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**PERCEIVED BENEFITS AND BARRIERS AND
MAMMOGRAPHY SCREENING COMPLIANCE
IN WOMEN AGE 40 AND OLDER**

BY

Amy Hoke VanZee

A THESIS

**Submitted to
Grand Valley State University
in partial fulfillment of the requirements for the
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1998

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ABSTRACT

PERCEIVED BENEFITS AND BARRIERS AND MAMMOGRAPHY SCREENING COMPLIANCE IN WOMEN AGE 40 AND OLDER

By

Amy Hoke VanZee

The mammography screening guidelines have been vague and differ from recommending organization to organization. Thus it is up to women to make decisions about mammography screening based on their personal health beliefs. This study examined the relationship between perceived benefits and perceived barriers to mammography and compliance with mammography screening guidelines in women age 40 and older. A correlational design was used with a convenience sample of 84 women from two outpatient family practice offices in the suburbs of a mid-western city. The Breast Cancer Screening Behaviors questionnaire created by Victoria Champion in 1995 was used to measure perceived benefits and barriers to mammography.

Data indicated that 74% of the subjects were compliant with recommended guidelines. However, the hypothesized relationships between perceived benefits and barriers to mammography and compliance were not supported. Subjects' education level was related to compliance (Chi-Square with Yates CC = 9.62, $p = .002$). Nursing implications were discussed.

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CHAPTER 1

INTRODUCTION

Breast cancer is the most common type of cancer among women besides skin cancers. One in 66 women in their forties will be diagnosed with breast cancer. It is the leading contributor to cancer mortality in women aged 40 to 55 (American Cancer Society, 1997). Several risk factors increase the likelihood of the disease occurring. These factors include: (a) aging, (b) personal history of breast cancer, (c) family history of breast cancer, (d) history of benign breast disease, (e) menarche younger than 12 years, (f) nulliparous, or a first child after age 30, (g) menopause after age 50, (h) higher education or socioeconomic level, (i) obesity and/or high fat diets, (j) lengthy exposure to cyclic estrogen, and (k) environmental exposure (American Cancer Society, 1997). The cause of breast cancer is still unknown, yet these risk factors are known to play a part in the risk of developing this disease. Virtually all women can be considered at risk. No effective cure or preventative method exists, and early detection offers the best opportunity for decreasing morbidity and mortality.

Justification

Early detection of breast cancer, while the tumor is still small and localized, provides the opportunity for the most effective treatment. Accordingly, the American Cancer Society voted on March 23, 1997 to change its breast cancer detection guidelines to include yearly mammography for all women 40 years of age and older . The proposed outcome of the guideline would result in earlier detection because breast cancers found

by mammography in women in their forties are smaller and more treatable than those found by self breast exam or clinical breast exam. Consequently, earlier detection by mammography could save lives.

Mammography can locate tumors too small to be detected by palpation of the breast by the woman or her health care provider. Early detection of breast cancer in women improves likelihood of successful treatment and thus decreases morbidity and mortality from the disease (American Cancer Society, 1997). Yet, there still exists an obvious lack of compliance with the recommended screening guidelines. In the 1990 National Health Interview Survey only 36% of women age 50 to 75 had a mammogram in the last year (Breene & Kessler, 1994). Michigan reported better statistics from its 1989 Behavioral Risk Factor Survey stating that 57.9% of resident women age 50 and older, had a mammogram in the last year (Islam & Thrush, 1991). In the more recent study conducted by Kurtz, Kurtz, Given, and Given (1994), 67.4% of the women studied were compliant with the then current American Cancer Society mammography guidelines of a baseline mammogram between ages 35-39, between ages 40-49 a mammogram every 1-2 years, and a yearly mammogram for women 50 years of age and older (American Cancer Society, 1991). Yet, the women in the age group of 50 and older were the least compliant with the recommended guidelines, in spite of increased breast cancer incidence after age 50 (American Cancer Society, 1991).

Fulton, Rakowski, and Jones (1995) studied inner city women and determinants of breast cancer screening. The study suggested that women with low incomes and education were less likely to participate in mammography. Furthermore, in 1994,

Victoria Champion (1994a) published her research on the relationship of age to mammography compliance. Her results showed a significant lack of compliance in women age 50 and older. She discovered that older women also identified more barriers to screening than women under age 50, who only identified cost. Thus compliance with and barriers to recommended mammography guidelines is an important health issue.

Finally, breast self exam and clinical breast exam are an important breast cancer screening tool. Yet, nonpalpable breast tumors can only be detected by mammography. In the past decade, screening mammography has increased detection of early stage breast cancer (Dodd, 1993) and substantially reduced mortality from the disease (Fletcher, Black, & Harris, 1993).

Compliance

The issue of compliance with breast cancer screening has frequently been studied in research. Much study has been conducted addressing women age 40 and older and their perceptions of breast cancer risks and screening effectiveness (Black, Nease, & Tosteson, 1995; Burnett, Steakley, & Tefft, 1995; Champion, 1991, 1994a, 1994b, 1995; Fulton, Rakowski, & Jones, 1995; Gray, 1990; Hyman, Baker, Ehpraim, Moadel, & Philip, 1994; and Lasbley, 1987). The majority of the existing research used the Health Belief Model (Rosenstock, 1974) as a framework to measure their subjects' perceptions about breast health behaviors and beliefs. The basis for the research was to determine what motivates women towards compliance with breast self exam and/or mammography screening.

Burnett et al. (1995) discovered a significant relationship between the patient-provider relationship and a woman's intention to have a mammogram. While Fulton et al. (1995) found that the greater the perceived benefit of mammography, the more likely the women were to participate in mammography. Lastly, Champion's (1994a) study reported the poor compliance with yearly mammography in women age 50 and older. A positive association was also reported between poor compliance to mammography and perceived barriers. Thus their lack of compliance was related to their health beliefs. As greater insight is achieved about health beliefs, the more able the health care community will be to target their interventions toward encouraging compliance with mammography guidelines.

Significance to Nursing

Nurses are role models to their patients. Patients seek care from nurses and put trust in the advice they receive. Nurses must be aware of their influential role. A study by Burnett, Steakley, and Tefft (1995) showed that women's intention to have a mammogram was negatively related to an uncaring health care professional, such as a nurse. Nurses can impact the disease of breast cancer by focusing their attention on educating patients on early detection and screening behaviors. Breast cancer screening involves breast self exam (BSE), identification of early signs and symptoms of lumps and when to seek evaluation, clinical breast exam (CBE), and mammography. The focus should be divided between primary, secondary, and tertiary prevention depending on the client. Primary prevention of breast cancer includes measures to avoid the known risk factors for developing breast cancer. Secondary cancer prevention begins with

identifying persons at risk for developing breast cancer and education on breast cancer screening. Tertiary breast cancer prevention includes the treatment of malignancy and early detection of secondary and new primary cancers.

Nurses can impact each stage of prevention through education, influencing health beliefs, and early detection. Nurses must educate women about the benefits to a mammography screening; such as early detection. Many women's lives could be saved if they followed the recommended mammography guidelines. Morbidity and mortality related to breast cancer could be decreased and patients' quality of life could be improved if nurses take the challenge to use their influential role to: (a) study what motivates women to compliance with breast cancer screening, and (b) educate their cliental on breast cancer early detection and screening.

Purpose

The purpose of this study was to determine the relationships between perceived benefits and perceived barriers to mammography, in women age 40 and older, and their compliance with mammography screening guidelines.

CHAPTER 2

LITERATURE AND CONCEPTUAL FRAMEWORK

Conceptual Framework

The Health Belief Model was developed out of the need for the Public Health Service to study and define the failure of the public to participate in available disease prevention and screening tests (Rosenstock, 1974). Several researchers, such as Rosenstock, Kirscht, and Becker, have altered the model and added concepts in their particular area of interest. The Health Belief Model is based on the belief

that individuals will take action to ward off, to screen for, or to control ill health conditions if they regard themselves as susceptible to the condition, if they believe it to have potentially serious consequences, if they believe that a course of action available to them would be beneficial in reducing either their susceptibility to or the severity of the condition, and if they believe that the anticipated barriers to (or cost of) taking the action are out weighed by its benefits (Rosenstock, 1990 p. 42).

The concepts of the Health Belief Model are all based on perceptions or beliefs on health issues. Currently, the concepts that make up the model include: (a) perceived susceptibility of disease, (b) perceived severity of disease, (c) perceived benefits to taking action, (d) perceived barriers to taking action, (e) self efficacy, (f) likelihood of intent to take action, and (g) demographic, sociopsychological, and structural variables (Rosenstock, 1990).

The Health Belief Model (1990) provides an excellent framework to help analyze and explain women's beliefs concerning breast cancer and breast cancer screening. According to the model, health beliefs and health behaviors are based on one's perceptions of risk of disease and the benefits or barriers to carrying out disease prevention behavior. Thus, to understand women and their beliefs about breast cancer, their perceptions of breast cancer must first be determined. The Health Belief Model guides investigation supporting such questions as: (a) do women consider themselves to be at risk for breast cancer, and/or (b) do they believe they are likely to die from breast cancer? The model further directs study of the perceptions women have about early detection of breast cancer, asking: (a) do women believe they will benefit from mammography, or (b) do they believe there are too many barriers, such as cost or discomfort, to mammography? The Health Belief Model concepts of: perceived benefits of healthy behavior, perceived barriers of healthy behavior, and likelihood of participation in health behaviors will provide the basis for this thesis for explaining and understanding women and their beliefs about early detection of breast cancer. If the beliefs of women and what motivates them towards participating in mammography can be understood, then interventions and education can be geared to encourage and support mammography behavior in an effective way. In summary, women's perceptions about benefits from mammography and barriers to mammography will be studied to better determine what motivates them to make a decision to participate in mammography.

Health Belief Model Related Research

The Health Belief Model has been used extensively in previous research concerning disease prevention (Bond, Aiken, & Somerville, 1992; Keller, & Hargrove, 1993; Kelly, Zyzanski, & Alemagno, 1991; Kim, Horan, Gendler, & Patel, 1991; Maiman, Becher, Kirscht, Haefner, & Drachman, 1977; Price, & Everett, 1994). Research results vary greatly depending on the study, yet all began with the premise that the Health Belief Model variables would provide an explanation for disease prevention and early detection behavior. Keller and Hargrove (1993) studied health beliefs and cardiovascular health behavior of African American women from ages 18-40. A convenience sample (80 women) came from a southwestern city, and included 77% under the poverty level. These African American women were interviewed in person using four separate surveys to measure perceived barriers and perceived benefits of cardiovascular disease (CVD) risk reduction and cardiovascular health behaviors. Results showed that 42% of the African American women were at moderate to severe risk for CVD. No correlation was found between perceived barriers to and perceived benefits from cardiovascular health behaviors and risk status. Also, no correlation was found between their value of health and perceived barriers. Yet, a correlation between their value of health and perceived benefits was clear. Perceived benefits of exercise were also significant, in that those who perceived benefits of exercise had an increased report of exercise (Keller & Hargrove). Some limitations to this study were evident. The sample size was very small, thus making generalizability very limited. Also, the survey language and use of the Likert Scales were designed for well educated, middle class

subjects. Possibly these surveys were too difficult for the subjects of the study, of whom 61% had only an 11th or 12th grade education, and 77% were below the poverty level (Keller & Hargrove, 1993).

Similar results were reported in the research conducted by Kelly et al. (1991), which looked at the effect of health education on predicting motivation and behavior change using the Health Belief Model variables. This study looked at five different lifestyle behaviors: smoking, stress, diet, seat belt use, and exercise. The research sample consisted of 215 subjects randomly assigned to four different groups. Ninety-seven percent of the subjects were white, 70% were women, and 90% had at least a high school education. Group 1 was the intervention group and groups 2-4 were the control groups. Group 1 received education on certain health behaviors. This study was limited because interventions were not consistent subject to subject in group 1. Rather interventions and education were determined by the physician based on the results of a questionnaire completed by the subject prior to seeing the physician. It is difficult to generalize the results of this study to other health behaviors. Motivated patients marked on their questionnaire that they were interested in changing a certain lifestyle area. The results showed that “motivated patients (those willing to work on changing a given lifestyle area) made more changes and more significant changes than non- motivated patients” (p. 316). The intervention group was more likely to be motivated to change and make significant changes 4 weeks following the initial interaction. Interestingly, perceived risk for disease and perceived benefits were positively related to belief in difficulty to change behavior. Self-efficacy was positively correlated with behavior change in stress and

exercise while a reported low self-efficacy score correlated with smoking behavior change. Those who scored at higher risk for negative health behaviors also had lower self efficacy scores. Perceived benefits and self efficacy strength were the strongest predictors for behavior change (Kelly et al., 1991).

The previous results are consistent with the findings of Kim et al. (1991) on the development of the Osteoporosis Health Belief Scale. Their sample consisted of 150 elderly subjects, ages 60 - 93. Female participants made up 80.7% of the subjects. Results from the questionnaire showed that health motivation and barriers to exercise among the subjects were the strongest indicators of exercise status and explanation of calcium intake (Kim et al., 1991). The most obvious limitation to this study is the need for further testing of the Osteoporosis Health Belief Scale. Also of concern, with any questionnaire, is the limitation of the subjects' self reports and the inaccuracy of self reporting.

Price et al. (1991) discussed perceived benefits as another variable of the Health Belief Model that has been shown to motivate people to healthy behaviors. They researched low income population's perceptions of lung cancer and smoking. A random sample of 500 Ohio residents, with incomes less than \$18,000, were surveyed by telephone. Eighty-three percent of the subjects were white; 32% were smokers; 37% were former smokers; and 30% had never smoked. The findings showed that only 36% of the participants were aware of the prevalence of lung cancer, while 41% believed there was nothing one could do to decrease risk of lung cancer. Four out of five of the subjects believed those of a lower socio-economic status were more likely to develop

lung cancer than those of a higher socio-economic status. Nine out of ten believed smoking increases the risk of lung cancer, while the subjects who smoked believed themselves as more susceptible to lung cancer. The subjects agreed they would benefit by saving money, and feeling healthier if they quit smoking. The results of this study are limited in their generalizability due to choosing subjects from only one state, not including low income households without a phone, and the natural response bias when an interviewer asks the subjects for a self-report on beliefs.

The variable of perceived benefits was also significant when studied by Bond, Aiken, and Somerville (1992). These researchers found that perceived benefits was positively related to compliance when studying adolescents with insulin dependent diabetes mellitus. Fifty-six adolescents were in the sample with ages ranging from 10 to 19 years old. Forty-three percent were male, and 91% were white. The subjects' parents had an average income of \$35,000 to \$40,000, and the mean diagnosis duration of the subjects was 5.8 years. The subjects initially received a questionnaire during an in home interview. Three telephone interviews over a three week period were used for follow up. Lastly, they each received a blood test 4 to 6 weeks after the last interview to measure compliance. Compliance was measured using the Child Compliance Telephone Interviews scale which reviewed the subjects' daily regimen, comparing these responses to an ideal standard based on sex, height, age, and prescribed regimen. The results showed that the greater the age of the subjects the less compliant the subjects were in controlling their diabetes. Three health belief variables: (a) cues to action, (b) perceived benefits, and (c) perceived barriers (cost) were all strong predictors of compliance.

Findings also showed that compliance increased when perceived benefits were high and perceived threat was low (Bond et al.). This study has great limitations because the sample was not chosen randomly. Health care providers may have had a bias when choosing subjects to participate in the research.

Finally, Maiman et al. (1977) supported the use of all Health Belief Model concepts in explaining the behavior of noncompliance. In this study, which examines mothers' adherence to diet regimens for their obese children, all of the model's concepts used to measure the mothers' beliefs were strongly correlated to weight loss by the child. The sample consisted of 182 mothers ages 17-62. Ninety-three percent of the mothers were African American with a mean income of \$6,839 and a mean education of 11.3 years. The researchers discovered that when the mothers felt higher levels of concern over their own child's health and risk of getting sick, they were more likely to adhere to the diet regulations. Both perceived severity and faith in medical care (perceived benefits) were positively correlated with weight loss. There was minimal correlation between perceived susceptibility and perceived barriers and weight loss (Maiman et al.). This study also is limited in its generalizability to all populations because 93.3% of the subjects were African American.

It is obvious from the results of the reviewed research that the Health Belief Model concepts are valuable tools to guide the explanation of compliance and noncompliance of people's use of disease prevention behaviors and screening techniques. The researchers (Bond et al., 1992; Keller et al., 1993; and Maiman et al., 1977) each found perceived benefits to be an indicator of compliance with healthy behavior. Also,

perceived barriers was described as a significant variable by Bond et al. (1992), and Kim et al. (1991). While Maiman et al. (1977) found no correlation between perceived barriers and compliance, but they did show perceived risk as being a motivator for compliance. Yet, the Kelly et al. (1991) research subjects reported that the greater their perceived risk, the more difficult they viewed change. Even with the differing results, the HBM variables are shown to provide insight into healthy behavior.

Breast Cancer Screening Related Research

Research on breast cancer screening has been varied in its attempt to understand what motivates people to participate in screening methods. Everything from health insurance to demographic variables have been implicated in failure to participate in breast cancer screening. The following research attempted to explain what motivates people to compliance with breast cancer screening.

In the study conducted by Margolis, Lurie, McGovern, & Slater (1993), the researchers addressed the screening method of mammography. The purpose of their research was to determine predictors of women's failure to attend their scheduled mammogram appointments. This study was a retrospective chart review of 907 women, age 40 and older, who had scheduled a mammogram in the space of one year. Sixty percent of the participants were white, 22% were African American, and 7% were Native American. Eighty-nine percent of these women had health insurance of some sort. The findings of this study showed appointment failure was associated with age. The younger the subject, the more likely she was to not keep her appointment. Failure to keep an appointment also correlated with being uninsured and of Native American decent. A

retrospective study has many constraints creating certain limitations to generalizability. The study was also carried out in a teaching hospital, so it may not generalize to other health care settings.

The perception of breast cancer risk and screening effectiveness was studied by Black, Nease, & Tosteson (1995). A random sample of 200 women, age 40 to 50 years old, was chosen from Dartmouth-Hitchcock Medical Center billing record for Pap smears in 1992. The women did not have a known diagnosis of breast cancer; 39% had an annual family income of \$50,000 to \$100,000, and 62% had at least a college education. The subjects received the questionnaire in the mail which asked questions pertaining to breast cancer risk and screening effectiveness. Seventy-three percent responded with a completed questionnaire. The results showed that the women overestimated their probability of dying of breast cancer within ten years by more than twenty times. When asked about their relative risk reduction from breast cancer screening they overestimated by six times . These results are based on assuming a 10% relative risk reduction from cancer screening. Eighty-eight percent of the subjects agreed that the benefits to screening mammography outweighed the barriers. The generalizability of this study is very limited because this population is better educated and of higher income than the general U.S. population of women of the same age range. Also, the subjects' breast cancer risk was not precisely known, and the effectiveness of modern screening mammography is unknown. The limitations also include the questionnaire which has not been previously tested.

Kurtz, Kurtz, Given, & Given (1994) examined women's perceptions and practices concerning breast cancer screening. Their sample consisted of 3,686 women, ages 35-65, who were employed at seven different work sites. No other demographic variables were described. The subjects received a questionnaire, concerning their perceptions and practices of breast cancer screening, at the onset of the study and six months later. Three months into the study, the women received educational brochures on breast cancer and screening. The researchers discovered that their subjects' perceptions of the importance of breast cancer screening, and their perceptions of barriers to mammography all improved from the initial questionnaire results to the six month questionnaire results. Interestingly, 89% of the women who at the initial questionnaire had never had a mammogram actually underwent mammography by the 6 month questionnaire (Kurtz et al., 1994). The study is limited by a 43% response rate (Kurtz et al., 1994) and that there was no control group with which to compare the findings. The sample also came from predominately public sector work places which may have employees with a higher than average level of education.

Women's intentions to participate in breast cancer screening were also measured by Burnett, Steakley, & Tefft (1995), in which 339 subjects were studied. The sample consisted of women 40 years of age and older who had participated in free breast cancer and cervical cancer screening. The uninsured women were recruited from six separate screening sites in Washington, D.C. Ninety percent of the women were African American, and 76% of the subjects had twelve years of education or less. Sixty-six percent had a family income of \$10,000 or less. The subjects received a questionnaire

developed by the researchers (Burnett et al., 1995). Intent to have a mammogram was measured by the researchers as the effect of personal attitudes and subjective norms concerning mammography. Only the breast cancer screening related results are reported for the specific purpose of this study. No significant relationship was found between intentions to participate in breast cancer screening and demographic variables, personal history of cancer, and family history of breast cancer. Intention to have a mammogram was positively related to the influence of a significant other and negatively related to an uncaring health care professional (Burnett et al., 1995). One limitation to this study is the use of a previously untested questionnaire. The study's generalizability is also limited by fact that these women were recruited from a cancer screening facility; thus, they may be more likely to participate in screening than the general population. Also, the sample consisted of 90% African American women, and therefore is not generalizable to all populations.

Lastly, Rosenman, Gardiner, Swanson, Mullan, & Zhu (1995) looked at U.S. farm women's participation in breast cancer screening practices. They used a sample of 680 farm women, age 40 and older, from four rural counties in Michigan. Ninety-six percent of the subjects had health insurance, 49.5% had completed high school, and 48.6% had a household income of greater than \$25,000. Each subject received a questionnaire. The results of the questionnaire showed that 51.9% of the women had a mammogram in the past year. There was a positive correlation between education level, income, insurance coverage, and mammogram usage. This study's generalizability is limited even to other farming communities because of the average income being greater than most other

farming communities. Also, with any questionnaire, there is a self-report bias that occurs.

The research results of the previous studies show that motivation to participate in breast cancer screening is affected by many variables. Reoccurring throughout the research was the impact that women's perceptions of benefits and barriers to breast cancer screening had on participation in breast cancer screening. Burnett et al. (1995) showed that nurses play a significant role in educating their clients on breast cancer screening. As seen in the Margolis et al. (1993) study, women younger than 60 are less likely to be consistent with screening than older women.

Breast Cancer Screening and Health Belief Model Related Research

The Health Belief Model (HBM) has been used frequently by researchers to better explain women's compliance or noncompliance with breast cancer screening. Many researchers have used the HBM, but Victoria Champion is at the forefront of breast cancer screening research using the HBM. Her studies have focused both on breast self exam and mammography. She has frequently developed and tested her own instruments to measure the HBM variables. Various studies will be reviewed, but Victoria Champion's work will be reviewed in depth.

Mammography related research.

Hyman et al. (1994) used the HBM variables to predict the use of mammography screening. A sample of 82 women, age 35 and older, were selected from employee health services of a large medical complex. Forty percent of the women were African American, 29.3% were Caucasian, and 19.5% were Hispanic. Sixty-seven percent of the

participants had some college education. The subjects each completed a questionnaire. The questionnaire was constructed by the researchers for use in this study. The perceived benefits and barriers questions were based on the Health Belief Model. The results showed perceived benefits and perceived barriers as being significant predictors to mammography utilization. The minority women showed a higher level of perceived susceptibility than did Caucasian women. The negative relationship of educational level to perceived benefits and positive relationship to ethnicity was also important, meaning that white women were more likely to be higher educated but less likely to perceive benefits of mammography. Compared to nonwhite women, white women also reported higher perceived barriers to mammography. The variable of perceived susceptibility was not a significant predictor of mammography utilization. This study is limited by its small sample size, and the fact that the subjects were all health care employees. These subjects may have an added knowledge level from working in the health care field that the general population does not have.

Mammography utilization was also studied by Fulton et al. (1991). They used a sample of 786 Rhode Island women, age 40 and older, obtained through random digit dialing, to carry out telephone interviews. Sixty-seven percent of subjects had some high school education, and only 19% reported having an income below the poverty level. The results of the interview showed that 50% of the subjects perceived mammography as highly effective and safe. Sixty-five percent of the women received mammograms as recommended. Perceived benefits and perceived barriers were greater predictors of mammography utilization than were perceived susceptibility and severity of breast

cancer. The demographic variables also were significant, showing that the lower the income and the lower the educational level, the less likely women were to participate in breast cancer screening (Fulton et al.). This study is also limited by their sample population. Rhode Island population tends to be older than the average U.S. population (Fulton et al.). In addition, the results of the study are based on an interview which used only one question to analyze each HBM variable, thus questioning the validity of the final results.

Fulton et al. (1995) conducted a more recent study on inner-city Hispanic women compared to other inner-city women's use of breast cancer screening. Seven hundred and sixty-one Rhode Island women, age 40 and older, were studied. The women were selected for their low income, minority status. These women were also interviewed by telephone. The interview questions were based on the HBM. Questions concerning the effectiveness and safety of mammography measured perceived benefits. The findings of this study portrayed quite a contrast between Hispanics and other minorities in the inner-city. Hispanic women as a whole were less educated, had lower incomes, and were less likely to have health insurance than other minority women. Hispanic women were also less likely to perceive themselves as susceptible to breast cancer. Only 20% of the Hispanic women had participated in breast cancer screening, compared to 35% of African American women. Finally, Hispanic women were less likely to agree with the benefits of mammography (Fulton et al., 1995).

Victoria Champion research.

Victoria Champion used the HBM variables as a basis for understanding women and their use of breast cancer screening (Champion, 1991, 1994a, and 1994b). The HBM was again used by Victoria Champion in a 1991 study which addressed the HBM variables' relationship to breast cancer screening behavior in women. The sample consisted of 322 women, age 35 and older, who did not have breast cancer. Ninety percent of the subjects were white and the mean education level was 13.7 years. These women received a mailed questionnaire. Several interesting results came from this study. A positive relationship was found between compliance with mammography, breast self-exam, and clinical breast exam and knowledge, social influence, and perceived susceptibility. The variables of confidence, knowledge, and perceived barriers equally predicted BSE behavior. The variables of knowledge, social influence, and health motivation were related to compliance with mammography. The correlation between BSE compliance and mammography compliance was not statistically significant. But the correlation between clinical breast exam compliance and mammography compliance was significant. This study also found younger women (Mean age = 43.23) to be more compliant with mammography than older women (Mean age = 54.82). The most obvious limitation to this study is the lack of generalizability to other races due to the participants being 90% white.

Champion (1994a) studied variables related to mammography compliance. Five hundred and eighty-one women, age 35 and older, from a large metropolitan area participated in the study. The mean age of participants was 50; 91.5% were white and

the mean education level was 13.7 years. Data were collected from these women four separate times over a two and a half year period. They initially received a mailed questionnaire. At second contact, there was an in-home interview where an intervention took place, and then follow up in home interviews occurred at one year and two years following the intervention. The results provided insight to women's compliance with mammography screening. The compliance ratio was significantly lower for women 50 years and older. Perceived barriers was also higher in women age 50 and older. Sixty-four percent of women younger than 50 were compliant with mammography for 5 years prior to the study, while only 25% of women, 50 and older were compliant with mammography for 5 years prior to the study. It also was apparent from the results that having a mammogram suggested by a health care professional was more important in compliance with those age 50 and older than for women under age 50. Health motivation, having mammography suggested, and having had a PAP smear were all significantly related to the 5 year mammography compliance (Champion, 1994a).

Champion focused on mammography screening in her (1994b) study where she researched the effect of behavioral stages on beliefs about breast cancer and mammography. The sample was taken from a large Midwestern city; 405 women over the age of 40 participated. Ninety-one percent of the subjects were white, and the mean education level was 13.5 years. Data collection occurred at in-home interviews. The findings suggested that women with significantly higher scores on perceived seriousness, perceived benefits, health motivation, and control, as well as significantly lower scores on perceived barriers, were more compliant with mammography guidelines (Champion,

1994b). These subjects had also previously agreed to participate in an intervention study; thus, they may have had a greater interest in breast cancer screening than the general population.

The literature review of the use of the Health Belief Model variables and breast cancer screening demonstrates for the most part the value these variables have in explaining breast cancer screening behavior. Different variables were stronger predictors for some studies than others, but overall the Health Belief Model has been shown to be a valuable framework for assessing the beliefs and motivation of women to participate in breast cancer screening. Frequently, perceived barriers was a significant variable associated with women's participation in breast cancer screening. The greater their perceived barriers, the less likely they were to carry out screening. The variable of perceived benefits was second to perceived barriers in predicting compliance with breast cancer screening. In the studies where knowledge and health motivation were tested (Champion, 1991, 1994a, 1994b; Fulton et al., 1991; Gray, 1990), these variables showed a significant effect on screening. In the majority of research where perceived susceptibility was studied, little to no significance was found with compliance (Fulton et al., 1991; Gray, 1990; and Lasbley et al., 1987). The literature review points out a few very strong health belief model variables as predictors of compliance, and the review brings other variables into question as to their usefulness in predicting breast cancer screening compliance.

Summary and Implications for the Study

The review of literature provided an extensive look at the Health Belief Model

variables use in various research. The HBM and breast cancer research reinforce the usefulness of variables in the model to study breast cancer screening. Women must be educated on their risk of breast cancer (Black et al., 1995; Kurtz et al., 1994) and the recommended screening guidelines. Women age forty years of age and older must participate in mammography yearly. Yet women age 50 to 59 were the least likely to be compliant with mammography appointments in the study conducted by Margolis et al. (1993). It has been shown that after educational intervention, women are more likely to participate in breast cancer screening (Kurtz et al.). Nurses are an excellent resource for the education of women. As seen in the Burnett et al. (1995) study, women reported increased compliance with screening when recommended by a health care personnel. Thus, it follows that women, and what motivates them toward mammography compliance, must be studied. Nurses have a responsibility to conduct this research. Due to their hands-on patient care, nurses are excellently suited to study and educate women. As seen in the previous research review, perceived barriers and perceived benefits related well to or strongly influenced compliance with a variety of health behaviors (Bond et al., 1992 ; Champion, 1991, 1994a, 1994b; Fulton et al., 1991; Gray, 1990; Hyman et al., 1994; Kelly et al., 1991; Kim et al., 1991; Lasbley et al., 1987; Maiman et al., 1977; Murray et al., 1993; Wyper, 1990). Perceived barriers was not significant in a few studies (Keller et al., 1993; Maiman et al., 1977). Yet, these studies addressed cardiovascular disease risk reduction behavior (Keller et al., 1993) and weight loss behavior (Maiman et al., 1977) from a predominately African American subject pool. Thus the results of these studies are not generalizable to women and mammography

compliance. Perceived benefits was not a significant factor in two studies (Lasbley et al., 1987) that addressed women and BSE compliance. Lasbley et al. (1987) looked strictly at the elderly population. The results of these studies also are limited to their generalizability to mammography screening because they only looked at BSE compliance.

Much research has been conducted on the HBM and BSE. More information must be collected on the HBM variables and mammography compliance. The American Cancer Society (1997) recently changed its recommendations. The guidelines now direct women, age 40 and older, to complete yearly mammograms, because early detection decreases the mortality and morbidity rate from breast cancer. Women age 40 and older must be studied to understand what motivates them to compliance with the recommended guidelines. The HBM variables of perceived benefits and perceived barriers have shown the strongest connection with compliance. The variables must be studied so nurses can design education programs that incorporate these beliefs accordingly. Once we understand what motivates women and can educate them, we have a better chance at saving lives by decreasing the mortality rate from breast cancer.

The following question was the focus for this study:

Research Question

What is the relationship between perceived benefits of mammography and perceived barriers to mammography and women, age 40 and older's compliance with mammography screening guidelines.

This study tested the following:

Hypotheses

- 1) Women, age 40 and older, who comply with mammography screening will have a higher perceived benefits score than women who do not comply with mammography screening.**
- 2) Women, age 40 and older, who comply with mammography screening will have a lower perceived barriers score than women who do not comply with mammography screening**

The variables in this study were defined as follows:

Definition of Terms

- 1) Perceived benefits of mammography - perceptions of risk reduction from participating in mammography.**
- 2) Perceived barriers to mammography - perceptions of negative aspects of mammography that work as impediments to undergoing mammography.**
- 3) Compliance with mammography screening guidelines - Having participated in screening mammography according to the American Cancer Society's recommended guidelines prior to 1997.**

CHAPTER 3

METHODS

Research Design

The design of this research study was a cross sectional - correlational study. The study described the correlation between women's, age 40 and older, perception of their benefits and barriers to mammography and their participation in mammography. This type of research design was appropriate for this study, because the researcher was not searching for a specific cause of mammography use but instead how women's perceptions and beliefs relate to their mammography screening practice. Furthermore, the researcher was not trying to manipulate or control the subjects' perceptions, instead an attempt was made to better identify and describe these variables and their effect on mammography use.

Sample and Setting

The settings for this research study were two major metropolitan medical center outpatient practice facilities. The first setting consisted of two physicians seeing 25 to 35 clients a day, and the nurse practitioner seeing 10 to 20 clients a day. The second facility consisted of one physician seeing 25 to 35 clients per day and a nurse practitioner, who was there one day a week, and saw 20 to 25 clients. A convenience sample, consisting of 84 subjects from the practice population, participated in this study. Women age 40 and older, who were able to speak and read English, had no history of breast cancer, who presented for a complete physical, re-check visit, or any type of well visit were asked to

complete the questionnaire for this study. Women excluded from this study were anyone under age 40, any women age 40 or older with a history of breast cancer, or who presented for an acute illness visit. Women were also excluded if their last mammogram was performed to diagnose a problem with the breast rather than for routine screening purposes. Ten women, who had completed the questionnaire, were excluded based on these criteria. It was anticipated that the inclusion and exclusion criteria utilized in this study would assist in the control of extraneous variables that might influence the subject's perceptions of benefits and barriers to mammography. The first 84 questionnaires fully and correctly completed were included in the study. The data were collected over a two month period.

Characteristics of Subjects

The participants were women ranging in age from 40 to 92 years of age with a mean of 57.63 years (SD = 13.61 years). The majority of the women were Caucasian. Most of the respondents were married, with only two reporting single status. Educational levels varied from completion of grade school to some who completed graduate school. The majority of participants reported that they did not have a friend or relative with breast cancer. Most of the women had previously had a mammogram. A summary of these demographic characteristics are listed in Table 1.

Table 1

Subject Demographic Characteristics

| Attributes | Number of Subjects (n = 84) | Percentage of Subject |
|--------------------------|--------------------------------|-----------------------|
| <u>Age</u> | | |
| 40 to 49 | 25 | 29.8 |
| 50 and older | 59 | 70.2 |
| <u>Race</u> | | |
| Caucasian | 76 | 90.5 |
| Hispanic | 1 | 1.2 |
| Native American | 7 | 8.3 |
| <u>Marital Status</u> | | |
| Single | 2 | 2.4 |
| Widowed | 14 | 16.9 |
| Divorced | 11 | 13.3 |
| Married | 55 | 66.3 |
| Separated | 1 | 1.2 |
| <u>Education</u> | | |
| Grade school | 2 | 2.4 |
| High school | 44 | 52.4 |
| Some college | 23 | 27.4 |
| College graduate | 7 | 8.3 |
| Some graduate school | 4 | 4.8 |
| Complete graduate school | 4 | 4.8 |
| <u>Provider</u> | | |
| MD | 68 | 81.0 |
| NP | 13 | 15.5 |
| <u>Acquaintance*</u> | | |
| Yes | 34 | 40.5 |
| No | 49 | 58.3 |

Note. * Having a friend or relative with breast cancer.

Instrument

The instrument used to measure perceived benefits and perceived barriers to mammography was a component of the Breast Cancer Screening Behaviors Health Belief Model Scales created by Victoria Champion (1993) (See Appendix D). This was a revised version of the original scales developed in 1984 (Champion). The variables of benefits and barriers to mammography were measured on a 5-point Likert scale with the following coding: Strongly disagree is scored as (1); disagree is scored as (2); neutral is scored as (3); agree is scored as (4); and strongly agree is scored as (5). The benefits scale included six questions addressing women's perceptions of their benefits to participating in mammography. The barriers scale included five questions addressing women's perceptions of their barriers to participating in mammography. Possible scores ranged from 6 to 30 for the benefits scale and 5 to 25 for the barriers scale. The greater the score on the benefits scale the greater the perceived benefits to mammography. The greater the score on the barriers scale the greater the perceived barriers to mammography. The content validity of these scales was evaluated by a panel of national experts (Champion, 1995). The scales were tested on a sample of 581 women. The benefits to mammography scale had a Cronbach alpha score of 0.79 and a test/retest score of 0.45. The barriers to mammography scale had a Cronbach alpha score of 0.73 and a test/retest score of 0.65 (Champion). The reliability of these scales was tested again using the data collected from the current research study. The benefits and barriers to mammography scales performed well in this study. The reliability coefficient for the benefits to mammography scale was a Cronbach alpha score of 0.76. The reliability

coefficient for the barriers to mammography scale was a Cronbach alpha score of 0.74. These reliability scores of greater than 0.7 are sufficient to make group comparisons between this study and the previous Champion studies where these scales were used.

Compliance with mammography was defined as having had a mammogram within the past 2 years for women age 40 to 49, and in the past year for women age 50 and older according to the American Cancer Society guidelines prior to 1997. Less frequent use of mammography screening was considered noncompliant. This definition of compliance was chosen, because it would have been difficult for women to already have implemented the new guidelines suggested by the American Cancer Society on March 23, 1997. When the current study was conducted these more current guidelines stated that all women age 40 and older should have a screening mammogram yearly.

The demographic profile collected the subjects' age, race, marital status, education level, health care provider seen, whether they had a friend or relative with breast cancer, if they had ever had a mammogram, the date and reason for their last mammogram, if they had a history of breast cancer, and the reason for this visit to the office (See Appendix C).

Procedure

Data for the research were collected by questionnaires. All women age 40 and older were approached when they came to the health care center. Women who were to be seen for an acute illness or who had a history of breast cancer were not approached. The subjects received a brief explanation of the study from the nurse or medical assistant

when they were placed in the room waiting to see the physician or nurse practitioner. This explanation was written out for the nurse and medical assistant to assure each subject received the same directions (See Appendix A). Any questions the subjects had which could not be answered by the nurse or medical assistant were directed toward the investigator by referring to the phone number provided on the cover letter of the questionnaire (See Appendix B). The subjects completed the questionnaire while waiting in the examining room for the physician or nurse practitioner. The questionnaire took an average of 5 to 10 minutes to complete. A cover letter was attached to the questionnaire. The cover letter gave an explanation of the study. It explained that the questionnaire was strictly voluntary, had no risk to the subject and was not related in any way to the care she would receive at the office. The cover letter also explained that the questionnaire was anonymous (See Appendix B).

Since the researcher was not present during the data collection, she was unaware of any information concerning any refusals to complete the questionnaire, problems with interruptions, or unusual questions or situations. The staff who handed out the questionnaire did not report any complications.

Benefits and Risks to Subjects

Permission was obtained from the Grand Valley State University Human Research Review Committee in order to conduct this study on human subjects. Following the University's approval, the study was presented to and approved by the Institutional Nursing Research Review Board.

The ethical considerations in the procedure for this research study involved

subject consent and risks to subjects. Completion of the questionnaire was implied consent from the subject to use the data collected from the questionnaire. This was stated on the cover letter. If the subject did not complete and turn in the questionnaire than she obviously did not consent to participate in the study.

There were minimal risks to the participants of this study. The cover letter directed subject's questions to the nurse researcher. The questionnaire was anonymous and the subjects were asked to place completed questionnaires in a box in the waiting room. Thus they were not handing it directly to any health care worker, and thus the anonymous atmosphere was maintained. Confidentiality of the subjects was maintained. The cover letter provided information to the women on how the researcher would protect the anonymity of the respondents on completed questionnaires by coding questionnaires with numbers and avoiding the use of any names on the questionnaires. The potential for subjects to fear how the information from the questionnaires was used was recognized. The cover letter explained that the information collected from the questionnaires was used only in the development of a nursing research thesis and would help guide nursing practice. The subjects might have also benefited from participation in this study. Temporary anxiety might have been positive and participation in the study may have triggered thoughts and motivation concerning their need for breast cancer screening.

CHAPTER 4

RESULTS / DATA ANALYSIS

The purpose of this study was to examine the relationship of women's perceived benefits and barriers of mammography to their compliance with recommended mammography guidelines. Data analysis was undertaken using the SPSS (Statistical Package for the Social Studies) computer statistical software package. T-tests were performed to examine differences between perceived benefits and perceived barriers scores of the women who were compliant with mammography screening guidelines and those women who were noncompliant with mammography screening guidelines. An alpha level of 0.05 was set for determining the significance level for all data analysis.

Hypotheses

The hypotheses for this study were: 1) women, age 40 and older, who comply with mammography screening, will have a higher perceived benefits score than women who do not comply with mammography screening. 2) women, age 40 and older, who comply with mammography screening will have a lower perceived barriers score than women who do not comply with mammography screening.

Demographics

Thus the subjects were divided into two groups: compliant and noncompliant. Compliance with mammography was defined as having had a mammogram within the past 2 years for women age 40 to 49, and in the past year for women age 50 and older. Less frequent use of mammography screening was considered noncompliant. The initial subject pool was decreased to 81 when the two groups were separated due to missing

data on the date of the last mammogram. The sample of 81 subjects was made up of 74.1% compliant women and 25.9% noncompliant women. The compliant group is slightly younger with an average age of 56 years old, while the noncompliant group is slightly older with an average age of 60 years of age. The racial status also differed between the two groups. The compliant women were 88.3% Caucasian, 1.7% Hispanic, and 10.0% Native American. The noncompliant women were 100% Caucasian. The compliant group reported that 72.9% were married while only 57.1% of the noncompliant group were married. The compliant women had a higher education level than the noncompliant women, with 56.7% of the compliant women reporting greater than a high school education and only 14.3% of the noncompliant women reporting greater than a high-school education. Forty-seven and five tenths of the compliant subjects had a friend or family member with breast cancer, and 28.6% of the noncompliant subjects had a friend or family member with breast cancer. A comparison of characteristics are summarized in Table 2.

Hypotheses Testing Results

Perceived benefits and barriers to mammography scores were used to determine the perceived benefits and barriers of mammography of both the compliant and noncompliant groups. Benefit scores for the compliant women ranged from 12 to 30 with a mean of 24.0 (SD = 4.3). The benefit scores for the noncompliant women ranged from 20 to 30 with a mean of 23.4 (SD = 2.5). Barrier scores for the compliant women ranged from 5 to 25 with a mean of 10.3 (SD = 3.8). Barrier scores for the noncompliant women ranged from 5 to 15 with a mean of 11.6 (SD = 3.0). A t-test for

Table 2

Comparison of Subject Characteristics with Compliance to Mammography

| Category | Age | % White | % Married | Ed* | % with Breast Ca Friend / Relative |
|--------------------------------|-----------------------|---------|-----------|------|------------------------------------|
| Total Sample (n = 81) | M 57.63 (SD 13.61) | 90.5 | 66.3 | 45.3 | 41.0 |
| Compliant Group (n = 60) | M 56.02 (SD 11.95) | 88.3 | 72.9 | 56.7 | 47.5 |
| Noncompliant Group (n = 21) | M 60.00 (SD 16.97) | 100.0 | 57.1 | 14.3 | 28.6 |

Note. * Percentage with greater than high school education.

independent means was performed to compare the mean benefits and barriers scores of each group. This test showed no significant difference between the benefits scores of the compliant and noncompliant women ($t = .80, df = 53.75, p = .43$). Also there was no significant difference between the barriers scores of the compliant and the noncompliant women ($t = 1.24, df = 74, p = .220$). Based on these findings, the hypotheses of the study were rejected. (Table 3)

Table 3

Hypotheses Testing Results

| Category | Compliant | Noncompliant | t-test | P |
|----------------|--------------------|--------------------|--------|-----|
| Benefits Score | M 24.0 (SD 4.3) | M 23.4 (SD 2.5) | .80 | .43 |
| Barriers Score | M 10.3 (SD 3.8) | M 11.6 (SD 3.0) | 1.24 | .22 |

Other Findings

A Mann-Whitney U-Wilcoxon Rank Sum W test was performed on each benefits and barriers question looking for any significant differences between the compliant and noncompliant groups. This test showed two questions with significantly different responses between the compliant and noncompliant groups. The compliant group scored higher than the noncompliant group on the perceived benefits question 9: Having a mammogram or x-ray of the breasts will decrease my chances of requiring radical or disfiguring surgery if breast cancer occurs. The compliant women had a mean rank of 42.84, while those women who were noncompliant had a mean rank of 29.13 ($z = 2.44$, $p = .01$). The noncompliant women scored higher than the compliant women on the perceived barrier question 11: Having a mammogram or x-ray of the breast would cost too much money. The noncompliant women had a mean rank of 51.25, while the compliant women had a mean rank of 36.92 ($z = 2.52$, $p = .01$). A comparison of the two groups' mean scores for each question is listed in Table 4.

Table 4

Summary of Respondents' Mean Scores for the Benefits and Barriers Scales by Compliance with Mammography Guidelines

| Item | Health Belief | Mean Score of * Compliant (n = 60) | | Mean Score of * Noncompliant (n = 21) | |
|---------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------------|------|---------------------------------------------|------|
| | | M | SD | M | SD |
| 1. When I get a recommended mammogram, I feel good about myself. | Benefit | 4.02 | 1.08 | 3.86 | 0.65 |
| 2. When I get a mammogram, I don't worry as much about cancer. | Benefit | 3.88 | 1.15 | 3.86 | 0.85 |
| 3. Having a routine mammogram or x-ray of the breasts would make me worry about breast cancer. | Barrier | 1.97 | 0.97 | 2.20 | 0.70 |
| 4. Having a mammogram or x-ray of the breast will help me find lumps early. | Benefit | 4.03 | 0.91 | 4.00 | 0.77 |
| 5. Having a mammogram or x-ray of the breast would be embarrassing. | Barrier | 2.12 | 1.10 | 2.10 | 0.85 |
| 6. Having a mammogram or x-ray of the breast would take too much time. | Barrier | 1.77 | 0.91 | 2.00 | 0.77 |
| 7. Having a mammogram or x-ray of the breasts will decrease my chances of dying from breast cancer. | Benefit | 4.08 | 1.06 | 3.95 | 0.59 |
| 8. Having a mammogram or x-ray of the breasts would be painful. | Barrier | 2.49 | 1.28 | 2.76 | 1.18 |
| 9. Having a mammogram or x-ray of the breasts will decrease my chances of requiring radical or disfiguring surgery if breast cancer occurs. | Benefit | 3.97 | 0.93 | 3.37 | 0.96 |
| 10. Having a mammogram will help find a lump before it can be felt by myself or a health professional. | Benefit | 4.12 | 0.95 | 4.05 | 0.60 |
| 11. Having a mammogram or x-ray of the breast would cost too much money. | Barrier | 1.95 | 0.95 | 2.60 | 1.05 |

Note. * Mean scores taken from analysis of subject responses ranging from 1 = Strongly disagree to 5 = Strongly agree.

A Chi-Square with Yates Continuity Correction was performed to look for any significant differences in the nominal demographics of the compliant and noncompliant groups. Because of small numbers in some of the categories the data were collapsed into two groups for each demographic criterion in order to perform this test. Race was classified white, and nonwhite (African American, Asian, Hispanic, Multi Racial, and Native American). Marital status was classified married and nonmarried (single, widowed, divorced, separated, and other). Education level (grade school, high school, some college, college graduate, some graduate school, and completed graduate school) was classified high school and less or at least college. Demographic comparisons are listed on Table 5. The only significant difference between the groups was level of education. Only 14.3% of the noncompliant group had a college level education or higher while 56.7% of the compliant group reported having a college level education or higher (chi-square with yates cc = 9.62, p = .002). Since age is an interval demographic, it was tested using a t-test for independent means. No significant differences between the two groups was shown ($t = -.99$; $df = 27.26$; $p = .33$).

Although the data analysis of this study did not support the hypotheses, findings did identify education level as a demographic characteristic which was associated with compliance. Interestingly, the compliant and noncompliant groups differed in their response to the question about cost of a mammogram, and thus may play a factor in why the noncompliant women did not follow mammography guidelines.

Table 5

Summary of Significant and Nonsignificant Demographics

| Categories | Group | | Chi-Square | p value |
|-----------------------|--------------|-----------|------------|---------|
| | Noncompliant | Compliant | | |
| <u>Race</u> | | | | |
| White | 100% | 88.3% | 1.41 | 0.24 |
| Nonwhite | 0% | 11.7% | | |
| <u>Marital Status</u> | | | | |
| Married | 57.1% | 72.9% | 1.13 | 0.29 |
| Nonmarried | 42.9% | 27.1% | | |
| <u>Education</u> | | | | |
| High school or < | 85.7% | 43.3% | 9.62 | .002 |
| College or > | 14.3% | 56.7% | | |
| <u>Provider</u> | | | | |
| MD | 85.0% | 83.1% | .00 | 1.00 |
| NP | 15.0% | 16.9% | | |
| <u>Acquaintance*</u> | | | | |
| Yes | 28.6% | 47.5% | 1.55 | 0.21 |
| No | 71.4% | 52.5% | | |

Note. * Have a friend or relative with breast cancer.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

Discussion Related to Hypotheses

The findings of this study did not support the hypotheses that: 1) women age 40 and older, who comply with mammography screening, will have a higher perceived benefits score than women who do not comply with mammography screening and 2) women age 40 and older, who comply with mammography screening will have a lower perceived barriers to mammography score than women who do not comply with mammography screening. Perceived benefits and perceived barriers to mammography did not predict which of the women would comply to mammography screening. However, there were interesting findings from this investigation that could direct further research.

The majority of women in this study were compliant with the recommended American Cancer Society mammography guidelines prior to 1997 (74.1%). They had high benefits scores and low barriers scores. However, the noncompliant women (25.9%) also had high benefits scores and low barriers scores. The perceptions of the noncompliant group are not consistent with previous research which showed that high perceived benefits and low perceived barriers is associated with mammography compliance (Champion 1994a, 1994b; Fulton et al., 1991; Hyman et al., 1994; Murray et al., 1993).

In order to understand why compliant and noncompliant women tested similarly on the perceived benefits and barriers scores, the two groups were separated and their demographic characteristics compared. Although not significantly different, the noncompliant group was slightly older, 100% Caucasian, less educated, were more likely to be unmarried, and reported fewer friends or relatives with breast cancer (Table 2). Education level was the only significant difference in demographics according to the Chi-Square with Yates Continuity Correction. This may provide some insight to the behavior of the noncompliant women. A woman of lower education level may be unable to read or may read poorly, thus she may have less general knowledge about breast cancer and mammography. Also lower educated women are less likely to have high paying jobs, thus they may have less income, making it more difficult to pay for the cost of a mammogram. The significance of the other demographic variables was not apparent due to the small number of subjects that participated in this study.

The next step was to see if there were any individual questions on the benefits and barriers to mammography scale that could predict compliance. A Mann-Whitney U-Wilcoxon Rank Sum W test was performed on the benefits and barriers questions. This test showed a significant difference in the two different groups on benefit question #9 and barrier question #11. The compliant group had a significantly higher score on #9 (Table 3). Question #9 evaluated perceived benefits of mammography if one already had breast cancer. Since the lump may be detected at a smaller size than detected without mammography, less disfiguring surgery would be required to remove the breast cancer. It could be speculated that the compliant women gave this question a higher score

because they considered the possibility of already having breast cancer. Thus they may have had an even deeper understanding of their risk of breast cancer in comparison to the noncompliant group who may not have considered this possibility. The compliant women may have felt susceptible to breast cancer. Perceived susceptibility is a variable of the Health Belief Model that was not tested in this study. For the other question, # 11, the noncompliant subjects scored higher than the compliant subjects (Table 3). This question was a perceived barrier question which asked if having a mammogram would cost too much money. This result also suggests that these noncompliant women are focusing more on the barrier of cost than on the benefits of mammography in comparison to the compliant women.

Relationship of Findings to Theoretical Framework

Although certain trends were noted within this study, the relationship between perceived benefits and perceived barriers and compliance with mammography screening was not established. As a result, the relevance of the Health Belief Model variables used in this study must be explored. The Health Belief Model suggests that healthy behavior is a result of the variables in the model: perceived susceptibility to the condition, belief in serious consequences, belief that the benefits of healthy behavior would out way the barriers to healthy behavior, general health motivation, and variables such as demographics, sociopsychological, and structural (Rosenstock, 1990). Perceived benefits and perceived barriers were the only variables addressed in this study based on the strength of these in previous research. If all the variables were studied, more information may have been supplied to explain the behavior of the two groups. It is possible that the

noncompliant group did not see themselves as susceptible to breast cancer even though they believed there were more benefits than barriers to mammography. This may give an explanation to why this group was noncompliant with mammography screening guidelines. Testing for perceived susceptibility to breast cancer along with perceived benefits and perceived barriers to mammography may provide greater insight to the motivation of women to carry out mammography screening. It was determined during the data analysis that there was a significant difference between the education level of the compliant and noncompliant group. The majority of the compliant women had a higher level of education. As stated above, the health belief model suggests that demographics may be a factor in predicting behavior. Education level was associated with compliance. Women of higher education may tend to have higher paying careers and be of a higher income level, and thus be less concerned about the cost of mammography. Further study of women and mammography screening must be carried out addressing all of the Health Belief Model variables in order to get a complete understanding of all the factors influencing behavior.

Relationship of Findings to Previous Research

Champion et al. (1994b) studied 405 women, over age 40, and their perceptions of benefits and barriers to mammography. Results showed that women who were compliant with mammography guidelines had significantly higher scores on benefits and significantly lower scores on barriers than noncompliant women. Champion et al. (1994a) also studied another population of women 35 and older, and their compliance with mammography guidelines. The compliance rates were significantly lower for

women 50 and older than in younger women. In the current study, the noncompliant women were slightly older (Mean = 60) than the compliant women. Fulton et al. (1991) studied 786 women, 40 and older, looking at predictors of breast cancer screening using the Health Belief Model variables. They also found perceived benefits and barriers to be predictors of mammography screening. Interestingly, they also reported a lower level of compliance in those subjects with a lower level of education. The current study also discovered that the noncompliant women reported a lower level of education in comparison to the compliant women.

Limitations and Recommendations

Although the results of this study may provide some insight into the health beliefs of perceived benefits and barriers of women concerning mammography screening, caution must be used in generalizing these results to other populations. The sample size was small and non random (n = 84). A large majority of the participants were Caucasian. In order to facilitate greater generalizability a research design that uses a larger, random sample and gathers a subject pool with a greater number of minority groups must be used.

Correlational research has some limitations. In this study only two conceptual perceptions were being addressed: perceived benefits and perceived barriers. It could be possible that the subjects' participation in mammography was influenced by other perceptions not considered by this research. Unlike an experimental design, manipulation of the independent variables was not done. Another weakness of correlational design was the willingness of the subjects to participate. The subjects who

chose to participate may have had a personality which was more likely to be self directed and thus more likely to participate in mammography. Thus the interpretation of results of this study were broad and tentative, but encouraged further study using the same variables to produce more consistent results.

Correlational research also has several strengths. Determining causal relationships has powerful implications for the health field. Determining the relationship of women's perceptions to their mammography behavior may be of greater importance than determining each individual perception. Just understanding the power of personal perception will guide the nurse to better target health perceptions and motivate and educate accordingly.

A cross-sectional design is susceptible to threats to external validity. The Hawthorne effect (Polit & Hungler, 1991) may cause a threat to the generalizability of the study results, because of the special attention the subjects feel being part of a study. The subject population may answer questions in a particular way, because they know they are a part of a research study. Experimental effect (Polit & Hungler, 1991) is another threat to a cross-sectional design. The expectations and interest in proving the hypothesis of the researcher may influence the subjects' reactions. These threats to the design were controlled by using a questionnaire. No interviewer was present to ask the questions or create a bias towards expected answers. Also, the questionnaire was anonymous, making it less likely for the experimental effect to be an influence. The subjects realized they could be honest, because no one knew it was their questionnaire. Also, in 1997, the year prior to the data collection for this study, there was a lot of media

coverage on the new American Cancer Society's guidelines. The media provided information to the public that the new guidelines recommended yearly mammograms for women age 40 and older. This fact may have influence the high level of compliance in this study.

Correlational designs are less susceptible to threats to internal validity in comparison to other designs. This research study was most susceptible to selection bias, because the women chosen for this study were seeking health care for wellness checks or rechecks and may have had an increased perceived benefit of health care. Yet an attempt to control threats to internal validity was done by creating a standardized approach in handing out and answering questions about the questionnaire. A script was created to control for extraneous variables and provided to the staff who were responsible for choosing the subjects and supplying them with a questionnaire.

Another limitation was the site where the subjects were collected. The women chosen to be in this study were all seeking health care. Thus they exhibited some concern about their personal health and showed motivation to seek health care. These subjects were also women who had access to health care. It would be a recommendation to utilize multiple sites, other than health care facilities, in order to obtain women who do not have access to health care.

The study was also limited by self report bias. The women who participated in this study chose to complete the questionnaire. They may have been more interested in mammography screening than a truly random sample. Thus their answers may have been bias to give the best report possible.

Data gathered from this study allowed identification of only two variables of the Health Belief Model: perceived benefits, and perceived barriers. Future research should study all the variables and their relationship to mammography screening compliance. Future research should also address such demographic variables as income level and insurance plan to better understand the ability of the subject to afford the cost of mammography.

Implications for Nursing

Breast cancer is the leading contributor to cancer mortality in women aged 40 to 55 (American Cancer Society, 1997). There are an estimated 180,300 new breast cancer cases expected in 1998 (American Cancer Society, 1998). Nurses must develop interventions, which are based on research, to decrease the cancer mortality and morbidity. The results of this study may help guide nursing practice in taking on this responsibility to educate women about mammography screening.

This study, along with previous research, demonstrated that women who are compliant with mammography screening guidelines perceive benefits to mammography and few barriers to mammography. However, the noncompliant women also perceived more benefits and less barriers and did not follow mammography guidelines. These are the women who need intervention. Whether it is education about mammography or information about the seriousness of breast cancer, nurses must target the noncompliant population and take action to improve compliance and fight against breast cancer.

Also reported in this study was the significance of cost as a perceived barrier for the noncompliant women. Nurses can be instrumental in educating about mammography

that is offered to the community free of charge. They also can support and give their time to staffing such facilities.

Nurse professionals must be leaders. First, they must stay updated on the latest recommended mammography guidelines, and educate their patients on these guidelines. Nurses also must stay current on the latest research to better understand what motivates women towards compliance, and use this information to guide their practice.

Recommendations

Finally more nursing research is needed in the study of mammography compliance. The perceived benefits and barriers scales (Champion, 1995) used in this study must undergo further testing. More study is needed addressing all of the Health Belief Model variables and their ability to predict mammography compliance. This will provide additional understanding and information to create strategies to improve mammography use.

Although the results of this study did not support the hypotheses, the findings may help guide future nursing research, and intervention development. It also provides some insight into the health beliefs of women about mammography screening which may guide nursing practice in educating women.

Appendix A

Script for Mammography Health Belief Scale

SCRIPT FOR MAMMOGRAPHY HEALTH BELIEF SCALE

Hand out questionnaire to all female patients, age 40 and older, who are not being seen for an acute illness. Give the questionnaire to the appropriate patients once they are in their examination room and vital signs have been taken. Instruct the female patient that the questionnaire is part of a research study being conducted on mammography screening. Also let them know participation is strictly voluntary and the cover letter will explain the study in more detail. Tell them it will take about 5 to 10 minutes of their time, and can be completed while waiting to see their health care provider. Ask them to return the completed questionnaire in the labeled box in the lobby.

Possible questions and answers:

Q: Will my health care provider see my answers?

A: No, your answers will remain anonymous and your health care provider will only see a final report once the research is completed.

Q: Do I have to fill out the questionnaire?

A: No, participation is voluntary.

Q: What if I have never had a mammogram, do I still fill out the questionnaire?

A: Yes, the questionnaire will just be asking questions to find out what you believe to be true about mammography.

If you are asked questions which you do not know the answer to, refer to the cover letter on the answer sheet and ask the patient to call one of the numbers provided.

Appendix B

Cover Letter

Cover Letter

Study of Attitudes about Mammography

My name is Amy VanZee and I am a registered nurse. I am conducting research which studies women's, age 40 and older, attitudes about mammography as screening for breast cancer. In order to carry out this research I need your help. I am asking you to complete the following questionnaire. You are one of 100 women that will participate in this study. There are no right or wrong answers. Everyone has different experiences which will influence how she feels. The information collected from the questionnaire is expected to help health care providers understand how to better educate women about mammography screening.

The information will be kept strictly confidential and the data will be coded so that you will not be known by your answers. You will not be identified by name. The information will be used for research only. There are no identified risks to participating in this study at this time. Participation is voluntary and you may withdraw at any time without affecting your future medical care. When you fill out and return the questionnaire and place it in the marked box in the lobby, this means you consent to participate in this study.

If you have any questions or concerns regarding this study, please contact me at 949-7464, Phyllis Gendler (chairperson of thesis committee) at 895-3516, or Paul Huizenga (Chair person of Human Research Review Committee at Grand Valley State University) at 895-2472. If you are interested in receiving a summary of the study, please fill out the attached form.

Thank you for your consideration in participating in this study.

Sincerely yours,

Amy VanZee, RN, MSN Candidate

Appendix C
Demographic Data

Demographic Data

Please complete the following information

1. Age (in years): _____
2. Race:
 1. African American _____
 2. Asian _____
 3. Caucasian _____
 4. Hispanic _____
 5. Multi Racial _____
 6. Native American _____
3. Marital Status:
 1. Single _____
 2. Widowed _____
 3. Divorced _____
 4. Married _____
 5. Separated _____
 6. Other _____
4. Highest education completed:
 1. Grade school _____
 2. High school _____
 3. Some college _____
 4. College graduate _____
 5. Some Graduate school _____
 6. Completed graduate school _____
5. Health care provider seen today:
 1. Physician _____
 2. Nurse Practitioner _____
6. Do you have a friend or relative with breast cancer?
 1. Yes _____
 2. No _____
7. Have you ever had a mammogram?
 1. Yes _____
 2. No _____
8. If yes, when was the last time you had a mammogram?
Date _____ (month, year)
9. For what reason did you have your last mammogram?

10. Have you ever had breast cancer?
 1. Yes _____
 2. No _____
11. Reason for today's visit?
_____, _____, _____

Appendix D

Research Questions

Research Questions

The following questions are about your attitude toward mammography. There are no right or wrong answers. Everyone has different experiences which will influence how they feel. Please circle Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree for each statement according to which one describes most accurately how you feel. It is important that you answer according to your actual beliefs and not according to how you feel you should believe or how you think we want you to believe. We need the answers that best explain how you feel.

SD = Strongly disagree

D = Disagree

N = Neutral

A = Agree

SA = Strongly agree

- | 1 | 2 | 3 | 4 | 5 | |
|----|---|---|---|----|-----------------------------------------------------------------------------------------------------|
| SD | D | N | A | SA | 1. When I get a recommended mammogram, I feel good about myself. |
| SD | D | N | A | SA | 2. When I get a mammogram, I don't worry as much about cancer. |
| SD | D | N | A | SA | 3. Having a routine mammogram or x-ray of the breasts would make me worry about breast cancer. |
| SD | D | N | A | SA | 4. Having a mammogram or x-ray of the breasts will help me find lumps early. |
| SD | D | N | A | SA | 5. Having a mammogram or x-ray of the breasts would be embarrassing. |
| SD | D | N | A | SA | 6. Having a mammogram or x-ray of the breasts would take too much time. |
| SD | D | N | A | SA | 7. Having a mammogram or x-ray of the breasts will decrease my chances of dying from breast cancer. |

- | | | | | | |
|----|---|---|---|----|---------------------------------------------------------------------------------------------------------------------------------------------|
| SD | D | N | A | SA | 8. Having a mammogram or x-ray of the breasts would be painful. |
| SD | D | N | A | SA | 9. Having a mammogram or x-ray of the breasts will decrease my chances of requiring radical or disfiguring surgery if breast cancer occurs. |
| SD | D | N | A | SA | 10. Having a mammogram will help find a lump before it can be felt by myself or a health professional. |
| SD | D | N | A | SA | 11. Having a mammogram or x-ray of the breasts would cost too much money. |

(Champion, 1995)

If you are interested in receiving a summary of the study please fill in your name and address in the following space provided.

Name: _____
Address: _____

*Thank-you for taking the time to fill out this questionnaire.
Please make sure that all questions are completed.*

Appendix E

**Grand Valley State University Human Research
Review Committee Letter of Permission**



**GRAND VALLEY
STATE UNIVERSITY**

1 CAMPUS DRIVE • ALLENDALE, MICHIGAN 49401-9403 • 616/895-6611

May 14, 1998

Amy Van Zee
1044 Keneberry Way
East Grand Rapids, MI 49506

Dear Amy:

Your proposed project entitled "*The Health Beliefs of Mammography Screening in Women age 40 and Older*" has been reviewed. It has been approved as a study which is exempt from the regulations by section 46.101 of the Federal Register 46(16):8336, January 26, 1981.

Sincerely,

Robert Hendersen, Acting Chair
Human Research Review Committee

Appendix F

**Spectrum Health Nursing Research
Committee Letter of Permission**



Spectrum Health

East Campus
1840 WEALTHY SE GRAND RAPIDS MI 49506
616 774 7444 www.spectrum-health.org

May 22, 1998

Amy VanZee
1044 Keneberry Way SE
East Grand Rapids, MI 49506

Dear Amy,

On behalf of the Nursing Research Committee, I am pleased to inform you that your proposed study "The Health Beliefs of Mammography Screening in Women Age 40 and Over" has been approved.

After you complete your research, we require that you submit a bound copy of your study to me for our library.

If you have any questions, please feel free to contact me at 774-7402.

Sincerely,

Yvonne Ford, RN, MS, CNOR
Chair, Nursing Research Committee

Appendix G

**Letter of Permission to use the
Instrument from Victoria L. Champion**

INDIANA UNIVERSITY



March 11, 1997

SCHOOL OF NURSING

Amy VanZee
945 Merrifield SE
Grand Rapids, MI 49507

Dear Ms. VanZee,

Enclosed is a copy of my Health Belief Model and related materials. You have my permission to use these materials. I only require that you send me a copy of the completed results. If you have any questions concerning alteration to the instrument please feel free to contact me.

Sincerely,



Victoria L. Champion, RN, DNS, FAAN
Professor and Associate Dean for Research

wpdocs\vlc\instr.ltr

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