

# The Effects of Standard Care Counseling or Telephone/In-Person Counseling on Beliefs, Knowledge, and Behavior Related to Mammography Screening

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**Purpose/Objectives:** To determine the most effective methods of increasing mammography adherence while also considering ease of intervention delivery in evolving healthcare systems.

**Design:** Experimental.

**Setting:** Women from a health maintenance organization and a large general medicine practice.

**Sample:** Women 50–85 years of age who had not had breast cancer and did not have a mammogram within the last 15 months.

**Methods:** Once consent and baseline information were obtained, women were randomized to receive in-person, telephone, or no mammography counseling.

**Main Research Variables:** Mammography adherence, perception of susceptibility to breast cancer, and benefits, barriers to, and knowledge of mammography.

**Findings:** Compared to standard care, telephone counseling was more than twice as effective at increasing mammography adherence, whereas in-person counseling resulted in almost three times the mammography adherence postintervention. Both telephone and in-person counseling are successful in changing perceived susceptibility, knowledge, barriers, and benefits.

**Conclusion:** Both telephone and in-person counseling interventions were successful in changing beliefs, which, in turn, increased mammography adherence.

**Implications for Nursing Practice:** Interventions based on altering beliefs are effective for increasing mammography adherence.

## Key Points . . .

- Cost-effective methods to promote mammography screening in age-appropriate women are needed.
- Both telephone and in-person counseling can be effective in increasing perceived susceptibility to breast cancer and perceived benefits of mammography as well as decreasing perceived barriers to mammography.
- Both telephone and in-person counseling are effective means of increasing knowledge about mammography.
- Telephone counseling was twice as effective as standard care in increasing compliance, whereas in-person counseling was almost three times as effective.

of women do not have consistent yearly mammograms (Massachusetts Medical Society, 1998). Healthcare professionals need to target those women who are noncompliant with yearly screening.

## Theoretical Framework

The counseling intervention reported in this article builds upon the previous work of the principal investigator and is based on the Health Belief Model (HBM) (Janz & Becker, 1984) as well as Prochaska and DiClemente's Transtheoretical Model (1984). According to the HBM,

Several prospective randomized studies have established a decrease in mortality for women between the ages of 50–69 (Anderson et al., 1988; Fletcher, Black, Harris, Rimer, & Shapiro, 1993; Roberts et al., 1990; Shapiro, 1989; Shapiro, Venet, Strax, Venet, & Roeser, 1982) who have received a mammogram. Based on these studies, the National Cancer Institute and the American Cancer Society have recommended annual mammography for women age 50 and older (Leitch et al., 1997). Although the majority of women in the United States have had at least one mammogram, more than 50%

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behavior is related to context-specific beliefs and knowledge. The Transtheoretical Model defines behavior change as a series of sequential stages. The degree of readiness to take behavioral action is operationalized by classifying women as precontemplators, contemplators, relapse precontemplators, or relapse contemplators. Precontemplators were women who had never had a mammogram and were not thinking about the procedure. Contemplators had not had a mammogram but were considering action in the next six months. Relapse precontemplators had received a previous mammogram but were not current and not thinking about getting one. Relapse contemplators had received a previous mammogram, were not current, but were thinking about getting one in the next six months.

## Background

A need remains for testing interventions that promote annual mammography adherence (Rimer, 1994). For the most part, interventions aimed at the individual have been based upon health behavior theories such as HBM (Janz & Becker, 1984), the Theory of Reasoned Action (Ajzen & Fishbein, 1980), and the Transtheoretical Model (Prochaska & DiClemente, 1984). Many intervention trials have demonstrated that tailored interventions are effective in changing mammography behavior (King, Rimer, Seay, Balshem, & Engstrom, 1994; King, Ross, Seay, Balshem, & Rimer, 1995; Marcus et al., 1993). Determining the most cost-effective methods of increasing mammography adherence while also considering the current structure of healthcare systems is important.

Telephone (King et al., 1994; Marcus et al., 1993; Prochaska & DiClemente, 1984) and in-person intervention counseling (Champion & Huster, 1995; Rimer et al., 1992; Rothman, Salovey, Turvey, & Fishkin, 1993) generally have been shown to be effective in increasing mammography adherence. Now a need exists to understand the relative effectiveness of these two forms of counseling. The purpose of this article is to describe the preliminary results from an ongoing, prospective, randomized intervention that contrast the effectiveness of telephone counseling with in-person counseling compared against a standard care control group. Outcomes included beliefs and knowledge related to mammography and breast cancer, as well as mammography adherence behavior. The following hypotheses were tested: (a) a significant difference in mammography adherence exists when comparing a standard care control group, a telephone counseling group, and an in-person counseling group, and (b) a significant difference exists in perceptions of susceptibility to breast cancer, perceptions of mammography screening benefits, knowledge of breast cancer, and barriers to screening four weeks postintervention when comparing a standard care control group, a telephone counseling group, and an in-person counseling group.

## Methods

### Setting and Sample

Under a protocol approved by the Indiana University Institutional Review Board, women who were older than 50 and had not had a mammogram in the last 15 months

were identified from the medical records of a large health maintenance organization (HMO) and a general medicine clinic in greater Indianapolis. The HMO served mostly Caucasian, middle-income women, whereas the general medicine clinic served primarily African Americans and low-income women. The HMO covered annual mammography screening for members who were 40 years of age or older. The clinic allowed healthcare coverage for all women regardless of ability to pay. The two respective healthcare facilities supplied lists of eligible women.

Women were eligible if they were 50–85 years of age, had not had breast cancer, and had not had a mammogram in the last 15 months. The 15-month time frame was selected to give women a three-month time period to receive a mammogram after they were due. Women meeting these criteria were defined as nonadherent. Two different recruitment approaches were used because the two sites had different procedures for appointment scheduling. The medical director sent introduction letters by mail to eligible members of the HMO. Research assistants then called the women to explain the study and ask if they would like to participate. If a woman agreed to participate, she was sent an initial baseline survey and an informed consent statement. The baseline survey included scales to measure beliefs and knowledge about mammography and demographic information. In contrast, women recruited from the general medicine clinic were approached during clinic visits and asked if they would be willing to participate. If they agreed, an informed consent was signed and baseline information was obtained immediately.

A total of 1,098 women (39%) out of 2,815 who were contacted agreed to participate, completed the baseline survey, and were randomized to receive either in-person, telephone, or no mammography counseling. Approximately 84% of the study participants were members of the HMO, whereas 16% were from the general medicine clinic.

### Procedure

Once women were entered into the study and baseline information was obtained, they were randomly assigned by a computer program to one of three possible groups. Group one received telephone counseling, group two received in-person counseling, and group three received no counseling (control group). Telephone counseling was completed during a prearranged and scheduled appointment with a graduate research assistant using a standard protocol. Written materials related to the intervention were sent to participants by mail prior to the telephone counseling. Written materials included a booklet designed for this study that had visual images and statements addressing perceived susceptibility and benefits and barriers to breast cancer screening. Graduate research assistants scheduled in-person counseling appointments, which occurred either in the general medicine clinic or HMO offices.

### Measures

**Perceived susceptibility, benefits, and barriers:** Summated context-specific scales assessed the HBM concepts of perceived susceptibility (3 items), benefits (5 items), and barriers (11 items) (see Table 1). Statements were anchored on a five-point summated Likert scale with mark-



ers ranging from "strongly agree" to "strongly disagree." Scales also had been previously developed and extensively revised for this research project. Detailed information regarding these scales has been reported elsewhere (Champion, 1993; Champion, & Scott, 1997). Scales had been assessed previously for criterion and construct validity using factor analysis and multiple regressions. All item statistics are listed in Table 1. Cronbach's alphas for internal consistency ranged from 0.74–0.88. The susceptibility scale assessed perceived personal risk of contracting breast cancer. The benefits and barriers scales assessed perceived benefits of getting mammography and perceived barriers related to obtaining a mammogram, respectively.

**Knowledge:** The knowledge scale contained 18 multiple-choice questions assessing general knowledge about breast cancer and breast cancer screening. The investigator developed the scale in a previous study. Questions included issues related to knowledge about screening and breast cancer treatment. Scores could range from 0–18. Cronbach's alpha was 0.77 for this sample.

**Stage for mammography adoption:** Participants were asked a series of questions to measure their stage of mammography adoption, including if they had ever heard of a mammogram, if they had thought about having a mammogram in the next six months, and the number of mammograms they had received in the previous five years. Answers to these questions were used in algorithms to

classify women consistent with previous definitions (Prochaska and DiClemente, 1984):

*Precontemplation:* Never had a mammogram and not thinking about having one in the next six months

*Contemplation:* Never had a mammogram but thinking about having one in the next six months

*Relapse precontemplation:* Previous mammogram but not within the previous 15 months. Not thinking about having one in the next six months

*Relapse contemplation:* Previous mammography but not within the previous 15 months. Thinking about having one in the next six months

All women were noncompliant (i.e., had not had a mammogram in the previous 15 months) upon entry into the study. Data used in the current report were based on questionnaire responses obtained at baseline and four weeks after intervention. Four weeks after the intervention, depending on the group, 17%–32% women had received a mammogram, allowing for preliminary testing of intervention effect. Women were defined as adherent if they had received a mammogram in the four weeks after intervention and nonadherent if they had not.

## Intervention

Women were randomly assigned to an in-person counseling, a telephone counseling, or no counseling control group. Those randomized to receive counseling received an individually tailored counseling protocol that included informa-

**Table 1. Summated Context—Specific Scale Statistics**

Factors	$\bar{X}$	Range	SD	alpha
<b>Susceptibility</b>	8.20	3–15	2.64	0.74
1. It is likely that I will get breast cancer.				
2. My chances of getting breast cancer in the next few years are great.				
3. I feel I will get breast cancer sometime during my life.				
<b>Benefits</b>	20.03	5–25	3.28	0.74
1. If I get a mammogram and nothing is found, I do not worry as much about breast cancer.				
2. Having a mammogram will help me find breast lumps early.				
3. If I find a lump through a mammogram, my treatment for breast cancer may not be as bad.				
4. Having a mammogram is the best way for me to find a very small breast lump.				
5. Having a mammogram will decrease my chances of dying from breast cancer.				
<b>Barriers</b>	20.83	11–41	6.64	0.88
1. I am afraid to have a mammogram because I might find out that something is wrong.				
2. I am afraid to have a mammogram because I don't understand what will be done.				
3. I don't know how to go about getting a mammogram.				
4. Having a mammogram is too embarrassing.				
5. Having a mammogram takes too much time.				
6. Having a mammogram is too painful.				
7. People doing mammograms are rude to women.				
8. Having a mammogram exposes me to unnecessary radiation.				
9. I cannot remember to schedule a mammogram.				
10. I have other problems more important than getting a mammogram.				
11. I am too old to need a routine mammogram.				



tion about the woman's stage of mammography adoption (see Table 2) as well as information about susceptibility to breast cancer, benefits of breast cancer screening, and ways to decrease barriers to breast cancer screening. Information regarding breast cancer and appropriate screening intervals also were covered. For both the telephone and in-person counseling interventions, a graduate nurse research assistant systematically addressed each of the components of susceptibility, benefits, and barriers. Women assigned to the in-person group were counseled in an available room at their HMO. If a woman was in the precontemplation stage, particular emphasis was placed on susceptibility and benefits to enable her to move from not thinking about having a mammogram to at least considering the possibility. For women in the contemplation stage (already considering the possibility of having a mammogram), more emphasis was placed on the barriers to mammography that were identified by each woman. Figure 1 lists examples of issues addressed in each of the interventions. In addition, written materials were used to detail the information covered during counseling. The in-person counseling protocol used printed brochures and flip charts and was presented during the counseling intervention. For women who received telephone counseling, the printed materials were mailed prior to the telephone counseling appointment. Both the telephone intervention group and the in-person group received information on breast self-examination.

**Table 2. Intervention Emphasis by Stage of Change**

Stage	Intervention
Precontemplation	<ol style="list-style-type: none"> <li>1. Provide personalized risk information. (Increase perceived susceptibility, if needed.)</li> <li>2. Provide information on benefits of breast cancer screening (e.g., detect cancer early, peace of mind, reduce treatment).</li> <li>3. Provide procedural information.</li> </ol>
Relapse precontemplation	<ol style="list-style-type: none"> <li>1. Repeat precontemplation information.</li> <li>2. Emphasize importance of annual screening.</li> </ol>
Contemplation	<ol style="list-style-type: none"> <li>1. Increase discussion of benefits to breast cancer screening.</li> <li>2. Identify and discuss individual barriers (e.g., pain, fear of radiation, transportation, scheduling, embarrassment).</li> <li>3. Provide specific information on implementation (e.g., scheduling, procedural).</li> <li>4. Increase perceived self-efficacy.</li> </ol>
Relapse contemplation	<ol style="list-style-type: none"> <li>1. Repeat contemplation information.</li> <li>2. Emphasize importance of annual screening.</li> </ol>

#### Susceptibility

- One woman in eight will contract breast cancer.
- Seventy-five percent of women diagnosed with breast cancer have no family history.
- Risk increases with age.

#### Benefits

- Discovered early, there is a 95% chance of cure.
- Lumps are smaller when found by mammography.
- More treatment options are available when breast cancer is discovered early.

#### Barriers

- Embarrassment
- Fear of cancer
- Lack of time
- Pain
- Radiation

### Figure 1. Intervention Messages

Nine nurses who were in graduate school were trained during a two-day session to deliver a standardized protocol. The graduate nurses participated in a detailed training session prior to intervention delivery. During the course of this study, monthly meetings were held to review protocols and check for consistency in intervention delivery. Each research assistant attended a two-day training workshop in which the theories related to the intervention as well as the intervention protocol were discussed. Research assistants were trained using flip charts, role modeling, repeated demonstrations, and counseling until they were comfortable with delivery and able to provide consistent interventions. Training sessions were videotaped for quality control. Protocols for the telephone and in-person sessions were the same. All nurses delivered both interventions.

### Data Analysis

All analyses were completed using the Statistical Package for Social Sciences (SPSS Inc., 1993). Analysis of covariance tested differences in variables of perceived susceptibility, benefits, and barriers by group, controlling for preintervention beliefs. Logistic regression was used to predict adherence. Alpha levels were set at 0.05.

### Results

#### Sample

The average age was 61 years, with approximately 68% being Caucasian and 30% being African American. Forty-three percent of the participating women completed 12 years of education. Nearly half of the women were married and 24% were widowed. All groups completed the intervention and a four-week follow-up. Calculations were based on this number. Out of the initial number of women who agreed to participate, only 696 remained after the four-week follow-up.

#### Adherence With Mammography Screening

No significant differences existed in stage of mammography adoption stage across groups before the intervention ( $\chi^2 = 8.90$ ,  $p \leq 0.346$ ). After intervention, the control



group had 17% of women become compliant, the telephone group had 30% become compliant, and the in-person group had 33% become compliant. When analyzed using logistic regression, the in-person counseling intervention group was significantly different from the control group (odds ratio = 2.80), indicating that women who received in-person counseling were almost three times more likely to have a mammogram screening than those who received no counseling (see Table 3). In addition, women receiving telephone counseling were more than twice as likely to have a mammogram (odds ratio = 2.18) compared to the control group.

### Knowledge, Perceived Susceptibility, Benefits, and Barriers

An analysis of covariance was completed using each of the scale values for susceptibility, benefits, or barriers as a dependent variable, with the covariates of preintervention scores and the independent variable being the intervention or control group. Postintervention, perceived susceptibility scores were significantly higher in both the telephone and in-person counseling groups ( $F = 13.26$ ,  $p \leq 0.001$ ) than in the standard care group (see Table 4). Perceived benefits were significantly lower for the control group ( $F = 3.91$ ,  $p \leq 0.02$ ) compared to both the telephone counseling and in-person groups.

A marginally significant difference was evident across all groups for total perceived barrier scores ( $F = 2.69$ ,  $p \leq 0.068$ ). Perceived barrier scores in the control group were significantly higher than those in the intervention groups receiving in-person or telephone counseling.

For knowledge, a strong group effect existed ( $F = 43.31$ ,  $p \leq 0.00$ ). Means for both telephone and in-person intervention counseling groups were significantly higher than for the control group when knowledge prior to intervention was controlled.

## Discussion

Results of these preliminary data analyses show significant intervention effects for mammography adherence as early as four weeks after receiving the intervention. About twice as many women in the in-person counseling intervention group (32%) received mammograms as in the no counseling control group (17%). A significant effect also is evident in the telephone counseling group, where 30% of the women became adherent to mammography by four weeks. These rates are similar to those reported by Rimer et al. (1992) at a three-month follow-up. The results also are consistent with the King et al. (1995) study in which the control and telephone counseling groups were compared

with telephone counseling plus personal letter, respectively. As more time elapses, mammography compliance may increase well above this level. With preliminary data analyses, only a slight difference (2%) exists in telephone versus in-person counseling. The theory-based counseling intervention, whether delivered by telephone or in-person, altered attitudinal and knowledge variables. Women were counseled in relation to their specific perceived susceptibility to breast cancer, perceived benefits of mammography, and perceived barriers to mammography. Information about what is involved in mammography and how to schedule a mammogram was delivered. The authors hypothesized that women who receive the counseling interventions would develop increased knowledge about breast cancer, perceived susceptibility, increased perceived benefits, and decreased perceived barriers and that knowledge would increase postcounseling. Preliminary results indicate that the counseling intervention is, indeed, changing beliefs.

Perceived susceptibility (personal risk) and benefits are increased through both counseling interventions. Perceptions of both are essential. If women do not perceive that they are at risk for breast cancer or that benefits exist to screening, they are not likely to take the time to complete this behavior.

Counseling about how to overcome barriers was equally effective in both counseling groups postintervention. For example, women in both the in-person and telephone counseling intervention groups had significantly lower perceived barriers than women who received no counseling.

Finally, significant differences existed in knowledge change between both the control group and telephone-counseling group and between the control group and the in-person counseling group, indicating that the counseling is effective in increasing knowledge about breast cancer and breast cancer screening. Although knowledge is necessary for action, it is not sufficient by itself.

### Limitations

The fact that the time from intervention was only four weeks for this preliminary report does not allow for conclusions about the long-term effectiveness of the tested interventions. Determining whether initial adherence rates will increase and extend past the first year is important.

Generalization of these findings to all women age 50 and older would not be justified. The sample who agreed to participate may have been somewhat biased in that they may have been relatively more interested in mammography or breast health.

At four weeks postintervention, the majority of women still are nonadherent. Sometimes scheduling a mammogram at a time that is convenient for the women can take up to two months. Compliance rates will no doubt increase above this preliminary level. Significant barriers that impede mammography screening may not yet be recognized. Further work must address these issues. Whether additional increases in adherence among this sample will occur and what, if anything, can be done to increase adherence to those who are still nonadherent remain to be seen. Further analysis of the cost of each of these strategies must be conducted.

**Table 3. Logistic Regression for Mammography Adherence by Group**

Variable	B	SE	Odds Ratio	Confidence Interval
Telephone group	0.78	0.25	2.18	(1.34, 3.54)
In-person group	1.03	0.21	2.80	(1.75, 4.48)



Table 4. Difference in Beliefs and Knowledge by Intervention

Category	Baseline Mean	Postintervention Mean	F	Probability
<b>Susceptibility Group</b>			13.26	0.001
Control	11.66	14.33		
Telephone	11.66	15.85		
In-person	11.80	16.30		
<b>Benefit Group</b>			3.91	0.02
Control	19.37	19.43		
Telephone	19.93	20.45		
In-person	19.76	20.08		
<b>Barriers Group</b>			2.69	0.068
Control	22.45	21.64		
Telephone	21.88	20.24		
In-person	21.19	19.93		
<b>Knowledge Group</b>			43.31	0.000
Control	8.38	8.00		
Telephone	8.65	10.62		
In-person	8.37	10.59		

## Conclusion

Theoretically, perceptions of susceptibility, benefits, and barriers, as well as knowledge, should influence screening adherence. Both telephone and in-person counseling were successful in changing perceived susceptibility, benefits, and barriers and in increasing knowledge in the correct direction. The small difference in perception of mammography barriers between groups may reflect the difficulty in overcoming perceived barriers. The in-person counseling group evidenced the greatest change. Indeed, individualized counseling to change perceived barriers, as well as support resources to decrease actual barriers, may be necessary to change these perceptions. Obviously, counseling alone may not be sufficient. Barriers are especially important when considering the fact that barriers have been the major construct predicting mammography adherence in past work (Salazar & DeMoor, 1995). Fol-

low-up at one and two years postintervention will determine intervention effects on interval adherence and allow further subgroup comparisons.

The implications for nurses are significant. Nurses are in primary positions to counsel women about the importance of breast cancer screening. Results from this study indicate that talking with women about perceived risk to breast cancer and benefits and barriers to screening significantly will increase mammography adherence. The results also indicate that telephone counseling may be effective as an alternative to in-person counseling. Further work will provide needed direction for helping women with this important life-saving behavior.

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## For more information . . .

► Breast Cancer and Mammography Facts  
[http://cancernet.nci.nih.gov/clinpdq/detection/Breast\\_Cancer\\_and\\_Mammography\\_Facts.html](http://cancernet.nci.nih.gov/clinpdq/detection/Breast_Cancer_and_Mammography_Facts.html)

► Medline Plus: Mammography  
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