IDENTIFYING THE DETERMINANTS OF GETTING A MAMMOGRAM IN RURAL WOMEN: A MIXED METHODS, REASON ACTION APPROACH

Alireza Geshnizjani

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ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

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Doctoral Committee

_____

Susan E. Middlestadt, Ph.D., Chair

_____

Ginette Delandshere, Ph.D

_____

Catherine M. Sherwood-Laughlin, Ph.D., MPH

_____

Mohammad R. Torabi, Ph.D., MPH

Date of Defense: June 30, 2011

Dedicated to my parents Gholamreza and Mahnaz

for their unconditional love and support and to my best

friend and inspiration in life, my grandmother, Batool Agha Rokni.

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Alireza Geshnizjani

IDENTIFYING THE DETERMINANTS OF GETTING A MAMMOGRAM IN RURAL WOMEN: A MIXED METHODS, REASON ACTION APPROACH

Background: Breast cancer is a major public health concern in the United States especially in rural communities. Getting screen mammogram regularly is an effective way to detect breast cancer at early stages and therefore increase the survival rate. Even though, the rate of mammography has been increasing, the rates are still not at a desired level. This purpose of this research was two-fold: 1) To identify salient consequences, referents, and circumstances of getting a mammogram to design an RAA-based quantitative instrument 2) To identify psychosocial determinants of getting a mammogram among women between the ages of 40 and 75 living in rural southern Indiana who have had one mammogram during their life time.

Methods: This was a mix-methods study based on the Reasoned Action Approach that took place between January-May 2011 in rural southern Indiana. In the first phase, an open ended elicitation survey was administered to 62 women. The results of the first phase were used to develop a closed-ended RAA based instrument tailored towards the target population for the second phase. In the second phase, 555 women participated in the closed-ended quantitative survey. The surveys were administered both online and through paper-pencil.

Results: The results of the research revealed that the RAA is an appropriate conceptual framework to study mammogram use behavior (R^2 = 55%). The results showed that perceived behavioral control had the largest weight (β=0.390, $p<0.01$), followed by attitude towards getting a mammogram (β=0.346, $p<0.01$), and perceived norm towards

getting a mammogram (β=0.183, p<0.01) in predicting an intention to get a mammogram in the next year or two.

Implications: Public health professionals should design interventions that focus on changing attitude, removing perceived barriers, and increasing perceived facilitators of getting a mammogram among rural women. Future research should focus examine healthcare providers and mammogram facilities employees to identify other determinants that influence this behavior.

INDEX WORDS: breast cancer, mammograms, health behavior theory, reasoned action approach, rural women, beliefs.

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CHAPTER ONE: EXECUTIVE SUMMARY

Background: Breast cancer is a major public health concern among women worldwide and in the United States especially in rural areas. Mammogram use is an effective way to detect breast cancer at an early stage and thus reduce the mortality rate from breast cancer.

Purpose: The purpose of this two-phase study was to identify the psychosocial determinants of getting a mammogram in the next year or two among American women between the ages of 40 and 75 who live in rural southern Indiana and have had at least one mammogram during their lifetime.

Methods: This is a mixed-method, two-phased, cross-sectional, theory-based, and community-based study. In the first phase (elicitation), data from 62 women were collected via paper-pencil surveys to identify perceived salient beliefs, referents, and circumstances associated with getting a mammogram. Based on the results of the first phase, an appropriate instrument was developed for this target population based on the Reasoned Action Approach (RAA). In the second phase (quantitative), 555 women who have had a mammogram before were recruited to take part in a quantitative survey either online or via paper-pencil: 277 women who have had a screening mammogram within the past two years and 278 women who have not had a screening mammogram within the past two years. Women were recruited from local mammogram facility, free medical clinic for underserved population, and through flyers in the community. In addition to the RAA constructs, other variables such as demographics, preventative health behaviors, past mammogram experience, personal doctor experience, and health care access were included in the instrument.

Results: The results of the first phase of the study revealed that the salient psychosocial factors of getting a mammogram were: early detection and peace of mind (salient perceived consequences), doctors, family members, and friends (salient perceived referents), and having insurance, having a mammogram facility close to home or work, feeling comfortable with personal doctor, and having enough time (salient perceived circumstances). The results of the second phase of the study revealed that the three global constructs of the RAA significantly predicted intention to get a mammogram. R^2 indicated that approximately 56.4% of the variability in intention to get a mammogram is predicted by the three global components of perceived behavioral control ($\beta=0.390$, $p<0.01$), attitude towards getting a mammogram ($\beta=0.346$, $p<0.01$), and perceived norm towards getting a mammogram ($\beta=0.183$, $p<0.01$).

Implications: The results of this study indicate that public health professionals should focus on changing attitudes of women with regards to getting a mammogram as well as removing barriers and increasing facilitators in order to increase the rate of mammography in rural areas.

CHAPTER TWO: BREAST CANCER AND SCREENING

- **Summary:**

Breast cancer is a major public health concern both worldwide and in the United States. Breast cancer is the most common cancer and second-leading cancer killer among American women (National Cancer Institute, 2010). Despite the improvements in breast cancer treatment, there is no clear method for primary prevention of breast cancer. Diagnosis at early stages remains to be the key to long-term survival from breast cancer. Research has shown that regular mammography reduces the mortality rate from breast cancer among women by 20-30% (CDC, 2010). Even though there has been a steady increase in the rate of mammography use among women, the rates are still not at the desired level. A significant segment of women remain under-screened or not screened at all (Breastcancer.org, 2010). Therefore, it is important to identify the factors associated with mammography use among women. In this chapter, I will provide some information to signify the importance of this health issue. I will define breast cancer and its cause, provide statistics on breast cancer worldwide and in the US, and describe symptoms, risk factors, breast cancer screening methods, breast cancer trends in terms of race and age, burden of breast cancer, and mammography use.

- **A. Breast cancer definition and cause:**
  - **Definition:** breast cancer is defined as an uncontrolled growth of breast cells. This usually happens as a result of abrupt changes in the genes, called mutations. The mutations which happen in the genes are responsible for the growth of cells. This change leads to uncontrolled growth of cells, resulting in the formation of tumors. Tumors can be benign or cancerous (malignant):

- Benign tumors: are not considered cancerous and their appearance is similar to normal cells. They grow slowly but they do not invade the nearby cells or spread to other parts of the body.
- Malignant tumors: are cancerous cells and can eventually spread beyond the original tumor to other parts of the body. Breast cancer is a malignant tumor that has developed from breast cells (American Cancer Society, 2009).

- **Cause of breast cancer:**
  - Breast cancer is always caused by genetic mistakes or abnormality in the human body. Only 5-10% of cancers are due to abnormality inherited from parents. About 90% of breast cancers are the result of genetic mutations that happen during the aging process (CDC, 2010). Therefore, it is important for women to go through annual screening as they age, even if they do not have a family history of cancer.

➢ **B. Breast cancer is a prevalent disease worldwide:**

- Cancer is a leading cause of death worldwide, causing 7.6 million deaths (around 13% of all deaths) in 2008. Breast cancer is the most common cancer in women worldwide, comprising 16% of all female cancers. It is estimated that 519,000 women died in 2004 due to breast cancer, and although breast cancer is thought to be a disease of the developed world, a majority (69%) of all breast cancer deaths occur in developing countries (WHO, 2004).
- Breast cancer is among the top ten causes of death of older women globally. The incidence of breast cancer is much higher in high-income countries

compared to low- and middle-income countries, but mortality is similar. This is due to the availability of better treatment in the high-income countries (WHO, 2010). However, the incidence rate of breast cancer is increasing in the developing world due to increased life expectancy, urbanization and adoption of western lifestyles (WHO, 2010).

- Incidence rates vary widely worldwide, with age-standardized rates as high as 99.4 per 100,000 in North America. Eastern Europe, South America, Southern Africa, and Western Asia have moderate incidence rates, but these are increasing. The lowest incidence rates are found in most African countries (WHO, 2010).
- Breast cancer survival rates also vary widely worldwide, ranging from upwards of 80% in North America, Sweden and Japan to around 60% in middle-income countries and below 40% in low-income countries. The low survival rates in less developed countries can be explained mainly by the lack of early detection programs, resulting in a high proportion of women presenting with late-stage disease, as well as by the lack of adequate diagnosis and treatment facilities (WHO, 2010).

➢ **C. Breast cancer has become prevalent in the United States:**

- Even though the mortality rate from breast cancer has been on the decline, breast cancer is still a major public health concern in the US. Breast cancer is the most common type of cancer among women in the US and the second leading causes of death after lung cancer (American Cancer Society, 2010).

- About one in eight women in the US (12%) will develop invasive breast cancer over the course of her lifetime (CDC, 2010).
- In 2010, an estimated 207,090 new cases of invasive breast cancer were diagnosed in women in the US, along with 54,010 new cases of non-invasive breast cancer (CDC, 2010).
- About 39,840 women in the US died in 2010 from breast cancer, though death rates have been decreasing since 1990. These decreases are thought to be the result of treatment advancements, earlier detection through screening, and increased awareness (National Cancer Institute, 2010).
- Breast cancer is the second most common cancer among American women regardless of race and ethnicity. It is the most common cause of death from cancer among Hispanic women. In addition, it is the most common cause of death from cancer among white, African American, Asian/Pacific Islanders, and American Indiana/Alaska Native women. In fact, breast cancer is not exclusive to women. About 1,970 new cases of invasive breast cancer were diagnosed in men in 2010. Less than 1% of all new breast cancer cases occur in men (CDC, 2010).

- **D. Symptoms of breast cancer:** Breast cancer warning signs may vary based on the individual and some women may show no symptoms. However, some of the most common breast cancer symptoms include (CDC, 2010):
  - New lump in the breast
  - Thickening or swelling in a portion of the breast
  - Irritation of breast skin

- Redness or flashy area in the nipple area
- Breast discharge such as blood (except milk)
- Any change in the size or shape of the breast
- Pain in any area of the breast

- **E. Risk Factors:** There are several risk factors that are associated with breast cancer. However, experiencing a risk factor does not mean that one will develop breast cancer, it simply means that the individual may have a higher risk of developing breast cancer compared to women without risk factors. It is recommended that women with higher risk factors talk to their doctors to lower their chances of developing breast cancer and going through screening tests. Some risk factors include (American Cancer Society, 2009):
  - Old age
  - Early onset of menstruation
  - Starting menopause at an older age
  - Never giving birth
  - Not breastfeeding
  - Personal history of breast cancer
  - Personal history of non-cancerous breast diseases
  - Family history of breast cancer
    - A woman's risk of breast cancer approximately doubles if she has a first-degree relative (mother, sister, daughter) who has been diagnosed with breast cancer. About 20-30% of women diagnosed with breast cancer have a family history of breast cancer (CDC, 2010). Therefore

women with a first-degree family relative diagnosis should consider earlier screenings. This may have implications in terms of changing perceived susceptibility of individuals with a first-degree family history.

- Treatment with radiation therapy to the breast
- Being overweight
- Long term use of hormone replacement therapy
- Mutated breast cancer genes BRCA1 or BRCA2
  - About 5-10% of breast cancers can be linked to gene mutations inherited from one's mother or father. Mutations of the BRCA1 and BRCA2 genes are the most common. Women with these mutations have up to an 80% chance of developing breast cancer during their lifetime, and they are more likely to be diagnosed at a younger age (prior to menopause). An increased chance of developing ovarian cancer is also associated with these genetic mutations. In men, about one in ten breast cancers are thought to be due to BRCA2 mutations and even fewer cases to BRCA1 mutations (breastcancer.org, 2010).
- Use of oral contraceptives
- Drinking excessive amounts of alcohol
- Not getting regular physical activity

- Although some risk reduction might be achieved with prevention, these strategies cannot eliminate the majority of breast cancers that develop in low- and middle-income countries where breast cancer is diagnosed in very late stages. Therefore,

early detection in order to improve breast cancer outcome and survival remains the cornerstone of breast cancer control

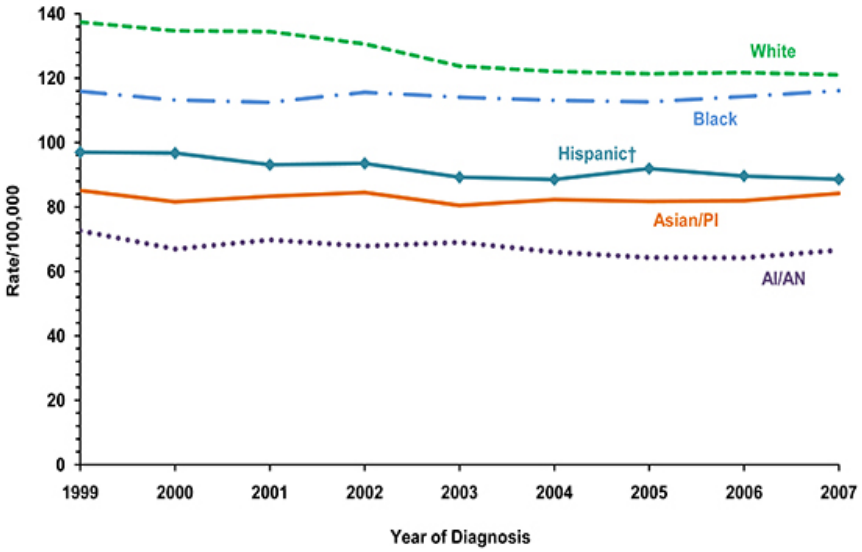
- **F. Prevention methods**: There are mechanisms to reduce the risk of developing breast cancer (American Cancer Society, 2009):
  - Controlling weight and getting regular exercise
  - Limiting the amount of alcohol consumption
  - Going through breast cancer gene screening and knowing the family history
  - Finding out the risk-ratio of hormone replacement therapy
    - From 1999 to 2006, breast cancer incidence rates in the US decreased by about 2% per year. One potential rationale for this may be due to the reduced use of hormone replacement therapy (HRT) among women after the results of a large study called the Women's Health Initiative were published in 2002. These results suggested a connection between HRT and increased breast cancer risk (Breastcancer.org, 2010).
  - Getting screened (getting a mammogram, breast self-exam, clinical breast exam, etc.) for breast cancer regularly
- **G. A closer look at breast cancer rates in the United States:**
  - 1. Trends in incidence rate: As a result of public health intervention and prevention efforts, the incidence rates and mortality rates have been decreasing across all races, yet the rates still remain high (CDC, 2010). Incidence of breast cancer has:
    - Decreased by 2% per year from 1999 to 2006 among all women

- Decreased by 1.5% per year from 1997 to 2006 among white women
- Decreased by 1.6% per year from 1997 to 2006 among African American women
- Decreased by 0.9% per year from 1997 to 2006 among Hispanic women
- Decreased by 1.5% per year from 1997 to 2006 among American Indian/Alaska Native women
- Remained the same from 1997 to 2006 among Asian/Pacific Islander women

- 2. Trends in the death rates from breast cancer have also decreased across all races or have remained the same. In the US, deaths from breast cancer (CDC, 2010):
  - Decreased by 1.9% per year from 1998 to 2006 among all women
  - Decreased by 2% per year from 1997 to 2006 among white women
  - Decreased by 1.5% per year from 1997 to 2006 among African American women
  - Decreased by 2.1% per year from 1997 to 2006 among Hispanic women
  - Remained the same from 1997 to 2006 among American Indian/Alaska Native women
  - Remained the same from 1997 to 2006 among Asian/Pacific Islander women
- 3. Breast cancer rates by race and ethnicity:

- Compared to African American women, white women are slightly more likely to develop breast cancer, but less likely to die of it. One possible reason is that African American women tend to have more aggressive tumors, although why this is the case remains unknown. Women of other ethnic backgrounds — Asian, Hispanic, and Native American — have a lower risk of developing and dying from breast cancer compared to white women and African American women (National Cancer Institute, 2010).
- As it can be seen in Figure 1, white women had the highest incidence rate for breast cancer during 1999-2007. African American women had the second highest rate of getting breast cancer, followed by Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native women (CDC, 2010).

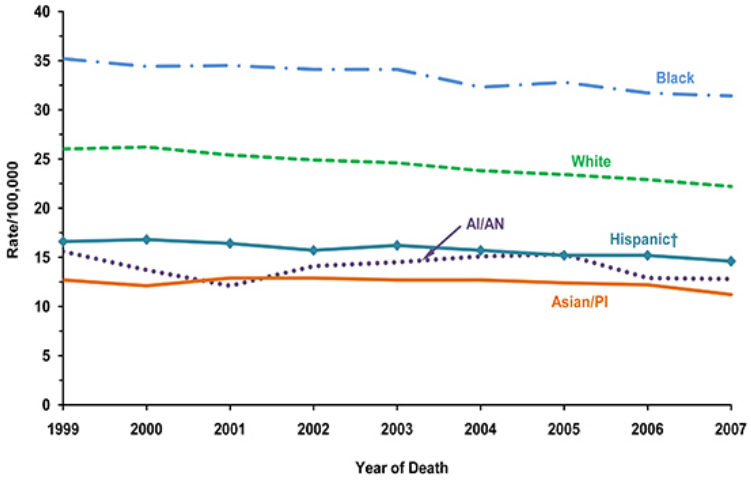
Figure 1: Female breast cancer incidence rates by race and ethnicity in US 1999-2007



Source: Combined data from the National Program of Cancer Registries as submitted to CDC and from the Surveillance, Epidemiology and End Results program as submitted to the National Cancer Institute in November 2009.

- Death rates by race and ethnicity: the death rate from breast cancer has varied from 1999 to 2007. As it can be seen in Figure 2, African American women were more likely to die of breast cancer than any other group. White women had the second highest rate of deaths from breast cancer, followed by Hispanics, American Indian/Alaska Native, and Asian/Pacific Islander (CDC, 2010).

Figure 2: Female Breast Cancer Death Rates by Race and Ethnicity in US, 1999-2007



Mortality source: U.S. Mortality Files, National Center for Health Statistics, CDC.

- 4. Breast Cancer by Age: research has shown that the risk of breast cancer increases with age. The table below shows the percentage of women (how many out of 100) who will get breast cancer over different time-periods.

Figure 3: Percent of U.S. Women Who Develop Breast Cancer over 10-, 20-, and 30- Year Intervals According to their Current Age, 2006-2007

Current Age	10 Years	20 Years	30 Years
30	0.43	1.86	4.13
40	1.45	3.75	6.87
50	2.38	5.60	8.66
60	3.45	6.71	8.65

Source: CDC, 2010.

- **H. Economic costs of breast cancer:**
  - The total cost for breast cancer has been estimated at $3.8 billion, of which $1.8 billion represents medical care. Since treatment costs are considerably lower when a tumor is discovered at an early stage, screening programs have economic value. Cost-effectiveness studies have estimated the cost of screening at between $13,200 and $28,000 per year of life saved. The ratios from several studies indicate the cost effectiveness of an annual mammography to be from $62,000 to $190,000 per life-year for women age 40-49 and $17,000 to $110,000 for women age 50-65. The cost effectiveness of a mammography every three years for women age 50-65 was determined to be $2,700 per life-year (National Cancer Institute, 2010).
- **I. Breast cancer screening:**
  - Comprehensive cancer control involves prevention, early detection, diagnosis and treatment, and rehabilitation. Key strategies for population-based breast cancer control include: raising general public awareness about breast cancer and the mechanisms to control breast cancer and promoting appropriate policies (American Cancer Society, 2009).
  - Control of specific modifiable breast cancer risk factors and effective integrated prevention of non-communicable diseases could eventually have an impact in reducing the incidence of breast cancer in the long term. For instances, promoting healthy diet, physical activity and control of

alcohol intake and weight management to reduce overweight and obesity may help reduce rates.

- Breast cancer screening is defined as checking a woman's breasts for cancer before there are signs or symptoms of the disease (CDC, 2010). Three main tests are used to screen the breasts for cancer:
  - **Mammogram.** A mammogram is an X-ray of the breast. Mammograms are the best method to detect breast cancer early when it is easier to treat and before it is big enough to feel or cause symptoms. Getting screening mammograms regularly can lower the risk of dying from breast cancer. Women ages 40 to 74 years, should have a screening mammogram every one or two years. Mammography screening is the only screening method that has shown to be effective (CDC, 2010). It can reduce breast cancer mortality by 20 to 30% in women over 50 years old in high-income countries when the screening coverage is over 70% (IARC, 2008). Mammography screening is very complex and resource intensive; no research of its effectiveness has been conducted in low resource settings. The National Cancer Institute (2009) reports that screening mammography every one to two years reduces breast cancer deaths by a third or more for women 50 and older.
  - **Clinical breast exam.** A clinical breast exam is an examination by a doctor or nurse, who uses his or her hands to feel for lumps or other changes in the breasts (breastcancer.org, 2010).

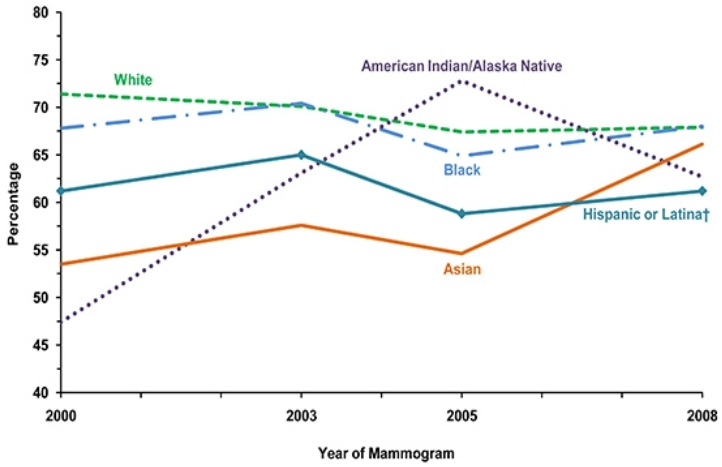
- **Breast self-exam:** A breast self-exam is when women check their own breasts for lumps, changes in size or shape of the breast, or any other changes in the breasts or underarm (armpit). There is no evidence on the effectiveness of screening through breast self-examination (BSE). However, the practice of BSE has been seen to empower women, taking responsibility for their own health. Therefore, BSE is recommended for raising awareness among women at risk rather than as a screening method (CDC, 2010).

- Although some risk reduction might be achieved with prevention, these strategies cannot eliminate the majority of breast cancers that develop in low- and middle-income countries. Therefore, early detection in order to improve breast cancer outcome and survival remains the cornerstone of breast cancer control (Breastcancer.org, 2010).

➢ **J. Mammograms:**

- Mammograms are the best way to detect breast cancer early when it is easier to treat and before it is big enough to feel or cause symptoms. Having regular mammograms can lower the risk of dying from breast cancer (National Cancer Institute, 2010).
- Mammograms and race: The rate of mammography has fluctuated across different racial groups in the past decade. Figure 4 shows the rate of getting a mammogram in different races in the U.S. :

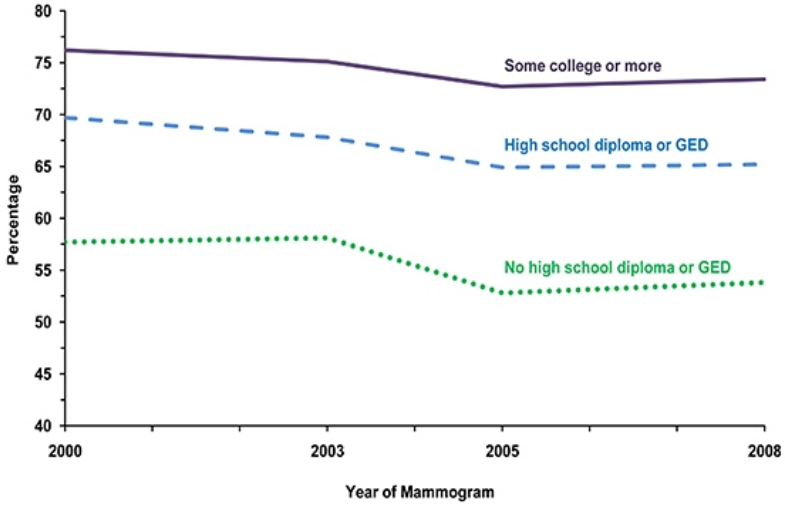
Figure 4: Percentage of U.S. Women Aged 40 Years and Older Who Have Had a Mammogram in the Last 2 Years by Race and Ethnicity



Source: Division of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion.

- Mammography and educational level: the percentages of mammography screening vary by education level. Women with the most years of schooling are most likely to have had a mammogram in the last two years. Figure 5 shows the percentage of women ages 40 years and older who had a mammogram in the last two years, grouped by their highest level of education.

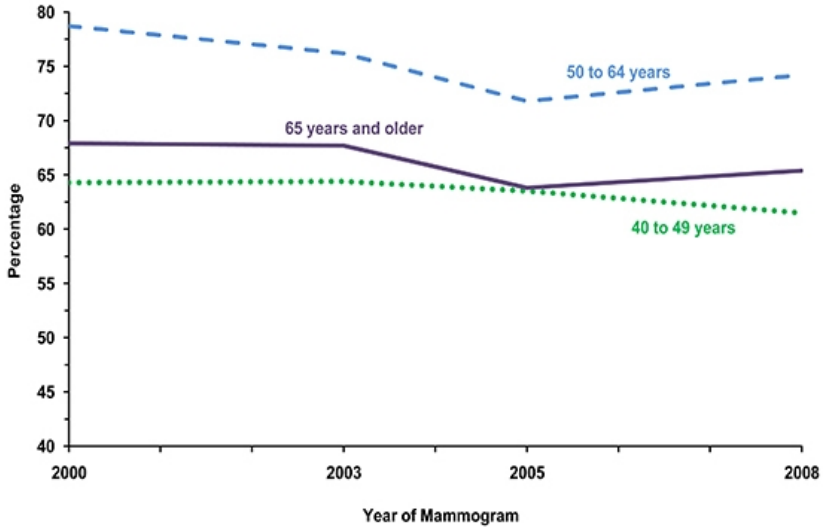
Figure 5: Percentage of U.S. Women Aged 40 Years and Older Who Have Had a Mammogram in the Last 2 Years by Education Level



Source: Division of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion

- Mammography and age: The percentages of mammography screening vary by age. Women ages 50 to 64 years are most likely to have had a mammogram in the last two years, followed by older women and younger women. Figure 6 shows the percentage of women ages 40 years and older who had a mammogram in the last two years, grouped by age.

Figure 6: Percentage of U.S. Women Aged 40 Years and Older Who Have Had a Mammogram in the Last 2 Years by Age



Source: Division of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion

- Mammography recommendation: There are various recommendations for getting a screening mammogram. Figure 6 shows these recommendations for women at average risk:

Figure 7: Mammography Recommendations for Women at Average Risk

Organization	Susan G Kumen the for Cure	American Cancer Society	National Cancer Institute	U.S Preventative Task Force
Recommendation	Every year beginning at age 40	Every year beginning at age 40	Every 1-2 years beginning at age 40	Every 2 years ages of 50-74

Source: Susan G Kumen for Cure

- Need to study mammography behavior: After mammography was shown to be an effective breast cancer screening tool in the late 1980's, use of screening mammography in the US rapidly increased. In 2008, 68 percent of white women, 68 percent of African American women, and 62 percent

of Hispanic/Latino women 40 years and older reported having a recent mammogram (CDC, 2009).This is a slight decline from 2000 rates.

- **K. Research Questions:** There is concern that this decrease in screening mammography may lead to an increase in breast cancer mortality because fewer cancers will be found early, when they are most treatable. Therefore, it is important to understand the behavior of getting a mammogram and the underlying determinants that influence this behavior. The main goal of this study is to identify the psychosocial determinants that influence women living in rural southern Indiana to get a mammogram. More specifically, the research objectives were:
    - Identify the salient consequences, referents, and circumstances of getting a mammogram in order to construct an appropriate RAA-based quantitative instrument.
    - Determine whether the global factors of the RAA predict the intention to get a mammogram among women between the ages of 40 and 75.
    - Determine whether the major constructs of RAA predict intention above and beyond the demographics, preventative behaviors, healthcare access, past mammogram experience, and personal doctor experience.
    - Identify the underlying psychosocial factors that predict the three major constructs of RAA in order to use them in designing interventions to promote regular mammogram use.

- In chapter 3, I will summarize the literature that has examined the behavior of getting a mammogram and its determinants.

CHAPTER THREE: SUMMARY OF EVIDENCE

A) Theory and Reasoned Action Approach:

- The main goal of screening programs is to examine people at high risk of a particular health condition and to allow interventions to prevent that condition from developing or progressing. A major determinant of the effectiveness of all screening programs is the level of participation in those programs. A high level of attendance at screening programs is a prerequisite if screening programs are to have a significant impact on a population's morbidity and mortality (Cooke & French, 2008). Although the screening programs have shown to be effective, the participation rates often remain low (CDC, 2010). Theories of health behavior have been used to study intention and participation in various health behaviors. One of the most frequently used theories of health behavior is the Reasoned Action Approach (RAA).
- RAA is the most recent formulation of the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), and the Integrated Model (IM) (Fishbein & Ajzen, 2010). The RAA proposes that intention is the immediate determinant of behavior; that attitude toward the act, perceived norm, and self-efficacy combine as global components to determine intention. Like TRA, RAA assumes that intention is the immediate determinant of behavior but in addition, the IM recognizes that environmental factors and skills and abilities can moderate the intention-behavior relationship. In addition, it views perceived normative pressure as a function of descriptive as well as of injunctive norms (Fishbein, 2008). RAA has been used to predict intention to engage in cancer prevention and

detections behaviors (Smith-McLallen & Fishbein, 2009). In addition, the previous versions of RAA (TRA and TPB) have been utilized in other studies to understand behaviors such as condom use (Albarracin, Johnson, Fishbein, & Muellerieile, 2001), physical activity (Hagger, Chatzisarantis & Biddle, 2002; Downs & Hausenblas, 2005), and other health behaviors as well as to develop interventions for such behaviors (Hardeman et al., 2002).

- Before the development of RAA, the previous versions (TRA and TPB) were both models that had been extensively used to predict human behavior. Cooke and French (2008) conducted a meta-analysis to quantify how well the TRA and TPB have predicted intentions to attend screening programs and actual attendance behavior. They identified 33 studies that examined screening for cancer (breast, cervical, and colon) as well as health checks, genetic screening, prenatal screening, diabetes screening, and screening for tuberculosis. The results of their study showed that across the studies as a whole, attitudes had a large relationship with intention, although subjective norm and perceived behavioral control possessed medium-sized relationships with intention. Intention has a medium-sized relationship with attendance behavior , although perceived behavioral control had a small relationship with attendance.
    - 16 out of 33 studies utilized TRA or TPB to examine the behavior of acquiring mammograms. Only 4 out of 16 studies were conducted in the US. A majority of the studies were conducted either in the United Kingdom or the Netherlands. Among the mammography studies, attitude had the strongest relationship to intention. The medium-sized subjective

norm-intention relationship for mammography was the smallest for any of the types of screening tests. The authors suggest that women do not vary much in their perceptions of normative pressure when considering mammography screening. In other words, most women perceive mammography screening as something that most of their important others would want them to do and therefore there is limited variability in their responses, reducing its prediction of intention (Cooke & French, 2008).

- This study will use RAA as a framework for understanding the factors that predict intention to get a mammogram among women ages 40 to 64. In the next sections of this chapter, I will summarize the studies that have examined the determinants of mammography use and select studies (Published since 1990) that have used TRA or TPB in order to study the intention to get a mammogram in American women.

B) Large Scale Studies

- In order to gain a better understanding of the state of the literature on studying the determinants of getting a mammogram, I conducted a comprehensive literature search. The goal was to identify all the articles that had been published on the determinants of mammograms from January 2000 through August 2010. I used Google Scholar, Academic Search (EBSCO), PsycINFO, and Web of Knowledge search engines to look for the articles. The following terms were used to identify the articles:
    - Breast cancer and mammograms
    - Determinants and mammograms
    - Factors and mammograms
    - Theories and mammograms
    - Determinants and mammography
    - Psychosocial factors and mammograms
    - Health behavior theories and mammograms
    - Health belief model and mammograms
    - Theory of Reasoned Action and mammograms
    - Theory of Planned Behavior and mammograms
    - Social Cognitive Theory and mammograms
    - Transtheoretical model and mammogram
    - Social influence and mammogram
- In order to be included in this literature review, articles had to have met the following inclusion criteria:

- Examine the determinants of getting a mammogram
- Focus on women in the US
- Published from January 2000 through August 2010
- Quantitative studies

- The purpose of this literature search was to identify the gap in the literature regarding determinants of getting a mammogram in terms of theory-use, race, age group, and sample size. The results of the literature search can be seen in Appendix 6.

This comprehensive literature search can be summarized as follow:

- There were a total of 50 articles published during this time span. A majority of the articles (34) were published before 2005, indicating that the rate of publication on determinants of getting a mammogram has slowed since 2004 in the US.
- In terms of target population's race and ethnicity, the majority of the studies had predominantly white participants and few Asians as their main participants. The break down is:
  - Almost 50% of the articles contained mainly white participants (25 studies)
  - About 25% of them contained mainly African Americans (8 all African Americans, and 5 majority African Americans)
  - About 20% Hispanic (6 all Hispanics and 3 majority Hispanics)
  - About 5% Asian (4 studies)

- In terms of the age of the target population, majority of the studies focused on individuals 40 and older, although a few studied women younger than the age of 30.
    - 2 studies all ages
    - 2 studies 30 or older
    - 24 studies 40 and older (50%)
    - 14 studies 50 or older (25%)
    - 6 studies 60 or 65 and older
- One of the major findings of the search was that majority of the studies (36) did not use any theories or conceptual framework in the design of their study. The break-down is as follows:
    - 36 studies did not use any theories
    - 8 studies used HBM
    - 3 studies used TRA or TPB
    - 1 study used TTM
    - 1 study used Precede-Proceed Model
    - 1 study used Behavioral Model of Health Behavior
- In terms of the behavior of interest, majority of the studies focused on first time mammogram use or mammogram use in general.
    - 9 studies focused on repeated or recurring mammogram use
    - 41 studies focused on first time mammogram use or mammogram use in general

- Some of the determinants or characteristics that were commonly examined in these studies were:
    - Demographic variables (age, SES, race, education, citizenship)
    - Family history
    - Obesity
    - Smoking
    - Social support
    - Physician recommendation
    - Medicare policy
    - Health insurance policy
- Some of these studies, focused on some special populations :
    - Low-income women (6)
    - Women living in rural areas (6)
    - Older women (6)
    - Un-insured women (2)
    - Low-educated women (1)
- In terms of the sample size, many of the studies have more than 1000 women in the study. It is important to mentioned that most of those studies utilized large data sets and did a secondary data analysis:
    - 50% of the articles had 1000 women or more
    - 20% of the articles had between 500 and 1000 women
    - 30% of the articles had less than 500 women
- Quick analysis of the significant variables:

- Results of the several studies suggested the important role of healthcare providers in getting a mammogram. Physician access barriers such as not having a physician-recommended mammography and having no primary care provider were among the determinants that were highly predictive of not obtaining mammography.
- Past screening behaviors (such as clinical breast exam and mammography) correlated strongly with the receipt of mammography.
- A majority of the socioeconomic barriers (except having no insurance) such as education, age, and income had no consistent significant impact on getting a mammogram.
- There were some racial and ethnic differences in the behavior of getting a mammogram. For example, African American and Latino women were more concerned about the cost, pain, and mammography safety than their white counterparts. On the other hand, having no insurance was more important to whites and Asians.
- The results of multiple studies showed that the concerns about cost and family history of cancer were less important among older women. However, screening knowledge has more impact on mammography use in women over the age of 65.
- One of the main findings of these studies was that women with less access to physicians are much less likely to obtain a mammogram.

C) Select Theory Studies

In this section of the proposal, I will summarize the results of the selected studies that utilized Theory of Reasoned Action (TRA) or Theory of Planned Behavior to study the behavior of getting a mammogram. To be part of this summary, the studies had to have the following inclusion criteria:

1. Examined the determinants of getting a mammogram
2. Studied the women in the US
3. It had to be published from January 1990 through August 2010
4. They were quantitative studies

In order to further investigate the behavior of acquiring mammography, I will summarize and examine the 6 selected studies that utilized either TRA or TPB in their design:

Study 1: Montano & Taplin (1991):

- Theory Used:
  - Expanded TRA: addition of habit, facilitating conditions, and affect
- Objectives: This study had three objectives:
  - Apply the TRA conceptual framework to the prediction and understanding of mammography participation after an explicit invitation to obtain a mammogram
  - Test the utilities and roles of the additional components in the expanded model for the prediction of mammography participation
  - Test whether the expanded model is sufficient to explain behavior or whether additional components external to the model can further improve prediction of mammography participation.

- Methods:
  - Study Design:
    - Prospective study
    - Elicitation and development of quantitative survey
  - Target population and Setting:
    - Women ages 40 and older attending a HMO
    - This study was conducted at Group Health Cooperative of Puget Sound (GHC) which is a HMO in western Washington State.
  - Recruitment:
    - All women ages 40 or older were mailed a two-page questionnaire which elicited information concerning breast cancer risk factors, and medical and screening history. Every woman who responded to the survey was sent a letter within two months indicating her risk category. In addition, they were asked to make an appointment for a mammogram.
  - Sample size:
    - 683 out of 939 women completed the survey (72% response rate)
  - Survey development:
    - A questionnaire was developed by conducting individual open ended interviews with 14 women The interviews were conducted to elicit three kinds of information: (1) positive and negative outcomes or attributes associated with having a mammogram, (2) referents who might influence the woman's decision about getting a mammogram,

and (3) environmental factors that might influence the likelihood of completing, an appointment (facilitating conditions).

- Behavior or dependent variable and measures:
  - Mammography participation
    - Did they get a mammogram based on the data base?
  - Intention to get a mammogram
    - "How likely is it that you will get a mammogram done this year at BCSC?"
- Determinants and measures:
  - Attitude: nine outcomes of mammography from the elicitation interviews were used. Researchers used two measures: behavioral belief and evaluation of consequence.
  - Subjective norm: Regular physician, husband, women friend(s), daughter(s), sister(s), regular nurse, prominent women and Group Health Cooperative were all identified in the elicitation interviews as potential sources of influence on the decision to have a mammogram. For each individual or group the women were asked to rate her perception of whether the person or group wanted her to get a mammogram and how strongly the respondent was motivated to comply with the expectation.
  - Habit: a measure of past behavior. In this study they used previous use of mammography in the last 5 years.

- Facilitating conditions: characteristics of the individual or environment that make it easier or more difficult for an individual to carry out on his or her intention. They used fours items: usual daily schedule, this time of the year, time to travel to get a mammogram, and arranging transportation to get a mammogram
- Affect: a measure of the individual's emotional reaction to the thought of the behavior
    - Four semantic differential items were used to measure the overall affect associated to getting a mammogram: good/bad, beneficial/harmful, pleasant/unpleasant, and frightening/reassuring
    - HBM constructs: perceived susceptibility, severity, and self-efficacy

- Other variables:
    - Demographic items such as race, marital status, education, religion, and income
    - Health behavior: amount of physical activity, seat belt use, number of visits to a healthcare provider in the past year, and number of Pap smears in the past 4 four years.

➢ Results

- General results:
    - 52% rate of participation in the mammogram
- Types of Analysis:

- 1) Multiple regression analysis to predict intention by adding attitude and subjective norm
- 2) Multiple regression by adding affect to the TRA constructs to predict intention
- 3) Multiple regression analysis to predict participation
- 4) Multiple regression by adding affect to the TRA constructs to predict participation
- 5) Multiple regression with attitude, subjective norm, affect, facilitating condition, and habit regressed against participation
- 6) Correlation between participation and other variables
- 7) Hierarchical stepwise multiple regression test to examine if demographic, HBM constructs, and health behavior variables predict participation over expanded TRA.

- Significant variables:
  - 1) Attitude (B= 0.34) and subjective norm (0.27) significantly predicted intention with R = 0.52 and R^2= 0.27
  - 2) Affect was significant (B=0.43) with R = 0.62 and R^2= 0.39
  - 3) Attitude (B= 0.27) and subjective norm (0.12) significantly predicted intention with R = 0.34 and R^2= 0.12
  - 4) Affect was significant (B=0.20) but SN no longer significant, R = 0.38 and R^2= 0.14
  - 5) The facilitating conditions significantly predicted participation

        - 6) Demographics variables such as income, marital status, and education positively correlated with participation. Age had a curvilinear relationship with participation. Health behaviors such as exercise, seat belt use, and number of Pap tests had a significant positive correlation with participation. Perceived susceptibility, severity and self-efficacy had a significant positive correlation with participation.
        - 7) Education, age dummy (60-75), and marital status dummy (never married vs. remainder) significantly improved variance accounted for participation.
    - Non-significant variables:
        - 5) Habit and affect did not significantly predict participation
        - 6) Number of healthcare visits not significant
- Conclusion:
    - The study supported the expanded TRA for predicting intention and behavior.
    - The model that best predicted participation was attitude, affect, and facilitating conditions and not subjective norm explaining 39% of intention and 20% of the behavior

Study 2: Michels, Taplin, Carter, & Kugler (1995):

- Theory Used:
  - TRA
- Objectives: This study had two objectives:
  - Estimate the participation rate in mammography screening for women who are military beneficiaries
  - Evaluate the extent to which attitudes and subjective norms are associated with women's intention to get a mammogram in the next year
- Methods:
  - Study Design:
    - Multi-staged, stratified method
  - Target population and Setting:
    - Women eligible for care at Madigan Army Medical Center (army beneficiaries)
  - Recruitment:
    - The surveys were mailed to women with a cover letter, surveys, and stamped envelops
  - Sample size:
    - 309 women 40 and older
    - Mean age of 65 and range of 41 to 89
  - Survey development:
    - The survey was developed from previous surveys
    - Some questions were added specific to this target population

        - The questionnaire was pilot tested
    - Behavior or dependent variable and measures:
        - Intention to get a mammogram
    - Determinants and measures:
        - Attitude
        - Subjective norm
        - Habit
        - Perceived risk of breast cancer
    - Other variables:
        - Source of care
        - Preventative cares
        - Breast cancer risk factors
        - Race, education, income
- Results
    - General results:
        - 21.5% never had a mammogram
        - 40% had their last mammogram in the past year
        - 12.8% get a regular mammogram
        - Some barriers mentioned in open-ended item were: cost, difficulty scheduling an appointment, and requirement for a referral to get a mammogram

- Types of Analysis:
  - 1) Comparison of women who get a regular mammogram and those who don't
  - 2) Multiple regression of attitude and subjective norm on intention
  - 3) Stepwise regression adding attitude, subjective norm, habit and perceived risk
- Significant variables:
  - 1) Women who get a regular mammogram are more likely to believe that a mammogram is likely to find asymptomatic cancer, less likely to believe that a mammogram causes pain, and more likely to believe it gives radiation, leads to thinking about cancer, and to radiation therapy or chemotherapy. Women with more participation were more likely to state that their doctor or media recommends a mammogram.
  - 2) Both attitude (Beta=0.005) and subjective norm (0.017) significantly predicted intention with R=0.39 and R^2= 0.15.
  - 3) Addition of habit and perceived risk improved the regression to R= 0.48 and R^2=0.23 but attitude became insignificant.
- Non-significant variables:
  - There were no significant differences between regular mammograms users and non-regular users in terms of age, race, educational level, insurance coverage, and military vs. civilian source of care.

➢ Conclusion:

- The expanded TRA explained the intention to get a mammogram.

- High participation is associated with breast cancer risk, income, education, and previous risk of breast cancer.
- Regular use of mammography among military beneficiaries is lower than rates in the non-military population.

Study 3: Montano, Thmpson, Taylor, & Mahloch (1997):

- Theory Used:
  - Expanded TRA (Attitude, subjective norm, affect, and facilitating conditions)
- Objectives: This study had three objectives:
  - Identification of population-specific barriers and other factors that affect low-income women's mammography utilization
  - Development of population-specific intervention strategies
  - Selection of measures for evaluating the intervention effectiveness
- Methods:
  - Study Design:
    - Cross-sectional study
    - Elicitation and development of quantitative survey
  - Target population and Setting:
    - The setting was a county-owned inner city hospital delivering comprehensive medical services to under-served women in Seattle
    - Low-income women between the ages of 50 and 69 who attended the hospital
      - Race: 47% white, 31% African-American, 10% Asian, 3% Hispanic
  - Recruitment:
    - The surveys were mailed to eligible women
    - Telephone the non-respondents and administer the questions by phone
  - Sample size:

- 361 women completed the survey

- Survey development:
  - During the elicitation phase 30 women were interviewed and a 14 person focus group was held.
  - The elicitation questions were about four main model constructs: (1) women's affective response to the idea of getting a mammogram, (2) women's behavioral beliefs about outcomes or attributes of obtaining a mammogram, (3) sources of social influence concerning mammography, and (4) conditions that facilitate or constrain women's ability to get a mammogram.
  - Quantitative survey was developed based on the elicitation data.
- Behavior or dependent variable and measures:
  - Intention to get a mammogram in the next year (5 point scale from no to very sure).
- Determinants and measures:
  - 5 affect measures: Five semantic differential, bipolar scales were used with endpoints: Scary–Comforting, Good–Bad, Important–Unimportant, Harmful Helpful, and Stressful–Not stressful.
  - 13 behavioral belief measures: (1) learn whether I have cancer, (2) allow me to live longer, (3) early detection, (4) too many X rays, (5) cause cancer because of machine pressure, (6) cause pain, (7) testing when there is no family history, (8) may miss detecting cancer, (9) testing when there are no symptoms, (10) involves technician touching

breasts, (11) involves being treated badly by staff, (12) costs money, and (13) requires effort.

- 5 subjective norm: The five sources of influence for mammography identified were doctor, family, friends, people in the news, and others in the medical community.
- 5 facilitator/constraint factors: The following five factors were identified as potentially affecting the ease of getting a mammogram: (1) doctor ordering one, (2) scheduling an appointment, (3) experience with clinic staff, (4) patient's general health, and (5) finding transportation.

- Other variables:
  - Previous mammography utilization
  - Demographic characteristics

- Results
  - General results:
    - 58% were very sure to get a mammogram in the next year
  - Types of Analysis:
    - 1) Correlation between intention and previous behavior, attitude, subjective norm, affect, and facilitators
    - 2) Multiple regression against intention for attitude, subjective norm, affect, and facilitators
    - 3) Correlation between intention and each item for behavior belief, affect, normative belief, and facilitators

- Significant variables:
  - 1) All correlations were significant (previous behavior, attitude, subjective norm, affect, and facilitators)
  - 2) Attitude (B=0.31), subjective norm (B=0.54), affect (0.21), and facilitators (B=0.32) all significantly predicted intention with R= 0.54.
  - 3) 10 of 13 behavioral beliefs, all of normative beliefs, all affect items, and all facilitators were significantly correlated with intention
- Non-significant variables:
  - 3) 3 of 13 behavioral beliefs (requires efforts, treated badly by staff, may miss detecting tanker) were not significantly correlated with intention

➢ Conclusion:

- All fours model constructs (attitude, affect, subjective norm, and facilitators) independently contributed to predicting intention
- The significant behavioral beliefs making up attitude are probably the most important determining the strategies for interventions

Study 4: Burnett, Steakley, & Tefft (1995):

- Theory Used:
  - TRA
- Objectives:
  - Identify barriers to breast cancer screening services from the perspective of medically underserved women of DC
  - Determine any relationship between attitudes and influence of significant others on getting a mammogram
  - Identify a relationship between the site where services are provided and the underserved women's intention to engage in getting a mammogram
- Methods:
  - Study Design:
    - Cross sectional; Correlational
  - Target population and Setting:
    - Medically underserved and uninsured adult women aged 40 and older
  - Recruitment:
    - Women were recruited from six cancer screening sites participating in a free breast cancer program
  - Sample size:
    - 339 medically underserved adult women
    - Mean age of 51, ranging 40-77, and household income of less than 35,000
    - Majority of women (90%) were African American

- Survey development:
  - The investigators developed Barriers to Breast and Cervical Cancer Screening Questionnaire (BBCCSQ). It contained 237 items divided into 4 sections. It contained demographic items such as age, race, marital status, education level, and income.
- Behavior or dependent variable and measures:
  - Intention to have a mammography within a one or two years of last mammogram
- Determinants and measures:
  - Attitudes
  - Subjective norm
- Other variables:
  - Demographics such as age, marital status, education, income, and race

➢ Results

- General results:
  - 30% of women reported never having had a mammogram.
- Types of Analysis:
  - Multiple regression to of attitude and subjective norm on intention
- Significant variables:
  - 1) Both attitude and subjective norm both significantly predicted intention with $R^2 = 11.5$
- Non-significant variables:

        - Demographic variables, cost, and transportation did not significantly predict intention

- Conclusion
    - The findings are consistent with the TRA assertions that behavioral intention is guided by attitude toward the behavior and by influence of others.

Study 5: Bowie, Curbow, La Veist, Fitzgerald, & Zabora (2003):

- Theory Used:
  - TPB
- Objectives: This study had three objectives:
  - Examine whether main constructs of TPB explain the intention to get a repeat mammogram in 6 months
  - Examine whether additional socio-cultural variables explain better the intention to undergo mammography among African American women
- Methods:
  - Study Design:
    - Two phased (elicitation and quantitative survey) cross-sectional study
  - Target population and Setting:
    - African American women aged 40 to 49 who had received one to five mammograms
  - Recruitment:
    - Women were recruited from the Johns Hopkins Hospital Breast Cancer Screening center
    - A packet was mailed to the women to invite them for a phone interview
  - Sample size:
    - Phase I contained 14 African American women aged 41 to 73 who lived in Baltimore city
    - They were asked the 6 standard elicitation questions

        - During the phase II of the study 150 African American women were recruited. They were between the ages of 40 and 49 with mean of 45.2
    - Survey development:
        - After the elicitation data was analyzed, the quantitative survey was developed.
    - Behavior or dependent variable and measures:
        - Intention to get a repeat mammogram in 6 months
    - Determinants and measures:
        - Attitude: it was measured with 16 items
        - Subjective norm: it was measured by 7 items
    - Other variables:
        - Preventative health behaviors such as blood pressure check, cholesterol check, physical, breast, and pelvic examination, and Pap smear.
        - Demographic items
        - Knowledge of breast cancer
        - Trust in health care system and providers
        - Previous experience with mammography
        - Anxiety
- Results
    - Types of Analysis:
        - 1) Hierarchical regression was performed using demographic variables.

- 2) Hierarchical regression was performed by adding TPB construct to demographic variables.
- 3) Hierarchical regression was performed by adding other variables such as anxiety and religious beliefs.
- 4) Hierarchical regression was performed by adding previous experience with mammograms.
- 5) Hierarchical regression was performed by adding other variables trust in health care system and providers.

- Significant variables:
  - 1) Of all the demographic variables only being unemployed and less educated were significantly associated with a higher intention.
  - 2) Employment and education stayed significant as well as behavioral belief and perceived behavioral control.
  - 4) Positive previous experience of mammograms significantly predicted intention
  - 5) Only the trust in the health care provider significantly predicted intention
- Non-significant variables:
  - 2) Subjective norm did not significantly predict intention
  - 3) Anxiety and religious beliefs were not significant
  - 5) Trust in health care system

- Conclusion:
    - Only the attitude and perceived behavioral control components of the theory explained the women's intentions.
    - In the expanded model, a positive previous experience with mammography, low income and educational level, positive beliefs about breast health, and lack of trust in health care providers explained increased intention to have another mammogram.

Study 6: Steele & Porche (2005):

- Theory Used:
  - TPB
- Objectives:
  - Test the TPB to predict mammography intention among rural women in Southeastern Louisiana.
- Methods:
  - Study Design:
    - Cross sectional study
  - Target population and Setting:
    - Women living in southeastern Louisiana who could read English and did not have a prior history of breast cancer
  - Recruitment:
    - Participants were identified by their primary care provider for the interviews
    - Participants were recruited by posting flyers in rural churches, health clinics, hospitals, senior centers, and school employee lunchrooms
    - Incentives were provided ($10 to everyone completed)
  - Sample size:
    - 302 women living in rural southeastern Louisiana completed the survey
    - The mean age was 53.7, ranging from 40 to 74
    - Majority of women (60.9%) were African American

- Survey development:
  - The questionnaire was developed specifically for this study after elicitation interviews and it contained 42 items
- Behavior or dependent variable and measures:
  - Intention to obtain a mammogram in the next year
- Determinants and measures:
  - Attitude
  - Subjective norm
  - Perceived behavioral control
- Other variables:
  - N/A

➢ Results

- General results:
  - N/A
- Types of Analysis:
  - 1) Regression of TPB constructs on intention to get a mammogram in the next year
- Significant variables:
  - 1) Attitude (B=0.244), subjective norm (B=0.176) and perceived behavioral control (0.288) had statistically significant direct effect on intention to obtain an annual mammogram.
- Non-significant variables:
  - N/A

- Conclusion:
    - Perceived behavioral control was the strongest predictor of mammography intention.
    - TPB explained 24% of variance in intention to get a mammogram next year.
    - Women with more positive attitude towards getting a mammogram, perceived greater support from their significant referents, and perceived greater control reported greater intention to get a mammogram in the next year.

Summary of Selected Studies:

- Very few studies have investigated factors affecting mammography utilizing conceptual frameworks or theories of health behaviors. In addition, few studies developed an appropriate instrument for their target population.
- A majority of the studies were cross-sectional and correlational in design, although one of the studies was a prospective study.
- Among these studies four of the six used TRA and two utilized TPB. They mostly used an expanded version of the TRA, adding affect, habit, and facilitating conditions. The use of TRA may be problematic because getting a mammography is not always under individual's control.
- In terms of the target population, a majority of the studies (3 out of 6) had African Americans as a main target, followed by whites (2 out of 6). One study did not reveal the characteristics of the target population. They mostly focused on lower socioeconomic women such as uninsured, low-income, rural, and people eligible for

military Medicare. Five of the six studies focused individuals 40 and older although one chose women 50 and older.

- The target behavior of interest was mainly an intention to get a mammogram in the next year of two. Some studies examined the actual behavior of getting a mammogram, although one of the studies examined the behavior of getting a repeated mammogram.
- In terms of instrument development, four of the six studies developed their instruments specifically for their target population by doing an elicitation, but only two of them revealed the results of an elicitation. Some of the most common behavioral beliefs mentioned by women were learning about the existence of tumor, allowing to leave longer, early detection, too many X-rays, radiation causing cancer, pain, cost, may miss detecting cancer, involves technicians touching breasts, involves being treated badly by the staff, and requiring time. The main salient referents mentioned by women were physicians, husband, female friends, daughter, sister, and nurses. Some of the most commonly mentioned facilitators were physicians ordering a mammogram, scheduling an appointment, experience with clinic staff, patient's general health, and finding transportation.
- Some of the most commonly tested variables besides the constructs of the TRA and TPB were: perceived susceptibility, perceived severity, self-efficacy, demographic items (age, race, education, income, etc.), lack of trust in physicians, lack of trust in healthcare system, previous experience with cancer, general health, family history of cancer, personal history of cancer, and having an insurance.

- There were some variables that significantly predicted intention to get a mammogram:
    - Attitude and subjective norm were always significant except in one study where subjective norm was not
    - Perceived behavioral control significantly predicted intention in both of the TPB studies
    - The results were inconsistent on which construct of TPB is most important. In one study attitude was the most important determinant of predicting intention although in the other subjective norm or perceived behavioral control was more important
    - Affect and emotional components were also important determinants of intention to get a mammogram
- Besides the constructs of theories, other variables that contributed significantly in predicting intention were (not in all studies thought):
    - Educational level
    - Positive experience of previous mammogram
    - Patient-provider caring relationship
    - Seat-belt use
    - Time
    - Cost

D) Research Gap

- Based on the results of the comprehensive literature, there is a gap in the literature:
  a. There are very few studies that utilized a strong theoretical framework to examine a comprehensive set of factors as determinants of mammography utilization. Most of the studies were conducted in European countries. Among the studies that have been done in the US, a majority have used Health Belief Model or TRA and rarely TPB. This could be problematic because getting a mammogram is not completely under individuals' control.
  b. Studies have not taken into account a comprehensive list of variables of socio-cultural issues.
  c. Only one study examined family history of cancer.
  d. Role of physicians in recommending mammograms has been shown to be significant but only a few studies have focused on studying this role.
  e. Most of the studies have not included older individuals defined as those over 65.
  f. Few studies have studied the mammography use among rural women and cancer survivors.

E) **Research goal and questions:** The main goal of this study was to identify the determinants that influence women living in rural southern Indiana between the ages of 40 to 75 to get a screening mammogram. More specifically, the research questions were:

i. Identify the salient consequences, referents, and circumstances of getting a mammogram in order to construct an appropriate RAA-based quantitative instrument.

ii. Do the global constructs of RAA predict the intention to get a mammogram among women between the ages of 40 and 75?

iii. Do the major constructs of RAA predict intention above and beyond the demographics, preventative behaviors, healthcare access, past mammogram experience, and personal doctor experience?

iv. Identify the underlying psychosocial factors that predict the three major constructs of RAA in order to use them in designing interventions to promote regular mammogram use.

CHAPTER FOUR: METHODOLOGY

A) Research Methodology & Analytical Procedures:

- Although findings from previous studies on mammograms are useful in understanding the decision making process of women to get a mammogram, there is a gap in the literature in terms of studies that properly use theories in their design. The overall proposed mix-methodology study included two phases of data collection:

  (1) Conducting an open-ended elicitation survey to identify salient beliefs, referents and circumstances

  (2) Developing an RAA-based, close-ended quantitative survey to gain further insight into the decision-making process of women to get a mammogram.

- The phases are described in detail below. Protocols for Phase 1 and 2 were approved by the Institutional Review Board at Indiana University for the use of human subjects (see Appendix 1).

B) Study Design, Participants and Participant Recruitment:

- Phase 1: A community-based, cross-sectional survey design was used in this study. The data used in this phase of the study came from a convenience sample of 62 women between the ages of 40 and 75 residing in Bloomington Indiana. The sample was recruited from local university as well as a free medical clinic for under-served populations. Women were recruited using flyers as well as recruitment by the receptionists and primary investigator at the clinic. Women were recruited from the free medical clinic in order to include women from a

lower socio-economic status population. The clinic serves women who do not have health insurance and their income level is below 200% of the federal poverty level. Participants filled out a questionnaire including open-ended, semi-structured items as well as closed-ended items which lasted approximately 15 minutes. Participation in the study was voluntary. Sixty-nine questionnaires were distributed and 65 were completed. Three women were excluded because they did not meet the age criteria. The final sample included 62 participants. The data collection took place during February and March of 2011. As an incentive for their participation, women had the opportunity to enter their name into a pool for a chance to win one of four $20 gift cards. All study protocols were reviewed and approved by the University Institutional Review Board.

- Phase 2: This phase of the study was a theory-based, cross-sectional, and community-based study examining mammogram use among women in rural southern Indiana. Participation in this study was voluntary. Women had to meet the following criteria: reside in southern Indiana, be between the ages of 40 and 75, and have had at least one mammogram during their life time. In order to reach a wider range of participants, women could complete the survey by completing a paper-pencil survey at the sites, by completing an online survey on a computer in the waiting area using the provided computers, or by completing an online survey at home on the website provided by a flyer. The two main sites of data collection were the local mammogram facility (responsible for 90% of mammograms in the area) and a free health clinic for individuals below the poverty line. Flyers containing study information and the website for the study were distributed

locally at churches, grocery stores, coffee shops, homeless shelters, and other public places. A majority of women chose to take the online survey in the waiting room at the two sites. Every woman who participated in the study received a $5 dollar gift card either to Subway or Starbucks. Participants took approximately 10 to 15 minutes to complete the survey. Data collection lasted for five weeks in the Spring of 2011 and resulted in 555 surveys from eligible women. Ethical approval for this study was granted by the Internal Review Board of the authors' university. Additionally, the mammogram facility and the health clinic approved all research protocol.

C) Instruments & Data Collection:

- **Phase 1: Item-Elicitation:** The questionnaire contained 23 items including demographic variables, (i.e. age, race, general health, and relationship status), previous and current mammogram behavior (i.e. time of first and last mammogram, frequency of getting a mammogram, reasons for not getting a mammogram, and intention to get a mammogram in the future), their personal and family history of cancer, the number of friends who have had cancer, and where they would go to get a mammogram. Participants were also asked questions regarding their health insurance coverage and whether it covers getting a mammogram. The elicitation items included six open-ended questions to elicit three categories of information:
    - (1) perceived positive and negative consequences associated with getting a mammogram in the next year or two,

- (2) perceived referents who might influence (approve or disapprove) women's decision to get a mammogram in the next year or two, and
- (3) perceived barriers and facilitators (or circumstances) that might influence women's decision to get a mammogram in the next year or two.

- **Phase 2: Comprehensive quantitative survey:**
- The survey instrument consisted of 84 close-ended items. About one-third of the instrument consisted of measures of demographic variables, socioeconomic status, other preventative behaviors (e.g., flu shot, Pap test), previous mammogram experience, health care access, and doctor's experience taken from the CDC BRFSS and the literature. Most of instrument assessed constructs of the Reasoned Action Approach (Fishbein & Ajzen, 2010) with 7-point Likert or semantic differential scales. Intention to have a mammogram in the next year or two was assessed with four items: *I will get a mammogram in the next year or two* (strongly disagree to strongly agree); *I will get a mammogram in the next year or two* (definitely no to definitely yes); *How likely is it that you will get a mammogram in the next year or two* (strongly unlikely to strongly likely); *When do you expect to get your next mammogram* (in the next 6 months to never).
- The direct measure of attitude towards getting a mammogram in the next year or two was assessed with four pairs of bipolar adjectives. Each appeared after the sentence: *My getting a mammogram in the next year or two is*…. The bi-polar adjectives were extremely bad-extremely good, extremely unpleasant-extremely pleasant, extremely unenjoyable-extremely enjoyable, and extremely worthless-extremely valuable. The direct measure of perceived norm was obtained by taking

the average of three items: *People who are important to me think that I should get a mammogram in the next year or two* (strongly disagree to strongly agree); *Most people like me will get a mammogram in the next year or two* (strongly disagree to strongly agree); and *How likely is it that people like you think that you should get a mammogram in the next year or two*? (extremely unlikely to extremely likely). The direct measure of perceived behavioral control was assessed by taking the average of three items: *How sure are you that you can get a mammogram in the next year or two?* (not at all sure to completely sure); *How confident are you that you can get a mammogram in the next year or two*? (not at all confident to completely confident); and *Getting a mammogram in the next year or two is.*. (not at all under my control to completely under my control).

- Factor analysis and reliability analysis verified the four-item measure of intention (α =0.81), a four-item measure of attitude (α =0.746), a three-item measure of perceived norm (α =0.724), and a three-item measure of perceived behavioral control (α =0.868). Measures for intention and the three global components of attitude, norm, and control were constructed by calculating the average of the associated items.
- According to the RAA, only the top-of-the-mind or salient beliefs operate as the causal factors that influence intention to perform the behavior. Therefore identifying the salient beliefs is a critical step in the application of RAA (Middlestadt, Bhattcharyya, Rosenbaum, Fishbein, & Shepherd, 1996). In an elicitation study with 62 women (Geshnizjani, Middlestadt, Sherwood, Delandshere, & Torabi, 2011), responses to six open-ended questions were

analyzed to identify most frequently-mentioned categories for perceived consequences, perceived social referents, and perceived circumstances.

- The content analysis revealed five salient consequences of getting a mammogram in the next year or two: *detect cancer early*; cause me pain or discomfort; *lead me to find out that I have cancer*; *give me peace of mind*; and *expose me to radiation*. Two close-ended items were written for each of these outcomes. To assess the behavioral belief, participants were asked to rate the extent to which they believed that their getting a mammogram would lead to the outcome on a 7-point scale ranging from *strongly disagree* to *strongly agree*. To assess outcome evaluation, they evaluated the consequences on a bipolar 7-point scale ranging from *very bad* to *very good*. These scales were scored from -3 to +3. For each outcome, a behavioral cross-product that ranged from -9 to +9 was created by multiplying the behavioral belief by the outcome evaluation. An indirect measure of attitude toward the act was created by summing these five behavioral cross-products.
- The content analysis also revealed six salient referents of getting a mammogram in the next year or two: husband/partner, female relatives (mother, sister, and daughter), other family members, three closest friends, personal doctor, and my health insurance company. Two close-ended items were written for each of these salient referents. To assess the normative beliefs, women were asked to rate the extent to which they believed that the salient referents would approve of them to get a mammogram on a 7-point scale ranging from *extremely unlikely* to *extremely likely*. To assess motivation to comply, they evaluated the normative beliefs on a 7-point scale ranging from *strongly disagree* to *strongly agree*. The

normative beliefs scales were scored -3 to +3 and the motivation to comply scales were scored from 1 to 7. For each normative belief, a normative cross-product that ranges from -21 to +21 was created by multiplying the normative belief by the motivation comply. An indirect measure of perceived norm was created by summing these six normative cross-products.

- Lastly, the content analysis revealed seven salient circumstances of getting a mammogram in the next year or two: *have health insurance*, *have a mammogram facility close to home or work*, *have enough time to get a mammogram*, *be able to get a convenient appointment to get a mammogram*, *receive a reminder about getting a mammogram*, *receive fast results after getting a mammogram*, and *have friendly staff and a warm environment.* Two closed-ended items were written for each of these salient circumstances. To assess the control beliefs, participants were asked to rate the likelihood of each of the salient circumstances to happen on a 7-point scale ranging from *extremely unlikely* to *extremely likely*. To assess perceived power, they evaluated the control beliefs on a 7-pont scale ranging from *extremely hard* to *extremely easy*. These scales were scored 1 to 7. For each control belief, a control cross-product that ranges from 1 to 49 was created by multiplying the control belief by the perceived power. An indirect measure of perceived behavioral control was created by summing these seven control cross-products.

- **Proposed Analysis**

- ***Phase 1 Analysis:*** The closed-ended responses were entered in SPSS version 18.0 and the open-ended responses were entered verbatim into Microsoft Word 2007.

A content analysis of the six open-ended items was conducted in order to identify common categories of responses for consequences, referents and circumstances. The most commonly mentioned, similar responses from participants were coded into categories for each construct. Like responses were combined into individual categories for each determinant. Responses and categories were re-organized based on discussions between the researchers during which a final consensus was reached. A frequency analysis was conducted to identify the percent of participants who mentioned each response category. The salient response categories will be used to construct a quantitative RAA-based instrument to further examine the underlying determinants of getting a mammogram among women living in rural settings.

- ***Phase 2 Analysis:*** All survey data were managed using PAWS 18.0. The survey responses were transferred from the online software (Survey Monkey) and from paper surveys into PAWS. A standard multiple regression analysis was conducted to determine if the three global constructs of the RAA predict the intention to get a mammogram in the next year or two. Next, a sequential multiple regression was performed by entering age, preventative behaviors variable, past mammogram experience, healthcare access, and personal doctor experience variables (these five significant variables were chosen from seven variables) in the first step, and then entering global constructs of RAA in the second step. The goal of this analysis was to determine if the addition of the global constructs of the RAA would improve the prediction of getting a mammogram above and beyond the other variables. The assumptions of regression including adequate

sample size, normality, linearity, homoscedasticity of residuals, absence of outliers, absence of singularity and multicollinearity, and independence of errors were met.

- To assess which aspects of the underlying cognitive structure might be associated to intention a series of correlations was calculated. One table was made to present the correlations between attitude toward the act and intention and the behavioral cross-products, including the two components of the behavioral cross-products (i.e., behavioral belief and outcome evaluation). Another table presented the correlations between perceived norm and intention, and the normative cross-products, including the two components of the normative cross-products (i.e., normative belief and motivation to comply). Lastly, another table presented the correlations between perceived behavioral control, intention, and the control cross-products, including the two components of the control cross-products (i.e., control belief and perceived power). The tables can be seen in the second manuscript.

CHAPTER FIVE: PROPOSED MANUSCRIPTS

Manuscript One

- The first manuscript will be based on the results of the elicitation phase. In this manuscript, the results of the elicitation phase will be presented as well as the methodology to analyze the data. In addition, I will explain the process of the development of the quantitative survey based on the results of the elicitation phase.

Manuscript Two

- In the second manuscript, I will present the results of the quantitative phase of the study. I will describe the characteristics of the target population and the role of global constructs of RAA in predicting intention to get a mammogram in the next year or two.

Manuscript 1:

Beliefs about Getting a Mammogram Among Rural Women:

A Theory-Based Saliet Belief Elicitation

Alireza Geshnizjani, MPH, M.S.[1] Susan E. Middlestadt PhD,[1] Catherine M. Sherwood-Laughlin, PhD, MPH[1] Ginette Delandshere, PhD[2] and Mohammad R. Torabi PhD, MPH[1]

1: School of HPER, Indiana University, Bloomington, IN, USA

2: School of Education, Indiana University, Bloomington, IN, USA

RUNNING HEAD: Beliefs about Mammography Use in Rural Women

Corresponding Author:

Alireza Geshnizjani

Indiana University

116 HPER, 1025 East Seventh Street

Bloomington, IN 47405

Email: ageshniz@indiana.edu

ABSTRACT

BACKGROUND: Breast cancer is a major health issue among women living in rural areas in the United States. Getting a regular mammogram can detect breast cancer at early stages and reduce the mortality rate. The purpose of this study was to identify the salient beliefs rural women hold about getting a mammogram.

METHODS: A paper-pencil, salient belief elicitation survey was conducted among 62 women between the ages of 40 and 74 living in rural southern Indiana. Participants were recruited from female staff of a local university and from women attending a free medical clinic serving individuals below the poverty line. Following the Reasoned Action Approach, six open-ended questions were asked to elicit salient consequences, salient referents, and salient circumstances about getting a mammogram in the next year or two.

RESULTS: Content analyses of responses to open-ended responses revealed five salient consequences, including detecting cancer early, providing peace of mind, causing pain or discomfort, exposing them to radiation and leading to finding out they have cancer. Asking who approved of getting a mammogram revealed personal doctor, family including husband, mother and sister, friends, health insurance provider as salient referents. Questions what made getting a mammogram easier and harder yielded 7 salient circumstances, including having insurance, having enough time, being able to get convenient appointments, receiving a reminder, receiving fast results, and having friendly staff and a warm environment.

IMPLICATIONS: Intervention activities that could be considered for rural women are discussed. Future research should use the results of the elicitation to create a close-ended instrument to be used in a larger scale quantitative study.

INTRODUCTION

Cancer is a major public health concern both worldwide and in the US. Cancer is a leading cause of death worldwide, resulting in 7.6 million deaths (around 13% of all deaths) in 2008 (World Health Organization [WHO], 2009). Breast cancer is the most common cancer among women worldwide, comprising 16% of all female cancers. It is estimated that 519,000 women died in 2004 due to breast cancer (WHO, 2004). Breast cancer is the most common cancer and second-leading cancer killer among American women (Center for Disease Control and Prevention [CDC], 2010). In 2010, more than 200,000 new cases of invasive breast cancer were diagnosed among women in the US, along with 54,010 new cases of non-invasive breast cancer (CDC, 2010). About 40,000 women died in 2010 from breast cancer, though death rates have been decreasing since 1990. These decreases are thought to be the result of treatment advancements, earlier detection through screening, and increased awareness (National Cancer Institute [NCI], 2010).

Despite the improvements in breast cancer treatment, there is no proven method for primary prevention. Diagnosis at early stages seems to be the best solution to long-term survival from breast cancer. Previous research has shown that getting a screening mammogram is the best method for early detection, when the cancer is easier to treat, before it is big enough to feel or cause symptoms (CDC, 2010). It is recommended that women ages 40 to 74 years receive a mammogram every one or two years (American Cancer Society, 2010). Research has shown that regular mammography reduces the mortality rate from breast cancer among women by 20-30% (CDC, 2010).

Since treatment costs are considerably lower when a tumor is discovered at an early stage, screening programs have economic value. The total cost for breast cancer has been estimated at $3.8 billion, of which $1.8 billion represents medical care. Cost-effectiveness studies have estimated the cost of screening between $13,200 and $28,000 per year of life saved. The ratios from several studies indicate the cost effectiveness of an annual mammography to be from $62,000 to $190,000 per life-year for women age 40-49 and $17,000 to $110,000 for women age 50-65 (NCI, 2010). Therefore, the costs associated with breast cancer could be alleviated via secondary prevention (i.e. screening methods).

Even though there has been a steady increase in the rate of mammography use among women, particularly after it was shown to be an effective tool in the late 80's, the rate is still not at the desired level in the United States. In 2008, 68% of white women, 68% of African American women, and 62% of Hispanic/Latino women 40 years or older reported having a mammogram within the past year (CDC, 2009).This is a slight decline from rates in 2000. A significant segment of women, especially women of a lower socio-economic status and women living in rural areas, remain under-screened or are screened at all, (Breastcancer.org, 2010). Therefore, it is important to identify factors associated with mammography use among these women.

There is limited research which has investigated psychosocial factors or perceived determinants affecting mammography utilizing solid conceptual frameworks or theories of health behaviors (Bowie, Curbow, La Veist, Fitzgerald, & Zabora, 2003; Burnett, Steakley, &Tefft, 1995; Michels, Taplin, Carter, &Kugler, 1995; Montano & Taplin,1991; Montano, Thompson, Taylor, & Mahloch, 1997; Steele & Porche, 2005a).

In addition, even fewer studies have developed an appropriate theory-based instrument to study this behavior for their target population (Bowie et al., 2003; Montano & Taplin, 1991; Montano et al., 1997; Steele & Porche, 2005a).

The Reasoned Action Approach (RAA) is one of the major theories of health behavior. RAA integrates constructs common to several behavioral theories, including the Theory of Planned Behavior, the Health Belief Model and Social Cognitive Theory (reference the theorists' paper) and has been used to understand health behaviors such as condom use behaviors (Albarracín, Johnson, Fishbein, Muellerleile, 2001), physical activity (Hagger, Chatzisarantis, Biddle, 2010; Downs & Hausenblas, 2010), and cancer screening behaviors (Cooke and French, 2008). The RAA (Fishbein and Ajzen, 2010) proposes that intention is the immediate determinant of behavior and intention, in turn, can be predicted by the weighted combination of three global factors, attitude toward the act, perceived norm, and perceived behavioral control. Underlying these three global factors is a belief structure about perceived consequences, perceived social referents, and perceived circumstances of behavior. However, not all consequences, referents, and circumstances are important. Instead, only the top-of-the-mind or salient beliefs operate as potential factors. As such, a salient belief elicitation is a rapid, theory-based, open-ended formative research technique designed to identify the modal salient beliefs underlying people's decisions to perform a behavior (Fishbein & Ajzen, 2010). Conducting a salient belief elicitation before applying the RAA to a new population and new behavior ensures that the instrument is relevant and culturally appropriate to the population and context.

Six studies have used the Theory of Reasoned Action or the Theory of Planned Behavior to understand getting a mammogram among women in the United States. However, only four studies (Bowie et al., 2003; Montano & Taplin, 1991; Montano et al., 1997; Steele & Porche, 2005b) examined the underlying belief structure and only two reported on the results of the elicitation used to develop the quantitative instrument (Montano & Taplin, 1991; Montano et al., 1997).

There is also a lack of research assessing psychosocial factors influencing women's mammogram use who live in rural areas. Few research studies have developed appropriate theory-based instruments to measure the determinants of getting a mammogram among women living in rural communities. One of the few studies examining mammogram use among women living in rural areas was conducted by Steele and Porche (2005). They developed an instrument utilizing the TPB constructs to examine mammogram use among women in rural Louisiana. Other studies assessing women in rural areas did not develop a specific instrument for their participants nor did they use theories to develop an instrument.

As such, the current study will utilize a theory driven, salient belief elicitation to help bridge the gap in the literature of mammography use among women living in rural areas. The goal of the study was twofold: (1) to identify the psychosocial determinants of getting a mammogram in the next year or two in women between the ages of 40 and 75 living in a rural southern Indiana using a theory driven, salient-belief elicitation, and (2) to use the results of the study to construct an appropriate quantitative instrument tailored to these women to further examine their determinants of getting a mammogram utilizing the RAA as a theoretical foundation. The current study will address the gap that exists in

the literature with regards to utilizing a theory-based approach to develop an appropriate instrument and reporting of the elicitation based surveys.

In this study of rural women between 40 and 75 years of age, a theory-based salient belief elicitation will be conducted in order to identify the salient or top-of-the mind beliefs held about getting a screening mammogram in the next year or two.

METHODS

Procedure

The data used in the current study came from a convenience sample of 62 women between the ages of 40 and 75 residing in a small rural Midwestern community. The sample included staff of the local university as well as women attending a free medical clinic for under-served populations. Since the free clinic serves women who do not have health insurance and whose income level is below 200% of the federal poverty level, using this site helped identify women of lower socio-economic status. Participants completed a questionnaire with open-ended, semi-structured items as well as closed-ended items which took approximately 15 minutes. Participation in the study was voluntary. The data collection took place during February and March of 2011. As an incentive for their participation, women had the opportunity to enter their name into a pool for a chance to win one of four $20 gift cards. All study protocols were reviewed and approved by the University Institutional Review Board. Sixty-nine surveys were distributed. The final sample included 62 participants; three women were excluded because they did not meet the age criteria.

Instrument

The close-ended section of the questionnaire assessed demographic variables, (i.e. age, race, general health, and relationship status), previous and current mammogram behavior (i.e. time of first and last mammogram, frequency of getting a mammogram, reasons for not getting a mammogram, and intention to get a mammogram in the future), personal and family history of cancer, the number of friends who have had cancer, and where they would go to get a mammogram.

The open-ended section, the salient belief elicitation, consisted of an opening paragraph that described the behavior followed by six open-ended questions. The participants were told: "As you may know, health educators tell us to eat breakfast every day. We want to know what you think and feel about eating breakfast every weekday for the next three months. There are no right or wrong answers. Just tell us what comes to your mind first." Following recommendations for the RAA (Middlestadt et al 1996), the open-ended questions (stated in terms of the breakfast behavior) included two to identify salient consequences (i.e., "what are the advantages or good things that might happen if you eat breakfast every weekday for the next three months? And what are disadvantages or the bad things that might happen if you eat breakfast every weekday for the next three months?"); two to identify salient referents (i.e., who, which people or groups, might approve or support you when you eat breakfast every weekday for the next three months? And who, which people or groups, might disapprove when you eat breakfast every weekday for the next three months?; and two to identify salient circumstances (i.e., " hat might make it easier for you to eat breakfast every weekday for the next three months?;

and what might make it hard for you to eat breakfast every weekday for the next three months?")

Analysis. The closed-ended responses were entered in SPSS version 18.0 and the open-ended responses were entered verbatim into Microsoft Word 2007. A content analysis of the six open-ended items was conducted in order to identify common categories of responses for consequences, referents and circumstances. The most commonly mentioned from participants were coded into categories for each construct. Like responses were combined into individual categories for each determinant. Responses and categories were re-organized based on discussions between the researchers during which a final consensus was reached. A frequency analysis was conducted to identify the percent of participants who mentioned each response category.

RESULTS

As can be seen in Table 1, participants were predominately white and just over half were married. The participants ranged in age from 40 to 70 (n=55, SD=13.2). About half (52%) of the participants rated their health to be either excellent or very good and the majority had participated in physical activity in the past month. A majority of participants indicated that they had health insurance and that their health insurance at least partially covered getting a mammogram. In terms of history of cancer, a majority of the participants (92%) were never diagnosed with cancer previously. Most of the participants had at least one family member (85.5%) or friend (69.4%) who have had cancer.

Almost all of the participants (79%) have had at least one mammogram and many (66%) have had a mammogram in the past two years. For these women, the age of first

mammogram ranged from 30 to 68 years of age (M=43.7, SD= 7.2). Most of the women (61%) expressed an intention to get a mammogram in the next 12 months. Those who did not intend to get a mammogram in the next year or two gave the following reasons: fear of radiation, not receiving a recommendation from their doctor, low perceived susceptibility of getting cancer, inconvenient location, lack of time, and cost. When asked where they would go to get further information about getting a mammogram, participants mentioned going to their healthcare providers (56.5%), the Internet (25.5%), going to the local mammogram center (15.6%), and asking their mothers or friends (10.5%).

As it is indicated in Table 2, by far, the most frequently mentioned perceived advantage of getting a mammogram was early detection of cancer (74.2%). They said that by getting a mammogram they could detect a potential tumor at early stages and as a result they would have a higher chance of survival. In addition, women mentioned that getting a mammogram will give them peace of mind (17.7%) and would provide them with more information about their health (12.9%). A few women mentioned benefits such as will provide a comparison point for future mammograms, will set a good example for others, and will get to see my doctor. Some of the advantages can be exemplified in the following response:

> *Advantages and good things that may happen by my getting a mammogram include screening for cancer; if there is cancer, it may be detected as soon as possible; there are baseline mammograms on file for me to enable my health care providers to refer to as necessary, including reasons unrelated to cancer detection; getting a mammogram sooner than later alleviates fears of the unknown; good role model for my daughter/friends/ family members; my health*

care provider is a large provider in my region and having my mammogram on file may be able to assist for cancer research, should I allow the information to be accessed. If it turns out that I do have cancer, I'm finding out now instead of 3 years from now when it could be more advanced or difficult to treat. (Participant # 23: a 44 year old single woman)

When asked about the disadvantages of getting a mammogram, a substantial percent of the participants (25.8%) mentioned there were no disadvantages. The most frequently mentioned disadvantage that was mentioned was that getting a mammogram would cause pain and discomfort (38.7%). Several women mentioned fears as negative consequences, including fear that results may lead them to find out that they have cancer (27.4%), that they will be exposed to radiation, fear that they may find out that they could die of cancer (11.3%), and the fear of receiving false positive results (8.1%). These responses illustrate the importance of mental or emotional aspects of cancer screening.

Table 3 shows the people and groups that the women mentioned as referents who would approve of them getting a mammogram in the next year or two. Their personal doctor was the most frequently mentioned referent. Many participants mentioned family members especially their husband or partner, their mothers, and their sisters. Friends and health insurance companies friends were perceived as approving referents. By and large, these women did not perceive any referents as disapproving, as exemplified by the following quote:

No one would disapprove of protecting myself – why would anyone disapprove of getting a mammogram? Most of the women that I know get a mammogram regularly (Participant # 14: a 54 year old married woman).

Lastly, participants were asked what would make it easier or more difficult for them to get a mammogram in the next year or two. As can be seen in Table 4, having a health insurance that covers mammograms was the most frequently mentioned circumstance. In addition, having the mammogram facility close to work or home, having time, and being able to get convenient appointments were among the most frequently mentioned responses as exemplified by the following participant:

The only real barrier I can think of is minor discomfort while the mammogram is being taken. Also, unfortunately it is sometimes difficult to take time off of work. My last mammogram had to be rescheduled due to a conflict at work. My health care provider is open from 8-5 M-F and the travel time to the doctor's office and appointment time is greater than my allotted lunch time. (Participant #6: a 62 year old divorced woman)

Consistent with other health seeking behaviors, healthcare providers play a critical role in encouraging and reminding women to get a mammogram. Participants mentioned that feeling comfortable with their personal doctor and receiving a reminder from their doctor as facilitators to getting a mammogram. In addition, certain characteristics of mammogram facilities can facilitate and encourage getting a mammogram among women in rural setting. For instances, women mentioned having female and friendly staff as well as a friendly and warm environment and receiving fast results as main facilitators to getting a mammogram. Lastly, a few participants mentioned that having the support of family and friends can encourage them to get a mammogram. One of the participants mentioned:

The absolute greatest help to make it easy for me to get a mammogram is the friendly reminders and promoting by my health care provider. Also the warm, kind, and

professional women staff providers. I would request a different provider if there were male attendants. The technologists doing the screening and taking the slides use the right terminology to not to make me feel uncomfortable, for example I am more comfortable with gentle, patient requests such as "place the tissue here on this surface", and positive reinforcements such as "that's right, good job". They are not judgmental about the way my body looks, or how much I weigh. (participant #9: a 55 year old married woman)

DISCUSSION

Breast cancer is a salient public health concern in the US and in Indiana. Even though Indiana (CDC, 2011) has a lower incidence rate of breast cancer (112.8 per 100,000 women) compared to the national average (120.4), the mortality rate from breast cancer (24 per 100,000 women) is higher than the national average (22.8). This discrepancy may be due to a lower rate of mammography in Indiana. While the rate of mammography has increased, Indiana was ranked the 40th state in terms of mammography use in 2008. In addition, among women who have had a mammogram, only 73.9% have had a mammogram in the past two years (CDC, 2011). In the current study, 79% of women have ever had a mammogram and among those 71% have had a mammogram in the past two years. When asked about their intention to get a mammogram, 72.6% mentioned that they intend to get a mammogram in the next year or two. Since NCI (2010) recommends that women get a mammogram annually after the age of 40, there is room for improvement and it is important to understand the beliefs that influence mammography.

Salient Beliefs. This study used a theory-based approach to identify salient consequences, referents and circumstances in order to help determine what influences women to get a mammogram. Early detection of cancer and a higher chance of successful treatment emerged as most frequently mentioned consequence perceived by these rural women. In addition, these women recognized that getting a mammogram would provide them with information about their health as well as a comparison point for future mammograms. These results are consistent with previous research studies (list some that are not TPB), including those that have used the RAA. Montano and colleagues (1997) found that their participants mentioned "learning whether I have cancer", "allow me to live longer", and "early detection" as their salient positive consequences. In another study, Montano & Taplin (1991) identified "would allow the detection of breast cancer in an early stage" as one of the salient perceived consequences.

A number of mental and emotional factors also emerged as salient beliefs about getting a mammogram. Consistent with previous research (?), a number of participants mentioned fears as negative consequences, including fear of finding out they have cancer, and fear of false positive. From a positive emotional perspective, several of these women mentioned that getting a mammogram would give them peace of mind if they find out they don't have cancer. This finding is unique to this study and has not been found by previous studies. [be sure it was not mentioned in the other studies. Not TPB.

As with a number of health care seeking behaviors and consistent with previous research (Montano et al., 1997; Coleman et al., 2003), a variety of aspects related to the patient-provider relationship came up as salient beliefs. A number of women mentioned that they would get to see their health care provider as an advantage of getting a

mammogram. Their personal doctor was the most frequently mentioned salient referent who would approve of getting a mammogram. And, when asked what made getting a mammogram easier or hard, these rural women mentioned having a personal doctor as a facilitator. In addition, health care provider was the most frequently mentioned source when participants were asked where they would go to get information about mammograms. Taken together, these findings demonstrate the critical importance of the provider when it comes to this and other care seeking and screening behaviors.

The mammogram clinic and the staff of the clinic also seem to play an important role. In terms of staff, having a friendly environment and staff and having female staff were mentioned as facilitators. In terms of the clinic, convenient appointments, close facilities, receiving fast results, and receiving a reminder came up frequently. These results are consistent with previous research studies (Montano et al., 1997; Cooke & French, 2008) and highlight the important impact that the previous mammogram experience and the patient-staff interaction may have on getting a mammogram.

On one hand, none of the participants came up with people who disapproved of getting a mammogram and several participants indicated they could think of no disadvantages. On the other hand, consistent with previous research, some disadvantages and barriers were mentioned by a significant minority. The most frequently mentioned disadvantage was the pain and discomfort women reported upon getting a mammogram. And, the most frequently mentioned barrier was not having health insurance.

Limitations

This study had several limitations. Participants were recruited from staff at a large Midwest university as well as a free medical clinic in rural southern Indiana; therefore

results are not generalizable to all women in Indiana. The data were collected only from women attending staff exercise classes or the clinic at a single point in time. Given that some of the participants were recruited from a university setting, such women are more likely to have a health insurance and therefore have a higher rate of getting a mammogram. Furthermore, women attending a health clinic may already be more knowledgeable about preventative health behaviors or more likely to see a healthcare provider, which may also increase their likelihood of engaging in health seeking behaviors such as getting mammograms.

Another limitation of the study was that four participants had to be removed from the sample due to incomplete responses on the questionnaire resulting in the final number of 62 participants. Lack of response to open-ended items could be due in part to the nature of the question in which participants had to fill in responses rather than select a multiple choice or Likert response. Only open-ended data and only frequency. You did not examine the relationship between % and intention or behavior.

Implications

Even though it has limitations, this theory-based formative study can provide a number of suggestions health professionals should test to encourage a higher and more regular level of mammography among rural women. Health educators could educate women about the physical and mental benefits of getting a mammogram, in particular the value of early detection of cancer and obtaining peace of mind. Public health professionals could address important perceived negative consequences and barriers such as exposure to radiation, time, lack of insurance and fear of false positives in designing interventions in rural areas

Public health professionals can help decision makers at clinics create programs that provide convenient appointment times, send out reminders, and provide fast results. In addition, they can impress upon administrative staff and technologists at mammogram facilities the importance of their role in increasing mammogram adherence throughout their friendliness. These findings suggest a number of ways to use the health care provider in encouraging mammograms. From a policy perspective, improving access to health insurance represents a clear recommendation.

In terms of additional research, although this study has identified salient consequences, referents, and circumstances women mention about getting a mammogram, a more rigorous study with a larger sample is needed to determine which of these are associated with intention or behavior. This study can be a quantitative one using close-ended items assessing behavioral beliefs, normative beliefs, and control beliefs created from the most frequently mentioned consequences, referents, and circumstances found in this study. In addition to the intrapersonal factors addressed here, research is needed on factors that are beyond the individual using the Social Ecological Model (SEM) as a conceptual framework. The SEM proposes that the health behavior is influenced by determinants at multiple levels (McLeroy, Bibeau, Steckler, & Glanz, 1988): intrapersonal (women), interpersonal (their family, friends, and healthcare providers), organizational (mammogram clinics), community (media), and policy (insurance coverage). Learning about determinants at these several levels may result in the development of more specific and effective public health interventions.

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Table 1: Participants Characteristics (N = 62)

Label Category	N (% of Participants)
Ethnicity	
White	48 (77.4)
African American	3 (4.8)
Latino or Hispanic	3 (4.8)
Asian	6 (9.7)
Relationship Status	
Single	5 (8.1)
Married	35 (57.4)
Divorced	12 (19.4)
Widowed	3 (4.8)
Other	7 (11.3)
Participated in Physical Activity	
Yes	49 (79.0)
No	13 (21.0)
Frequency of Getting a Mammogram	
Every 6 months	1 (1.6)
Every year	29 (46.8)
Every 2 years	6 (9.7)
Every 3 to 5 years	10 (16.1)
Never	14 (22.6)
Have you had cancer	
Yes	5 (8.1)
No	57 (91.9)
Have health insurance	
Yes	51 (82.3)
No	11 (17.7)

Table 2: Percent Mentioning Consequences for Getting a Mammogram (N=62)

Advantages	**N**	**% of Participants**
Will detect cancer early	46	74.2
Will give me peace of mind	11	17.7
Will provide me with information about my health	8	12.9
Will provide a comparison point for following mammograms	5	8.1
Will set a good example for others	4	6.5
Will get to see my doctor	3	4.8
Disadvantages		
Will cause me pain or discomfort	24	38.7
Will lead me to find out that I have cancer	17	27.4
Will expose me to radiation	11	17.7
Will lead me to find out that I may die	7	11.3
Will lead to false positives	5	8.1
Other disadvantages	4	6.5
No disadvantages	16	25.8

Note: Participants were allowed to give more than one response.

Table 3: Percent Mentioning Approving Referents for Getting a Mammogram (N=62)

Category Label	N	% of Participants
My doctor	28	45.2
My family	20	32.3
My husband	11	17.7
My friends	7	11.3
My health insurance	6	9.8
My mother	4	6.5
Sister	4	6.5
Other referents	10	16.1
Myself	10	16.1

Note: Participants were allowed to give more than one response.

Table 4: Percent Mentioning Circumstances of Getting a Mammogram (N=62)

Phrased as Facilitators	N	Percent	Phrased as Barriers	N	Percent
Having an insurance	23	37.1	Not having an insurance	17	27.4
Having the mammogram facility close to home or work	16	25.8	Distance or location	5	8.1
Feeling comfortable with my personal doctor	14	22.6	Not having a doctor	4	6.5
Having enough time	9	14.5	Not having enough time	18	29.0
Being able to get convenient appointments	9	14.5	Not having convenient appointment	13	21.0
Receiving a reminder	7	11.3	---	---	---
Receiving fast results	7	11.3	Having to wait for the results	4	6.5
Having a friendly environment and staff at the mammogram facility	6	9.7	---	---	---
Having female staff at the mammogram facility	4	6.5	----	--	--
Having the support of family or friends	5	8.1	----	--	--
---	---	---	Being afraid of getting negative results	7	11.3

Note: Participants were allowed to give more than one response.

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Manuscript 2:

Psychosocial Determinants of Getting a Mammogram among Rural Women: A Reasoned Action Approach

Alireza Geshnizjani, MPH, M.S.,[1] Susan E. Middlestadt, PhD,[1]

Ginette Delandshere, PhD,[2] Catherine M. Sherwood-Laughlin, PhD, MPH,[1] &

Mohammad R. Torabi, PhD, MPH[1]

1: School of HPER, Indiana University, Bloomington, IN, USA

2: School of Education, Indiana University, Bloomington, IN, USA

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RUNNING HEAD: Psychosocial Determinants of Mammography

Corresponding Author:

Alireza Geshnizjani

Indiana University

116 HPER, 1025 East Seventh Street

Bloomington, IN 47405

Email: ageshniz@indiana.edu

ABSTRACT

Background: Breast cancer is a major public health concern worldwide and in the US, especially in rural areas. Research has shown that getting a screening mammogram on a regular basis is the most effective means of early detection and reducing the mortality rate from breast cancer. The goal of this study was to identify the psychosocial determinants that explain intention to get a mammogram in the next year or two among rural women.

Method: A sample of 555 women between the ages of 40 and 75 who have had at least one mammogram during their lifetime completed a questionnaire online and through paper and pencil survey. Women were recruited from a local mammogram facility and from a free clinic located in rural Southern Indiana to participate in a quantitative survey based on the Reasoned Action Approach.

Results: The results of the regression analysis revealed that 56% of the variability in intention to get a mammogram can be explained by attitude, perceived norm, perceived behavioral control, age, healthcare access, previous mammogram experience, doctor's experience, and other preventative behaviors. Perceived behavioral control and attitude had the highest regression coefficients. Correlation analyses revealed the association between other underlying psychosocial factors and the major constructs of the RAA.

Conclusion: The RAA is a conceptual framework appropriate to understand mammogram use. Public health professionals could focus on designing interventions that focus on changing attitude, reduce barriers, and increase the facilitators of getting a mammogram.

INTRODUCTION

Breast cancer is a major public health concern both worldwide and in the US (CDC, 2010; WHO, 2010). Aside from non-melanoma skin cancer, breast cancer is the most common and second deadliest type of cancer among American women. In 2007, more than 200,000 women were diagnosed with breast cancer and approximately 40,000 women died from breast cancer in the US (CDC, 2010). Women living in the state of Indiana are not immune to this health issue. The state of Indiana has a lower incidence rate of breast cancer (112.8 per 100,000 women) compared to the national average (120.4), yet, the mortality rate from breast cancer (24 per 100,000 women) is higher than the national average (22.8) (BRFSS, 2010). Although there are ways to lower the risk of developing breast cancer, there is no clear method for primary prevention of breast cancer.

Regular screening mammograms are the best and most effective method for early detection. Early detection of breast cancer drastically increases the chance of survival because the treatment can be started early in the course of the disease and possibly before it has metastasized to other parts of the body (CDC, 2011; Mandelblatt et al., 2009). The American Cancer Society (2011) recommends that women age 40 and older get a mammogram every year and continue to do so as long as they are healthy.

Even though the rates of mammography use have been increasing in the US, the rates are still not at a desired rate especially among women from a lower socio-economic status and those living in rural areas. According to the CDC (2010), the rate of getting a recent mammogram (in the past two years) increased from 30% in 1987 to 70% in 2000. However, the rate declined to 66% in 2005. In 2008, 68% of white and African American

women, and 62% of Hispanic women 40 years or older had a recent mammogram (CDC, 2010). In the same year, Indiana was ranked 40th in terms of rates of mammography use in the US (CDC, 2010). The rate of mammography use in rural areas is even lower than urban areas (Doescher & Jackson, 2009). In addition, the prevalence of getting a regular or repeat mammogram is even lower compared with recent use (Clark, Bonacore, & Rakowski, 2003). Therefore, it is important to identify the factors or determinants that encourage women in rural areas to get a regular mammogram with the goal of designing more effective interventions.

While there are numerous studies of mammography use among American women, there are important gaps in the research. First, most research examining determinants of getting a mammogram is not based on a comprehensive conceptual framework and does not use theories of health behavior (Cooke & French, 2008; Schueler, Chu, & Smith-Bindman, 2008). Among the studies based on a theoretical framework, most utilized the Theory of Reasoned Action (TRA) or the Health Belief Model (HBM) (Montano & Taplin, 1991; Burnett, Steakley, & Tefft, 1995; Michels, Taplin, Carter, & Kugler, 1995; Montaño, Thompson, Taylor, & Mahloch, 1997; Calvocoressi, Kasl, Lee, Stolar, Claus, & Jones, 2004; Adams, Becker, & Colbert, 2001) as a theoretical framework. However, there are weaknesses in the application of these theories; TRA and HBM are not very effective in the study of behaviors which may not be under individuals' volitional control. Therefore, a more comprehensive theory such as Reasoned Action Approach (RAA) would be better suited to address such behaviors. Second, very few studies have focused on examining the determinants of women living in rural areas (Mayne & Earp, 2003; Steele & Porche, 2005; Tejeda, Thompson, Coronado, Martin, & Heagerty, 2009). Third,

there is limited research focusing exclusively on women who have had a mammogram in the past in order to study their future behavior of getting screening mammograms regularly (Dailey, Kasl, Holford, Calvocoressi, & Jones, 2007; Davis, Emerson, & Husaini, 2005; Rahman, Dignan, & Shelton, 2003). Lastly, there are no recent studies which have utilized a comprehensive approach (i.e. utilizing a solid theoretical framework as well as a range of demographic, healthcare access, and other health behavior variables as confounding factors) to address women's mammogram use.

The Reasoned Action Approach (RAA), the most recent iteration of Theory of Reasoned Action, the Theory of Planned Behavior, and the Integrated Model (Fishbein & Ajzen, 2010), is a comprehensive theory which has been used to explain a number of health behaviors including getting a mammogram and other cancer screenings (Fishbein, 2008; Smith-McLallen & Fishbein, 2009). According to the RAA (Figure 1), intention is the immediate determinant of behavior: the stronger the intention, the more likely it is that the behavior will be carried out (Fishbein and Ajzen, 2010). Intention is, in turn, determined by a weighted combination of attitude towards the act, perceived norm, and perceived behavioral control. Individuals who have a more positive attitude towards a behavior, more positive perceived norms, and perceive more control towards performing a behavior are more likely to have high intention to perform the behavior. These three global constructs are each, in turn, determined by a weighted combination of behavioral beliefs and evaluation of salient consequences (in case of attitude), normative beliefs and motivation to comply with salient referents (in case of perceived norm), and control beliefs and perceived power about salient circumstances (in case of perceived behavioral control). All other factors such as perceived risk, past behavior, socioeconomic status,

and healthcare access influence the behavior through this underlying cognitive structure. This theoretical framework can help identify the population-specific factors or determinants of getting a mammogram, provide input to the design of effective interventions, and help select of measures for evaluating intervention effectiveness.

The present study examines the behavior of *getting a mammogram in the next year or two* among women who had at least one mammogram during their life time, who live in rural southern Indiana, and who are between the ages of 40 and 75. More specifically, with the ultimate goal of improving interventions to increase timely mammogram use, the purpose of the study is (1) to determine whether intention can explained by the weighted combination of the three global constructs and (2) to identify which aspects of the underlying belief structure are associated with intention and thus would be possible priorities for an intervention.

METHODS

Study Participants and Data Collection

This study was a theory-based, cross-sectional, and community-based study examining mammogram use among women in rural southern Indiana. Participation in this study was voluntary. Women had to meet the following criteria: reside in southern Indiana, be between the ages of 40 and 75, and have had at least one mammogram during their life time. The reason was that most research studies have focused on one-time screening rather than repeat mammogram use, which is the most effective method to detect cancer at early stages (Schueler et al., 2008). In order to reach a wider range of participants, women could complete the survey through a paper-pencil survey at the sites,

by completing an online survey on a computer in the waiting area using the provided computers, or by completing an online survey at home on the website provided by a flyer. The two main sites of data collection were the local mammogram facility (responsible for 90% of mammograms in the area) and a free health clinic for individuals below the poverty line. Flyers containing study information and the website for the study were placed in the two study sites and were distributed locally at churches, grocery stores, coffee shops, homeless shelters, and other public places.

A majority of women chose to take the online survey in the waiting room at the two sites. All women were offered a $5 dollar gift card either to Subway or Starbucks to participate in the study. Participants took approximately 10 to 15 minutes to complete the survey. Data collection lasted for five weeks in the spring of 2011 and resulted in 564 surveys from eligible women. Ethical approval for this study was granted by the Internal Review Board of the authors' university. Additionally, the mammogram facility and the health clinic approved all research protocols.

Survey instrument

The survey instrument consisted of 84 close-ended items. About one-third of the instrument used items taken from the CDC BRFSS and the literature to assess demographic variables, socioeconomic status, other preventative behaviors (e.g., flu shot, Pap test), previous mammogram experience, health care access, and experience with the doctor? experience.

Most of the instrument assessed constructs of the Reasoned Action Approach (Fishbein & Ajzen, 2010) with 7-point Likert or semantic differential scales. Intention to have a mammogram in the next year or two was assessed with four items: *I will get a*

mammogram in the next year or two (strongly disagree to strongly agree); *I will get a mammogram in the next year or two* (definitely no to definitely yes); *How likely is it that you will get a mammogram in the next year or two* (strongly unlikely to strongly likely); *When do you expect to get your next mammogram* (in the next 6 months to never).

The direct measure of attitude towards getting a mammogram in the next year or two was assessed with four pairs of bipolar adjectives. Each appeared after the sentence: *My getting a mammogram in the next year or two is*…. The bi-polar adjectives were extremely bad-extremely good, extremely unpleasant-extremely pleasant, extremely unenjoyable-extremely enjoyable, and extremely worthless-extremely valuable. The direct measure of perceived norm was obtained by taking the average of three items: *People who are important to me think that I should get a mammogram in the next year or two* (strongly disagree to strongly agree); *Most people like me will get a mammogram in the next year or two* (strongly disagree to strongly agree); and *How likely is it that people like you think that you should get a mammogram in the next year or two*? (extremely unlikely to extremely likely). The direct measure of perceived behavioral control was assessed by taking the average of three items: *How sure are you that you can get a mammogram in the next year or two?* (not at all sure to completely sure); *How confident are you that you can get a mammogram in the next year or two*? (not at all confident to completely confident); and *Getting a mammogram in the next year or two is..* (not at all under my control to completely under my control).

Factor analysis was conducted by entering all 14 items into the model at the same time. Four factors were extracted (Eigenvalues larger than 1) and the factor loadings ranged 0.490 to 0.965. Factor analysis and reliability analysis verified the four-item

measure of intention (α =0.81), a four-item measure of attitude (α =0.746), a three-item measure of perceived norm (α =0.724), and a three-item measure of perceived behavioral control (α =0.868). Measures for intention and the three global components of attitude, norm, and control were constructed by calculating the average of the associated items.

According to the RAA, only the top-of-the-mind or salient beliefs operate as the causal factors that influence intention to perform the behavior. Therefore identifying the salient beliefs is a critical step in the application of RAA (Middlestadt, Bhattcharyya, Rosenbaum, Fishbein, & Shepherd, 1996). In an elicitation study with 62 women (Geshnizjani, Middlestadt, Sherwood, Delandshere, & Torabi, 2011), responses to six open-ended questions were analyzed to identify most frequently mentioned categories for perceived consequences, perceived social referents, and perceived circumstances.

The content analysis revealed five salient consequences of getting a mammogram in the next year or two: *detect cancer early*; *cause me pain or discomfort*; *lead me to find out that I have cancer*; *give me peace of mind*; and *expose me to radiation*. Two close-ended items were written for each of these outcomes. To assess the behavioral belief, participants were asked to rate the extent to which they believed that their getting a mammogram would lead to the outcome on a 7-point scale ranging from *strongly disagree* to *strongly agree*. To assess outcome evaluation, they evaluated the consequences on a bipolar 7-point scale ranging from *very bad* to *very good*. These scales were scored from -3 to +3. A behavioral cross-product that ranged from -9 to +9 was created by multiplying the behavioral belief times the outcome evaluation for each salient consequence. An indirect measure of attitude toward the act was created by summing these five behavioral cross-products.

The content analysis also revealed six salient referents of getting a mammogram in the next year or two: husband/partner, female relatives (mother, sister, and daughter), other family members, three closest friends, personal doctor, and my health insurance company. Two close-ended items were written from each of these salient referents. To assess the normative belief, women were asked to rate the extent to which they believed that the salient referents would approve of them to get a mammogram on a 7-point scale ranging from *extremely unlikely* to *extremely likely*. To assess motivation to comply, they rated the extent to which they wanted to do what each referent wanted them to do on a 7-point scale ranging from *strongly disagree* to *strongly agree*. The normative belief scales were scored -3 to +3 and the motivation to comply scales were scored from 1 to 7. A normative cross-product that ranges from -21 to +21 was created by multiplying the normative belief times the motivation comply for each referent. An indirect measure of perceived norm was created by summing these six normative cross-products.

Lastly, the content analysis revealed seven salient circumstances of getting a mammogram in the next year or two: *having health insurance*, *having a mammogram facility close to home or work*, *having enough time to get a mammogram*, *being able to get a convenient appointment to get a mammogram*, *receiving a reminder about getting a mammogram*, *receiving fast results after getting a mammogram*, and *having friendly staff and a warm environment.* Two closed-ended items were written for each of these salient circumstances. To assess the control belief, participants were asked to rate how much they expected each circumstance to happen on a 7-point scale ranging from *extremely unlikely* to *extremely likely*. To assess perceived power, they evaluated the effect of each circumstance on their getting a mammogram on a 7-pont scale ranging from *extremely*

hard to *extremely easy*. These scales were scored 1 to 7. For each circumstance, a control cross-product that ranged from 1 to 49 was created by multiplying the control belief times the perceived power for each item. An indirect measure of perceived behavioral control was created by summing these seven control cross-products.

Analyses

All survey data were managed using PAWS 18.0. The survey responses were transferred from the online software (Survey Monkey) and from paper surveys into PAWS. A standard multiple regression analysis was conducted to determine if the three global constructs of the RAA explained intention to get a mammogram in the next year or two (Table 1). Next, a sequential multiple regression was performed by entering age, preventative behaviors variable, past mammogram experience, healthcare access, and personal doctor experience variables (these five significant variables were chosen from seven original demographic variables) in the first step, and then entering global constructs of RAA in the second step (Table 2). The goal of this analysis was to determine if the addition of the global constructs of the RAA would improve the prediction of getting a mammogram above and beyond the other variables. The assumptions of regression including adequate sample size, normality, linearity, homoscedasticity of residuals, absence of outliers, absence of singularity and multicollinearity, and independence of errors were met.

To determine which aspects of the underlying cognitive structure might be associated to intention three sets of correlations were calculated. Table 3 presents the correlations between attitude toward the act and intention and the behavioral cross-products, including the two components of the behavioral cross-products (i.e., behavioral

belief and outcome evaluation). Table 4 presents the correlations between perceived norm and intention, and the normative cross-products, including the two components of the normative cross-products (i.e., normative belief and motivation to comply). Lastly, Table 5 presents the correlations between perceived behavioral control, intention, and the control cross-products, including the two components of the control cross-products (i.e., control belief and perceived power).

RESULTS

Participant Characteristics

A total of 564 women participated in the study. The mean age of the sample was 54 years (SD=7.7 years, range = 40-74). A majority of the participants were white (92.7%), married (59.9%), and employed full time (63.8%). About half (52.4%) did not have a college degree. When asked about their past mammogram behavior, 49.3% mentioned that they had a mammogram in the past two years and 50.7% had a mammogram more than two years ago. When asked how often they get mammograms, 46.1% of the participants indicated that they get a mammogram every year, 14.4% every two years, 11.7% every three years, and 12.7% every four or more years. Most participants had healthcare coverage (81.9%). However, only 57.6% had coverage that covered the full cost of mammograms. Additionally, nearly half the sample (43.1%) reported confusion about the guidelines for mammography.

Predicting Intention from the Three Global Components

In the first analysis (Table 1), standard multiple regression was performed to predict intention to get a mammogram in the next year or two from the three global

constructs of RAA (i.e., attitude, perceived norm, and perceived behavioral control). The multiple R was statistically significant ($F(3, 560) = 226.7$, $p<0.001$) with R^2 at 0.548 and the adjusted R^2 value of 0.564. All three regression coefficients were significantly different from zero. The adjusted R^2 indicates that approximately 56.4% of the variability in intention to get a mammogram is predicted by the three global components of perceived behavioral control ($\beta=0.390$, $p<0.01$), attitude towards getting a mammogram ($\beta=0.346$, $p<0.01$), and perceived norm towards getting a mammogram ($\beta=0.183$, $p<0.01$). The size and direction of the standardized coefficients suggest that women are more likely to intend to get a mammogram if: (1) they perceive that getting a mammogram is under their control, (2) they have a positive attitude towards getting a mammogram, and (3) they have a more positive perceived norm.

In the next analysis, a hierarchical regression was performed to determine if the global constructs of the RAA would predict intention to get a mammogram above and beyond other demographic and health behavior variables (age, previous mammogram experience, personal doctor experience, healthcare access, and other preventative behaviors). In the first step of the hierarchical regression, five of the eight variables that were significantly related to intention were entered into the model: age, previous mammogram experience, doctor experience, healthcare access, and other preventative behaviors. The multiple R was significantly different from zero ($F(5, 558) = 41.528$, $p<0.001$) at the end of the first step with the $R^2 = 0.271$and adjusted R^2 value of 0.265. This means that the above mentioned variables accounted for 26.5 % of the variability in intention to get a mammogram. All five variables significantly predicted intention to get a

mammogram with past mammogram experience having the largest coefficient and age having the smallest negative coefficient (Table 2).

In the second step, the global constructs of the RAA were entered into the model. After step two, the three global constructs of the RAA increased the explained variance in intention to get a mammogram by 30% (R^2= 0.572, F (8, 555) = 92.59, p<0.001). After entering all the variables, healthcare access and personal doctor experience did not significantly predict intention any more although the other variables significantly predicted intention. The adjusted R^2 of 0.566 indicates that 56.6% of the variability in intention to get a mammogram can be explained by healthcare access, personal doctor experience, age, preventative behaviors, past mammogram experience, attitude, perceived norm, and perceived behavioral control. Perceived behavioral control (β=0.335, p<0.001) and attitude ((β=0.313, p<0.001) had the largest coefficients followed by perceived norm (β=0.171, p<0.001).

Underlying Belief Structure

Table 3 presents the correlation results for the behavioral beliefs underlying attitude towards getting a mammogram and intention to get a mammogram. The indirect measure of attitude, the sum of the five behavioral belief cross-products, was significantly correlated to the direct measure of attitude (r=0.542, p<0.001) and to intention (r=0.293, p<0.001) to get a mammogram. Statistically significant correlations of behavioral belief cross-products with intention were observed for two of the five consequences of getting a mammogram: *will detect cancer early* and *will give me peace of mind*. Further examination of structure underlying these cross-products reveals that both the behavioral belief and the outcome evaluation are important because they are

both significantly correlated to intention. For example, the behavioral belief cross-product for the consequence, *will give me peace of mind,* was significantly related to intention to get a mammogram ($r=0.38$, $p<0.001$). Examination of behavioral belief component showed that those individuals who believe that getting a mammogram will give them peace of mind are more likely to intend to get a mammogram ($r=0.41$, $p<0.001$). Additionally, the results of correlation between the outcome evaluation and intention revealed that women who evaluated having peace of mind more positively had a higher intention to get a mammogram ($r=0.30$, $p<0.001$).

Table 4 presents the correlation results for the normative beliefs underlying perceived norm and intention to get a mammogram. The indirect measure of perceived norm, the sum of the six normative cross-products, was significantly correlated to the direct measure of perceived norm ($r=0.627$, $p<0.001$) and intention ($r=0.499$, $p<0.001$) to get a mammogram. Correlations between the normative cross-products and intention reveal that all six salient referents are important. Further examination of the correlations with the respective normative belief and motivation to comply components shows that both aspects are important. Therefore the intention to get a mammogram is related to individuals' beliefs that others want them to get a mammogram and to their motivation to carry out what other individuals want them to do. For instance, the normative cross-product for the referent, *my personal doctor,* shows a significant correlation with intention ($r=0.544$, $p<0.001$). The correlation between this normative belief item and intention was $r=0.490$ ($p<0.001$), indicating that those individuals who believed that their personal doctor wanted them to get a mammogram had a higher intention to get a

mammogram. Additionally, those individuals who wanted to comply with their personal doctor had a higher intention to get a mammogram ($r=0.395$, $p<0.001$).

Table 5 presents the correlation results for the control beliefs underlying perceived behavioral control and intention to get a mammogram. The indirect measure of perceived behavioral control, the sum of the seven control cross-products, was significantly correlated to the direct measure of the perceived behavioral control ($r=0.517$, $p<0.001$), and intention to get a mammogram ($r=0.487$, $p<0.001$). Correlations between the control belief cross-products and intention showed that all eight salient circumstances are important. A closer examination of the correlations of respective control belief and perceived power components reveals that both aspects are important. Thus, the intention to get a mammogram is associated with individuals' perception about the probability of a circumstance to happen and with their perception of how likely it is that they will overcome that circumstance. For example, the control cross-product for the circumstance, *having insurance,* shows a significant correlation with intention ($r=0.397$, $p<0.001$). The correlation between this control belief item and intention was $r=0.336$ ($p<0.001$), indicating that those individuals who perceive to have insurance in the next year or two had a higher intention to het a mammogram. In addition, those individuals who perceived that having insurance would make it easier for them to get a mammogram in the next year or two, had a higher intention to get a mammogram ($r=0.271$, $p<0.001$).

DISCUSSION

The goal of this study was to understand the factors that encourage women living in rural southern Indiana to get a screening mammogram on a regular basis. The findings

from this study suggest that the RAA is a useful theory in understanding how women make decisions to get a mammogram. The multiple R predicting intention to get a mammogram in the next year or two was statistically significant and substantial in size. Additionally, the three global constructs of the RAA predicted intention above and beyond five other variables (i.e. age, other preventative behaviors, previous mammogram experience, healthcare access, and personal doctor experience). The adjusted R^2 indicates that the global constructs of the RAA (i.e., attitude, perceived norm, and perceived behavioral control) explain 56.4% of the variability in intention to get a mammogram in this population.

Although R^2 in this study is comparable to TRA and TPB research with other heath behaviors such as physical activity (Blue, 1995), the R^2 found here is larger than in studies that have examined intention to get a mammogram. R^2 ranged from 11.5% to 39.0% in previous studies utilizing TRA and TPB (Burnett et al., 1995; Michels & Taplin,1995; Montano & Talplin,1991; Montano et al., 1997; Steele & Porche, 2005). For example, Steele and Porche (2005) used the TPB to examine factors that influence women (between the ages of 40 and 74) living in rural Louisiana to get a mammogram and found that three global constructs explained 24% of the variability in intention to get a mammogram. Perhaps the larger R^2 found in this study was due to the increased reliability of the direct measures being based on multiple items (i.e., 4-item intention, 4-attitude, 3-item perceived norm, and 3-item perceived behavioral control).

According to the RAA, intention is the immediate determinant of behavior and it is explained by the weighted combination of attitude, perceived norm, and perceived behavioral control. In this study, all three global constructs of the RAA significantly

predicted intention. Perceived behavioral control had the largest regression coefficient (β=0.390), followed by attitude (β=0.346), and perceived norm (β=0.183). Consistent with previous research (Bowie et al., 2003; Steele & Porche, 2005), the results indicate that even though all three global constructs have significant weights, perceived behavioral control and attitude contribute the most in predicting intention among this population. Steele and Porche (1995) concluded that all global constructs of the TPB significantly predicted intention and the order of the regression coefficient was the same as the current study: perceived behavioral control (β=0.288), attitude (β=0.244), and subjective norm (β=0.176). In another study, Bowie and colleagues (2003) assessed repeat mammography and concluded that only perceived behavioral control (β=0.190) and attitude (even though slightly; β=0.03) significantly predicted intention, yet subjective norm was not a significant predictor. This may be due to the fact that the researchers only targeted African American women between the ages of 40 and 49. The psychosocial factors influencing intention to perform a health behavior may be different across age and race.

In order to design effective interventions to increase mammogram use, identifying the underlying beliefs that are associated with intention, attitude, perceived norm, and perceived behavioral control may be helpful. It is possible that by targeting the proposed psychosocial determinants in the design of the interventions, the individuals' attitudes, perceived norms, and perceived behavior control may change, consequently may result in changing individuals' behavior. Correlation analyses were conducted between each of the individual underlying psychosocial determinants with intention and with the global constructs. Only two of the six studies that utilized either TRA or TPB to study

mammogram use, assessed the cognitive structure of the global constructs (Michels & Taplin, 1995; Montano et al., 1997). In the current study, there was a strong correlation between two of the behavioral belief items (i.e. *will detect cancer early* and *will give me peace of mind*) and intention to get a mammogram and a small correlation between another behavior belief item (i.e. *will cause me pain and discomfort*) and intention. Two of these behavioral beliefs findings (i.e. *will detect cancer early* and *will cause me pain and discomfort*) are consistent with previous research (Michels & Taplin, 1995; Montano et al., 1997) and one (i.e. *will give me peace of mind*) is a unique finding of this study. Michels and Taplin (1997) concluded that there was a correlation between women who believed that getting a mammogram will lead to an early detection of breast cancer and their intention to get a mammogram. Results from another study (Montano et al., 1997) suggested that there were significant correlations between the intention to get a mammogram and those who believed that getting a mammogram will lead to *early detection*, *cause me pain*, *expose me to too much radiation*, and *allow me to live longer*. Previous research did not identify *will give me peace of mind* as a significant salient behavioral belief and therefore this belief item is exclusive to the current study. The positive correlation suggests that women who believe that getting a mammogram will give them peace of mind are more likely to intend to get a mammogram.

Although the results of the regression showed that perceived norm is the least powerful predictor of intention, the regression coefficient was still significant. Additionally, consistent with previous findings, results from the correlation analysis in the current study indicated that all underlying normative beliefs items were significantly correlated with intention. The significantly correlated normative beliefs can be divided

into three categories: family members (husband/partner, daughter, sister, and mother), healthcare providers, and friends or other people like me. The findings of this study was unique in a way that it distinguished family members from each other (i.e. sister, mother, daughter, husband, and other family members) and included them in the analysis. In an example of previous research, Montano and colleagues (1997) found significant correlations between intention and perceived referents such as doctors, family members, friends, people in the news, and other people in medicine. Results of another study suggested that individuals with higher perceived support from their family and friends had increased intention to get a mammogram (Katapodi, Facione, Miaskowski, Dodd, & Waters, 2002). In the current study, women's personal doctor had the highest correlation with intention to get a mammogram, which is consistent with previous research. In their review article, Scheler and colleagues (2008) concluded that women who had a personal doctor and perceived to have the doctor's support to get a mammogram, had much higher intention to get a mammogram.

Consistent with previous research among rural women, perceived behavioral control was the most powerful predictor of intention (Michels & Taplin, 1995). In terms of underlying psychosocial determinants, all of the measured control beliefs were significantly correlated to intention. These significantly correlated factors or circumstances (i.e. control beliefs) can be divided into two categories: factors involving individual women and environmental factors mostly associated the mammogram facility. The individuals' salient circumstances were having health insurance and time to get a mammogram, which vary from woman to woman. Most of the circumstances were the characteristics of the mammogram facility and therefore were under the control of the

mammogram facility. The characteristics of the mammogram facility included: location of the facility (distance from home or work), having a friendly environment and staff, providing fast results, sending a reminder, and having convenient appointments. It is to the benefit of the mammogram facility owners to make necessary changes (i.e. remove barriers and add/promote facilitator circumstances) in order to increase regular mammogram use. The associate of these circumstances with intention is consistent with previous research. For instance, Michels and Taplin (1995) concluded that there was a significant correlation between intention and receiving a reminder and having insurance. In addition, Schueler and colleagues (2008) found a negative correlation between lack of insurance and intention to get a mammogram indicating that those who did not have insurance were less likely to intend to get a mammogram. Other researchers have found significant correlations between intention and finding transportation and convenient appointments (Montano et al., 1997), distance to mammogram facility (Levy-Storms, Bastani, & Reuben, 2004), and time (Davis, Emerson, & Husaini, 2005).

Limitations

The current study is not without limitations. The self-reported data are susceptible to social desirability and self-report bias. The women may not provide accurate reports about their behavior due to lapses in memory. Because getting a mammogram is socially desirable, the participants may be more inclined to report engagement in this behavior as well as beliefs about the behavior. This study used a convenience sample. The sample is not representative and the findings cannot be generalizable to all women in rural areas or all women in general or to settings with less access to health care. Since the majority of data were collected from the local mammogram facility and a free health clinic through

online and paper surveys, some women may have been excluded due to lack of access to the Internet, lack of exposure to the flyers, lack of time, or reduced literacy. While consistent with the ethnic make-up of rural, southern Indiana (BRFSS, 2010), the sample lacks ethnic diversity. Finally, the design is a correlational one that can identify associations but cannot establish causation.

Implications for interventions and future research

The Social Ecological Model (SEM) may be a useful conceptual framework for addressing the behavior of getting a mammogram from both the standpoint of research and intervention (McLeroy, Bibeau, Steckler, & Glanz, 1988). The Social Ecological Model proposes that the health behavior is influenced by determinants at multiple levels: intrapersonal (women who get mammograms), interpersonal (their family, friends, technologists, and healthcare providers), organizational (mammogram facility), community, and policy (insurance coverage for mammograms). Incorporating multiple levels of determinants may result in the development of more specific and effective public health interventions. Although this study is not without limitation, the following suggestions may be useful in the design of public health interventions and conducting future research:

1. Public health professionals can design interventions that focus on changing attitude towards getting a mammogram and perceived behavioral control
2. Public health interventions can concentrate on educating women on positive consequences of getting a mammogram such as getting peace of mind and early detection rather than scare tactics

3. Public health interventions can focus on changing circumstances at different levels of SEM. Some examples of strategies that may be effective at each level include:

   a. Individual: provide women with time management skills, address mechanisms to alleviate the cost of mammograms, and setting up reminders to get a mammogram using technological devices such as IPODs and computers
   b. Interpersonal: encourage doctors to recommend women to get a regular mammogram, educate women about the correct recommendations for a mammogram, and encourage women to promote regular mammography among their friends and family
   c. Organizational: changes within the mammogram facility can happen at two levels: leadership (providing fast results, providing after hours or weekend hours to get a mammogram, hiring and training friendly staff, providing discounted or free mammograms, and sending reminders to women to get an annual mammogram); staff level (being friendly and light-hearted, and displaying a non-judgmental attitude)
   d. Community: create traveling mammogram facilities for remote rural areas or providing transportation for women to mammogram facilities in nearby locations as well as mass media communication campaigns to raise awareness about correct mammogram recommendations
   e. Policy: change health insurance policies to increase partial or full coverage of mammograms and increase government funded initiatives to provide discounted or free mammograms

4. Public health professionals can create components of programs that educate women about how to discriminate between reliable and unreliable information on the Internet and other media with regard to mammograms

Although this study identified salient consequences, referents, and circumstances of women to get a mammogram, more extensive research is needed to better understand this behavior. This study focused on understanding women's perception about the factors that influence them to get a mammogram. Future research could better address some of the interpersonal and organizational factors by interviewing the employees at mammogram facilities (such as receptionists, technologists, and leadership team) to examine their perception of women who go to their facilities. In addition, future research can further study this behavior in other rural areas in order to compare and contrast the results of this study with other communities with different characteristics.

Note

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Figure 1

Reasoned Action Approach Adapted to Getting a Mammogram: Rural Women Who Have Had At Least One Mammogram

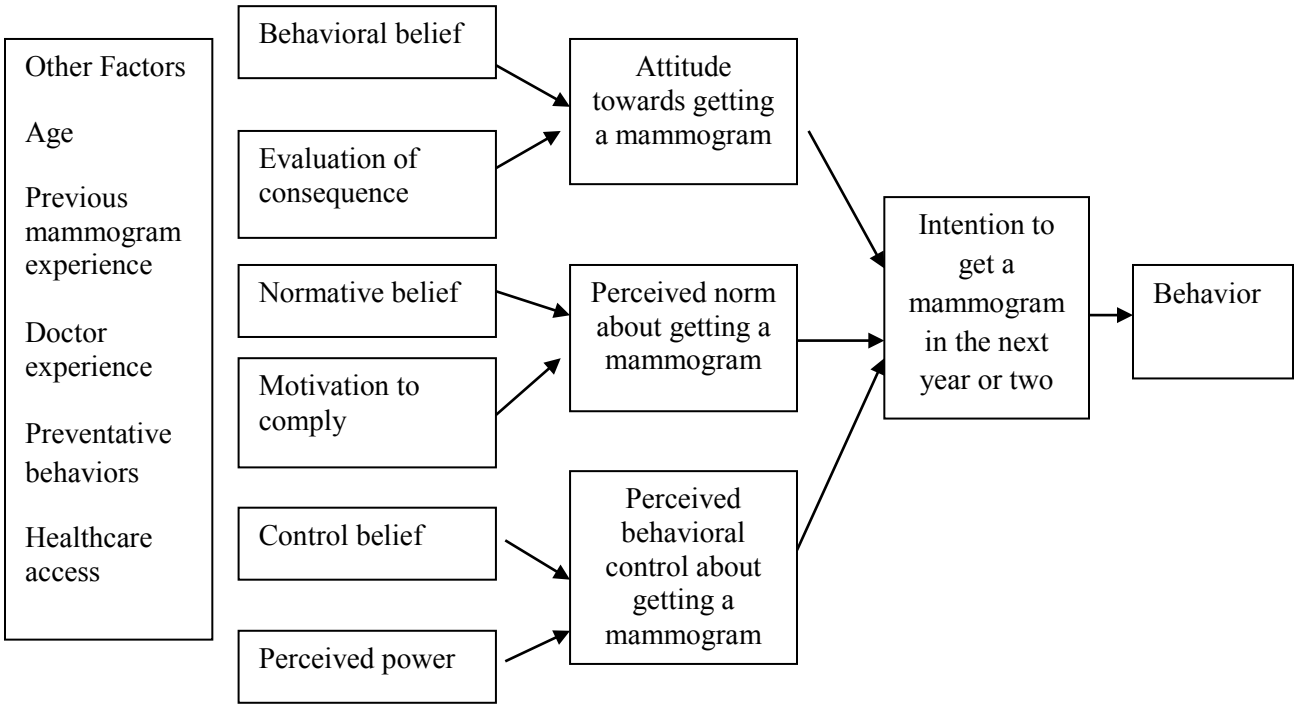

Table 1: Regression analysis summary for intention to get a mammogram

Variable	B	SE B	Beta	T	p
Attitude towards the act	0.546	0.055	0.346	9.892	0.000
Perceived norm	0.256	0.046	0.183	5.537	0.000
Perceived behavioral control	0.44	0.037	0.390	11.882	0.000

Note: $R^2 = 0.548$

Table 2: Hierarchical regression analysis predicting intention to get a mammogram

Steps and predictor variables	R^2	R^2 Change	Beta	Std Error
Step 1	0.271**	0.271**		
Age			-0.094*	0.007
Preventative behaviors			0.201**	0.057
Past mammogram Experience			0.259**	0.115
Health care access			0.143**	0.050
Doctor's experience			0.136**	0.050
Step 2	0.572**	0.300**		
Age			-0.086	0.005
Preventative behaviors			0.084	0.045
Past mammogram Experience			0.077	0.093
Health care access			0.049	0.041
Doctor's experience			0.012	0.039
Attitude towards the act			0.313**	0.057
Perceived norm			0.171**	0.046
Perceived behavioral Control			0.335**	0.041

Note: **p<0.01. * p<0.05

Table 3: Correlation of attitude towards the act (AA) and intention (IN) with behavioral beliefs, outcome evaluations and behavioral cross-products

	Mean and Standard Deviation of Cross-Products		Behavioral Cross-Products		Behavioral Beliefs		Outcome Evaluations	
Salient Consequences	M	SD	AA	IN	AA	IN	AA	IN
Will detect cancer early	4.73	4.23	0.397**	0.286**	0.397**	0.286**	0.301**	0.353**
Will cause me pain or discomfort	-0.91	2.86	0.345**	0.100*	-0.312**	-0.500	0.314**	0.043
Will lead me to find out that I have cancer	1.30	4.79	0.023	-0.008	0.081	0.023	0.069	-0.032
Will give me peace of mind	5.62	3.76	0.449**	0.380**	0.454**	0.412**	0.278**	0.302**
Will expose me to radiation	-0.86	3.41	0.276**	0.010	-0.170**	0.074	0.188**	0.099*
Mean of behavioral cross products	9.88	9.96	0.542*	0.293**				

Table 4: Correlation of perceived norm (PN) and intention (IN) with normative beliefs, motivation to comply, and normative belief cross-product

	Mean and Standard Deviation of Cross-Products		Normative Cross-Products		Normative Beliefs		Motivations to Comply	
Salient referents	M	SD	PN	IN	PN	IN	PN	IN
My husband / partner	11.65	8.56	0.543**	0.432**	0.551**	0.472**	0.297**	0.207**
My female relative	12.28	7.56	0.527**	0.398**	0.533**	0.423**	0.342**	0.249**
My other family members	10.18	8.09	0.542**	0.306**	0.547**	0.327**	0.308**	0.194**
My three closest friends	11.73	7.40	0.555**	0.362**	0.550**	0.367**	0.319**	0.239**
My personal doctor	16.04	7.04	0.470**	0.544**	0.423**	0.490**	0.279**	0.395**
My health insurance company	9.23	8.92	0.361**	0.315**	0.318**	0.297**	0.194**	0.116**
Sum of normative cross-products	70.09	40.91	0.627**	0.499**				

Table 5: Correlation of perceived behavioral control (PNBC) and intention (IN) with control beliefs, perceived power, and control belief cross products

	Mean and Standard Deviation of Cross-Products		Control Cross-Products		Control Beliefs		Perceived Power	
Salient circumstances	M	SD	PBC	IN	PBC	IN	PBC	IN
Having health insurance	5.35	4.02	0.472**	0.397**	0.445**	0.336**	0.305**	0.271**
Having enough time	5.93	3.28	0.508**	0.431**	0.526**	0.435**	0.313**	0.281**
Mammogram facility close to work or home	6.01	3.23	0.379**	0.342**	0.336**	0.309**	0.298**	0.269**
Friendly staff and warm environment	5.15	3.31	0.305**	0.340**	0.334**	0.372**	0.157**	0.191**
Convenient appointments	5.85	3.20	0.469**	0.407**	0.441**	0.361**	0.349**	0.315**
Receiving a reminder	4.53	4.07	0.375**	0.405**	0.344**	0.358**	0.296**	0.331**
Receiving fast results	4.85	3.44	0.358**	0.368**	0.395**	0.383**	0.187**	0.224**
Sum of control cross-products	5.38	2.71	0.517**	0.487**				

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Additional tables:

Correlation Table between Regression Variables:

Variables	1	2	3	4	5	6	7	8
Attitude	---							
Perceived norm	0.487**	---						
Perceived behavioral control	0.478**	0.367**	---					
Age	0.031	-0.010	0.084*	---				
Preventative behaviors	0.264**	0.180**	0.339**	0.110**	---			
Past mammogram experience	0.402**	0.286**	0.332**	0.064	0.230**	---		
Healthcare access	0.214**	0.151**	0.494**	0.147**	0.431**	0.370**	---	
Doctor experience	0.325**	0.221**	0.333**	0.051	0.236**	0.349**	0.390**	---

Mean and Standard Deviation of Variables Used

Variables	Mean	Standard Deviation
Attitude	4.96	0.90
Norm	5.78	1.01
Transformed Perceived behavioral control	0.55	0.12
Age	53.64	7.68
Preventative behaviors	3.80	1.01
Past mammogram experience	3.22	0.49
Healthcare access	3.98	1.25
Doctor experience	6.02	1.15

CHAPTER SIX: REFLECTIONS AND FUTURE DIRECTIONS

While working on my PhD at IU, I learned many valuable lessons that will guide me throughout my life. Some of these lessons include:

1) Following your passion: I believe that this is the most important lesson that I have learned. I have learned that the key to success is to follow your passion. I am really passionate about teaching, research and service in the field of public health. By getting a PhD, I thought I would be able to follow all my three passions. It has been a great experience the past few years for me. I have taught several courses, met great students, worked on different research projects with various colleagues and professors, and had the opportunity to get involved with the community. I do not think, without following my passion in improving the health of individuals and communities, I would have been able to reach this point in my life.
2) Comprehensive approach to changing health behavior: Based on my experience in graduate school, I believe that in order to change health behaviors public health professions cannot focus on just one dimension. They need to design interventions that focus on individuals, their family and friends, organizations, communities and policies. Targeting different determinants at different levels would increase the chance of changing health behavior.
3) Importance of getting community members involved in the research process: I strongly believe that community members and members of the target populations are great assets to doing research. I was fortunate enough to meet great individuals at the Olcott Center, Bloomington Hospital, SIRA, IMA, Radiation Oncology Center, and homeless shelters. I received guidelines and feedback from

nurses, doctors, receptionists, technologists, patients, cancer survivors, and community members and tried to incorporate them into my research. I believe that involving the community gave me a deeper understanding of the target population, helped me with a more efficiently collect data, and empowered my target population. I met great people and was able to establish great connections and I plan to work with some of them on future research projects. During this process, I learned that the gap between academia and community can be narrowed by honest and direct communication. Although, my research was not completely a Community Based Participatory Research (CBPR), I tried to incorporate certain aspects of CBPR into my research. I believe that future public health research will utilize CBPR more often and it will allow public health professionals to do higher quality research.

4) Get involved: I believe that PhD students should get involved with research projects from the first semester with their own advisor or other faculty members. Going through different research projects will prepare students to independently conduct in their own research for their dissertation and future projects. Getting involved with research projects also allows students to learn how to work in groups and how to successfully collaborate with other researchers. I was fortunate to work on various research projects with Dr. Middlestadt and her research team as well as Dr. Torabi. All of those experiences prepared me to conduct my own research under the supervision of my committee members.
5) Persistence: Getting a PhD is a long and tedious process and it is very important to be persistent and dedicated every day. It is very similar to a roller-coaster ride,

lots of highs and lots of lows. It is very important not lose perspective and stay strong. Hard work will pay off.

6) Support system: During this process, it is very important to have a strong support system so you can rely on them and you're their advice and guidance. I was very fortunate to have my family, my advisor, my committee members, girlfriend, and friends by my side during this tough time.
7) Time-management: It is very challenging to balance teaching, being involved in research, attend meetings and classes, and apply for jobs all at the same time. Therefore, time management is key to success during this process. It is very important not to procrastinate and accomplish daily tasks.
8) Start early: I believe that PhD students should tailor their course activities and projects towards their dissertation. This way by the last year of their program they would have a good sense of the state of the literature and they would be able to finish their dissertation in a timely manner.
9) Be caring and kind to others: I strongly believe in the following saying "what goes around comes around." During my time at IU, I tried to be the best human being and teacher that I can be. In return, I established a great social network and a support system. I felt supported by many individuals throughout this process who helped me during the data collection and other aspects of my research. I had 6 graduate students help me with the data collection process as well as administrative staff at different organizations. I had many friends and students helping me with the recruitment process.

10) Open communication with your adviser: I was fortunate enough to establish a great relationship with my adviser and mentor, Dr. Middlestadt. She was a very good communicator and helped me to express myself better. This allowed me to have a better understanding of her expectations and what I needed to do to fulfill them. She was also very generous with her time and spent as much time with me as I needed. I believe that having a great relationship with my adviser made me a more competent researcher.

My Research Orientation

My overarching goal as a researcher is to prevent disease and disability among my research participants and help them achieve and maintain a positive quality of life. I ascribe to a systems way of approaching health research. I strive to address topics through my studies which will promote positive behavior change at the intrapersonal level and extend to the inter-personal and even organization, community, and policy level. I tend to utilize a community-based participatory research approach in order to gain insight into the lived experiences of and empower my target population. My research experience has been a dynamic process. My initial research experiences were medically-based and focused on disease treatment. I worked as a lab assistant in a virology lab and conducted research on the treatment of type II diabetes. Working in the lab and volunteering with an endocrinologist helped me to realize the importance of research on health behavior to prevent chronic diseases. I believe that the prevention of chronic disease relies heavily on behavior change, therefore in terms of methodology I have utilized health theories in the design of my research projects. I have focused a large part

of my efforts towards cancer prevention in general and more specifically in reducing rates of cervical and breast cancer in women through primary and secondary prevention.

Future Direction of Research

Given my multi-disciplinary background, I am interested in pursuing a wide variety of research endeavors. As I look forward toward in my career as an academic and researcher, I see my future research agenda as three-fold:

- Chronic disease prevention
- Using advanced statistical methods such as SEM to develop a casual model of health seeking behaviors
- Innovative use of technology in research and teaching

In terms of topical interest, the overarching theme of my research has been related to chronic disease prevention. My future research trajectory includes:

- Health-Seeking Behaviors:
    - Utilizing a theory-based approach to investigate the role of patient-provider interactions in increasing HPV vaccination among college students
    - Examining the impact of the patient-provider interactions in terms of young individuals' engaging in health prevention measures such as vaccination. Specifically, I am interested in the role that health care providers play in terms of influencing their patients to engage in preventative health behaviors.

- Studying health from the perspective of the healthcare provider. I am also interested in health information seeking whether it is from a healthcare provider or from an alternative source of health education.
- Utilizing a theory-based approach to investigate the determinants of getting a mammogram among women in other rural communities to compare and contrast with rural southern Indiana
- Developing a causal model of health-seeking behaviors using SEM

- Intervention Design and Evaluation
  - Utilizing Intervention Mapping in the design of interventions based on the results of my research
  - Evaluation of HIV/AIDS Intervention
  - Analyzing the role of theory in designing worksite wellness programs in the university setting
- Methodological Interests
  - Applying advanced statistical analysis such as structural equation modeling in order to develop a model of potential casual relationships related to sexual assault
  - Applying the principles of critical qualitative research methods to the study of health behaviors
  - Using item-elicitation to collect participant driven responses in order to develop measures and scales
  - Evaluation of different teaching styles to reach students from various educational and knowledge background

My research thus far has addressed social and ecological determinants of various health behaviors and the development of interventions aimed at changing negative health outcomes. As a faculty member I plan to continue this pursuit of research and continue to strive to improve individual and community health.

Conclusion:

I believe that my purpose in life is to help other human beings. By getting into the field of public health, I believe that I can play a part in helping people change their own behavior for the betterment of their health. This is a fundamental human right; all human beings regardless of their race, age, nationality, and religion deserve to be healthy. Getting a PhD is the first step in my journey towards achieving my goal. I aspire to be a good human being first, a good teacher, and a good researcher. I believe that through my teaching I can touch the lives of my students and in turn I hope that they will go out and touch the lives of others.

APPENDICES:

A) Appendix 1: IRB Approval

B) Appendix 2: Study Information Sheets

C) Appendix 3: Phase I Elicitation Instrument

D) Appendix 4: Phase 2 Quantitative Instrument

E) Appendix 5: Table 1: Health Issue Evidence Table

F) Appendix 6: Table 2: Theory Evidence Table

G) Appendix 7: Table 3: Large Scale Evidence Table

H) Appendix 8: Table 4: Select Studies Evidence Table

I) Appendix 9: Recruitment Flyers

J) Appendix 10: References

Appendix 1: IRB Approval for phase I

INDIANA UNIVERSITY

OFFICE OF RESEARCH ADMINISTRATION

To: SUSAN ELIZABETH MIDDLESTADT
APPLIED HEALTH SCIENCE

From: IU Human Subjects Office
Office of Research Administration – Indiana University

Date: January 24, 2011

RE: **EXEMPTION GRANTED**

Protocol Title: Identifying determinants of getting a mammogram in order to reduce mortality rate from breast cancer

Protocol #: 1101004542 |

Funding Agency/Sponsor: None

IRB: IRB-IUB, IRB00000222

Your study named above was accepted on January 23, 2011 as meeting the criteria of exempt research as described in the Federal regulations at 45 CFR 46.101(b), paragraph(s) (2) . This approval does not replace any departmental or other approvals that may be required.

As the principal investigator (or faculty sponsor in the case of a student protocol) of this study, you assume the following responsibilities:

Amendments: Any proposed changes to the research study must be reported to the IRB prior to implementation. To request approval, please complete an Amendment form and submit it, along with any revised study documents, to iub_hsc@indiana.edu. Only after approval has been granted by the IRB can these changes be implemented.

Completion: Although a continuing review is not required for an exempt study, you are required to notify the IRB when this project is completed. In some cases, you will receive a request for current project status from our office. If we are unsuccessful at in our attempts to confirm the status of the project, we will consider the project closed. It is your responsibility to inform us of any address changes to ensure our records are kept current.

Per federal regulations, there is no requirement for the use of an informed consent document or study information sheet for exempt research, although one may be used if it is felt to be appropriate for the research being conducted. As such, these documents are returned without an IRB-approval stamp. Please note that if your submission included an informed consent statement or a study information sheet, the IRB requires the investigational team to use these documents.

You should retain a copy of this letter and any associated approved study documents for your records. Please refer to the project title and number in future correspondence with our office. Additional information is available on our website at http://researchadmin.iu.edu/HumanSubjects/IUB/hs_home.html.

If you have any questions, please contact our office at the below address.

Thank you.

Appendix 1 : IRB Approval for Phase 2:

INDIANA UNIVERSITY INSTITUTIONAL REVIEW BOARD (IRB)

DOCUMENTATION OF REVIEW AND APPROVAL (DRA)

Reviewing IRB (please choose one): IRB STUDY NUMBER: 1103004982

Biomedical: ☐ IRB-02 ☐ IRB-03 ☐ IRB-04 ☐ IRB-05

Behavioral: ☐ IRB-01 ☒ IUB IRB

Please type only in the gray boxes. To mark a box as checked, double-click the box, select "checked", and click "OK".

SECTION I: INVESTIGATOR INFORMATION

Principal Investigator:

Name *(Last, First, Middle Initial)*: **Middlestadt, Susan**

Department: Applied Health Science Phone: 857-5768 E-Mail: semiddle@indiana.edu

Fax: _____ Address: _____

Additional Study Contact:

Name: Geshnizjani, Alireza Phone: 856-0791 E-Mail: ageshniz@indiana.edu

Student Contact, if this is a student protocol: See above Phone: _____ Email: _____

Project Title: **Using Reasoned Action Approach to Identifying the Determinants of Getting a Mammogram among Women in Southern Indiana**

Sponsor/Funding Agency: _____ PI on Grant: _____

Sponsor Protocol #/Grant #: _____ Period: from: _____ to _____

Sponsor Type: ☐ Federal ☐ State ☐ Industry ☐ Not-for-Profit ☐ Unfunded ☐ Internally Funded

Funding Status: ☐ Pending ☐ Funded ☐ N/A

Grant Title (if different from project title): _____

SECTION II: TYPE OF REVIEW

☒ Exempt Review

☐ Expedited Review

☐ Full Board Review (*Choose One*) → ☐ Behavioral: ☐ IRB-01 ☐ IU Bloomington IRB ☐ Biomedical: ☐ IRB-02 ☐ IRB-04 ☐ IRB-05

SECTION III: DOCUMENTS INCLUDED WITH RESEARCH SUBMISSION

☐ Assent, dated: _____
Number of assent documents: _____

☐ Authorization, dated: _____
Number of authorizations: _____

☐ Clinical Investigator's Brochure, dated: _____

☐ Expedited Research Checklist, dated: _____

☒ Exempt Research Checklist, dated: 03/13/2011

☐ HIPAA & Recruitment Checklist, dated: _____

☐ Informed Consent, dated: _____
Number of consent documents: _____

☐ Protocol, dated: _____

☒ Recruitment materials (please list and date): Flyer and email script 03/13/2011

☐ Request form(s) for vulnerable population(s) (please list and date): _____

☒ Surveys, questionnaires (please list and date): 03/13/2011

☐ Summary Safeguard Statement or HUD Form, dated: _____

☒ Study Information Sheet 03/13/2011

☐ Other (please list and date): _____

SECTION IV: INVESTIGATOR STATEMENT OF COMPLIANCE

By submitting this form, the Principal Investigator assures that all information provided is accurate. He/she assures that procedures performed under this project will be conducted in strict accordance with federal regulations and Indiana University policies and procedures that govern research involving human subjects. He/she acknowledges that he/she has the resources required to conduct research in a way that will protect the rights and welfare of participants, and that he/she will employ sound study design which minimizes risks to subjects. He/she agrees to submit *any* change to the project (e.g. change in principal investigator, research methodology, subject recruitment procedures, etc.) to the Board in the form of an amendment for IRB approval prior to implementation.

1 IRB Form v09/01/2010

Appendix 2: Phase 1 Study Information Sheet

Study # 1101004542
INDIANA UNIVERSITY
STUDY INFORMATION SHEET

Identifying determinants of getting a mammogram in order to reduce mortality rate from breast cancer

You are invited to participate in a research study of examining the factors that influence women between the ages of 40 to 64 to go to their doctor to get a mammogram. You were selected as a possible subject because you are a female between the ages of 40 to 64**.** We ask that you read this form and ask any questions you may have before agreeing to be in the study.

The study is being conducted by Alireza Geshnizjani at Indiana University in the department of Applied Health Science. It is funded by the School of HPER at Indiana University.

STUDY PURPOSE

The purpose of this study is to better understand the decision making process of women to get a mammogram. The results of this study will be used to help public health professionals to design appropriate interventions that encourage women to get a regular mammogram to reduce the mortality rate from breast cancer.

NUMBER OF PEOPLE TAKING PART IN THE STUDY:

If you agree to participate, you will be one of 40 subjects who will be participating in this research at Indiana University.

PROCEDURES FOR THE STUDY:

If you agree to be in the study, you will participate in an open ended survey. During the survey you be asked open-ended questions regarding your knowledge of and experience about mammograms. The survey is expected to take approximately ten to fifteen minutes. Please do not put your name or any other kind of identifying information on the survey.

BENEFITS OF TAKING PART IN THE STUDY:

We anticipate that the data provided by this study will add to the body of knowledge about mammograms and breast cancer, which will better inform educators to address this topic in designing interventions that may lead to lower mortality rates from breast cancer.

CONFIDENTIALITY

Efforts will be made to keep your personal information confidential. Your survey will be anonymous as no identifying information is asked on the survey; however, we cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Once you have turned in your survey, the investigator will not be able to return it.

Organizations that may inspect and/or copy your research records for quality assurance and data analysis include groups such as the study investigator and his/her research associates, the IUB Institutional Review Board or its designees, and (as allowed by law) state or federal agencies, specifically the Office for Human Research Protections (OHRP), who may need to access your research records.

CONTACTS FOR QUESTIONS OR PROBLEMS

For questions about the study or a research-related injury, contact the principle researcher Alireza Geshnizjani at 116, HPER, 857-6813 and ageshniz@indiana.edu.

For questions about your rights as a research participant or to discuss problems, complaints or concerns about a research study, or to obtain information, or offer input, contact the IUB Human Subjects office, 530 E Kirkwood Ave, Carmichael Center, 203, Bloomington IN 47408, 812-856-4242 or by email at iub_hsc@indiana.edu

VOLUNTARY NATURE OF STUDY

Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. Leaving the study will not result in any penalty or loss of benefits to which you are entitled. Your decision whether or not to participate in this study will not affect your current or future relations with the investigator.

Form date: January 23, 2011

Appendix 2: Phase 2 Study Information Sheet

Study #1103004982
STUDY INFORMATION SHEET

Identifying the factors of getting a mammogram

You are invited to participate in a research study of examining the factors that influence women between the ages of 40 to 75 to go to their doctor to get a mammogram. The inclusion criteria for this study is that you are a female between the ages of 40 to 75 and have had at least one mammogram during your lifetime**.** I ask that you read this form and ask any questions you may have before agreeing to be in the study.

The study is being conducted by Alireza Geshnizjani at Indiana University in the department of Applied Health Science. It is funded by the School of HPER at Indiana University.

STUDY PURPOSE

The purpose of this study is to better understand the decision making process of women to get a mammogram. The results of this study will be used to help public health professionals to design appropriate interventions that encourage women to get a regular mammogram to reduce the mortality rate from breast cancer.

NUMBER OF PEOPLE TAKING PART IN THE STUDY:

If you agree to participate, you will be one of 500 subjects who will be participating in this research at Indiana University.

PROCEDURES FOR THE STUDY:

If you agree to be in the study, you will participate in an online survey or paper-pencil survey. During the survey you be asked questions regarding your knowledge of and experience about mammograms. The survey is expected to take approximately 15 minutes. Please do not put your name or any other kind of identifying information on the survey.

BENEFITS OF TAKING PART IN THE STUDY:

I anticipate that the data provided by this study will add to the body of knowledge about mammograms and breast cancer, which will better inform educators to address this topic in designing interventions that may lead to lower mortality rates from breast cancer.

Paument:

If you participate in this study you will enter your email address at the end and you will receive a $5 dollars gift card in your email. If you fill out this survey at VIM or SIRA, you can ask the receptionist to receive a $5 gift card in person.

CONFIDENTIALITY

Efforts will be made to keep your personal information confidential. Your survey will be anonymous as no identifying information is asked on the survey; however, I cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Once you have submitted your survey, the investigator will not be able to return it.

Organizations that may inspect and/or copy your research records for quality assurance and data analysis include groups such as the study investigator and his/her research associates, the IUB Institutional Review Board or its designees, and (as allowed by law) state or federal agencies, specifically the Office for Human Research Protections (OHRP), who may need to access your research records.

CONTACTS FOR QUESTIONS OR PROBLEMS

For questions about the study contact the principle researcher Alireza Geshnizjani at 116, HPER, 317-450-2276 and ageshniz@indiana.edu.

For questions about your rights as a research participant or to discuss problems, complaints or concerns about a research study, or to obtain information, or offer input, contact the IUB Human Subjects office, 530 E Kirkwood Ave, Carmichael Center, 203, Bloomington IN 47408, 812-856-4242 or by email at iub_hsc@indiana.edu

VOLUNTARY NATURE OF STUDY

Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. Leaving the study will not result in any penalty or loss of benefits to which you are entitled. Your decision whether or not to participate in this study will not affect your current or future relations with the investigator.

Form date: March 25, 2011

Appendix 3: Phase 1 Elicitation Survey:

Understanding factors influencing getting a mammogram

Dear Participant,

We would like your help in understanding what factors influence women between the ages of 40 to 64 to go to their doctor to get a mammogram. Your answers to this survey will be used to better understand women's beliefs about mammography and to design programs and interventions aimed at reducing the mortality rate of breast cancer. Your responses will be anonymous. That means we will not know your name.

Please keep in mind, there are no right or wrong answers to these questions. We want to know what you think, feel, and do. Please answer what comes to your mind first. Sometimes it may look like we are asking the same question several times, just answer what comes to your mind. Your answers will remain completely anonymous. You may omit any question or section that makes you feel uncomfortable. The survey will take about 10-15 minutes. Please follow the directions on each page.

Thank you in advance for your participation in this study.

We thank you in advance for your time!

A. Please answer the following questions about your health and health behaviors:

1. Would you say that in general your health is….
    a. Excellent
    b. Very good
    c. Good
    d. Fair
    e. Poor

2. During the past month, other than your regular job, did you participate in any physical activities or exercise such as running, golf, gardening, or walking for exercise?
    a. Yes
    b. No
    c. Not sure

3. A mammogram is an x-ray of each breast to look for breast cancer. Have you ever had a mammogram?
    a. Yes
    b. No (Please skip to question 5)
    c. Don't know/ Not sure (Please skip to question 5)

4. How long has it been since you had your last mammogram?
    a. Within the past year (anytime less than 12 months ago)
    b. Within the past 2 years (1 year but less than 2 years ago)
    c. Within the past 3 years (2 years but less than 3 years ago)
    d. Within the past 5 years (3 years but less than 5 years ago)
    e. 5 or more years ago
    f. Don't know/ Not sure

5. How old were you when you had your first mammogram?

    a. ……years old
    b. Do not know/ Not sure

6. How often do get a mammogram?
    a. Every 6 months
    b. Every year
    c. Every 2 years
    d. Every 3 to 5 years
    e. Other
        i. Please specify:……
    f. I do not get a mammogram

B. Mammogram questions: A mammogram is an x-ray of each breast to look for breast cancer. Please answer the following questions about you getting a mammogram. Remember, there are no right or wrong answers. We are interested in understanding your perceptions about getting a mammogram.

7. What are some of the advantages of you getting a mammogram in the next year or two? What good things may happen?

---

8. What are some of the disadvantages of you getting a mammogram in the next year or two? What bad things may happen?

---

9. Who approves/supports of you getting a mammogram in the next year or two?

---

10. Who doesn't support or disapproves of you getting a mammogram in the next year or two?

---

11. What makes it easy for you to get a mammogram? What conditions or circumstances?

---

12. What makes it hard for you to get a mammogram? What conditions or circumstances?

C. Personal and Family History of Cancer: Please answer the following questions about the history of cancer among your family/friends and your mammogram experience.

13. Have you ever been diagnosed with cancer?
    a. No
    b. Yes
        i. Please specify the type of cancer…….
    c. Refuse to answer

14. Have any of your family members (Such as father, mother, brother, sister, husband, child, aunt, uncle, cousin, grandfather, and grandmother) ever been diagnosed with cancer? If yes, please specify the relationship and type of cancer.

    Relationship ----------> Type of cancer

---

15. Have any of your friends ever been diagnosed with cancer? If yes, please specify how many of them and the type of cancer.

---

16. Please tell us about your future mammogram. I intend to get a mammogram……
    a. In the next 12 months
    b. In the next 2 years
    c. In the next 3 years
    d. In the next 5 years
    e. In the future but I am not sure when
    f. I do not intend to get a mammogram

17. If you DO NOT have a mammogram every 1 to 2 years, which of the following statements describes you? Please check all answers that apply to you.
    a. My doctor said I did not need a mammogram
    b. My doctor did not tell me to have a mammogram when I saw him/her
    c. My doctor did not call or send me a reminder to get a mammogram
    d. I did not know that I needed a mammogram every 1 to 2 years
    e. I do not think that mammograms work in finding cancer
    f. I will not get cancer
    g. The place I want to go to have a mammogram is too far away
    h. I do not have transportation to get a mammogram
    i. I do not think a mammogram is covered by my insurance company
    j. I believe that mammograms will cause cancer
    k. Others
        i. Please specify……
        ……
        ……
        ……

18. If you want to get information about getting a mammogram, where would you go? Whom would you ask?

19. Are you currently covered under a health insurance plan/policy?
    a. Yes
    b. No
    c. Don't know/ Not sure

20. Does your health insurance plan/policy pay (fully or partially) for mammograms?
    a. Yes, it fully pays for mammograms
    b. Yet, it partially pays for mammograms
    c. No, it does not pay for mammograms
    d. Don't know/ Not sure

21. How old are you? _____ years old.

22. How do you describe yourself? Are you… (Please check all that apply)

    a. White
    b. Black or African American
    c. Latino or Hispanic
    d. Asian or Asian American
    e. American Indian, Alaska Native
    f. Multi-racial
    g. Other

23. Are you….?
    a. Single
    b. In a relationship but not married
    c. Married
    d. Divorced
    e. Widowed
    f. Separated

Appendix 4: Phase 2 Quantitative Instrument

Identifying the factors of getting a mammogram

You are invited to participate in a research study of examining the factors that influence women between the ages of 40 to 75 to go to their doctor to get a mammogram. You were selected as a possible subject because you are a female between the ages of 40 to 75 and have had at least one mammogram during your lifetime. I ask that you read this form and ask any questions you may have before agreeing to be in the study.

The study is being conducted by Alireza Geshnizjani at Indiana University in the department of Applied Health Science. It is funded by the School of HPER at Indiana University.

STUDY PURPOSE

The purpose of this study is to better understand the decision making process of women to get a mammogram. The results of this study will be used to help public health professionals to design appropriate interventions that encourage women to get a regular mammogram to reduce the mortality rate from breast cancer.

NUMBER OF PEOPLE TAKING PART IN THE STUDY:

If you agree to participate, you will be one of 500 subjects who will be participating in this research at Indiana University.

PROCEDURES FOR THE STUDY:

If you agree to be in the study, you will participate in this paper-pencil survey. During the survey you be asked questions regarding your knowledge of and experience about mammograms. The survey is expected to take approximately 15 minutes. Please do not put your name or any other kind of identifying information on the survey.

BENEFITS OF TAKING PART IN THE STUDY:

I anticipate that the data provided by this study will add to the body of knowledge about mammograms and breast cancer, which will better inform educators to address this topic in designing interventions that may lead to lower mortality rates from breast cancer. In addition, if you fill out this survey at VIM or SIRA, you can ask the receptionist to receive a $5 gift card.

CONFIDENTIALITY

Efforts will be made to keep your personal information confidential. Your survey will be anonymous as no identifying information is asked on the survey; however, I cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Once you have submitted your survey, the investigator will not be able to return it.

Organizations that may inspect and/or copy your research records for quality assurance and data analysis include groups such as the study investigator and his/her research associates, the IUB Institutional Review Board or its designees, and (as allowed by law) state or federal agencies, specifically the Office for Human Research Protections (OHRP), who may need to access your research records.

CONTACTS FOR QUESTIONS OR PROBLEMS

For questions about the study or a research-related injury, contact the principle researcher Alireza Geshnizjani at 116, HPER, 317-450-2276 and ageshniz@indiana.edu.

For questions about your rights as a research participant or to discuss problems, complaints or concerns about a research study, or to obtain information, or offer input, contact the IUB Human Subjects office, 530 E Kirkwood Ave, Carmichael Center, 203, Bloomington IN 47408, 812-856-4242 or by email at iub_hsc@indiana.edu

VOLUNTARY NATURE OF STUDY

Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. Leaving the study will not result in any penalty or loss of benefits to which you are entitled. Your decision whether or not to participate in this study will not affect your current or future relations with the investigator.

Screening questions: If your answers to the following questions are YES, you are eligible to participate in the study. If any of the answers is NO, unfortunately, you are not eligible to participate in the study.

- **A mammogram is an x-ray of the breasts to look for breast cancer. Have you ever had a mammogram?**
  - Yes
  - No

- **Are you between the ages of 40 and 75?**
  - Yes
  - No

- **Do you currently live in the state of Indiana?**
  - Yes
  - No

Section 1: Health seeking behaviors: In this section, you will answers questions about your health seeking behaviors and your past mammogram experience.

1. **Would you say that in general your health is…**
   1. Excellent
   2. Very good
   3. Good
   4. Fair
   5. Poor

2. **A flu shot is an influenza vaccine injected into your arm. During the past 12 months, have you had a flu shot?**
   1. Yes
   2. No
   3. Not sure

3. **A Pap test is a test for cancer of cervix. Have you ever had a Pap test?**
   1. Yes
   2. No
   3. Not sure

4. **A routine checkup is a general physical exam, not an exam for a specific injury, illness, or condition. In the past 12 months, have you visited a doctor for a routine checkup?**
   1. Yes
   2. No
   3. Not sure

5. **During the past 12 months, have you had your blood pressure checked?**
   1. Yes
   2. No
   3. Not sure

6. **How old were you when you had your first mammogram?**
   1. ____ years old.
   2. Don't know / Not sure

7. **How long has it been since you had your last mammogram?**
   1. Within the past year (any time less than 12 months ago)
   2. Within the past 2 years (1 year but less than 2 years ago)

3. Within the past 3 years (2 years but less than 3 years ago)
4. Within the past 4 years (3 years but less than 4 years ago)
5. 5 or more years ago
6. Don't know / Not sure

8. How often do you get a mammogram?

1. Once every 6 months
2. Once a year
3. Once every 2 years
4. Once every 3 years
5. Once every 4 years
6. Once every 5 years or more
7. I do not get a mammogram
8. Not sure/ Don't know

9. How satisfied were you with the overall services you received at the time of your last mammogram?

1. Very dissatisfied
2. Dissatisfied
3. Satisfied
4. Very Satisfied

10. When you had your last mammogram, how well did the staff at the mammography center explain the procedure to you?

1. Not very well at all
2. Not very well
3. Well
4. Very well

11. When you had your last mammogram, how friendly were the staff at the mammography center?

1. Very unfriendly
2. Unfriendly
3. Friendly
4. Very friendly

12. In general, how difficult is it for you to get an appointment for a mammogram within a reasonable length of time?

1. Very difficult
2. Difficult
3. Not very difficult
4. Easy

13. When you had your last mammogram, how long did you wait at the center to get your mammogram?

1. Less than 5 minutes
2. Between 5 and 15 minutes
3. Between 15 and 30 minutes
4. More than 30 minutes

Section 2: Attitudes, norms, and intention:

In this section, you will answer questions about your perceived attitudes, beliefs, norms, and intention on mammograms. For each of the following statements, please circle the number that corresponds best with description of your opinion. There is no right or wrong answer. Some of the questions may appear to be similar, but they do address somewhat different issues.

14. How likely is it that you will get a mammogram in the next year or two?

Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely
1	2	3	4	5	6	7

15. I will get a mammogram in the next year or two…

Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

16. My getting a mammogram in the next year or two is …

Extremely Unpleasant	Quite Unpleasant	Slightly Unpleasant	Neither	Slightly Pleasant	Quite Pleasant	Extremely Pleasant
1	2	3	4	5	6	7

17. My getting a mammogram in the next year or two is…

Extremely Unenjoyable	Quite Unenjoyable	Slightly Unenjoyable	Neither	Slightly Enjoyable	Quite Enjoyable	Extremely Enjoyable
1	2	3	4	5	6	7

18. My getting a mammogram in the next year or two is …

Extremely Worthless	Quite Worthless	Slightly Worthless	Neither	Slightly Valuable	Quite Valuable	Extremely Valuable
1	2	3	4	5	6	7

19. My getting a mammogram in the next year or two is …

Extremely Bad	Quite Bad	Slightly Bad	Neither	Slightly Good	Quite Good	Extremely Good
1	2	3	4	5	6	7

20. Most people who are important to me think I should get a mammogram in the next year or two...

Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

21. Most people like me will get a mammogram in the next year or two…

Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

22. How likely is it that people like you think that you should get a mammogram in the next year or two?

Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely
1	2	3	4	5	6	7

23. How sure are you that you can get a mammogram in the next year or two?

Not at all Sure			Somewhat Sure			Completely Sure
1	2	3	4	5	6	7

24. Getting a mammogram in the next year or two is …

Not at all under my control			Somewhat under my control			Completely under my control
1	2	3	4	5	6	7

25. How confident are you that you can get a mammogram in the next year or two?

Not at all Confident			Somewhat Confident			Completely Confident
1	2	3	4	5	6	7

26. I will get a mammogram in the next year or two…

Definitely No						Definitely Yes
1	2	3	4	5	6	7

27. When do you expect to get your next mammogram?

1. In the next 6 months
2. In the next 6 to 12 months
3. In the next 2 years
4. In the next 3 years
5. In the next 4 years
6. In the next 5 years or more
7. I intend to get it but not sure when
8. I do not intend to get a mammogram

Section 3: Consequences

For each of the following statements, please circle the number that corresponds best with your opinion. There is no right or wrong answer.

My getting a mammogram in the next year or two…	Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely
28. Will detect cancer early	1	2	3	4	5	6	7
29. Will cause me pain or discomfort	1	2	3	4	5	6	7
30. Will lead me to find out that I have cancer	1	2	3	4	5	6	7
31. Will give me peace of mind	1	2	3	4	5	6	7
32. Will expose me to radiation	1	2	3	4	5	6	7

For each of the following statements (which correspond to the previous questions), please circle the
number that corresponds best with your opinion. There is no right or wrong answer.

When it comes to me getting a mammogram in the next year or two…	Extremely Bad	Quite Bad	Slightly Bad	Neither	Slightly Good	Quite Good	Extremely Good
33. Detecting cancer early is…	1	2	3	4	5	6	7
34. My experience of pain and discomfort is…	1	2	3	4	5	6	7
35. Finding out that I have cancer is…	1	2	3	4	5	6	7
36. Getting peace of mind is…	1	2	3	4	5	6	7
37. Being exposed to radiation is…	1	2	3	4	5	6	7

Section 4: Important People

For each of the following statements, please choose the answer that best describes your opinion. Please mark your answer by selecting the number that is closest to how you feel. There is no right or wrong answer. Mark Not Applicable if you have no person who meets that description.

	Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely	N/A
38. My husband/partner thinks that I should get a mammogram in the next year or two...	1	2	3	4	5	6	7	0
39. My female relative (Mother, sister, or daughter) thinks that I should get a mammogram in the next year or two...	1	2	3	4	5	6	7	0
40. My other family members think that I should get a mammogram in the next year or two…	1	2	3	4	5	6	7	0
41. My three closest friends think that I should get a mammogram in the next year or two...	1	2	3	4	5	6	7	0
42. My personal doctor thinks that I should get a mammogram in the next year or two...	1	2	3	4	5	6	7	0
43. My health insurance company thinks that I should get a mammogram in the next year or two	1	2	3	4	5	6	7	0

For each of the following statements (which correspond to the questions above), please circle the number that corresponds best with your opinion. There is no right or wrong answer**.**

When it comes to me getting a mammogram in the next year or two …	Strongly Disagree	Disagree	Slightly Disagree	Neither	Agree	Quite Agree	Strongly Agree	N/A
44. I want to do what my husband/partner thinks I should do	1	2	3	4	5	6	7	0
45. I want to do what my female relatives thinks I should do	1	2	3	4	5	6	7	0
46. I want to do what my other family think I should do	1	2	3	4	5	6	7	0
47. I want to do what my three closest friends think I should do	1	2	3	4	5	6	7	0

When it comes to me getting a mammogram in the next year or two …	Strongly Disagree	Disagree	Slightly Disagree	Neither	Agree	Quite Agree	Strongly Agree	N/A
48. I want to do what my personal doctor thinks I should do	1	2	3	4	5	6	7	0
49. I want to do what my health insurance company thinks that I should do	1	2	3	4	5	6	7	0

Section 5: Facilitators and Barriers:

For each of the following statements, please choose the answer that best describes your opinion. Please mark your answer by selecting the number that is closest to how you feel. There is no right or wrong answer.

50. I expect that I will have insurance in the next year or two.

Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely
1	2	3	4	5	6	7

51. I expect that I will have a mammogram facility close to home or work in the next year or two.

Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely
1	2	3	4	5	6	7

52. I expect that I will have enough time to get a mammogram in the next year or two.

Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely
1	2	3	4	5	6	7

53. I expect that I will be able to get convenient appointments to get a mammogram in the next year or two.

Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely
1	2	3	4	5	6	7

54. I expect that I will receive a reminder about getting a mammogram in the next year or two.

Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely
1	2	3	4	5	6	7

55. I expect that I will receive fast results after getting a mammogram in the next year or two.

Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely
1	2	3	4	5	6	7

56. I expect that I will have friendly staff and a warm environment when getting a mammogram in the next year or two.

Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither	Slightly Likely	Quite Likely	Extremely Likely
1	2	3	4	5	6	7

For each of the following statements, please choose the answer that best describes your opinion. Please mark your answer by selecting the number that is closest to how you feel. There is no right or wrong answer**.**

57. Having insurance will make it…

Extremely Hard	Quite Hard	Slightly Hard	Neither	Slightly Easy	Quite Easy	Extremely Easy
1	2	3	4	5	6	7

….for me to get a mammogram in the next year or two.

58. Having a mammogram facility close to home or work will make it…

Extremely Hard	Quite Hard	Slightly Hard	Neither	Slightly Easy	Quite Easy	Extremely Easy
1	2	3	4	5	6	7

….for me to get a mammogram in the next year or two.

59. Having enough time will make it…

Extremely Hard	Quite Hard	Slightly Hard	Neither	Slightly Easy	Quite Easy	Extremely Easy
1	2	3	4	5	6	7

….for me to get a mammogram in the next year or two.

60. Having convenient appointments will make it…

Extremely Hard	Quite Hard	Slightly Hard	Neither	Slightly Easy	Quite Easy	Extremely Easy
1	2	3	4	5	6	7

….for me to get a mammogram in the next year or two.

61. Receiving a reminder will make it…

Extremely Hard	Quite Hard	Slightly Hard	Neither	Slightly Easy	Quite Easy	Extremely Easy
1	2	3	4	5	6	7

….for me to get a mammogram in the next year or two.

62. Receiving fast results will make it…

Extremely Hard	Quite Hard	Slightly Hard	Neither	Slightly Easy	Quite Easy	Extremely Easy
1	2	3	4	5	6	7

….for me to get a mammogram in the next year or two.

63. Having friendly staff and a warm environment will make it…

Extremely Hard	Quite Hard	Slightly Hard	Neither	Slightly Easy	Quite Easy	Extremely Easy
1	2	3	4	5	6	7

….for me to get a mammogram in the next year or two.

Section 6: Cancer risk and healthcare access

In this section, you will answer some questions about risk of cancer and healthcare access.

64. Have you ever been told by a doctor, nurse, or other health professional that you had cancer?
1. Yes
2. No
3. Don't know / Not sure

65. Have healthcare professionals detected any benign (not cancerous) lump or abnormal growth in your body?
1. Yes
2. No
3. Don't know/ Not sure

66. How any members of your family (such as husband, father, mother, brother, sister, grandparents, or children) been diagnosed with cancer?
1. None
2. One
3. Two
4. Three
5. Four and more

67. How many of your friends been diagnosed with cancer?
1. None
2. One
3. Two
4. Three
5. Four and more

68. How likely is it that you will get breast cancer during your life time?
1. Extremely unlikely
2. Quite unlikely
3. Slightly unlikely
4. Neither
5. Slightly likely

6. Quite likely
7. Extremely likely

69. Do you have one person you think of as your personal doctor or healthcare provider?

1. No
2. Yes, only one
3. Yes, more than one

70. Was there a time in the past 12 months when you needed to see a doctor but could not because of time?

1. No
2. Yes
3. Don't know/ Not sure

71. Do you have any kind of healthcare coverage, including health insurance, prepaid plans such as HMOs, or governmental plans such as Medicare?

1. No
2. Yes
3. Don't know/ Not sure

72. Does your healthcare coverage cover mammograms?

1. I do not have a health care coverage
2. No
3. Yes, partially
4. Yes, fully
5. Don't know/ Not sure

73. Has there been a time when you needed to get a mammogram but could not because of cost?

1. Yes
2. No
3. Don't know / Not sure

Section 7: Healthcare provider experience and demographic items

If you have a personal doctor, please answer the next three questions about your personal doctor. If you do not have a personal doctor please answer the next three questions about the last doctor that you saw.

74. To what extent do you agree or disagree with the following statement. My doctor gives me enough time to ask questions.

Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

75. To what extent do you agree or disagree with the following statement. My doctor seems to care about me.

Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

76. To what extent do you agree or disagree with the following statement. I trust my doctor.

Strongly	Disagree	Slightly	Neither	Slightly	Agree	Strongly

Disagree		Disagree		Agree		Agree
1	2	3	4	5	6	7

77. **There has been a lot of information on mammograms in the media recently. Have you ever been confused about the guidelines on mammograms?**
    1. Yes
    2. No

78. **What is your age?**
    1. ___ years old
    2. Don't know /Not sure

79. **Which of the following would you say is your race?**
    1. White
    2. Black or African American
    3. Latino or Hispanic
    4. Asian
    5. Native Hawaiian or Other Pacific Islander
    6. American Indian or Alaska Native
    7. Multiracial
    8. Other

80. **Are you…**
    1. Married
    2. Divorced
    3. Widowed
    4. Separated
    5. Never married
    6. In a relationship but not married

81. **What is the highest grade or year of school you have completed?**
    1. Grades 1 through 8 (elementary)
    2. Grades 9 through 11 (Some high school)
    3. Grade 12 or GED (High school graduate)
    4. College 1 year to 3 years (Some college or technical school)
    5. College 4 years or more (College graduate)
    6. Graduate or professional degree

82. **Are you currently…**
    1. A Housewife
    2. Retired
    3. Self-employed
    4. Out of work for more than a year
    5. Out of work for less than a year
    6. Part-time employed
    7. Full-time employed

83. **Do you receive government assistance to purchase food items for your household (WIC, SNAP, TANF, etc)?**
    1. Yes
    2. No

84. **Has there been in a time in your life, when you did not have any kind of health care coverage?**
    1. Yes
    2. No
    3. Don't know/ Not sure

Appendix 5: Table 1: Health Issue Evidence Table: Significance of Breast Cancer

Table 1: Scope and Significance of Breast Cancer

Source	Method or information on the source	Type of information provided
CDC, 2010	- It is one of the major operating components of the Department of Health and Human Services. - Their mission statement is to collaborate to create the expertise, information, and tools that people and communities need to protect their health – through health promotion, prevention of disease, injury and disability, and preparedness for new health threats.	- Facts on breast cancer - Risk factors -Prevention methods - Symptoms - Screening - Diagnosis - Treatment
Breastcancer.org, 2010	- It is a nonprofit organization dedicated to providing the most reliable, complete, and up-to-date information about breast cancer. -Their mission is to help women and their loved ones make sense of the complex medical and personal information about breast cancer, so they can make the best decisions for their lives.	-Latest statistics on breast cancer - Latest recommendations on breast cancer screening - Analysis on pathology report and ways to manage stress - Information on various types of treatment of breast cancer and their side effects - Online support for cancer patients and survivors such as blogs, chat rooms, discussion boards - Providing booklets and brochures free of charge by mail - Latest research findings on risk factors
National Cancer Institute, 2010	- NCI is one of 27 Institutes and Centers that comprise the U.S. National Institutes of Health, which is part of the U.S. Department of Health and Human Services. - NCI's initial responsibilities include conducting and fostering cancer research; reviewing and approving grant-in-aid applications to support promising research	-Information on different types of cancer - Breast cancer treatment - Breast cancer clinical trials - Prevention methods of breast cancer - Role of genetics in breast cancer development - Statistics on breast cancer and understanding the statistics - Economic costs of breast cancer

Source	Method or information on the source	Type of information provided
	projects on the causes, diagnosis, treatment, and prevention of cancer; collecting, analyzing, and disseminating the results of cancer research conducted in the United States and in other countries.	
American Cancer Society, 2010	- It is a nationwide, community-based voluntary health organization dedicated to eliminating cancer as a major health problem. Headquartered in Atlanta, Georgia, it has 12 chartered Divisions, more than 900 local offices nationwide, and a presence in more than 5,100 communities. - Their goal is eliminating cancer as a major health problem by preventing cancer, saving lives, and diminishing suffering from cancer, through research, education, advocacy, and service	-Breast cancer treatment options - Breast cancer detailed guide - Stories of hope from breast cancer survivors - Treatment decision tool -Research studies on breast cancer treatment - Information on local ACS chapters
World Health Organization (WHO), 2009	-It is the directing and coordinating authority for health within the United Nations system. - - It is responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries and monitoring and assessing health trends.	- Statistics on breast cancer worldwide - Information on local and broad prevention interventions on breast cancer - Latest trends on breast cancer - Facts on cancer in general and ways to prevent and reduce the risk factors

Appendix 6: Table 2: Theory Evidence Table

Table 2: Theory and Reasoned Action Approach Evidence Table

Source	Methods	Findings	Other Comments
Fishbein, 2008	- This article describes the integrative model of behavioral prediction (IM). - It also addresses some criticism directed at RAA.	-Consistent with TRA, IM assumes that intentions are the immediate determinants of behaviors but it also recognizes that environmental factors and skills and abilities can moderate the intention-behavior relationship. - IM also assumes that intentions are a function of attitudes, perceived normative pressure, and self-efficacy. But it views PNB as a function of descriptive as well as injunctive norms.	N/A
Cooke & French, 2008	-Meta-analysis was used to quantify how well the TRA and TPB have predicted intentions to attend screening programs and actual attendance behavior. -Systematic literature searches identified 33 studies that were included in the review.	-Across the studies as a whole, attitudes had a large-sized relationship with intention, while SN and PBC possessed medium-sized relationships with intention. -Intention had a medium sized relationship with attendance, whereas the PBC–attendance relationship was small sized.	- Suggestions for future research emerging from these results include targeting attitudes to promote intention to screen, a greater use of implementation intentions in screening information and examining the credibility of different screening providers.
Smith-McLallen & Fishbein, 2009	-This study used the Integrative Model of Behavioral Prediction to examine differences between Blacks and Whites in the US in the degree to which attitudes, PBC, and normative pressure contribute to predicting intentions to engage in three cancer screening behaviors (mammogram, colonoscopy	-Results indicated that for Blacks intentions to engage in all behaviors were driven by PBC. - Patterns were more varied for Whites and indicated that normative pressure was a particularly important determinant of screening intentions whereas attitudes were most strongly associated with dieting intentions.	- Results suggest that interventions targeting these behaviors should be tailored by behavior and by ethnicity.

Source	Methods	Findings	Other Comments
	and PSA test) and three healthy lifestyle behaviors (controlling ones diet to lose weight, eating fruits and vegetables and exercising regularly).		

Appendix 7: Table 3: Large Scale Evidence Table

Table 3: Research studies examining the determinants of getting a mammogram among American women (2000-2010)

Num	Author/Date	Purpose	Sample	Race	Age	Theory
1.	Borrayo et al., 2000	To examine the determinants of getting M among Mexican-born and US born women	179 American-Mexicans	57% US-born 43 Mexican-born	50 and older	HBM
2.	Clark et al., 2000	Examine factors (including smoking) that determine M	1577	NR	42-75	No
3.	Crump e al., 2000	Identify barriers to M use among low-income AA	574	100 AA	40 and older	No
4.	Cumming et al., 2000	Identify predictors of screening M	843 rural women	52 W 48 AA	50 and older	No
5.	Hawley et al., 2000	Role of physician recommendation in M rate	1301	53 W 47 NW	52 and older	HBM
6.	Kelaher et al., 2000	Impact of medicare policy on M	2419	Both AA and WW	60 and older	No
7.	Rawl et al., 2000	To examine the impact of race and age on M screening	648	71.5% W 28.5% AA	50-85 years old	HBM
8.	Adams et al., 2001	To identify barriers to M for AA women	164	100% AA	35-86	HBM
9.	Coleman et al., 2001	To study racial differences in breast cancer screening and effects of medicare funding on M	13,545	Majority W	65-74	No
10.	Husaini et al., 2001	To examine the predictors M among AA	364	100 AA	40 and older	No
11.	Murabito et al., 2001	Predictors of M use	691	NR	40-79	No
12.	O'Malley et al., 2001	Physician rec to M and race, SES	1933	55 W 45 AA	52 and older	No
13.	Valdez et al., 2001	Factors of M among low-income, low-educated Latinas	1197	100 H	40 and older	No
14.	Coughlin et al., 2002	Brest cancer rates and determinants of M among Hispanic women	7253	100 H	50 and older	No
15.	Katapodi et al., 2002	Relationship of social support and M among low-income	833 low income women	34 W 28 AA 38 H	19-99	Social Support
16.	Messina et al., 2002	Identify benefits and barriers of getting M among smokers and non-smokers	1440	NR	50 and older	No
17.	Tu et al., 2002	Examine knowledge and practices of M among Chinese American women no history	350	100 Chinese-Americans	40 and older	No
18.	Bowie et al., 2003	To identify determinants of intention to get a repeated M	150	100 AA	40-49	TPB
19.	Caplan et al., 2003	Examine M among older women	949	88.7 W 5.1 AA	50 to 85	No

Num	Author/Date	Purpose	Sample	Race	Age	Theory
20.	Finney et al., 2003	Factors influencing M as well as family history	310	93 W 7 AA	40 and older	HBM
21.	Harris et al., 2003	***Identify racial diff in M and knowledge	4500	86.2 W 13.8 AA	40 and older	No
22.	Harrison et al., 2003	***Factors impacting M in older women	10000	91 W 9 AA	65 and older	No
23.	Jones et al., 2003	*Determinants of M in low income elderly AA	214	100 AA	65 and older	No
24.	Lukwago et al., 2003	*Sociocultural correlates of M in urban AA women	1241	100 AA	18-65	No
25.	Mayne et al., 2003	***Predictors of initial and repeat M in rural areas	830	51 W 49 AA	50 and older	No
26.	Rahman et al., 2003	***To explore the pattern of adherence for M	22778	91 W 2.1 AA 4.9 H	40 and older	No
27.	West et al., 2003	*To examine breast cancer attitudes and practices among rural AA women aged 50 or older who had not had a mammogram in the last 2 years	320	91% AA	50 and older	No
28.	Abraido-lanza, 2004	*To examine if there are differences between Latino and Non-Latino and impact of socio-demographic and health care variables on M	11,744	95.4 Non-Latina 4.6 Latina	40 years and older	No
29.	Blanchard et al., 2004	*To describe patterns of screening use among women who were examined at a large screening and diagnostic service and determinants of getting M	72,417	82.33 W 4.48 AA	Aged 40 and older	No
30.	Calvocoressi et al., 2004	*Influence of perceived susceptibility to breast cancer to M	1279	60.6 W 39.4 AA	40-79	HBM
31.	Coughlin et al., 2004	*Demographic and socioeconomic factors that impact M	10645	77 W 14 AA 9 H	40 and older	No
32.	De Alba et al., 2004	*Factors (including citizenship) that impact M among US-born and Non-US born	6,320	Hispanic and Asian Majority	18 and older	No
33.	Levy-Storms et a., 2004	***Identify predictors of nonadherence to M in older women	499	54 W 11 AA 24 H	60 to 84	TTM and adherence model
34.	Wee at al., 2004	Factors (including obesity) that predict M	5277	73.5 W 26.5 AA	50-75	No
35.	Davis et al., 2005	***Reasons for non-adherence to M for AA women who had not received M in last year	91	100 AA	40-84	No

Num	Author/Date	Purpose	Sample	Race	Age	Theory
36.	Gross et al., 2006	*Association of perceived risk, actual risk and M	6002	70.6 W 1.1 AA 12.8 H	45-75	No
37.	Palmer et al., 2005	*Correlated of M in Hispanic women	200	100 H	50 or older	HBM
38.	Steele & Porche, 2005	*To test the TPB for M intention in rural women	302	61% AA	40-74	TPB
39.	Young et al., 2005	***Barriers of M in older minority women	405	100 AA	60 and older	No
40.	Darnell et al., 2006	*Determinants of M among AA and L in faith-based M program	1115	64 AA 36 H	40 an d older	HBM
41.	Garbers et al., 2006	*Impact of US citizenship and other factors on M (AA and Caribbean)	300	49.3 AA 50.7 C	40 an d older	No
42.	Ferrante et al., 2006	*Relationship between obesity and M	1809	10.1 W 36.2 AA 50.3 H	40 and older	No
43.	Leong-Wu et al., 2006	*Correlates of getting M in low-income Asian Americans	1695	100 Asian American	40 and older	Yes (Behavioral model of health services)
44.	Buki et al., 2007	*Identify predictors of M in uninsured Latina women	467 uninsured Latina women	94% born outside of US	40 to 87	No
45.	Dailey et al., 2007	***SES predictors of nonadherence to M	1451	61 W 39 AA	40-79	No
46.	Nash et al., 2007	*Describe factors impacting M	2059	50 W 23.9 AA 18.3 H	50 and older	No
47.	Coughlin et al., 2008	*Factors associated with cervical cancer screening and M	91492	89.3 W 9 AA	40 and older	No
48.	Lopez-McKee et al., 2008	*Factors affecting repeat M among low-income Mexican Americans	68	100 H	50-64	TPB
49.	Tejeda et al., 2009	*Determinants of M among f His and Non-his W in rural area	538	71.7 W 28.3 H	40 and older	Precede-Proceed model
50.	Malin et al., 2010	***Determinants of M after an abnormal M in underserved women	76	48 W 38 AA	30 and older	HBM

Note: * means first time M; *** Multiple;

Appendix 8: Table 4: Select Studies of TRA and TPB Evidence Table

Table 4: Select Evidence Table: Determinants of getting a mammogram among women in the US by using TRA/TPB

Citation/Purpose	**Population/Behavior**	**Methods:** **1. Quals/quant** **2. Sample (Size, race)** **3. Representative** **4. Data collection** **5. Theory (Constructs)** **6. DV**	**Finding on Determinants** **-Intrapersonal** **-Demographics** **-Environmental**	**Comments**
Bowie et al., 2003 Purpose: Identify determinants of intention to repeat M among AA	-AA women between the ages of 40 to 49 who had received M before -Getting a repeat M	1. Quantitative 2. 150 women Mean: 45.2 (40-49) Race: 100% AA 3. Non-representative 4.Phone interview 5. TPB (Added variables: education, age, income, insurance, being employed, occupation, positive previous experience) 6. DV: Intention to get a M	***Intrapersonal:*** **-Significant determinants:** ATT, PBC **Non-significant:** SN ***Demographics:*** **Significant:** Being employed Education **Non-significant:** Age Occupation Income ***Environmental:*** **Significant:** Positive previous experience Lack of trust in health care provider **Non-significant** Household income Health insurance Anxiety Lack of trust in health care system	-Rate of M: 100% because it was part of the inclusion criteria. -They did an elicitation first. -They had good measures in this study. -They performed multiple regression.
Burnett et al., 1995 Purpose: to examine the	- Uninsured women over age 40 in DC	1. Quantitative 2. 339	***Intrapersonal:*** **-Significant determinants:** ATT, SN, previous personal history of	-Rate of M:100% part of inclusion criteria

Citation/Purpose	**Population/Behavior**	**Methods:** **1. Quals/quant** **2. Sample (Size, race)** **3. Representative** **4. Data collection** **5. Theory (Constructs)** **6. DV**	**Finding on Determinants** **-Intrapersonal** **-Demographics** **-Environmental**	**Comments**
determinants of breast cancer screening among underserved women in DC	-Getting a M	Mean: 51 (40-77) Race: 8% W, 90% AA 3. Non-representative 4. In-person interview 5. TRA (Uncaring healthcare professions, age, education, income, race, marital status, time, personal history of cancer) 6. DV: intention to have a M in the next 2 years	cancer **Non-significant:** N/A ***Demographics:*** **Significant:** N/A **Non-significant:** Income Age Education Marital status ***Environmental:*** **Significant:** Uncaring healthcare professionals Taking too much time **Non-significant** N/A	-R^2 = 11.5%
Michels et al., 1995 Purpose: Identify barriers to getting a M in a military beneficiary population	-Women eligible for military health care over the age of 40 -Getting a M	1. Quantitative 2. 309 women Mean: 65 (41-89) Race: 72.4% W, 10.7% AA, 15.9% ASI, 3.7% H 3. Representative based on zip codes 4. Mailed questionnaires 5. TRA (education, income, perceived risk, doctor's recommendation,	***Intrapersonal:*** **-Significant determinants:** Perceived risk of breast cancer, NB (doc's recommendation), Attitude, SN. **Non-significant:** N/A ***Demographics:*** **Significant:** Income Education **Non-significant:** Age, race, insurance	-Rate of M: 21.5% -R2 was 0.23.

Citation/Purpose	**Population/Behavior**	**Methods:** **1. Quals/quant** **2. Sample (Size, race)** **3. Representative** **4. Data collection** **5. Theory (Constructs)** **6. DV**	**Finding on Determinants** **-Intrapersonal** **-Demographics** **-Environmental**	**Comments**
		6. DV: Intention to get a M	***Environmental:*** **Significant:** Cost	
Montano & Taplin, 1991 Purpose: to test an expanded TRA to predict mammography participation	-Women above the age of 40 -Behavior: "get a M done this year"	1. Quantitative 2. 638 women aged 40 and older (other demographics not reported) 3. Non-representative (women who went to a HMO) 4. Mailed questionnaire 5. Expanded TRA (Affect, facilitating conditions, habit, race, marital status, education, religion, and income. Some health-related behaviors: seat belt use, number of visits to a health care provider in the past year, and number of Pap smears in the past four years, perceived susceptibility, severity, and efficacy. 6. DV: "How likely it is that you would get a mammogram done this year at this HMO" AND "Mammography participation"	***Intrapersonal:*** **-Significant determinants:** ATT, affect, SN. P Susceptibility, P. severity (from HBM) **Non-significant:** Habit ***Demographics:*** **Significant:** Income Education Marital status Number of pap tests Seat belt use **Non-significant:** Age # of health care visits per year Race Religion ***Environmental:*** **Significant:** Facilitating conditions.	-Rate of M: 52% -The expanded TRA model explained 39% of the variance in women's intentions. -Facilitating conditions: transportation and time of travel.
Montano et al., 1997 Purpose: to identify factors impacting M	-Low-income women 50 or older from an inner city public hospital	1. Quantitative 2. 361 women Age range: 50-69	***Intrapersonal:*** **-Significant determinants:** Affect, ATT, SN, NB	-Rate of M: 66% -They did an elicitation to develop

Citation/Purpose	**Population/Behavior**	**Methods:** **1. Quals/quant** **2. Sample (Size, race)** **3. Representative** **4. Data collection** **5. Theory (Constructs)** **6. DV**	**Finding on Determinants** **-Intrapersonal** **-Demographics** **-Environmental**	**Comments**
among low-income women in US	-Getting a M	Race: 47% W, 31% AA, 10% ASI, 3% H 3. Non-representative 4. Mailed surveys 5. Expanded TRA (Affect and facilitators/constraints added to SN, BB, ATT) 6. DV: Intention to get a mammogram	**Non-significant:** N/A ***Demographics:*** **Significant:** N/A **Non-significant:** N/A ***Environmental:*** **Significant:** Facilitators (doctor's order, transportation, appointment available)	the quantitative survey. -The model explained 54% of variance in intention.
Steele & Porche, 2005 Purpose: To test TPB to predict M intention among rural women in Southeastern Louisiana.	-Women living in rural southeastern Louisiana w/o a prior history of breast cancer -Getting a mammogram	1. Quantitative 2. 302 women Mean: 53.7 (40-74) Race: 61% AA 3. Non-representative: recruited from churches, health centers, hospitals 4. Questionnaire in person 5. TPB (Int, Att, SN, PBC, BB, NB, CB) 6. DV: Intention to get a M	***Intrapersonal Determinants:*** **Significant:** -ATT, SN and PBC -PBC was the strongest predictor of intention (then intention then SN) -Behavioral belief , normative belief, and control belief were all significant **Non-significant:** N/A ***Demographics:*** N/A ***Environmental:*** N/A	-Rate of M: nor reported -There was no mention of measures. -They used path analysis and multiple regression

Appendix 9: Recruitment flyers

Participate in a 15-Minutes Long Survey on Mammograms

Get a $5 Subway or Starbucks Gift Card

WHO IS ELIGIBLE?

1. Women living in southern Indiana
2. Between the ages of 40 and 75
3. Have had at least ONE mammogram before

HOW TO PARTICIPATE?

Go to "Mammogramstudy.com" either at home or using the computers in the waiting area

Take the survey and get a gift card in your email or from the receptionist

Goal of the study: This study is being conducted by Indiana University Department of Applied Health and has been approved by the IRB. The goal is to identify the factors women in southern Indiana to get a mammogram. The results of the study will help appropriate and effective interventions to reduce the mortality rate from breast cancer.

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Alireza Geshnizjani, PhD, MPH
CURRICULUM VITAE

A. CONTACT INFORMATION

Home Address: 800 N Union Street, Apt # 204
Bloomington, IN 47408

Work Address: HPER 116
1025 East Seventh Street
Indiana University
Bloomington, IN 47405

Phone: (317) 450-2276
E-Mail: ageshniz@indiana.edu

B. EDUCATIONAL BACKGROUND

8/2008-7/2011 **Doctorate of Philosophy**

Major: Health Behavior
Minors: Inquiry Methodology; Statistics
Focus: Theories of Health Behaviors
Dissertation: *Identifying Determinants of Getting a Mammogram among Women in Rural Areas: An Application of Reasoned Action Approach*
Current GPA: 4.0
Department of Applied Health Sciences
School of Health, Physical Education, and Recreation
Indiana University, Bloomington, IN

8/2006-05/2008 **Master of Public Health**
Concentration: Public Health Leadership
GPA: 3.97
Department of Applied Health Sciences
School of Health, Physical Education, and Recreation
Indiana University**,** Bloomington, IN

8/2004-05/2006 **Master of Science**
Major: Biology
Focus: Molecular Biology
GPA: 3.86
Department of Biology
School of Health, Physical Education, and Recreation
Indiana University Purdue University, Indianapolis, IN

8/2001-5/2004 **Bachelor of Science**
Major: Biology
GPA: 3.99
Department of Biology
Indiana University
Bloomington, IN

C. PROFESSIONAL PUBLIC HEALTH POSITIONS

2009-Present **Committee Member Strategic Planning Committee**
School of Health, Physical Education and Recreation
Indiana University

2009-Present **MPH Advisory Board Member**
Applied Health Science Department
School of Health, Physical Education and Recreation
Indiana University, Bloomington, IN

2008-Present	**Career Center Coordinator** Applied Health Science Department School of Health, Physical Education and Recreation Indiana University, Bloomington, IN
2008-2009	**Public Health Intervention and Evaluation Intern** Department of Health & Wellness, Indiana University Health Center Indiana University, Bloomington, IN
Summer 2007 & 2008	**Diabetes Center Education Coordinator** Clayton Endocrinology Saint Louis, MO
2008-Present	**Sexual Assault Awareness Educator** Sexual Assault Crisis Services Indiana University Health Center, Indiana University, Bloomington, IN
2006-2008	**Sexual Assault Awareness Educator** Sexual Assault Crisis Services Office for Women's Affairs Indiana University, Bloomington, IN
2002-2004	**Health Educator for Diabetes Patients** Terre Haute Diabetes Center Terre haute, Indiana

D. ACADEMIC APPOINTMENTS AND AFFILIATIONS

1/2011-5/2011 **Instructor for Personal Health**
Department of Applied Health Science
Indiana University, Bloomington, IN

8/2010-12/2010 **Co-Teaching for Models and Theories of Health Behavior**
Graduate level course
Department of Applied Health Science
Indiana University, Bloomington, IN
(Course Co-instructor: Dr. Susan Middlestadt)

2008-Present **Research Project Coordinator**
Middlestadt Research Group
Department of Applied Health Science
Indiana University, Bloomington, IN

Summer I 2010 **Instructor for Program Planning**
Department of Applied Health Science
Indiana University, Bloomington, IN

1/2010-5/2010 **Instructor for Program Planning**
Department of Applied Health Science
Indiana University, Bloomington, IN

8/2009-12/2009 **Instructor for Personal Health**
Department of Applied Health Science
Indiana University, Bloomington, IN

8/2009-12/2009	**Co-Teaching for Models and Theories of Health Behavior** Graduate level course Department of Applied Health Science Indiana University, Bloomington, IN (Course Co-instructor: Dr. Michael Reece)
Summer II 2009	**Instructor for Personal Health** Department of Applied Health Science Indiana University, Bloomington, IN
Summer I 2009	**Instructor for Program Planning** Department of Applied Health Science Indiana University, Bloomington, IN
1/2009-5/2009	**Instructor for Personal Health** Department of Applied Health Science Indiana University, Bloomington, IN
1/2009-5/2009	**Associate Instructor for Intervention Design** Graduate level course using Intervention Mapping Department of Applied Health Science Indiana University, Bloomington, IN (Course Instructor: Dr. Susan Middlestadt)
8/2008-12/2008	**Instructor for Personal Health** Department of Applied Health Science Indiana University, Bloomington, IN

8/2008-12/2008 **Associate Instructor for Models and Theories of Health Behavior**
Graduate level course
Department of Applied Health Science
Indiana University, Bloomington, IN
(Course Instructor: Dr. Michael Reece)

1/2008-5/2008 **Graduate Teaching Assistant for Epidemiology**
Department of Applied Health Science
Indiana University, Bloomington, IN
(Course Instructor: Dr. Leila Dabbagh)

1/2008-5/2008 **Graduate Teaching Assistant for Drug Use in American Society**
Department of Applied Health Science
School of Health, Physical Education and Recreation
Indiana University, Bloomington, IN
(Course Instructor: Kathy Finley)

8/2007-12/2007 **Associate Instructor for Models and Theories of Health Behavior**
Graduate level course
Department of Applied Health Science
Indiana University, Bloomington, IN
(Course Instructor: Dr. Susan Middlestadt)

8/2007-12/2007 **Graduate Teaching Assistant for Stress Management**
Department of Applied Health Science
Indiana University, Bloomington, IN
(Course Instructor: Andrea Alexander)

1/2007-5/2007	**Graduate Teaching Assistant for Nature of Cancer** Department of Applied Health Science Indiana University, Bloomington, IN (Course Instructor: Dr. Katherine Sherwood)
8/2006-12/2006	**Graduate Teaching Assistant for Human Sexuality** Department of Applied Health Science Indiana University, Bloomington, IN (Course Instructor: Dr. Katherine Sherwood)
1/2005-5/2005	**Instructor** Animal Biology Department of Biology, Indiana University Purdue University, Indianapolis, IN
8/2004-12/2004 8/2005-12/2005	**Instructor** Human Anatomy and Physiology Department of Biology Indiana University Purdue University, Indianapolis, IN
8/2003-5/2004	**Undergraduate Teaching Assistant** 300-Level Genetic Course for two different courses Department of Biology Indiana University, Bloomington, IN
8/2001-5/2003	**Research Assistant** Dr. Cheng Kao Virology Lab Department of Biology Indiana University, Bloomington, IN

E. <u>FUNDING AWARDS:</u>

Spring 2011	**James W. Crowe Scholarship Award,** School of Health, Physical Education and Recreation, Indiana University, $1000.00.
Spring 2011	**Principle Investigator**, Identifying the Determinants of Getting a Mammogram among Women in Rural Areas. School of HPER Research Fellowship. School of Health, Physical Education and Recreation, Indiana University, $1000.00.
Spring 2011	**Travel Grant-in-Aid**. University to cover travel costs associated with presenting at academic conferences. Applied Health Science Department, Indiana University, $600.00.
2010-2011	**Co-Principle Investigator**, Attitudes and Beliefs towards Sexual Assault Post Taking a class on Sexual Violence. School of HPER Research Fellowship. School of Health, Physical Education and Recreation, Indiana University, $2000.00.
Spring 2011	**School of HPER Research Fellowship.** School of Health, Physical Education and Recreation, Indiana University, $1000.00.
Fall 2010	**Applied Health Science Travel Grant-in-Aid**. University to cover travel costs associated with presenting at academic conferences. Indiana University, $600.00.
Fall 2010	**HPER Travel Grant-in-Aid**. University to cover travel costs associated with presenting at academic conferences. School of Health, Physical Education, and Recreation, Indiana University, $400.00.
Fall 2010	**School of HPER Research Fellowship**. School of Health, Physical Education and Recreation, Indiana University, $1000.00.
Fall 2010	**International Services Graduate Student Awards.** Indiana University Bloomington, $2000.00.
Summer 2010	**Applied Health Science Fellowship Award.** Indiana University, $666.00.

Spring 2010	**School of HPER Research Fellowship.** School of Health, Physical Education and Recreation, Indiana University, $750.00.
Fall 2009	**School of HPER Research Fellowship.** School of Health, Physical Education and Recreation, Indiana University, $750.00.
2008-2009	**Principle Investigator**, Acceptability of HPV Vaccination among College Women. School of HPER Research Fellowship. School of Health, Physical Education and Recreation, Indiana University, $2000.00.
Spring 2009	**Applied Health Science Teaching Scholarship.** Indiana University, $2000.00.
January 2009	**HPER Scholarship Grant.** School of Health, Physical Education and Recreation, Indiana University, $2000.00.
Spring 2009	**School of HPER Research Fellowship.** School of Health, Physical Education and Recreation, Indiana University, $1250.00.
Fall 2008	**Applied Health Science Travel Grant-in-Aid**. University to cover travel costs associated with presenting at academic conferences. Indiana University, $500.00.
Fall 2008	**School of HPER Research Fellowship.** School of Health, Physical Education and Recreation, Indiana University, $1250.00.
Fall 2008	**Office of Women's Affairs Leadership Award.** Office of Women's Affairs, Indiana University, $300.00.
Fall 2007	**Statistics & Evaluation Consultant**, Evaluation of the Tobacco Free Youth Program 7th grade central Indiana middle schools. Ruth Lilly Health Education Center. Indianapolis, Indiana, $5000.00. (Principal Investigator: Dr. Catherine Sherwood).

Fall 2007 **Consultant, Bloomington Hospital of Orange County community health needs assessment.** Indiana State Department of Health, $5000.00. (Principal Investigator: Dr. Catherine Sherwood).

F. PEDOGOGICAL Development

9/2008-Present **C589: Models and Theories of Health Behavior Lab**
Responsible for the re- design, and continued development of this course

G. PUBLICATIONS:

Refereed Research Publications:

Torabi, M.R., & **Geshnizjani, A**. (2009). Major Public Health Trends and Issues: Implications for ICHPER-SD. Proceedings of the International Council for Health, Physical Education, Recreation, Sport and Dance Europe Regional Congress, Antalya, Turkey, pp. 758-767.

Geshnizjani, A., Torabi, M. R., & Jozkowski, K. N. (2011). A review of theory-based HIV prevention interventions: 2000-2010. *Health Education Monograph Series*, 28(2), 25-38.

Middlestadt, S., Sheats, J., **Geshnizjani, A**., Sullivan, P., Arvin, C. (2010). Factors Associated with Participation in Worksite Wellness Programs: Implications for Increasing Willingness Among Rural Service Employees. Health Education & Behavior. Accepted for Publication.

Geshnizjani, A., Jozkowski, K., & Middlestadt, S.E. (under review). Underlying Determinants Influencing Female College Students' Decision to go to the Doctor to get the HPV Vaccine: A Salient Belief Item Elicitation Analysis. *Journal American College Health.*

Jozkowski, K., **Geshnizjani, A.**, & Middlestadt, S.E. (in progress). Health seeking behaviors: What role do the providers play in recommending the HPV vaccine? *Qualitative Health Research.* (Expected submission date: May 2011)

Geshnizjani, A., & Middlestadt, S.E. (in progress). Utilizing structural equation modeling in examining determinants of eating breakfast among college students: an application of Reasoned Action Approach. *Health Education and Behavior*. (Expected submission date: May 2011)

Torabi, M.R., Thiagarajah, K., & **Geshnizjani, A.** (in progress). Examining the relationship between nutrition knowledge and eating behaviors among college students in the United States. Health Educator. (Expected submission date: July 2011)

Jozkowski, K., & **Geshnizjani A**. (in progress). Evaluation of a sexual violence course in preventing sexual assault among college students. *Violence Against Women*. (Expected submission date: June 2011)

Geshnizjani, A., Jozkowski, K., & Middlestadt, S.E. (in progress). Determinants of getting the HPV vaccine among college females: An application of the Reasoned Action Approach. *Journal of American College Health.* (Expected submission date: August 2011)

Executive Reports:

Geshnizjan, A., Sherwood, C., & Weatcraft, M. (2007). Evaluation of the Tobacco Free Youth Program 7th grade central Indiana middle schools. Ruth Lilly Health Education Center. Indianapolis, Indiana.

Geshnizjan, A., Sherwood, C., & Weatcraft, M. (2007). Evaluation of the Up in Smoke Program central Indiana High Schools 2006-2007 school year. Ruth Lilly Health Education Center. Indianapolis, Indiana.

Sherwood, C., Lorenzen-Huber, L., & **Geshnizjani, A.** (2007). Bloomington Hospital of Orange County community health needs assessment.

H. PRESENTATIONS:

Refereed Presentations:

Thiagar, K., Torabi, M., Geshnizjani, A. (July 2011). Nutrition knowledge among college students in the United States. Paper presented at the Society for Nutrition Education Annual Conference, Kansas City, MO.

Geshnizjani, A., Jozkowski, K., & Torabi, M. (2011, April). The role of theory in HIV prevention interventions: A comprehensive evaluation study. Paper presented at the Rural Center (RCAP) for HIV/STD Prevention Conference, Bloomington, Indiana.

Jozkowski, K., **Geshnizjani, A**. (2011, March). Sexual violence in the college culture: evaluating an alternative approach to sexual assault prevention education. Paper presented at the Association of Women in Psychology, Philadelphia, PA.

Geshnizjani, A., Jozkowski, K., & Middlestadt, S. (2010, November). An ounce of pain in your pocket is worth a pound of prevention: Utilizing Theory of Planned Behavior to understand HPV vaccination among college females. Paper presented at the annual national meeting of the American Public Health Association, Denver, Colorado.

Jozkowski, K**.** & **Geshnizjani, A**. (2010, November). When Does No Really Mean No? Sexual Violence in the College Culture: An Innovative Conceptualization of Sexual Assault Prevention Education. Paper to be presented at the annual meeting of the Center for Family Life Education Sex Education Conference, Somerset, NJ.

Macy, J., **Geshnizjani, A.**, & Middlestad, S. (2010, November). Confirming the importance of social norms in smoking cessation behavior**.** Paper presented at the annual national meeting of the American Public Health Association, Denver, Colorado.

Jozkowski, K., **Geshnizjani, A**., & Middlestadt, S. (2010, November). Too busy for their health? Understanding healthcare providers' role in increasing HPV vaccination among college female students. Paper to presented at the annual national meeting of the American Public Health Association, Denver Colorado.

Swanson, J., Middlestadt, S., Wang, C., Pelto-Wheeler, S., Sheats, J., Stevenson, L., Sullivan, M., Nana, K., & **Geshnizjani, A.** (2008, October). Salient beliefs underlying willingness to participate in worksite wellness programs among rural employees. Presented at the annual national meeting of the American Public Health Association in San Diego, CA.

Sherwood-Puzzello, C., Cook, L., Daugherty, A., **Geshnizjani, A**., Ickes, N., & Meleski, R. (2007, November). Rural health in the Heartland: An assessment of access to health care, health status indicators, health behaviors, and health literacy among residents in a rural Indiana county. Presented at the annual national meeting of the American Public Health Association in Washington DC.

Sherwood-Puzzello, C., Cook, L., Daugherty, A., **Geshnizjani, A**., Ickes, N., & Meleski, R. (2007, May) Collaboration and Community Participation: Essential Requirements for Identifying Health Needs in Rural Indiana. Presented at the annual meeting of the Indiana Public Health Association, Bloomington, Indiana.

Invited presentations**:**

Geshnizjani, A. (2011, February). Health behavior change. Presented at Health Promotion and Wellness Department in State University of New York, Oswego, NY.

Geshnizjani, A. (2011, February). Curriculum development in interdisciplinary heath science courses. Presented at Center for Learning Innovation in University of Minnesota, Rochester, MN.

Geshnizjani, A. (2011, February). Health belief model and behavior change among college students. Presented at Department of Health, Safety, and Environmental Health Sciences in Indiana State University, Terre Haute, IN.

Geshnizjani, A. (2011, March). Program planning and health behavior change. Presented at the Department of Community Health in University of Maine, Farmington, ME.

Geshnizjani, A. (2011, March). Health behavior theories: intervention and evaluation. Presented at the College of Education and Health Professions in Columbus State University, Columbus, GA.

Geshnizjani, A. (2011, March). Impact of health behavior theories on health services research. Presented at the Department of Health Services in Saint Joseph's University, Philadelphia, PA.

I. RESEARCH-RELATED CONSULTANCIES AND OTHER EFFORTS:

2007-2008 **Statistics & Evaluation Consultant**, Evaluation of the Tobacco Free Youth Program 7th grade central Indiana middle schools. Ruth Lilly Health Education Center. Indianapolis, Indiana.

2006-2008 **Consultant, Bloomington Hospital of Orange County community health needs assessment.** Indiana State Department of Health.

J. COURSES TAUGHT:

Course	*Average Enrollment*	*Semesters Taught*
Models and Theories of Health Behavior (Graduate Level) Department of Applied Health Science, Indiana University	60	4
HPER C403: Program Planning (300-level course) Department of Applied Health Science, Indiana University	50	3
HPER H263: Personal Health Department of Applied Health Science, Indiana University	80	5
Animal Biology Department of Biology, IUPUI	40	1
Human Anatomy Department of Biology, IUPUI	50	2
Intervention Design by Intervention Mapping (Graduate Level) Department of Applied Health Science, Indiana University	20	1

K. MASTER AND UNDERGRADUATE STUDENT RESEACRH MENTORING:

Year	*Project*	*Student Level*	*Number Enrolled*	*Semester(s) Mentored*
2010-2011	**Research Coordinator** Data collection and entry	Masters	2	2 each
2009-2010	**Research Coordinator** Data collection and analysis	Masters	1	1
		Undergrad	2	2 each
2010-present	**Research Coordinator** Data analysis and presentation	Masters	9	2

L. RESEARCH-RELATED SERVICE TO THE PROFESSION

2010 **Conference Moderator**
American Public Health Association

2009-Present **Abstract Reviewer**
The American Public Health Association Student Assembly

2007 **Conference Moderator**
Indiana Public Health Association

2007 **Conference Moderator**
The Rural Center for AIDS Prevention, National Conference

Professional Organizations:

American Public Health Association

Indiana Public Health Association

Services to the Department, School, and University:

2011- Present **Public Health Advisory Board**
School of Health, Physical Education and Recreation
Indiana University

2009-2011 **MPH Advisory Board**
Department of Applied Health Science
Indiana University

2009-Present **Teaching Observer & Evaluator**
Evaluating first year PhD students teaching to provide feedback
Department of Applied Health Science
Indiana University

2009-Present **Committee Member Strategic Planning Committee**
Health, Physical Education and Recreation
Indiana University

2006-Present **Guest Lecturer**
Department of Applied Health Science
Indiana University

M. AWARDS AND HONORS:

2006-Present	**Outstanding Dean's List Student** Department of Applied Health, Indiana University
2007-Present	**Eta Sigma Gamma Honors Society** Indiana University
2008	**Office of Women's Affairs Leadership Award** Office of Women's Affairs, Indiana University
2004-2006	**Outstanding Dean's Student Award** Department of Biology, IUPUI
2004	**Outstanding Undergraduate Teaching Instructor** Department of Biology, Indiana University
2003	**Community Leadership Scholarship Award** RPS, Indiana University
2001-2004	**Outstanding Dean's Student Award** Department of Biology, Indiana University
2000-2001	**Dean's List** Department of Life Sciences, Indiana State University

N. REFERENCES

Primary References

Dr. Mohammad Torabi
Interim Dean, School of Health, Physical Education & Recreation
Chancellor's Professor, Department of Applied Health Science
Indiana University
Email: torabi@indaina.edu
Phone: (812) 855-3627

Dr. Susan Middlestadt
Associate Professor, Department of Applied Health Sciences
School of Health, Physical Education & Recreation
Indiana University
Email: semiddle@indiana.edu
Phone: (812) 856-5768

Dr. Catherine Sherwood-Laughlin MPH
Assistant Department Chair
Director, MPH Program
Executive Director, Office of Community Health Engagement
Associate Clinical Professor, Department of Applied Health Science
School of Health, Physical Education & Recreation
Email: csherwoo@indiana.edu
Phone: (812)-855-2673

Additional References

Ms. Carol McCord MSW
Associate Dean of Student Affairs
Division of Student Affairs
Email: camccord@indiana.edu
Phone: (812) 855-8187