

## GERONTOLOGY

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# Knowledge and Beliefs of Breast Cancer Among Elderly Women in Puerto Rico

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This is the first national study of breast-cancer knowledge, beliefs, and early detection practices among elderly women (65+) in Puerto Rico. Cancer breast examination (CBE) was the most common early detection practice, followed by the mammogram, with breast self exam (BSE) a distant third. The primary reasons most often cited for never having a mammogram related to both personal and external factors: not having symptoms, negligence or forgetfulness, and not having a physician's referral. No statistically significant difference ( $p < 0.05$ ) was found between knowledge and early detection practices. Conversely, beliefs had an impact on preventive behavior. Those who had less misconceptions were most likely to have had a CBE or a mammogram. Bivariate analysis demonstrated that age was associated with performing a BSE once or twice monthly, ever having a mammogram, and having a mammogram in the past two years. A higher socioeconomic status was associated to

performing BSE and ever having had a mammogram. Education correlated positively to ever having a mammogram or having a mammogram in the two years prior to the interview. Factors that explained compliance with a mammogram in the last two years included referral from a physician, owning a car, and receiving information after menopause on breast cancer from a health care provider. A gynecological visit increased the probability of having had a mammogram during the last two years. Logistic regression determined that a referral from a physician was the most important factor for mammogram compliance when a combination of variables were considered.

*Key words:* Breast cancer early detection practices, Breast cancer knowledge and beliefs, Obstacles to breast cancer detection practices, Elderly women, Puerto Ricans.

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Older women are at higher risk of developing breast cancer and dying from the disease than their younger counterparts. Women 65 years of age or older have 6 times the risk of developing breast cancer than women under the age of 65 and 7 times the risk of dying from this disease than women under the age of 65 (1,2). Approximately 40 to 45% of invasive breast cancers occur in women 65 years or older (3-7). However, breast cancer screening rates decrease with increasing age (1-3).

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With a growing proportion of the population 65 years of age and older, and with the expected increase of this segment of the population as baby-boomers age, it is expected that breast cancer will become a more significant health issue for older women. However, studies indicate that breast cancer screening rates decrease with increasing age (1,2,8). Despite the fact that a mammography is the best method for early detection of breast cancer and that there is a need for a periodic clinical breast examination (CBE) and mammography, women 50 years of age and older have been slow to adopt these practices (1-5, 9-13). Although mammography use has increased, older and minority women are still underserved (1,3,4,8,14-16). Women 60 years of age and older are less likely to undergo mammographies than younger women (7). Hispanic women's use of CBE and mammography are lower than that of their white and African-American counterparts (17). The report *Healthy People 2000* (18) set up as objectives to increase to 80% the total of Hispanic women 40 or older to undergo breast cancer test in the year 2000. The 1987

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National Health Interview Survey (NHIS) pointed out that among Mexican-American, Cuban and Puerto Rican elderly women, Puerto Ricans comprised the largest group that had never heard of a mammography (16). A study of older Hispanic women indicates that 57% stated that no one had suggested a CBE within the last years and 82% said no one indicated that they should have a mammogram (12). A study with Latino women pointed out that physician recommendations and discussion with either a doctor or nurse had an association with ever having a mammogram (16).

Studies indicate that older women are not aware that they are vulnerable to breast cancer risk or that mammograms are the best screening practice for finding breast cancer (5-7,19,20). However, research have shown that recognition of breast cancer incidence as increasing with age and knowledge of screening guidelines are associated with breast cancer screening among older women (9,21). It is important to promote screening among older women. More attention ought to be placed on issues related to the women themselves, such as attitudes, knowledge, and beliefs, as well as to factors pertinent to the health-care system, including the information provided and exams ordered or performed by physicians, cost of exams, and accessibility. All are relevant to the design of breast cancer screening programs.

Cancer was the second cause of death for older women in Puerto Rico for 1990 (22,23). Heart ailments were first and diabetes, third. Age-specific breast cancer incidence rates calculated for 1990 indicate an increase from 88.7 per 100,000 females 40 to 44 to 202.7 per 100,000 females 75 or older (24).

This is the first national study of breast-cancer knowledge, beliefs, and early detection practices among elderly women (65 years of age and older) in Puerto Rico. The objectives of the project were to gain insight of personal and external barriers affecting breast cancer early-detection practices as well as of demographic characteristics that may influence non-compliance among older women in Puerto Rico.

## Methods

A national survey was conducted in a sample stratified by socioeconomic status and area of residence of 500 women age 65 or older. Data analysis focused on the most important barriers to breast cancer early detection practices. Internal barriers were defined as knowledge, beliefs and self-perception of health. Gender preference for physician was considered only for CBE. External barriers were defined as those related to health insurance, transportation, referrals to mammograms, and information

provided by health-care providers about breast cancer and early detection practices. The detection practices considered were: breast self-examination (BSE) once or twice a month, CBE during the last year, mammogram sometime in life, and mammogram during the last two years. The effect that social and demographic variables, family and personal history of breast cancer, and visit to a gynecologist had on detection practices was also considered.

A bivariate analysis was performed using contingency tables to describe the relationship between breast cancer early-detection practices and internal or external barriers. Also, social and demographic characteristics, family and personal breast cancer history and visit to a gynecologist were considered. Independence tests were performed for each table and the odds ratio (OR) was computed to determine the strength of association between screening practices and the other variables.

Logistic regression was used to determine the effect of barriers and other predicting variables only for mammograms since mammograms are the most efficient screening practice for breast cancer detection. Potential predictors for the initial model were defined by the significant variables ( $p < 0.10$ ) found in the bivariate analysis. The Wald test was performed to determine significant predictors. Once this was accomplished, variables that were significant in the initial model were used to build a reduced model. Both models were subjected to analysis of deviance in order to determine a final model.

## Results

**Demographic, social and health characteristics.** A stratified sampling design was defined with equal size for each strata in order to balance the number of participants by socioeconomic status and place of residence. However, when the data was collected slight differences were observed in this stratification. The number of interviews for those in the lower status was greater in the metropolitan areas, specially in the largest cities (Table 1). Some factors, such as higher rejection among women from the non-low socioeconomic status (middle and upper) living in inside-central metropolitan areas, could explain the difference. Fifty per cent of the total sample was classified as low socioeconomic status and 46% as non-low.

Women's ages ranged from 65 to 99 years. The average age was  $73.95 \pm 6.51$  years. A considerable proportion (44.6%) of women were over 74 years old. The average years of formal schooling was  $5.60 \pm 4.53$  years. Forty per cent of the participants had less than 4 years of academic education, 28.6% had four to seven years, and 30.8% had

**Table I. National Survey: Interviewees by Area of Residence and Socioeconomic Status (n=500)**

| Area of Residence  | Socioeconomic Status* |        |         |        |       |         |
|--|-----------------------|--------|---------|--------|-------|---------|
|  | Low                   |        | Non-low |        | Total |         |
|  | n                     | %      | n       | %      | n     | %       |
| Inside-central, Metropolitan (largest city in the metropolitan area) | 104                   | (60.8) | 67      | (39.2) | 171   | (100.0) |
| Outside-central, Metropolitan (surrounding inside-central cities)    | 87                    | (51.5) | 82      | (48.5) | 169   | (100.0) |
| Non-metropolitan   | 80                    | (50.0) | 80      | (50.0) | 160   | (100.0) |

\* Low = Median household price < \$ 40,000 Non-low = Median household price \$40,000 and higher

at least eight years of education. Thirteen per cent of the sample had never attended school. The maximum level of education was 18 years of schooling.

Almost half of the sample were widows (49.2%) followed by those who reported legal or common law marriage (35.0%). Twelve per cent of the women were separated or divorced, and less than 4.0% had never been married. Three-fourths of the interviewees (75.4%) mentioned Catholicism as their religious preference. Only 2.2% of the women did not state religious preference. Two-thirds (65.8%) of the women were living with other persons. Fifty two percent of those who did not live alone lived with their spouses. Daughters were cited as the most frequent companions to medical appointments; yet, almost one-third of respondents (29.4%) stated going alone to medical appointments.

Almost 83% per cent of the women had Medicare Part A, which covers hospitalization services. The overwhelming majority (90.8%) also had Medicare Part B, which covers ambulatory services; including mammograms. Many of the interviewees (57.9%) reported to have Medicaid. Over one third (36.6%) of the women reported also having a private health plan. The stratification of the sample by socioeconomic status could explain these results.

Only 13.8% of the 500 women reported to have felt pain or any discomfort in the breast during the five years prior to the interview. More than three-fourths (76.8%) of these 69 women reported to have felt pain or discomfort during the twelve months prior to the interview. A relatively small proportion of the interviewees (11.8%) reported to ever having felt a nodule in the breasts. Thirty per cent of these 59 women reported to have felt a nodule during the last twelve months previous to the interview. Only 3.4% of the 500 women (17 women) stated having had secretions from the nipples. Approximately 8% of the interviewees had undergone a breast biopsy. Thirty two women (6.4%) reported to had been diagnosed cancer of any type. Only

nine of these 32 women had been diagnosed with breast cancer; therefore 1.8% of the women who participated in the study had been diagnosed with breast cancer. Twenty percent of the interviewees reported to have or have had relatives who had been diagnosed with breast cancer. Thirty-four percent of these women mentioned a sister as having suffered or suffering from the disease; 10.8% mentioned a daughter, and 2.9%, a mother. Fifty-three percent mentioned other female relatives such

as cousins, nieces, grandmothers, aunts and granddaughter. Risk factors were not the objective of the investigation. Participants were asked if a female relative had been diagnosed breast cancer as a way to look into breast cancer issues and factors that could promote awareness to the disease but not genetic predisposition. Similarly, they were also asked if they knew or had known someone who had been diagnosed the disease. Two-thirds of the respondents (67.6%) knew someone that had been diagnosed with breast cancer

**Gynecologist-patient relationship.** One-third of the study group had visited a gynecologist during the year prior to the interview. Half (51.5%) of these 169 women received an explanation on how to detect breast cancer during this visit, and the same proportion received a referral for mammogram. Fifty percent of the women who visited the gynecologist received an explanation on how to perform BSE. Likewise, 78.7% of the women who visited the gynecologist the year previous to the interview underwent a CBE.

**Knowledge and beliefs of breast cancer.** Twenty statements were used to construct two scales to determine level of knowledge and beliefs about breast cancer. Twelve statements were used to measure knowledge and eight for beliefs. The responses for these statements were: true, false and do not know. The following codes were assigned to the knowledge statements: 1-true, 0-false/ do not know. The responses to the beliefs were assigned the following: 0-false, 1-true/do not know. The scales were computed using the unweighted sum of codes. The values for the knowledge scale indicate the number of correct answers. High values in the knowledge scale indicate high level of breast cancer knowledge. The beliefs-scale values indicate number of false answers. Low values in the beliefs-scale indicate low level of beliefs on breast cancer issues. Beliefs were defined as incorrect knowledge or notions not based on scientific facts. In terms of beliefs, most of the respondents thought that hitting, bruising or hurting the

breast can cause breast cancer. Many adhered to the notion that never having intercourse reduces the risk for developing the disease.

Forty-eight per cent of the participants answered correctly 10 or more of the items on the knowledge scale. Almost 17% (16.5%) of the women obtained a score of five or less in this scale. The majority of the elderly women had correct knowledge about breast cancer: they knew that the possibility of breast cancer increases with age and that breast self-exams (BSE), clinical breast exams (CBE) and mammograms are early detection practices.

The distribution of the responses for the statements on beliefs related to breast cancer showed that 88% of the interviewees believe that hitting or bruising the breasts can cause breast cancer; 59% acknowledged that women who have breast cancer must always undergo a mastectomy; and 55.7% indicated that breast cancer always leads to death. The majority of the elderly women (61.3%) either upheld the belief that never having had sexual intercourse decreases the possibility of developing breast cancer (29%) or could not assume a position as to it (32.2% do not know). Only 38.7% knew the correct answer.

The distribution of the beliefs-scale showed that around 75% of the interviewees had a high level of beliefs. That is, almost three-fourths of the participants answered affirmatively to four or more of the eight beliefs-statements. An affirmative answer to a belief statement implied misconception or ignorance about a breast cancer issue. The median for the belief-scale was five. Further analysis indicated that education and age were determining factors for breast cancer knowledge and beliefs. Those with more education and in the younger age category (65-69) expressed less misconceptions about the disease.

**Attitudes.** Attitudes toward gender preference of health-care provider were examined. The survey instrument included a question pertaining to gender preference of the physician who performs the CBE. The study group was almost equally divided in terms of preference as to female physician (46.5%) and no preference at all (45.8%). Only 7.7% stated that they prefer a male physician to conduct the CBE over a female

**External barriers.** External barriers to detection practices were defined as obstacles pertaining to the health delivery system or other structural factors: transportation to services, explanation of detection practices, and physician referral. A large majority of the interviewees (71%) had never received an explanation on how to detect breast cancer. Half of the women in the study group had not received a physician referral for a mammogram during the last five years. The majority of the women (64%) depended on others, mostly relatives, for transportation to medical appointments.

**Sources of information on breast cancer.** The two main sources of information related to breast cancer early detection practices were health professionals (43.8%) and television (29.2%). Printed materials (newspapers, magazines, books or pamphlets distributed at health centers) did not rank high as a principal source of information on breast cancer. However, newspapers, magazines and books ranked second as secondary sources of information. Television was the secondary source most often cited which points to this media as an important primary and secondary source of information.

**Early detection practices.** Only 9.2% of the interviewees expressed not performing a BSE. One-fourth of the national sample (25.6%) reported that no physician had ever performed a CBE. Thirty-nine percent of the women stated that they had never had a mammogram. Ninety percent of the women reported to practice BSE as a method to detect breast cancer. Ninety-four per cent of them (423) reported having performed a self examination of their breasts during the last year. However, only 8.8% of the study group followed the recommended BSE interval (once a month) and 4.2% twice a month (Table 2). Almost forty percent (39.4%) of the women had never had a mammogram. Forty-two percent of the total sample had the last mammogram two years prior to the study and 15.8%, three years or more. Fifty-six percent of the women who have had at least one mammogram during their life did not follow a specific time interval; 38.5% had an annual mammogram and only 2.4% reported having one every two years. Seventy two per cent of the women (361/500) reported to have had a CBE performed by a physician or nurse at least once in their life. Almost two-thirds of these 361 women (61.8%) had a CBE performed one year or less prior to the interview

**Reasons for non-compliance.** The elderly women were asked what was the main reason for not performing the BSE. The most frequently offered response was feeling fine or not feeling any symptoms or discomfort (41.3%). Other main reasons were: physician does breast examination (17.4%), not knowing how to perform BSE (6.5%), feeling uncomfortable to touch one's body (6.5%), and fear of finding something (6.5%). Reasons subsumed under other personal reasons (21.7%) include: self perception of old age, carelessness, not being able to detect changes in the breast, religious reasons, lack of interest, and not seeing its importance. To sum up, 82.6% of the interviewees indicated personal reasons for not performing the BSE.

As previously mentioned, almost 40% of the elderly women indicated that they had never had a mammogram. The principal reason for never having a mammogram at any time in their life was lack of symptoms (55.8%). Other

**Table 2.** National Survey: Early Detection Practices

| Practices                                    | Number | (%)  |
|--|--------|------|
| <b>Breast self-examination (n = 495)</b>     |        |      |
| Never  | 46     | 9.2  |
| No during the last twelve months             | 26     | 5.2  |
| One time per month                           | 44     | 8.8  |
| Two time per month                           | 21     | 4.2  |
| Others <sup>1</sup>                          | 358    | 71.6 |
| <b>Last mammogram (n = 488)</b>              |        |      |
| Never  | 197    | 39.4 |
| One year ago                                 | 166    | 33.2 |
| Two years ago                                | 46     | 9.2  |
| Three years ago or more                      | 79     | 15.8 |
| <b>Interval (n = 299)</b>                    |        |      |
| No specific interval                         | 169    | 56.5 |
| Every year                                   | 115    | 38.5 |
| Every two years                              | 12     | 2.4  |
| <b>Clinical breast examination (n = 489)</b> |        |      |
| Never  | 128    | 25.6 |
| One year or less                             | 223    | 44.6 |
| Two years ago or more                        | 138    | 27.6 |

<sup>1</sup> Others includes daily, weekly, more than two time per month and annually.

main reasons were: not recommended by physician (12.7%), negligence (9.6%), and not perceiving it as necessary (8.6%). Approximately, 85% of these 197 women cited personal reasons as the primary reason for not ever having a mammogram.

Twenty-five percent of the women (125) had not had a mammogram during the year previous to the interview. The main reason cited among these 125 women was lack of symptoms (44.4%). Negligence (22.4%) and no referral from physician (10.4%) were also cited as main reasons but to a lesser extent. Once again, personal reasons were emphasized.

**Breast Self-Examination.** For further analysis of BSE, a comparison between women who comply once or twice a month and those who have not performed BSE during the last twelve months was carried out. Those who had never performed BSE were included in the latter group. Women who stated to practice BSE on other intervals (weekly, daily) were excluded on the basis that they could be providing information to impress the interviewer or did not know the correct interval.

Demographic characteristics affect BSE practices. The young-old women (65-69) have a higher possibility of practicing BSE as defined when compared to older women ( $p < 0.05$ ). For those 65-69, the odds of performing BSE was 2.66 higher than the odds of women 75 or older (Table 3).

Internal or personal barriers were not significant for BSE. The only external or systemic barrier that affected variations in BSE practice was main source of information about the disease and detection practices. Those women who stated that health-care professionals were their main source of information were twice as likely to perform BSE (OR = 2.49, 95%CI: 1.11-5.60) than those who mentioned other sources of information

**Clinical Breast Examination.** A visit to the gynecologist in the 12 months prior to the interview increased the possibilities of having a CBE. These women were six times as likely to have a CBE than others who have not had this health care intervention (OR = 6.04, 95%CI:3.53-10.39)

Beliefs-scale were associated with CBE. A low level of beliefs doubled the odds of having a CBE in the last twelve months prior to the interview (OR = 2.17, 95%CI = 1.35-3.48).

Transportation, having Medicare Part B, and having received information about early detection practices were associated to CBE among elderly Puerto Rican women. Women who own a car had higher opportunity of undergoing a CBE in the year prior to the interview than

**Table 3.** National Survey: Sociodemographic Characteristics and Breast Self Examination

| Characteristics             | Self-examination    |        |    |        | OR    | 95%CI     |
|-----------------------------|---------------------|--------|----|--------|-------|-----------|
|                             | 1-2 times per month |        | No |        |       |           |
|                             | n                   | (%)    | n  | (%)    |       |           |
| <b>Socioeconomic status</b> |                     |        |    |        |       |           |
| Non-low                     | 29                  | (44.6) | 43 | (59.7) | 1.00  | -----     |
| Low                         | 36                  | (55.4) | 29 | (40.2) | 1.80* | 0.88-3.84 |
| <b>Age</b>                  |                     |        |    |        |       |           |
| 65-69                       | 26                  | (40.0) | 16 | (22.2) | 2.66* | 1.09-6.56 |
| 70-74                       | 17                  | (26.2) | 20 | (27.8) | 1.39  | 0.55-3.49 |
| 75+                         | 22                  | (33.9) | 36 | (50.0) | 1.00  | -----     |

\*  $p < 0.10$  \*\*  $p_{trend} < 0.05$

those who depended on relatives for transportation to medical appointments (OR = 2.16, 95%CI:1.04-4.54). No differences were found between among those who depended on relatives or other means (including walking) for transportation (OR=0.78, 95%CI:0.47-1.28). Women who had Medicare Part B showed a 76% higher opportunity of reporting a CBE in the last year when compared to those who did not have the health plan

(OR=1.76, 95%CI:1.03-3.01). Receiving information from health-care providers on the methods to detect breast cancer after menopause increased by 68% the odds of having had a CBE in the last year by 1.68 times (95%CI: 1.02-2.77).

**Mammogram Sometime in Life.** Elderly women from middle and upper socioeconomic status had a 70% (95%CI: 1.16-2.5) higher possibility of having had a mammogram sometime in their life. Age also affected this early detection practice. Women 65 to 69 years old had a 63% higher odds (OR=1.63, CI: 1.03-2.58) of ever having had a mammography than those 75 and older. Participants with eight or more years of formal schooling were twice as likely to ever have had a mammogram (OR = 2.19, 95%CI: 1.37-3.51) than those with a third grade or less

Two variables pertaining to personal history of breast cancer were significantly related ( $p < 0.05$ ) to ever having had a mammogram: having had a breast biopsy (OR = 6.4, 95%CI: 2.23-25.12) and having at least one symptom related to breast cancer (OR = 3.5, 95%CI: 2.02-6.17). Having or having had a female relative with breast cancer showed a marginal association with this practice ( $0.05 < p < 0.10$ ). That is, being faced by the possibility of having breast cancer and undergoing a breast biopsy, having had at least one symptom or having a relative who suffered from the disease augment the odds of these women ever having had a mammogram. These factors could be enabling the elderly women to be more aware of the disease and of a mammography as a screening practice.

Visiting a gynecologist during the last year increased the possibilities of ever having a mammogram 3.64 (95%CI: 2.31-5.73) times as much than for those who did not. This could be related to positive impact from this health care specialist with regards to information about the disease. Knowing someone (not a relative) who had been diagnosed with breast cancer also increased the odds of having had at least one mammography; 51% (OR = 1.51, 95%CI: 1.01-2.26).

Beliefs were the only internal barrier that was significantly associated to ever having had a mammogram. Those who upheld less beliefs were more likely to ever having had a mammogram. A score of four beliefs or less in the belief-scale increased the possibility 80% in comparison to women who scored five or more.

The external barriers were determining factors for ever having had a mammogram. Those that were significant ( $p < 0.05$ ) were: not having Medicare Part B and/or a private health plan, not having received information about early detection practices, other main source of information than health provider, and not receiving a referral for a mammogram. Transportation was marginally significant ( $0.05 < p < 0.10$ ). Women who have health insurance that

covers mammograms are more likely to have had this screening practice than those who do not. The odds was 2.07 times as likely (95%CI:1.34-3.20) for those with Medicare part B and it triples (OR = 3.00, 95%CI: 1.96-4.60) for those who also have a private health insurance. Referral from a physician was what most affected ever having had a mammogram. Women who had received a referral in the last five years are 34.1 times (95%CI: 18.9-62.0) more likely to ever have had a mammogram than those who had not. Only 7.3% (18 of 248 elderly women) of the women who received a referral for a mammogram did not attend screening. This provides evidence that once the physician recommends a mammogram the elderly women tend to follow the doctor's orders. Receiving information about early detection increased the likelihood of ever having had a mammography to almost four times as much (OR=3.73, 95%CI: 2.24-6.23). When a health-care provider was the principal source of information on early detection practices after menopause, the odds of ever having had a mammogram almost tripled (OR = 2.90, 95%CI: 1.94-3.20) when compared to those women who received the information from other sources (Table 4).

A logistic regression model was constructed to explain ever having had a mammogram by different predictors. The predictors variables were determined by the significant association ( $p < 0.10$ ) found in the bivariate analysis. In addition, area of residence and socioeconomic status were included in the logistic model. Analysis of deviance was used to determine the best model to fit the breast cancer early detection practices. Internal barriers were excluded from the model because they were not statistically significant. Information provided by health-care professional on early detection measures after menopause ( $p = 0.0298$ ), referral for a mammogram during the five years prior to the interview ( $p < 0.001$ ), and health-care provider as main source of information were significant ( $p = 0.03$ ). Physician referral was the most important factor (OR<sub>a</sub> = 34.12, 95%CI:18.23-63.9) even when confounding variables were considered. Having undergone a breast biopsy was also a significant factor for ever having had a mammogram even when other variables were considered (OR= 4.48, 95%CI:1.15-17.3). The confounding variables found in this model were: socioeconomic status ( $p = 0.0224$ ) and age ( $p = 0.0513$ ) (Table 5)

**Mammogram within the Last Two Years.** Age was related to having a mammogram in the last two years prior to the interview. Women 65 to 69 were twice as likely (OR= 2.24, 95%CI: 1.15-4.40) to have had their last mammogram during this time interval than those 75 or older. Education level was marginally significant ( $0.05 < p < 0.10$ ) for having had a mammogram in the last two years. It was observed

**Table 4.** National Survey: External Barriers and Mammogram Sometime in Life

| External Barriers  | Mammogram |        |     |        | OR    | 95%CI       |
|--|-----------|--------|-----|--------|-------|-------------|
|  | Yes       |        | No  |        |       |             |
|  | n         | (%)    | n   | (%)    |       |             |
| <b>Transportation</b>  |           |        |     |        |       |             |
| Own car  | 44        | (14.8) | 17  | (8.6)  | 1.88  | 0.98-3.62   |
| Relative's car   | 157       | (52.7) | 114 | (57.9) | 1.00  | -----       |
| Others   | 97        | (32.6) | 66  | (33.5) | 1.07  | 0.71-1.62   |
| <b>Medicare B</b>  |           |        |     |        |       |             |
| Yes  | 241       | (80.9) | 131 | (67.2) | 2.07  | 1.34-3.20   |
| No   | 57        | (19.1) | 64  | (32.8) | 1.00  | -----       |
| <b>Other plan</b>  |           |        |     |        |       |             |
| Yes  | 139       | (46.5) | 44  | (22.5) | 3.00  | 1.96-4.60   |
| No   | 160       | (53.5) | 152 | (77.6) | 1.00  | -----       |
| <b>Information from health-care providers on early detection practices after menopause</b> |           |        |     |        |       |             |
| Yes  | 105       | (36.1) | 25  | (13.1) | 3.73  | 2.24-6.23   |
| No   | 186       | (63.9) | 165 | (86.8) | 1.00  | -----       |
| <b>Principal source of information</b>   |           |        |     |        |       |             |
| Health Professional  | 162       | (45.8) | 57  | (28.9) | 2.90  | 1.95-4.34   |
| Others   | 137       | (54.2) | 140 | (71.2) | 1.00  | -----       |
| <b>Referral for mammogram (&lt; 5 years)</b>   |           |        |     |        |       |             |
| Yes  | 230       | (77.4) | 18  | (9.1)  | 34.14 | 18.99-62.04 |
| No   | 67        | (22.6) | 179 | (90.9) | 1.00  | -----       |

that those with more formal years of schooling (8th grade or more) had a 73% higher possibility of having had a mammogram in the last two years than those with less schooling (OR = 1.73. CI: 0.87-3.45).

Two external barriers were significant ( $p < 0.05$ ) for having had a mammogram in the last two years: receiving information about early detection practices and having had a referral for a mammogram during the last five years.

Women who received information about early detection practices from a health-care provider were twice as predisposed to have had this screening practice in the last two years (OR = 2.06, 95%CI: 1.10-3.88) than those who had not. A referral for a mammogram was the most important determinant for having a mammography during this specific period of time. The odds increased 7.62 times (95%CI: 3.93-14.84) when a physician recommended the

**Table 5.** National Survey: Mammogram Sometime in Life : Logistic Regression Model

| Variable  | SE ( )  | p -value | OR      |       |
|---|---------|----------|---------|-------|
| Intercept   | -4.1426 | 1.6937   | 0.0145  | ----- |
| Socioeconomic status  | 0.6223  | 0.2726   | 0.0224  | 1.86  |
| Age   | 0.0411  | 0.0211   | 0.0513  | 1.04  |
| At least one symptom  | 0.6808  | 0.3877   | 0.0791  | 1.98  |
| Breast biopsy   | 1.5032  | 0.6896   | 0.0293  | 4.50  |
| Medicare part B   | 0.5563  | 0.3149   | 0.0773  | 1.66  |
| Information from health-care providers on early detection practices after menopause | 0.7395  | 0.3403   | 0.0298  | 2.09  |
| Referral for mammogram ( $\leq 5$ years)  | 3.5303  | 0.3189   | <0.0001 | 34.13 |
| Main source of information  | 0.5861  | 0.2839   | 0.0390  | 1.80  |

screening practice than when not. The different factors that affect the practice of mammogram in the last two years were evaluated simultaneously in a logistic regression model. The significant ( $p < .0001$ ) predictors found were: physician referral and visit to the gynecologist. Referral for a mammogram increased the odds of having had a mammography in the last two years by 6.36 times (95% CI:3.6 - 12.4) when adjusted by visit to a gynecologist (Table 6). Other variables were not considered because they were not significant.

**Table 6.** National Survey: Mammogram in the Last Two Years: Logistic Regression Model

| Variable                              | SE ( $\beta$ ) | p-value | OR    |
|---------------------------------------|----------------|---------|-------|
| Intercept                             | -1.0594 0.4436 | 0.0169  | ----- |
| Referral for mammogram: last 5 years  | 1.8507 0.3583  | <0.0001 | 6.63  |
| Visit to gynecologist: last 12 months | 1.9318 0.3712  | <0.0001 | 6.89  |

### Conclusions and Implications

Developing breast cancer programs that can reach elderly women who are not complying with early detection practices poses a challenge to public health professionals. The identification of factors that influence decision making is an important step. This study identifies broad areas to compliance, specifically mammograms. CBE was the most common early detection practice among elderly women in Puerto Rico, followed by the mammogram, with BSE a distant third. Nearly 45% of the women reported undergoing a CBE during the year previous to the interview. Forty-two percent reported having a mammogram within the last two years. Sixty percent of the women reported never having had a mammogram. Only 8.8% of the interviewees indicated that they perform a monthly BSE.

No statistically significant difference ( $p < 0.05$ ) was found between knowledge and early detection practices. Conversely, beliefs had an impact on preventive behavior. Those who had less misconceptions were most likely to have had a CBE or a mammogram. Bivariate analysis demonstrated that age was associated with performing a BSE once or twice monthly, ever having a mammogram, and having a mammogram in the past two years. A higher socioeconomic status was associated to performing BSE and ever having had a mammogram. Education correlated positively to ever having a mammogram or having a mammogram in the two years prior to the interview.

Bivariate analysis demonstrated that the likelihood of having a CBE increased when the women owned a car and

did not depend on others for transportation (OR=2.16, 95%CI:1.04-4.54); received Medicare Part B (OR=1.76, 95%CI:1.03-3.01); or had received information after menopause from a health care provider about breast cancer and early detection methods (OR=1.68, 95%CI:1.02-2.77). Undergoing a CBE in the twelve months prior to the interview was related to a visit to a gynecologist (OR=6.04, 95%CI:3.53-10.39). Beliefs were the only personal variable associated with CBE compliance. Women with less misconceptions were most likely to have had a CBE in the year prior to the interview.

Factors that explained compliance with a mammogram in the last two years included referral from a physician, owning a car, and receiving information after menopause on breast cancer from a health care provider. A gynecological visit increased the probability of having had a mammogram during the last two years. Logistic regression determined that a referral from a physician was the most important factor for mammogram compliance when a combination of variables was considered.

In keeping with trends in other studies (4,7, 9,13, 15,16), this study adds to the scientific evidence that shows a positive relationship between a physician's recommendation to a mammogram and compliance. It also demonstrates that a referral is the most important factor that affects elderly Puerto Rican women's mammography decisions. Furthermore, few studies have investigated the extent to which elderly women follow recommended screening guidelines. Thus, the national survey carried out in this investigation establishes what older women in Puerto Rico know about breast cancer and whether they follow recommended screening procedures. It also sheds light on important factors to mammogram compliance that service providers, particularly physicians, can take advantage of to reinforce screening practices among older Latino women and not just women in Puerto Rico.

### Resumen

Este es el primer estudio nacional sobre creencias, conocimientos y prácticas de detección temprana del cáncer de mama en mujeres de edad mayor (65 años y más) en Puerto Rico. El examen clínico fue la práctica más común, seguido del mamograma y el autoexamen en un remoto tercer lugar. Las razones principales para nunca haberse hecho un mamograma tuvieron que ver con factores personales y externos: no tener síntomas, negligencia u olvido y no tener un referido médico. No se encontró relación significativa ( $p < 0.05$ ) entre conocimiento y prácticas de detección temprana. Sin embargo, las



creencias sí afectaron el comportamiento preventivo. Aquéllas con menos creencias eran más dadas a haberse hecho un examen clínico de mama o un mamograma. El análisis bivariado demostró que la edad estaba asociada a hacerse un autoexamen una o dos veces al mes durante los dos últimos años. Un estado socioeconómico más alto demostró una correlación positiva con haberse hecho un mamograma alguna vez o en los últimos dos años antes de la entrevista. Los factores que explican el cumplimiento con la mamografía en los dos años antes de la entrevista fueron: referido médico, tener carro y recibir información sobre cáncer de mama después de la menopausia de parte de un proveedor de servicios de salud. Una visita al ginecólogo/a en los dos años antes de la entrevista aumentaba la probabilidad de haberse hecho el mamograma. La regresión logística determinó que un referido médico era la razón principal para cumplimiento con la mamografía.

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