, such as perception of aging, or external and emanating from the environment, such as instruction by knowledgeable others (see Figure 1).

Self-efficacy, a concept derived from Social Learning Theory, has gained increasing recognition as a predictor of health behavior change and maintenance (Bandura, 1977). Rosenstock, Strecher & Becker (1988) suggested including self-efficacy as a separate HBM independent variable. They concluded that self-efficacy added to the model's explanatory value (Rosenstock et al. 1988). Since the HBM is increasingly focused on lifestyle behaviors requiring long term changes, people must feel they have the power to produce effects (Rosenstock, Strecher & Becker, 1990).

The theory of self-efficacy advances the basic premise that the expectation of personal mastery and success determines whether or not an individual will engage in a particular behavior (Bandura, 1982). Ascribed to this theory are two types of expectancies which are purported to exact powerful influences on behavior: (a) outcome expectancy which is the belief that certain behaviors will lead to certain outcomes; and (b) self-efficacy expectancy which is the belief that a person can successfully execute the

behavior required to produce the outcomes (Bandura, 1977). Underlying these expectancies and impacting outcomes are the individual's beliefs regarding self-efficacy. According to Bandura, one's belief in the ability to perform a behavior is an important link between knowing what to do and actually doing it. Besides knowing what to do, one must know how to do it and want to do it. If you think you can, and you want to, you probably will (Lawrence & McLeroy, 1986).

This study was guided by the HBM (Rosenstock, 1990). The conceptual focus of the HBM was modified by the Self-Efficacy Theory as defined by Bandura (1982). Selected aspects of Wyper's diagram were used as a framework to channel the direction of the study. Specifically, do increased knowledge and benefits in the form of education have an impact on perceived barriers to performing BSE? Do perceived barriers impact net perceived efficacy of BSE and further affect BSE practice? (See Figure 1).

Chapter 2

LITERATURE REVIEW

The literature was reviewed in relationship to the Health Belief Model (HBM) and breast care education as well as the use of the HBM in breast cancer screening. The research methods and theoretical frameworks used by other investigators to study breast cancer education and breast self-examination (BSE) practices were explored. Four specific breast care behaviors and beliefs were included in the literature review as related to this study. They were frequency and proficiency of BSE, perceived barriers, and self-efficacy in BSE.

The Health Belief Model and Health Behaviors

The Health Belief Model (HBM) has been researched in regards to several different health behaviors. Some of the research results have been significant. For example, Becker, Kaback, Rosenstock, & Ruth, (1975) found that participation in screening for Tay Sachs was significantly related to the constructs of susceptibility and severity. In another study, when tested with mothers of obese children, the variables of susceptibility, severity, benefits and barriers were significantly correlated to adherence with a reduction diet for the children (Becker, Maiman, Kirscht, Haefner, & Drachman, 1977). Aho (1979) also found that HBM variables were significantly related to flu inoculation behavior in senior citizens.

Results of these studies did not support or suggest a specific approach for intervention to be used by the practitioner (Mikhail, 1981). The

model did demonstrate flexibility and enabled practitioners to choose appropriate interventions. There was a potential, then, for application to a wide variety of health related actions in preventive and health promotion domains (Mikhail).

The Health Belief Model and Breast Care Practices

The use of the HBM in determining frequency of BSE was studied by Champion beginning in 1984. Champion's first study included the original four concepts of perceived susceptibility, seriousness, benefits and barriers developed by Becker (1974) and Rosenstock (1966).

Champion in her 1985 study included a fifth concept labeled health motivation which derived from the work of Becker, et al. (1977). Champion defined health motivation as "a state of concern (salience) about general health matters which results in positive health activities and willingness to seek and comply with orders which are believed to decrease disease" (Champion, 1985, p. 374). The study tested BSE practices with reliable and valid instruments (Champion, 1984) and included multivariate analyses.

A limitation of Champion's 1985 study was the use of a homogeneous convenience sample of mostly white Protestant subjects with educational levels of a sophomore in college. This sample may not have been representative of the population as a whole.

In her 1987 study, Champion added the variables of control, knowledge of breast cancer, and knowledge of BSE as independent variables. These variables were measured by scales previously tested for validity and reliability. Individual items measured frequency of BSE and method by which BSE was taught. This study and two additional studies

(Alagna & Reddy, 1984; Hallal, 1982) found the concept of control significantly related to BSE. Specifically, an individual's feeling of a sense of control over health outcomes was related to specific behavior. Champion, (1987) also reported that knowledge of breast cancer and knowledge of BSE were found to be positively related to frequency of BSE as well as to thoroughness of practice (Opinion Research Corporation, 1980; Trotta, 1980). In addition, the Opinion Research Corporation, (1980) found younger and better educated women more likely to practice BSE.

Perceived Barriers, Proficiency and Self-Efficacy as
Health Belief Model Constructs

Results of Champion's 1985 research affirmed the barriers construct as being the most significant in predicting frequency of BSE. This finding agreed with research by Trotta (1980) who also used the HBM to examine the frequency of BSE. Trotta analyzed a total of 446 responses. The concept of barriers explained the largest amount of variance in BSE with other HBM constructs being nonsignificant. According to Champion (1985), health motivation was the second most important variable in predicting BSE. People who were concerned about their health, in general, were more likely to examine their breasts. These observations have relevance for nurses when researching effectiveness of BSE education and when teaching and encouraging the practice of BSE.

Perceived barriers again significantly predicted frequency of BSE, accounting for a majority of the variance in Champion's 1987 study. The results of that study were not theoretically consistent with the HBM which predicts health behavior based on all five attitudinal constructs. Of particular significance to nursing was the following conclusion:

Although women might learn breast self-examination through pamphlets or audio visual material, the experience of being taught breast self-examination by health professionals may help to increase compliance for this important behavior. A primary responsibility of nurses is health teaching and professional nurses need to assume the role of teaching breast self-examination for all women clients (Champion, 1987, p. 381).

A subsequent study by Champion (1988) was conducted to examine the relationship between attitudinal variables specified by the HBM and related to intent, frequency and proficiency of BSE. Specifically, the three dependent variables of intent, frequency and proficiency were examined for extent of association with the independent variables of perceived susceptibility, seriousness, benefits, barriers, health motivation, control and cues. Champion considered cues to action as a significant factor, and used them as part of the HBM as identified by Becker (1974) and Rosenstock (1966). Cues were defined as factors that serve to precipitate behaviors and/or increase the likelihood of health action taking place. Findings suggested that in addition to barriers and health motivation, which had been significant in previous studies, the concepts of susceptibility, seriousness and control may be important. Since this study design was correlational in nature, even though these variables proved significant in predicting self-reported intentions, frequency, and proficiency of BSE, little is known about how change in these variables might affect actual behaviors (Champion, 1988).

Lashley (1987) examined predictors of BSE practice in elderly female subjects in selected senior centers using the HBM as a theoretical

framework. She sought to measure frequency of BSE performance and BSE techniques. Her findings were similar to previous studies with fewer perceived barriers to BSE resulting in higher BSE technique scores. Receiving instruction through a class on BSE also was related to BSE technique (Lashley, 1987). Limitations of Lashley's study included use of a small convenience sample which weakened generalizability of results to other study populations.

Olson and Mitchell (1989) concluded that self-confidence was a critical factor in BSE frequency. Satisfaction with BSE ability and ability to explain BSE technique significantly predicted frequency of BSE. This finding was consistent with Bandura's self-efficacy theory (1977) which emphasized the importance of assessing confidence in one's skill to predict adoption and persistence of any health behavior. Rosenstock, Strecher, and Becker, (1988), acknowledged the importance of individuals' perception of their competence to perform a behavior and suggested including self-efficacy as a separate HBM independent variable.

From their research finding, Olson and Mitchell (1989) concluded that perceived risk of developing breast cancer did not predict BSE behavior. They determined that teaching programs emphasizing explanations and demonstration of BSE technique were essential.

Wyper (1990) mathematically combined HBM variables to form two collective constructs, perceived threat of breast cancer and net perceived efficacy of BSE. Wyper sought to determine their combined influence on BSE performance. (see Figure 1). As in previous studies, barriers were the most powerful dimension of the model in both univariate and multivariate analyses. Seriousness (perceived threat) was a poor predictor of BSE

practice. Benefits (perceived efficacy) which had been significant in some previous HBM studies had little significance and did not improve the explanatory value of the HBM. Wyper concluded that attention should be directed toward (a) decreasing perceived barriers to BSE (b) exploring the relationship of perceived self-efficacy to BSE practice and (c) designing and evaluating nursing strategies to enhance a persons actual competence in performance of BSE.

Breast Self-Examination and Related Theories of Relevance

Lauver (1987) suggested that complementary theories needed to be considered. In her article, Lauver compared three perspectives of relevance to BSE; the HBM, self-efficacy theory, and self-regulation theory. Empirical support in BSE research was cited for each theory. Lauver concluded that relevance of the constructs of perceived benefits, general health motivation, perceived susceptibility, perceived seriousness of the impact of breast cancer and socioeconomic status, to BSE frequency had not been well supported empirically. Lauver cited several major studies as sources of her findings (Bennett, Fleishmann, & Lawrence, 1983; Champion 1984, 1985, 1988; Siero, Kok, & Pruyn, 1984; and Trotta, 1980). Trotta, (1980) tested the combined effect of several variables of the HBM on BSE and found no relationship between perceived benefits and BSE frequency. However, cues such as media messages were found to be positively associated with BSE frequency. Bennett et al. (1983) and Siero et al. (1984) concurred that perceived susceptibility to breast cancer, perceived seriousness of the impact of breast cancer, and the sociodemographic variables (such as age, education, socioeconomic and marital status) were

not found to be associated with the frequency of BSE. Barriers have consistently accounted for the most variance on BSE behavior, between 12% and 27% in a majority of research articles (Champion, 1985, 1987; Lashley, 1987; Trotta, 1980; Williams, 1988).

Lauver (1987) described self-efficacy theory as an additional theoretical perspective of the HBM used to guide BSE research. Lauver defined the central construct of self-efficacy theory as "the judgment of how well one can act in a stressful situation" (Lauver, 1987, p.19), and stated that self-efficacy captured what was measured by the construct of perceived barriers in the HBM. A previous study by Brailey, (1986) found moderate but significant correlations between perceived self-efficacy and frequency of BSE after BSE education. Brailey used the PRECEDE model for health education planning in her study and found skill in technique to be an enabling factor through which health education could influence health behavior. One of the conclusions of Brailey's study was that both group and individual teaching interventions for BSE were effective in increasing women's frequency of BSE, perceived skill in their technique and confidence in their skill.

Results of Champion's studies (1985, 1987, 1988 and 1991) substantiate the need for intervention research as a means of increasing BSE frequency and proficiency (Champion, 1991). Possible interventions to research might include examining the effectiveness of specific BSE teaching protocols on breast care practices for women in high risk age groups.

Research by Calnan and Rutter (1986) demonstrated that even a single class on BSE is valuable, particularly for improving technique. This study investigated three groups of women of the age group 35-59, 278 of

whom accepted an invitation to attend BSE classes and were taught the techniques in detail, 262 who declined the invitation and 594 controls to whom no classes were offered but whose beliefs and self-reported behaviors were measured. Calnan & Rutter's results suggested that health education might be more effective in encouraging frequency of BSE if it focused on changing beliefs about the value of the behavior rather than beliefs about susceptibility to breast cancer.

Maddox (1991), using the Self-Care Deficit Theory as a theoretical framework, determined in her study that women ages 60 to 80 or more years, often feel unsure about their ability to perform BSE properly, and many know very little about this self-care practice. Although some documentation exists, limited research about BSE practice in this age group of women has been conducted. Maddox's study examined the effects of BSE instruction including breast model demonstration as a nursing intervention on confidence level, frequency and accuracy of BSE performance. Confidence was defined as each subject's perceived self-efficacy in performing BSE correctly. Frequency was self-reported as actual number of times BSE was performed between nursing intervention and 3 month follow-up post-class evaluation. Accuracy was demonstrated and scored by each woman actually locating various abnormalities within sample breast models at the 3 month follow-up post-class evaluations (Maddox, 1991).

Conclusions of Maddox's 1991 study included the following; (a) the teaching method of return demonstration had a positive effect on level of confidence in performing BSE, (b) an increase in the practice of BSE on a monthly basis was reported, (c) nursing activities that include planned BSE

teaching sessions benefit women of all ages, (d) nurses need to continue to incorporate teaching as a method of helping when interacting with older women, and (e) older women feel more confident about their ability to perform BSE correctly when nurses include individual BSE self-demonstrations in their interventions.

Some limitations of Maddox's (1991) study were lack of a control group, uneven distribution of subjects in the 3 groups based on age and lack of a standardized test. Construct validity and test-retest reliability were established only by review of a panel of experts and through pilot testing of the instrument.

There is documented research that 75% of breast cancers occur in women 50 years of age and older (American Cancer Society, 1992) and 90% of breast lumps are found by women themselves or their partners (O'Dell et al., 1991; Poole & Judkins, 1990; Strax, 1990). Studies that look at this high risk age group to determine types of breast care education that most effectively improve BSE practice are desirable components of nurse research disciplines.

Breast Care Education

Nursing research supports the premise that self-confidence in one's ability to perform BSE is critical (Champion, 1989; Maddox, 1991; O'Dell et al. 1991; Olson & Mitchell, 1989). Findings from Olson and Mitchell's 1989 study suggest that a nursing intervention approach that minimizes fear and anxiety over the possibility of developing breast cancer and maximizes women's sense of confidence and competence is indicated. Providing specific information about BSE techniques, recommending BSE as a

self-screening procedure and identifying community programs for early detection may alleviate some anxiety (Frank-Stromborg, 1986).

Health education can be defined as "the process of assisting individuals, acting separately or collectively, to make informed decisions about matters affecting their personal health and that of others" (National Task Force on the Preparation and Practice of Health Educators, 1983, p. 50). The central concern of health education is health behavior. Positive changes in health behavior are the ultimate aims of health education programs. Nurses bring to health education a particular expertise in working with individual patients and groups of patients to facilitate learning and behavior change (Glanz, Lewis, & Rimer, 1990). In addition, nurses working in community based organizations such as ambulatory care clinics, retirement centers and golden age centers are in ideal settings to provide client education and to plan and provide screening programs (Frank-Stromborg, 1986). Client education has historically been in the domain of nursing and is an important independent function of professional nursing (Spellbring, 1991).

Chapter 3

METHODOLOGY

Design

A quasiexperimental, 1 group, pretest and posttest design was used to examine the effectiveness of a specific teaching protocol, breast self-examination (BSE) on breast self-examination practice. The treatment variable was 1 hour of group instruction developed and implemented by the nurse educator for the purpose of providing cognitive information about breast cancer and procedural knowledge of BSE. The groups numbered 4 to 12 subjects per class. The study design was chosen to allow determination of the influence of BSE education on BSE practice; specifically, does small group instruction in BSE including discussion, demonstration and guided practice, (a) increase self-reported frequency of BSE? (b) increase perceived proficiency in performing BSE? (c) decrease perceived barriers to BSE? (d) increase perceived self-confidence in performing BSE?

Ipsative controls with each participant serving as her own control was used (Woods & Catanzaro, 1988). Each participant's original set of values in relation to practice of BSE before the treatment variable was compared to their subsequent values and practice of BSE 3 months after the treatment variable. Modifying demographic variables of age, educational level and history of diagnosed breast cancer were assessed as the pretest was administered.

Sample

The population included in this study were females, 50 years of age or older, and had no history of diagnosed breast cancer. Prospective subjects in the study were contacted by announcements in "Senior News", the official monthly newsletter of Yellowstone County Council on Aging, and by individual invitation to participate through Deaconess Medical Center's DEACONESS 65 Club. DEACONESS 65 is a service/socialization department of Deaconess Medical Center, Billings, Montana, designed to meet financial, transportation and health information needs of people 65 years of age and older. It also serves as the managing unit for Deaconess Medical Center's Volunteer group. This volunteer group which may include women younger than 65 years of age provides a wide range of services for the medical center. In return, the volunteer group receives selected health promotion benefits including breast care education. This constitutes a convenience sample of women who join DEACONESS 65 to use those services or who do volunteer work at Deaconess Medical Center. The convenience sample also included women who frequented Yellowstone County Council on Aging Senior Centers. The researcher recognizes the scope of this study was limited by the use of this accessible population who were easy to identify and available to contact. The study thus excluded women in an institution or being cared for in a hospital or extended care facility at the time the study was initiated.

The announcement of the breast care class and invitation to attend went to approximately 500 households within Yellowstone County. The educational opportunity was presented as a community class supported by DEACONESS 65 and Yellowstone County Council on Aging. The first 50

women who volunteered to participate, signed an informed consent and met the criteria of being 50 years of age or older, and had no previous history of diagnosed breast cancer were included in the study. The study dealt with health values and health promoting behaviors, phenomena that are heterogeneous in humans, however, the people sampled were of the same gender and were all over 50 years of age. In addition, they comprised a group of women who accessed senior services at DEACONESS 65 and Yellowstone County Council on Aging, so there was some homogeneity of the subjects. Since the study had one independent variable, BSE education, the rule of thumb requirement of "multiplying the number of variables by 40 subjects for a large size sample" (Ackerman & Lohnes, 1981, pg. 93) was applied. Ten more subjects were added to allow for a 25% attrition rate.

Data Producing Instruments

Operational and conceptual definitions for the study's independent variable of BSE education and dependent variables of self-reported frequency, proficiency, and perceived barriers and self-efficacy were as follows:

1. BSE education is cognitive information about the breast and breast cancer. Information about the structure and composition of the breast and aging changes that normally occur was included, as well as importance of early detection of breast changes and statistical documentation of the need of BSE. BSE procedures were operationalized by the use of a 20 minute video tape demonstrating step by step BSE (American Cancer Society, 1987). Participation was accomplished by the use of breast models for palpation and by guiding participants through an examination of their own breasts

through their clothing. (See Appendix B for BSE class content and step by step BSE).

2. Frequency was defined as a behavior of BSE and was measured by a single question which asked the number of times BSE was completed (Champion, 1985). For this study the question was asked for the 3 months immediately previous to BSE education and in the post-class survey, for the 3 months immediately after the BSE class. (See Appendix C, Pre- and Post-Class Survey Part I).

3. Proficiency was evaluated for this study as competence and thoroughness related to using the pads of the fingers for the examination, systematic examination method, and position and length of examination time. (Champion, 1993). In this study proficiency was assessed pre- and post-BSE class by use of the 11 item scale developed by Champion in 1988 and reevaluated by Champion in 1993. (See Appendix C, Pre- and Post-Class Survey Part II, Section 1).

4. Perceived barriers as defined by Champion (1985), are "the negative components of an anticipated behavior which would be undertaken for the purpose of detecting disease and/or maintaining health Negative aspects might include problems such as monetary consequences, pain, changing habits, inconvenience, embarrassment, side effects, or need for new patterns of behavior." (Champion, 1985, p. 374). For the purpose of this study, the presence of barriers was assessed pre- and post-BSE class by use of the 6 item scale subsequently developed by Champion in 1993 (See Appendix C, Pre- and Post-Class survey Part II, Section 1).

5. Self-efficacy is perceived confidence in ability to perform BSE effectively, to detect breast lumps, and to discriminate between normal and abnormal

breast tissue during BSE (O'Dell et al., 1991). A new scale developed and used by Champion (1993), assessed "confidence, perceived procedural competence to perform breast self-examination with perceived ability to detect abnormal lumps" (Champion, 1993, p. 140). (See Appendix C, Pre- and Post-Class Survey Part II, Section 2).

Indicators

Indicators for BSE education included attendance and active participation in a 1 hour small group instruction session. Active participation was evidenced by return demonstration of the systematic BSE method presented on provided breast models and by personal examination of subjects own breasts, through their clothing. Cognitive information was assessed through discussion and a question and answer period.

The indicator for frequency of BSE was measured by asking participants how often they examined their breasts during the 3 months prior to instruction and for the 3 month period immediately following BSE instruction. This question was included with 4 questions related to proficiency and 6 additional items measuring thoroughness (Champion, 1988). As developed by Champion (1988) thoroughness questions addressed the following items; looking at breasts in the mirror, looking for puckering or dimpling of the skin, examining breasts with the pads of fingers, examining breasts in a circular motion, looking for discharge from the nipples and feeling the areas between the armpit and breasts (see Appendix C Pre- and Post-Class Survey, Part 1). Items were summed for a total score to measure this variable. Champion incorporated items for proficiency in the 1988 study from the research of Ronis (1985) and Opinion Research Corporation Polls (1980). Written permission was sought and received from

Champion to use this measurement of the dependent variables of frequency and proficiency (see Appendix D).

The indicators for perceived barriers as redesigned by Champion (1993) included six items related to embarrassment, convenience and changing habits. These attitudinal items were measured on a Likert scale and scored with strongly agree equal to 1 and strongly disagree equal to 5 (Champion, 1993).

Indicators of perceived self-efficacy focused on level of confidence in ability to carry out a behavior and to perform BSE correctly. This included perceived ability to recognize normal feeling breast tissue, and perceived ability to identify changes or abnormalities in breast tissue. Perceived self-efficacy was measured on an 11 item scale developed and used by Champion (1993). Items were measured on a Likert scale and scored with strongly agree equal to one and strongly disagree equal to five.

Validity and Reliability

Champion's 1985 study, which operationally defined and tested the concept of barriers, used a convenience sample of 301 women drawn from a large metropolitan city. The women were of varying ages, races, religions and socioeconomic classes. Internal consistency reliability was determined for testing barriers using Cronbach alpha with a resulting coefficient of .76. Test, retest reliability using Pearson r was at .83. Content validity for test items was judged by faculty and colleagues familiar with the Health Belief Model. Construct validity was established via factor analysis and multiple regression.

In 1988 Champion conducted a correlational study to identify the attitudinal variables of frequency and proficiency of BSE. A probability

sample was used consisting of 380 women age 35 years and over who were contacted via random digit dialing. The target population was all women 35 years of age and older who had not had breast cancer. The women in the sample ranged in age from 35 to 81 years and had a mean educational level of 12.97 years. The internal consistency coefficient for proficiency including frequency of BSE was .73. Content validity was established via a panel of national experts and construct validity established through factor analysis and multiple regression. Discriminant analysis was used for the frequency variable which was measured with only one item.

In 1993, Champion, using the context of breast cancer and BSE, conducted a study to refine an instrument to measure the HBM concepts of susceptibility, seriousness, benefits, barriers, health motivation and confidence. The study used a random sample of 581 women 35 years of age and over from a metropolitan area. Sample population age ranged from 35 to 88 years old. The mean educational level was 13.7 years. Items for these instruments were subjected to content analysis by national experts. Construct validity was established using exploratory factor analysis. Criterion-related validity was established by relating developed instruments to BSE behavior using simultaneous multiple regression and bivariate correlations. Cronbach's alpha reliability coefficients for the revised scales ranged from .80 to .93. Test-retest correlations ranged from .45 to .70 (Champion, 1993). Written permission was received (see Appendix D) to use the scales to measure perceived barriers and confidence (perceived self-efficacy) for this researcher's study. (see Appendix C, Part II, Sections 1 & 2.)

Confidence as the most recent concept added to the HBM, was equated with Bandura's construct of self-efficacy (Bandura, 1977), by Rosenstock, Strecher, & Becker (1988). Results so far have shown a significant positive association (Brailey, 1986; Celentano, 1983; Edgar, Shamian & Patterson, 1984; Lauver & Angerame, 1988). For this study the most recent concept of confidence was used as adopted and tested by Champion (1993) rather than the concept of self-efficacy.

Methods of Procedure

The research setting for the study was senior community centers of Area II Council on Aging and DEACONESS 65 Nurse Service classrooms of Deaconess Medical Center. Entry to this setting was assured since Area II Council on Aging requests and receives health promotion and maintenance programs from DEACONESS 65 nurse service for their members on a regular and continuing basis. The Vice-President of Deaconess Medical Center's Clinical Outreach Division and the Executive Director for Council on Aging were informed of intent to research. The overall goal of the study was stated. Written permission was obtained to contact the sample population and use described facilities and resources (see Appendix E).

Participants were informed that the nurse researcher was conducting a survey to study the effects of breast care education. They were invited to be part of the study and assured that participation in the survey was entirely voluntary and was not required to attend the BSE class.

Subjects who chose to participate were asked to read and sign an informed consent. The informed consent; (a) stated the survey was a research project; (b) explained the purpose of the research; (c) explained that as participants, they were requested to complete a pre-BSE class survey

and give permission to be contacted by mail and/or phone 3 months after the BSE class to complete a second survey; (d) assured participants they could discontinue participation in the study at any time, (e) assured participants of confidentiality (see Informed Consent Form, Appendix F). Participants in the study were given an information sheet that directed them to contact the nurse researcher should they have questions or concerns about information they were given or survey questions they answered (see Appendix G).

Data Collection

Demographic information obtained from each participant included age, educational level and history of diagnosed breast cancer (see Demographic Information Sheet, Appendix H). A personal history of diagnosed breast cancer excluded that subject from the study. As pre-BSE class surveys were collected, each was assigned a code number consisting of subject initials and date of birth by year, month and day. Surveys and address sheets thereafter were kept in a separate locked file accessible only to the researcher (see Appendix C for Pre-Class Survey Form).

A 3 month post BSE class survey was sent to each participant (see Appendix C). A self-addressed, stamped envelope was enclosed. Each survey form and envelope had the subjects' letter and number identifying code matching the identifying code on each pre-BSE class survey. If there was no response after 10 days, the nurse researcher contacted each non-respondent by telephone and encouraged the subject to complete and return the survey form regardless of BSE practice during the 3 months since the class. If that was not possible, a telephone interview covering survey questions was conducted. According to Woods & Catanzaro (1988) telephone

or voice to voice interviews are an acceptable method of collecting data and produce a high interview completion rate. If the post-BSE class survey was not obtained, the subject was dropped from the study.

Class Procedure

All teaching sessions including redemonstration were conducted by the same nurse researcher. Didactic information was given to women in groups of 4 to 12, so personalized demonstration and guided practice could be facilitated by the nurse researcher. Because of site limitations privacy could not be assured so redemonstration was done using breast models and by the women themselves on their own clothed breasts. Components of the breast care and BSE class were as follows:

- I. Introduction
 - A. Statistics on prevalence of breast cancer in the United States (American Cancer Society, 1992, 1993).
 - B. Anatomy of the breast and surrounding structures
- II. Breast Self-Examination (BSE)
 - A. Critical components
 - B. Basic Steps of BSE, 20 minute video (American Cancer Society, 1987).
 - C. Breast Model Demonstration and Instruction
 - D. Re-demonstration by participants
 - E. Discussion
 - F. Questions and Answers (American Cancer Society, 1987).
(See Appendix B for narrative of class content and pictorial guide to BSE).

Methods of Analysis

Descriptive statistics were used to summarize the demographic data collected. Frequency and percent of each age group was reported. Age categories were expressed as groups from 50-59, 60-69, 70-79, 80-89, and 90 and above. A mean and standard deviation for age was given. Range of age represented was stated. Level of education was ranked as follows:

- 0 - no formal education
- 1 - some grade school
- 2 - completed grade school
- 3 - some high school
- 4 - completed high school
- 5 - some college or technical school
- 6 - completed college

Range, mean and SD of educational levels were given along with frequency and percent for each educational level.

Inferential statistical procedures were used to test whether the independent variable of breast care education significantly impacted the 4 dependent variables of frequency, proficiency, barriers and self-confidence. A *t* test for paired samples was used to compare pre- and post-BSE education dependent variables. A one-tailed test was used since the hypotheses were that BSE education would increase BSE frequency and proficiency, decrease perceived barriers and increase perceived self confidence. The *p* value was <.0001. A social science statistical package was used.

Protection of Human Subjects

There were minimal risks associated with this study. However, inherent in the educative process is the intent to influence an individual's

health related behavior, either by providing information for decision making or by attempting to change attitudes or values (Pender, 1987). Attendance at an information giving session then might carry a risk of behavior change and result in fear or discomfort. Increased awareness of a potential health threat may cause anxiety. Subjects may also perceive increased knowledge as a threat to personal vulnerability (Damrosch, 1991). Attending a breast care class has the potential risk of causing anxiety related to competence in performing BSE and the possibility of discovering breast changes that indicate pathology. For some women, viewing a naked female breast and being encouraged to examine and palpate a breast model and/or their own breasts may cause some embarrassment and discomfort (Love, 1991).

Benefits for participants included up-to-date statistics about breast cancer and information about breast care practice. Increased awareness of self-examination techniques and increased knowledge of breast structure may increase self-confidence in ability to maintain and protect their own health (Maddox, 1991). Pender (1987) stated that beliefs about the effectiveness of recommended health protective action, such as BSE appear to be important determinants of behaviors. According to the United States Preventive Services Task Force, addressing personal health behaviors in this way is of benefit to individuals in reducing the incidence and severity of disease and disability (Fisher, Ed. 1989).

As previously stated in the Methods of Procedure section, all data collected was kept confidential and individuals were not identified in any report. Participants had the right to withdraw from the study at any time without being questioned or coerced into continuing. Locked, limited access storage for demographic information sheets, signed consent forms and

completed surveys will be maintained by the nurse researcher for a 5 year period after completion of the study. Duplicate signed informed consent forms are held in a locked, limited access file by the College of Nursing, Montana State University for a period of 5 years. Approval for this study was obtained from the Human Subjects Committee in the College of Nursing and Montana State University (see Appendix I).

Chapter 4

DATA ANALYSIS

The purpose of this study was to document the impact of breast self-examination (BSE) education on BSE practices of women 50 years of age or older, who had no history of breast cancer. A survey was completed by each participant before BSE education and again 3 months after BSE education. The content of the pre- and post-education surveys was identical. The questions were designed to elicit information regarding each woman's frequency of BSE, perceived proficiency of BSE, perceived barriers to BSE, and perceived self-confidence in performing BSE.

Fifty one women signed informed consents, completed pre-BSE education surveys and attended BSE education class. Two women were eliminated from the study because of stated previous breast cancer diagnoses. Forty one women completed and mailed back surveys 3 months after the BSE class. Four women were contacted by telephone and completed the survey during the telephone interview. One woman dropped out of the study because of physical disability due to arthritis. Two women were unavailable to complete the study because of hospitalization and one woman was away for the winter. A total of 45 or 88% of the women attended BSE education, completed both pre- and post-BSE education surveys and were included in this study.

Demographics

Demographic data obtained for this study included age and level of education. The age range for study participants was from 51 to 95 years

(see Table 1). The mean age was 71.7 years (SD = 9.32). The 70 to 79 years of age group was the largest with 46.67% of the study subjects. The sample group was white, middle class females, who were actively involved in a volunteer group or visited a senior center regularly.

Table 1. Demographic Data for Age Groups.

Age Groups	Mean Age	Number In Group	% of Each Group
50 - 59	55.20	5	11.11
60 - 69	65.00	11	24.44
70 - 79	73.95	21	46.67
80 - 89	83.86	7	15.56
90 - up	95.00	1	2.22
Totals	71.71	45	100.00

Educational levels were arranged in 6 groups. Educational level 1 was designated as some grade school. Educational level 2 specified grade school completion. Educational level 3 was designated as some high school. Educational level 4 had completed high school. Educational level 5 was equivalent to some college or technical school. Educational level 6 was designated as completed college or technical school. The largest percentage of women in the survey, 37.78% were in educational level 4 and had completed high school (see Table 2).

Table 2. Demographic Data for Educational Levels.

Ed. Levels	Age Groups					Ed. Levels Total n=45
	50-59 n=5	60-69 n=11	70-79 n=21	80-89 n=7	90-up n=1	
1			1	2		3 6.67%
2		2	1		1	4 8.89%
3		2	1	1		4 8.89%
4	3	2	10	2		17 37.78%
5	1	4	2	1		8 17.77%
6	1	1	6	1		9 20.00%
					Total	100.00%

Frequency of Breast Self-Examination

The first dependent variable, frequency of BSE was measured by a single question which asked the number of times BSE was completed in the 3 months previous to BSE education. The post-BSE education survey period was for the 3 months following BSE education. Responses were assigned values from 0 to 4, representing the number of times BSE was performed monthly.

In the pre-BSE education survey, the largest number of respondents, 16 or 35.5% reported a BSE frequency of one time for the 3 month survey period (see Table 3). The pre-BSE education mean for frequency was 1.53 (SD=1.10).

In the 3 month post-BSE education survey, the largest number of respondents 17 or 37.8% represented a BSE frequency of 3 times for the 3 month survey period (see Table 3). The mean frequency was 2.28 (SD=1.12).

Table 3. Frequency of BSE

Pre-Ed. Survey			Post-Ed. Survey		
Freq./ Mo.	Number Respond.	%	Freq./ Mo.	Number Respond.	%
0	8	17.8	0	4	8.9
1	16	35.5	1	6	13.3
2	12	26.7	2	13	28.9
3	7	15.6	3	17	37.8
4	2	4.4	4	5	11.1
Total	45	100.0		45	100.0
Mean Freq.	1.53			2.29	
SD	1.10			1.12	
<i>t</i> test for Paired Samples					
Mean (diff.)	.75				
SD	.93				
T-Value	5.43*				

* $p \leq .0001$

The mean difference between pre- and post-BSE education survey results for frequency of BSE was .75 (SD=.93). A *t* test for paired samples was used to test the significance of frequency between the mean of the pre- and post-BSE education survey scores with a resulting T-Value of 5.43 ($p \leq .0001$). The self reported frequency rate of BSE increased at a statistically significant level from pre- to post-BSE education surveys.

Perceived Proficiency

The second dependent variable of perceived proficiency was determined by using a summated score of 10 questions related to self-reported competence and thoroughness. The items were rated so that increasing magnitude indicated better practice. Possible scores ranged from a minimum of 8 to a maximum of 39.

Perceived proficiency values ranged from 8 to 32 for the pre-BSE education survey. Nineteen was the most frequently occurring score represented by 6 or 13.3% of the respondents. The perceived proficiency mean for the pre-education survey was 21.15 (SD=5.54) (see Table 4).

Post-BSE education survey scores for perceived proficiency ranged in value from 10 to 36. The most frequently occurring score was 28 represented by 7 respondents or 15.6%. The perceived proficiency mean for the post-education survey was 25.55 (SD=5.91) (see Table 4).

The mean difference between the pre- and post-BSE education surveys for perceived proficiency was 4.40 (SD=4.60) (see Table 4). A *t* test for paired samples used to test the significance of perceived proficiency between the mean of the pre- and post-BSE education survey scores yielded a T-Value of

Table 4. Perceived Proficiency in BSE

Profic. Score	Pre-Ed. Survey		Post-Ed. Survey	
	Freq.	%	Freq.	%
8 (less profic)	1	2.2	0	0.0
10	0	0.0	1	2.2
11	1	2.2	0	0.0
12	1	2.2	1	2.2
13	0	0.0	1	2.2
14	1	2.2	0	0.0
15	2	4.4	1	2.2
16	2	4.4	0	0.0
17	3	6.7	0	0.0
18	3	6.7	1	2.2
19	6	13.3	0	0.0
21	5	11.1	2	4.4
22	4	8.9	4	8.9
23	1	2.2	3	6.7
24	3	6.7	1	2.2
25	3	6.7	4	8.9
26	2	4.4	2	4.4
27	1	2.2	3	6.7
28	0	0.0	6	13.3
29	0	0.0	2	4.4

(table continues)

Profic. Score	Pre-Ed. Survey		Post-Ed. Survey	
	Freq.	%	Freq.	%
30	3	6.7	2	4.4
31	2	4.4	2	4.4
32	1	2.2	4	8.9
33	0	0.0	3	6.7
34	0	0.0	1	2.2
36 (more profic.)	0	0.0	1	2.2
Total	45	100.0	45	100.0%
Profic. Mean	21.15		25.55	
SD	5.54		5.91	
<i>t</i> test for Paired Samples				
Mean (Diff.)	4.40			
SD	4.60			
T-Value	6.41*			

* $p \leq .0001$

6.41 ($p \leq .0001$). The perceived proficiency scores increased at a statistically significant level from pre- to post-BSE education surveys.

Perceived Barriers

The third dependent variable of barrier scores was the result of a summated score of 6 questions using a Likert Scale of 1 = Agree Strongly to 5 = Disagree Strongly. The higher the total score the fewer perceived

barriers to BSE. Possible scores ranged from a minimum of 6 to a maximum of 30.

Pre-BSE education survey scores for perceived barriers ranged from 11 with a frequency of 1 at 2.2% to a score of 30 with a frequency of 6 at 13.3%. The perceived barrier mean was 22.95 (SD=5.49) (see Table 5).

Post-BSE education survey scores for perceived barriers ranged from a score of 12 to a score of 30 with a frequency of 8 at 17.8%. The perceived barrier mean for the post-education survey was 25.11 (SD=4.62) (see Table 5).

The mean difference between pre- and post-BSE education surveys for perceived barriers was 2.15 (SD=4.23) (see Table 5). A *t* test for paired samples used to test significance of barriers between the mean of the pre- and post-BSE education surveys yielded a T-Value of 3.41 (SD = 4.23) (see Table 5). The perceived barrier scores increased at a statistically significant level from pre- to post-BSE education surveys.

Table 5. Perceived Barriers to BSE.

Barriers Score	Pre-Ed. Survey		Post-Ed. Survey	
	Freq.	%	Freq.	%
10 (more barr.)	0	0.0	1	2.2
11	1	2.2	0	0.0
12	1	2.2	1	2.2
13	2	4.4	0	0.0
15	2	4.4	0	0.0
17	1	2.2	1	2.2

(table continues)

Barriers Score	Pre-Ed. Survey		Post-Ed. Survey	
	Freq.	%	Freq.	%
18	3	6.7	2	4.4
19	1	2.2	1	2.2
20	1	2.2	2	4.4
21	3	6.7	1	2.2
22	6	13.3	3	6.7
23	6	13.3	1	2.2
24	1	2.2	2	4.4
25	1	2.2	4	8.9
26	1	2.2	4	8.9
27	2	4.4	5	11.1
28	1	2.2	5	11.1
29	6	13.3	4	8.9
(less 30 barr.)	6	13.3	8	17.8
Total	45	100.0	45	100.0
Barrier Mean	22.95		25.11	
SD	5.49		4.62	
<i>t</i> test for Paired Samples				
Mean (Diff.)	2.15			
SD	4.23			
T-Value	3.41*			

* $p < .0001$

Perceived Self-Confidence

The fourth and last dependent variable was perceived self-confidence. These levels were determined by use of a Likert Scale using values from 1 = Agree Strongly to 5 = Disagree Strongly. The scores were summed for eleven questions. The higher the score the less perceived self-confidence. Possible scores ranged from a minimum of 11 (more self-confidence) to a maximum of 55 (less self-confidence).

Pre-BSE education scores for perceived self-confidence ranged from 16 to 55. The perceived self-confidence mean for the pre-education survey was 30.68 (SD=9.4) (see Table 6).

Post-BSE education scores for perceived confidence ranged from 12 to 55. The mean score was 25.29 (SD=8.09) (see Table 6).

The mean difference between pre- and post-BSE education survey scores for perceived self-confidence was -5.40 (SD=7.08). The minus score was the result of reversing the magnitude value with the higher scores signifying the less perceived self-confidence. A *t* test for paired samples used to test significance of perceived self-confidence between the mean of the pre- and post-BSE education survey scores yielded a T-Value of -5.11 (SD=7.08) (see Table 6). The perceived self-confidence scores decreased at a statistically significant level from pre- to post-BSE education surveys.

In regard to questions related to perceived self-confidence, 53% of the respondents, in the pre-BSE education survey disagreed with statement 3: "If I were to develop breast cancer, I would be able to find a lump by performing breast self-examination." Fifty-three percent of the respondents also disagreed with statement 4, "I am able to find a breast lump if I practice breast self-examination alone". In the post-BSE

Table 6. Perceived Self-Confidence in BSE

Conf. Score	Pre-Ed. Survey		Post-Ed. Survey	
	Freq.	%	Freq.	%
12 (more conf.)	0	0.0	1	2.2
16	1	2.2	4	8.9
17	0	0.0	1	2.2
18	2	4.4	3	6.7
19	1	2.2	3	6.7
20	1	2.2	2	4.4
21	2	4.4	1	2.2
22	2	4.4	2	4.4
23	3	6.7	2	4.4
24	2	4.4	5	11.1
25	3	6.7	2	4.4
26	1	2.2	4	8.9
27	3	6.7	1	2.2
28	0	0.0	1	2.2
29	0	0.0	3	6.7
30	4	8.9	1	2.2
32	2	4.4	4	8.9
33	3	6.7	1	2.2
34	2	4.4	0	0.0
35	1	2.2	0	0.0

(table continues)

Conf. Score	Pre-Ed. Survey		Post-Ed. Survey	
	Freq.	%	Freq.	%
36	1	2.2	0	0.0
37	0	0.0	1	2.2
38	1	2.2	0	0.0
39	1	2.2	0	0.0
40	2	4.4	0	0.0
41	2	4.4	0	0.0
42	0	0.0	2	4.4
44	1	2.2	0	0.0
46	2	2.2	0	0.0
53	1	2.2	0	0.0
(less 55 conf.)	1	2.2	1	2.2
Total	45	100.0	45	100.0
Conf. Mean	30.68		25.28	
SD	9.40		8.08	
t test for Paired Samples				
Mean (Diff.)	-5.40			
SD	7.08			
T-Value	-5.11*			

*p<.0001

