
Breast Cancer Beliefs of Women Participating in a Television-Promoted Mammography Screening Project

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Synopsis

A survey of breast cancer and breast cancer screening beliefs was mailed to a random sample of

1,000 women who contacted a telephone bank in response to a television-promoted, reduced-cost mammography project. Beliefs and demographics of women in the sample who subsequently completed a mammogram were compared with those who did not.

No statistically significant differences were found between participants (persons who completed a mammogram) and nonparticipants with respect to age, race, marital status, income, or educational preparation. Groups also did not differ significantly in the series of beliefs examined. Factor analysis revealed respondents' most salient beliefs about breast cancer and early detection of breast cancer.

Evidence is presented to suggest a need for enhanced efforts to recruit minority group women to participate in mammography screening.

ABOUT ONE WOMAN OUT OF NINE in the United States will develop breast cancer, the most commonly occurring cancer in women, accounting for more deaths than cancer of any other part of the body except the lungs (1). Unfortunately, breast cancer survival rates have remained virtually unchanged for the past 40 years (2). There *are* known breast cancer risk factors that include age, family history, nulliparity, age at first pregnancy, and total duration of active menses (3). Approximately 75 percent of breast cancers, however, occur in women with no known risk factors (4). Thus, all women must be considered at potential risk of the disease.

Early diagnosis of breast cancer increases treatment options and may reduce mortality (5-10). The most promising and most sensitive of the early detection methods is screening mammography (7). The American Cancer Society (ACS) recommends that women ages 35 to 39 receive a baseline mammogram; that women ages 40 to 49 have a mammogram every 1 to 2 years; and, that women ages 50 or older have an annual checkup that includes mammography.

The National Cancer Institute (NCI) has adopted similar guidelines and has set a goal of participation in annual screening by 80 percent of eligible women by the year 2000 (11). While screening mammography is becoming more common, it is still underutilized (1,10). A 1987 Gallup poll revealed that just 40 percent of women ages 40 years or older had had a mammogram in the past 3 years, an increase over the approximately 18 percent in 1983 (10). Other studies have shown that only 15 to 30 percent of eligible women have had a mammogram, and even fewer participate in routine screening (12-14). Cost, lack of physician referral, fear of cancer detection, fear of losing a breast, fear of radiation exposure, lack of knowledge concerning the benefits of mammography, and inaccessibility may contribute to poor compliance (4,14-16).

Only 37 percent of physicians in a 1989 ACS study were following the guidelines for mammography referral, an increase over the 11 percent found in a 1984 study (17). Cost was still a major factor for not referring eligible women. Thus, a woman's reluctance to have a mammogram is a complex

issue linked to real barriers and misconceptions.

The Health Belief Model (HBM) is used frequently to predict preventive health and sick-role behavior (18). The likelihood that someone will take a preventive health action is based on the person's (a) *perceived susceptibility* to a disease; (b) *perceived severity* of a disease; (c) assessment of whether the *benefits* of performing the desired action outweigh the *perceived costs and barriers*; and (d) acceptance of effective *cues to action*, either of an internal or external nature (19). Subsequent research by Bandura (20) suggests a fifth component, *self-efficacy*, or the confidence that one can carry out the activity needed to produce the desired outcome. A review of the HBM by Janz and Becker (21) shows overall support for the model, and that the concepts should be a part of health education and behavior change planning.

Previous studies have examined participation in mammography screening and health beliefs using aspects of the HBM. Taplin and coworkers (22) examined the concept of susceptibility, and found that participation improved with increasing age, family history of breast cancer, and previous breast biopsy. High-risk women were more likely to participate, especially those ages 50–59. Calnan (23) showed a positive association between perceived susceptibility and participation in breast screening. Lane and Fine (24) found that participation was significantly higher for women with breast symptoms, those having physical findings on examination, and those who did not have to pay for the mammogram. Other investigators found that submitting to mammography was related to income, history of breast problems, having a regular physician, and social interaction with friends (25). Mammography behavior was examined in older black women by Burack and Liang (26). They found that beliefs only weakly influenced initial acceptance and mammography completion. The utility of early treatment, the presence of breast symptoms, and cost influenced completion after controlling for initial acceptance. In another study, participation was associated with perceived susceptibility and the perceived benefit of mammography as a screening tool (27).

In a study in Scotland, it was observed that women who declined breast screening participated less frequently in other preventive health behavior, exhibited more fear of cancer, and had less knowledge of cancer (28). Other investigators found that compliance with mammography at the worksite was associated with positive physical findings upon breast examination (29). Moreover, there were no

differences between compliers and noncompliers in terms of age, time between periodic health examinations, and followup or insurance coverage.

In a mammography screening project promoted on television in metropolitan Chicago, 9,307 women (58 percent) had the procedure performed out of 16,118 who qualified for screening mammography, (30). In surveys completed prior to the project, mammography was seen more as a diagnostic tool than a screening tool, and women and physicians still were concerned about radiation exposure.

An ACS demonstration breast cancer screening project in northeast Florida offered free mammography, breast examination, and education and instruction in self-examination to 1,032 eligible women. Using door-to-door ACS volunteers, only a 61-percent participation rate in free screening was achieved (31). Eligible women in San Diego who received an incentive (a coupon for a nutrition information kit) from their ACS unit had a higher rate of appointment-making than the women not receiving an incentive (81 percent versus 59 percent) (32). Wolosin found that mammography participation resulted from physicians' referral rather than women's own initiatives (33).

Participants in breast screening are more likely to be of higher socioeconomic status (SES), white, younger, and better educated than nonparticipants (12,25–27,34). Hispanic women who are more educated and of higher SES are more likely to have had a screening mammogram than other Hispanic women (35). Farley and Flannery report that women of lower SES have a higher rate of late-stage diagnosis (36).

Some studies have shown that participants have more breast cancer knowledge than nonparticipants (27,28). The profile of the woman most likely to be knowledgeable about the ACS guidelines for screening is (a) ages 40–49, (b) aware that breast cancer is a leading cause of death in women, (c) supportive of the idea of taking control of her health, and (d) doing breast self-examination on a regular basis (37).

The Tampa Breast Screening Project

To promote low cost screening mammography, District IV of the Florida Division of the American Cancer Society, together with a Tampa television station, sponsored the Tampa Bay Area Breast Screening Project for seven Florida counties. The project consisted of a program that was aired for 4 days during which viewers were urged to call in to

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schedule a mammogram. For a week prior to the event, 30-second prerecorded promotional announcements on breast cancer and news segments on mammography were telecast. This series of news segments was also run each day during the 4-day show on the 6 and 11 p.m. news broadcasts.

To be eligible for a mammogram, women had to be ages 35 to 39 without ever having had a mammogram or, if ages 40 or older, not having had a mammogram in the past year. In addition, all women had to be asymptomatic for breast problems and not be breastfeeding or pregnant.

This study examines participation of self-referred eligible women in this television-promoted, relatively low-cost screening mammography effort. For purposes of the study, participation was defined as scheduling and completing a mammogram within the period February to April 1990. Of the 13,920 self-referral calls, 13,215 women, or 94.4 percent, met the eligibility criteria and were sent an information packet describing how to schedule a \$45 mammogram at a participating facility. We estimated that the number and geographic distribution of the participating facilities should have permitted access by motor vehicle to most women, based on a one-way driving time of 40 minutes or less. Women had 8 weeks to complete a mammogram. A total of 6,640 women, or 50.2 percent of those eligible, actually underwent a screening mammogram.

We were interested in delineating reasons why close to one-half of the self-referrals failed to receive their screening mammogram. This type of followup had not been conducted on previous television-promoted breast screening (30,32). Thus, the purposes of this project were (a) to examine the association between participation in the 1990 Tampa Bay Area Breast Screening Project and beliefs about breast cancer and mammography using dimensions of the HBM as the theoretical construct, (b) to compare selected demographic characteristics of the participants and nonpartici-

pants, and (c) to make recommendations that may increase participation in similar mammography-promotion programs in the future.

Methods

Population and sampling. This study used a retrospective, cross-sectional survey research design. A random sample of 1,000 women was drawn from the population of 13,215 eligible women who called the television telephone bank during the breast screening project and were sent the information packet on how to schedule a mammogram at a participating facility. These women were selected approximately 4 months after the formal promotion was concluded, and approximately 2 months after eligibility for the reduced-cost mammograms ended. The selection process gave us access to the woman's name, address, telephone number, age, and her eligibility criteria with respect to qualifying for the low-cost mammogram.

Instrumentation. To identify salient beliefs, a convenience sample of 20 women ages 35 or older, who were not part of the screening program, was surveyed. These women were asked to provide responses to two open-ended items: up to five reasons why they would have a mammogram performed, and up to five reasons why they would not have a mammogram performed. Beliefs listed at least five times were considered to be salient.

These salient beliefs and a review of the literature on instruments that incorporated HBM-related concepts were used to develop the survey (38-41). To determine content validity, three experts in cancer education and survey construction evaluated the instrument. Their comments regarding addition, deletion, or modification of items were collated and incorporated into the instrument. Reviewers indicated the HBM component most appropriate for the respective items. The instrument included elements of the HBM and consisted of 29 statements answered by using a five-point Likert-type scale ranging from "strongly disagree" to "strongly agree." A neutral point of "neither agree nor disagree" was included. Five questions addressing demographic variables (age, race, marital status, income, and educational level) and one question as to whether the woman had a mammogram performed as a result of the breast screening project were included.

To estimate instrument reliability with respect to the belief statements, a test-retest procedure was performed with 15 women over a period of 2

weeks. The percentage agreement for the 29 belief statements ranged from 80 to 100 percent; and the overall mean was 91.3 percent. Since individual item reliability and overall instrument reliability were determined to be acceptable, no items were deleted. Readability was assessed to be at the eighth-grade level using the Gunning Fog Index (42). The survey form required approximately 15 minutes to complete.

Data collection. This study was reviewed and approved by the University of South Florida Institutional Review Board (IRB) with the stipulation that respondents be permitted anonymity. Survey forms, along with a cover letter and self-addressed, postage-paid envelope, were mailed to 1,000 randomly selected women who had requested information packets through the television telephone bank. No followup mailing was performed for nonrespondents, and surveys and envelopes were not coded. Participants and nonparticipants in screening mammography were identified on the basis of self-report, since individual requirements and logistics prohibited the screening forms from being linked with the clinical evaluations. Self-report has been shown to be an effective and reliable method for retrospective examination of mammography compliance, however (43).

Data analysis. To profile the sample of women, the following descriptive statistics were collected: percentages for categorical data (race, marital status, income level, educational level), and mean, mode, and standard deviation for continuous data (age). To determine demographic differences between participants and nonparticipants, chi-square ($\alpha = .05$) was used. Age data subsequently were grouped categorically by ACS guidelines for mammography screening. Since the group of respondents was predominantly white, responses were grouped by race, white versus all other racial groups. Since most respondents were married, "married" respondents were compared with respondents of "all other" marital status categories. College graduates were compared with women of all other educational levels. Responses to the 29 health beliefs were reported as means and standard deviations according to mammography status.

Factor analysis was applied across all 29 beliefs. Individual items with factor loadings $\geq .45$ were extracted. Analyses were performed for all subjects, for participants only, and for nonparticipants only, to see if the factor structures were similar.

To analyze the difference in beliefs about breast

Table 1. Demographic profile of women participants¹ and nonparticipants in breast cancer screening who responded to a special survey, Tampa, FL, 1990

Variable	Participants		Nonparticipants	
	Number	Percent ²	Number	Percent ²
Age (years):				
39 or younger.....	33	7.3	5	5.2
40-49.....	112	24.8	20	20.6
50 and older.....	307	67.9	72	74.2
Race:				
White.....	435	96.0	93	95.9
Black.....	9	2.0	2	2.1
Hispanic.....	6	1.3	2	2.1
Asian, Oriental.....	0	0.0	0	0.0
Other.....	3	0.7	0	0.0
Marital status:				
Married.....	337	74.2	68	70.1
Divorced.....	41	9.0	7	7.2
Single.....	16	3.5	4	4.1
Widowed.....	60	13.2	18	18.6
Annual household income:				
Less than \$15,000.....	114	26.5	27	30.7
\$15,000-\$20,000.....	68	15.8	18	20.5
\$20,000-\$30,000.....	128	29.7	23	26.1
\$30,000-\$50,000.....	80	18.6	12	13.6
More than \$50,000.....	41	9.5	8	9.1
Educational level:				
Less than high school..	30	6.6	9	9.6
High school graduate...	291	64.4	60	63.8
Technical-vocational....	26	5.8	7	7.4
College graduate.....	105	23.2	18	19.1

¹ Totals may differ because information is incomplete for some variables.

² Percentage of participants and nonparticipants for each demographic option.

cancer and mammography between the participants and nonparticipants, the Likert-type scales were treated as interval level data. Mean scores were compared using a series of two-tailed *t*-tests. To adjust for the error rate problem associated with multiple comparisons, the Bonferroni method was employed to calculate a more stringent alpha level (from $\alpha = .05$ to $\alpha = .017$). The relevance of race (white versus other races) was tested across the health beliefs using *t*-tests. As previously described, the Bonferroni method was employed to reduce the risk of Type I error.

Results

Survey return rate. Of the 1,000 surveys mailed to prospective respondents, 573 (57.3 percent) were returned. Because of incomplete data, 17 of the survey forms were not usable. Of these 17, the status of mammography completion was not known in 13, and 4 surveys were returned unanswered. The total number of usable surveys was 556 (55.6 percent). Of the respondents, 459 (82.5 percent) reported having completed screening mammography,

Table 2. Comparison of means and standard deviations (SD) of the responses to belief statements¹ of participants and nonparticipants in 1990 Tampa survey

Belief statement	Participants		Nonparticipants		t
	Mean	SD	Mean	SD	
Early detection of breast cancer increases my chances of having it cured	1.12	1.49	1.21	0.50	0.555 n.s.
Getting a mammogram is a frightening experience	4.17	3.94	3.84	1.17	0.799 n.s.
I believe it is possible to detect breast cancer at an early stage	1.42	2.68	1.36	0.54	0.224 n.s.
The cost of a mammogram is too high for me	2.63	4.72	2.60	1.27	0.066 n.s.
I believe that having a mammogram would give me peace of mind	1.57	2.75	1.65	0.79	0.287 n.s.
I believe that I will get breast cancer in my lifetime	3.37	3.28	3.27	0.92	0.313 n.s.
Getting breast cancer would ruin my life	3.25	4.12	3.23	1.15	0.050 n.s.
I would not be anxious about breast cancer if I had a mammogram	1.95	3.85	2.07	1.00	0.307 n.s.
My doctor has never recommended a mammogram for me	3.72	5.68	3.47	1.26	0.428 n.s.
I believe that my breast could be saved if a cancer is found early	1.68	2.97	1.62	0.78	0.216 n.s.
If left untreated, breast cancer will lead to death	1.56	3.29	1.44	0.72	0.347 n.s.
I personally have known a woman who had breast cancer	1.83	4.32	1.89	1.04	0.138 n.s.
I believe that breast cancer is a serious disease	1.31	1.88	1.28	0.52	0.138 n.s.
Getting a mammogram is embarrassing for me	4.06	3.96	3.79	1.12	0.659 n.s.
As I get older, my chances of getting breast cancer increase	2.07	3.43	1.93	0.84	0.393 n.s.
My family and friends would approve of my getting a mammogram performed	1.55	2.56	1.76	0.75	0.784 n.s.
I do not have time to get a mammogram	4.39	3.35	4.04	0.96	0.984 n.s.
I believe that I will get breast cancer in the next 5 years	3.66	3.81	3.61	0.86	0.125 n.s.
Getting transportation to a mammography center would be hard for me	4.21	3.62	3.90	0.92	0.842 n.s.
I believe that if my mother or sister had breast cancer, I am more likely to get it ..	1.94	3.88	1.84	0.73	0.267 n.s.
I could get a mammogram performed close to my home	1.84	3.64	2.01	0.87	0.450 n.s.
I believe that having a mammogram is painful	4.10	4.20	3.93	1.06	0.404 n.s.
I am afraid of the radiation from a mammogram	3.93	4.20	3.77	0.98	0.367 n.s.
Losing my breast would change how I feel about myself	2.87	4.98	2.59	1.13	0.546 n.s.
I believe a mammogram is unsafe	4.23	3.19	4.04	0.84	0.593 n.s.
Making an appointment to get a mammogram is difficult	4.22	3.59	3.75	0.99	1.265 n.s.
Losing my breast would change how my husband, boyfriend, or others feel about me	3.49	5.33	3.45	0.99	0.061 n.s.
I worry about getting breast cancer	2.95	5.84	2.88	1.03	0.128 n.s.
Practicing breast self-examination is an important activity for me to detect breast changes	1.97	4.44	2.00	0.76	0.063 n.s.

¹ 1 = agree; 2 = agree; 3 = neither agree nor disagree; 4 = disagree; 5 = strongly disagree.

NOTE: $\alpha = .017$, n.s. = not statistically significant

while 97 (17.5 percent) reported not having done so.

A followup mailing was considered but was not conducted, since it would have required contacting all potential respondents because Institutional Review Board requirements prohibited the coding of return envelopes that would have permitted tracking of survey respondents and nonrespondents. Limited funds and the elapsed time since the promotional campaign had occurred were factors in the decision not to pursue a followup mailing. According to Babbie (44), a return rate of between 50 and 60 percent is sufficient to analyze. Furthermore, Sarvela and McDermott point out that increasing the response rate to a mailed survey by using reminders or followup mailings does not necessarily guarantee respondent representativeness (45).

Demographic profile of respondents. The age of the respondents ranged from 31 to 83 years with a mean of 57.5, a mode of 65, and a standard deviation

of 11.7. A total of 69 percent were older than age 50. The age distribution of respondents, according to ACS and NCI guidelines, and their participation status are presented in table 1. Modal responses with respect to demographics included being white (96.0 percent), married (73.5 percent), having a yearly household income of \$20,000-\$30,000 (29.1 percent), and having a high school education (64.3 percent). These data are summarized by mammography status also in table 1. There were no statistically significant differences in the demographic profiles of participants and nonparticipants.

Distribution of responses. The data in table 2 represent the means and standard deviations for the participant and nonparticipant groups with respect to the 29 belief statements. When tested at $\alpha = .017$, no statistically significant group differences were found for any of the health beliefs. An analysis using race or ethnic group as the dependent variable also did not reveal any differences.

Factor analysis for the entire group of respondents yielded three factors that contributed to 32.2 percent of the total variance. The conceptual dimensions presenting in factor 1 could be classified clearly as "barriers," and included fear, embarrassment, time, pain, safety, and difficulty in making an appointment. As seen in other studies that used the HBM as the theoretical construct, barriers constituted a prominent component (21). The emerging features of factor 2 were lifetime risk, 5-year risk, and general worry about the disease, constructs that could best be classified as perceptions of "susceptibility." Factor 3 encompassed features of seriousness, and change of image and self-concept, elements that could be interpreted as perceptions of "severity." The data in table 3 report these major factors and factor loadings.

The factor analysis for mammography participants alone yielded three factors contributing to 32.2 percent of the total variance (table 3). The three factor structures were similar to those identified in the analysis of all respondents. Since participants made up the majority of the respondents, this relationship was to be expected. For the nonparticipants, analysis yielded three factors accounting for 34.8 percent of the total variance (table 3). Two of the factor structures were similar to those previously identified, "barriers" and "susceptibility." Factor 3 was a heterogeneous construct incorporating elements of "early detection, age and risk, peace of mind, and social support." The feature of "severity" was not a component in the nonparticipant group. Janz and Becker (21) report that "perceived severity" is often the least potent factor associated with the HBM.

Discussion

The aim of the Tampa Bay Breast Screening Project was to promote breast cancer awareness and to make low cost mammography screening accessible to eligible women. This particular television-promoted effort may have served as a cue to action for the more than 5,000 women completing the screening who may not have done so otherwise. It is possible that some of the women who completed the mammogram might have scheduled one anyway, even without the benefit of the promotion. Behavioral intention was not assessed. Retrospective pretesting might have been able to examine intent prior to the mammography promotion and should be considered in future endeavors of this nature.

The television promotion was clearly effective in

Table 3. Major factors and factor loadings for all respondents, mammography participants, and mammography nonparticipants, 1990 Tampa, FL, survey

Major factor	Factor loading
<i>All respondents</i>	
Factor 1: Barriers (¹ 12.5 percent)	
Frightening .....	.74
Embarrassing .....	.93
Time .....	.52
Painful .....	.64
Radiation exposure .....	.48
Unsafe .....	.51
Appointment difficulty .....	.52
Factor 2: Susceptibility (¹ 6.9 percent)	
Lifetime risk .....	.97
Five-year risk .....	.75
Worry .....	.47
Factor 3: Seriousness (¹ 12.8 percent)	
Serious disease .....	.99
Losing breast and self image .....	.66
Losing breast and image held by others .....	.93
<i>Participants</i>	
Factor 1: Barriers (¹ 13.9 percent)	
Frightening .....	.47
Embarrassing .....	.51
Time .....	.52
Painful .....	.55
Transportation .....	.46
Radiation exposure .....	.75
Unsafe .....	.94
Appointment difficulty .....	.55
Factor 2: Susceptibility (¹ 7.0 percent)	
Lifetime risk .....	.97
Five-year risk .....	.75
Worry .....	.46
Factor 3: Seriousness (¹ 11.3 percent)	
Serious disease .....	.97
Ruin life .....	.45
Losing breast and self image .....	.92
Losing breast and image held by others .....	.60
<i>Nonparticipants</i>	
Factor 1: Barriers (¹ 15.9 percent)	
Frightening .....	.77
Ruin life .....	.49
Embarrassing .....	.91
Time .....	.45
Painful .....	.74
Radiation exposure .....	.51
Appointment difficulty .....	.72
Factor 2: Susceptibility (¹ 7.6 percent)	
Lifetime risk .....	.97
Five-year risk .....	.72
Worry .....	.60
Factor 3: Miscellaneous concerns (¹ 11.3 percent)	
Early detection .....	.52
Peace of mind .....	.52
Age as risk .....	.45
Family/friends approval .....	.59

¹ Percent of variance explained by this factor.

eliciting an audience response (as judged by the initial volume of calls), but obviously it could not generate more than a 50.2 percent compliance rate among those women meeting eligibility require-

ments. While a compliance rate of 50.2 percent is not necessarily poor, there is a need to examine further the reasons other eligible women drop out. It is not known what percentage of the women who initially responded to the television promotion subsequently scheduled and completed mammography outside the scope of the promotion and use of the participating screening facilities. A future prospective study might help to clarify this issue.

The survey response rate in excess of 57 percent was relatively high for a mailed instrument without reminders or a followup mailing. We believe this rate of return is especially noteworthy given that the survey followed the original breast screening promotion by approximately 4 months. The response would seem to signify a high topic salience and that retrospective studies of this nature are both feasible and desirable. The instrument was deliberately kept short and addressed only those items that pilot testing and literature review deemed as most salient. This point may have contributed to the favorable response we observed. Nevertheless, a more comprehensive set of beliefs may need to be examined in future studies.

It is worthwhile to note that 69 percent of the survey respondents were ages 50 or older. In terms of the spiraling risk of breast cancer that occurs after age 50, this rate of return further substantiates the success of some physicians, health educators, and other professionals in making the subjects of breast cancer and mammography salient ones in this age group. It also may be noteworthy that the 40–49 age group constituted more than 20 percent of the survey respondents. Some investigators support the efficacy of mammography screening in this age group (10). In the Breast Cancer Detection Demonstration Project, the kinds of breast cancers found and the corresponding patient survival rates suggest that screening is virtually as effective in this somewhat younger group as in the group of women ages 50 and older (10). Thus, understanding the beliefs and motivations that influence screening participation among women in their 40s may become of increasing importance to health care professionals.

Two important limitations were posed by the study. One, the institutional review board prohibited linking the surveys to the clinical evaluations. As a result, our assessment of participation was limited to self-report data. Two, the retrospective nature of the study prevented us from providing a profile of the nonrespondents, since the information originally obtained by telephone during the

promotion consisted primarily of the eligibility criteria required by the promotion organizers.

A followup study was not considered at the time of the promotion activities. Consequently, potentially key data points (race, previous history of mammography, and so on) were not sought. The followup could have provided more suitable planning and evaluation data had some of these issues been addressed at the time of the television promotion. While we know that in our respondent group, 82.5 percent reported getting a mammogram, just 50.2 percent of the original population of 13,215 eligible women followed through. This number is presumed to be valid, since it was calculated on the basis of the number of clinical evaluations that were actually performed.

We cannot tell what proportion of the survey nonrespondents were mammography nonparticipants. Since there is a sizable disparity between the 50.2 percent of the original callers for whom there were clinical evaluations, and the 82.5 percent of the survey respondents who indicated having completed a mammogram, either or both of two conditions may be applicable: (a) there was a strong social desirability bias influencing survey respondents, thus falsely inflating the number who reported receiving the screening or (b) a large proportion of the mammography nonparticipants comprised the survey nonrespondents, with nonresponse possibly influenced by guilt or anxiety concerning the screening or the followup survey, an observation that other investigators have noted (unpublished data by Dr. Marty and colleague). These elements could account for the absence of significance in beliefs and the similarity in the factor structures among the survey respondents. (It also is possible that randomized selection of subjects could have skewed the sample simply by chance.) Future investigations will need to explore these issues.

Demographic factors were not associated with compliance to mammography in this study, nor were they related to beliefs about breast cancer and mammography. The original self-selection, the subsequent nonresponse bias, and the deliberately limited range of beliefs examined, however, could account for this finding. Respondent profiles revealed that 96 percent of the women were white, and 73.5 percent were married. If these statistics even remotely reflect the demographics of the more than 13,000 women who made contact through the television phone bank, the initiative may have to be marketed differently to reach unmarried, widowed, and minority populations. The television-promoted

effort in the Chicago metropolitan area also attracted only a modest response from the minority community (30). The Tampa Bay area has a significantly large minority population, composed mostly of African Americans and Hispanics. Native American, African American, and Hispanic women have the poorest 5-year breast cancer survival rates (46), due in part to detection delay (47). Since these groups also constitute a disproportion of the socioeconomically disadvantaged people in the United States who lack access to health care (46,48), a more disciplined approach to reaching them in promotional efforts of the type we describe is warranted. The use of other media, or the initiation of such promotions on culturally targeted broadcast stations (for example, Black Entertainment Television, Spanish-speaking channels, and so forth) needs to be explored. If regional channels with large viewer markets are to be used, as was the case with this recently completed effort, it may be necessary to identify minority spokeswomen who have name recognition and high audience salience to reach more of the women at risk.

Factor analysis supported previous research concerning the relevance of *perceived barriers* to beliefs and decisions pertinent to breast cancer and mammography. The HBM component of *perceived susceptibility* explained the least amount of variance. Among persons who reported not getting a mammogram, *perceived barriers* explained the greatest amount of variance. A weak (in terms of variance explained) heterogeneous factor also emerged in this noncompliant group that combined perceptions of risk (susceptibility), social support (cues), peace of mind (benefits) and other issues that deserve further examination in the future. One must bear in mind that factor analysis assists health educators and other individuals in understanding some of the relevant elements used in forming beliefs and making decisions, but it is limited in its ability to provide insights concerning how beliefs are formed.

Having known a woman who had breast cancer, a point associated with cues to action, did not discriminate between mammography participants and nonparticipants in this study. Future work should examine the impact of other potential cues on mammography compliance, including recommendation of a physician, recommendation from a spouse or significant other, or previous mammography history and experience. While personal history of breast cancer or other breast disease ordinarily could serve as a cue, such a history was not appropriate in this retrospective examination,

since eligibility criteria required a negative history of breast disease symptoms.

Reasons for the failure of women to follow through in the scheduling and completion of mammography-related appointments, especially after an initial display of enthusiasm, require further investigation. Reasons in addition to a woman's own beliefs and fears that may sabotage the mammography promotional effort should be examined. For the effort we describe, an information packet was sent to women who called the phone bank. The packet consisted of printed material whose readability was estimated at the 12th-grade level (42). The procedure for scheduling a mammogram, as it was explained in the packet, may not have been clear. Some women may have thought that by calling the phone bank, the mammogram would be scheduled for them, and that they would be called back. Perhaps the 12th-grade level information in the packet was too complex or lacked sensitivity to the audience. Such concerns will require study and refinement prior to future promotional endeavors.

Conclusions

Evaluation of promotional campaigns to increase women's compliance with mammography screening guidelines requires appropriate planning, commitment of resources to monitor community response, and careful followup. Our study was not able to identify major differences along demographic and belief lines between mammography participants and nonparticipants who made an initial information contact with a television phone bank. We were able to confirm that many women continue to report barriers that may inhibit wider acceptance of this type of breast screening. Moreover, our investigation produced evidence to suggest that women who are members of racial or ethnic minority groups may require promotional efforts that are more specifically targeted. In addition, certain procedural steps were identified that might clarify instructions to the audience, and thus, improve participation. We believe that these data can be used to enhance future efforts at promoting mammography in the community that we studied and may be an appropriate point of departure for persons planning similar programs in other settings.

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