

Breast Cancer Knowledge and Early Detection among Hispanic Women with a Family History of Breast Cancer along the U.S.-Mexico Border

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Abstract: Background. Breast cancer is the leading cause of cancer-related death among U.S. Hispanic women. Hispanics are less likely than non-Hispanic White women to be diagnosed at an early stage and survive breast cancer. **Methods.** For this cross-sectional study, we assessed differences in breast cancer knowledge, attitudes, and screening practices between Hispanic women with (FH⁺) and without (FH⁻) a family history of breast cancer in three U.S.-Mexico border counties. **Results.** Among 137 Hispanic women age 40 and older, FH⁺ women had levels of knowledge and attitudes about breast cancer similar to those of FH⁻ women. FH⁺ participants were more likely to have ever performed breast self-examinations, although levels of compliance with screening guidelines did not significantly differ between FH⁺ and FH⁻ groups. **Conclusion.** U.S. Hispanic women with a family history of breast cancer constitute an at-risk group for which adhering to preventive screening guidelines could substantially reduce breast cancer mortality.

Key words: Breast cancer, knowledge, detection, Hispanic.

Breast cancer is the most commonly diagnosed cancer and the leading cause of cancer-related death among women worldwide,¹ with more than 800,000 new cases of breast cancer diagnosed annually, representing 21% of all new cancers in women.^{2,3} Additionally, globally estimates suggest the highest age-adjusted breast cancer incidence

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rate is reported for North America, including Mexico, at 99.4 new cases per 100,000 women per year.⁴ Breast cancer accounts for nearly one in every three cancers diagnosed among women in the U.S.⁵ However, significant racial and ethnic variations in breast cancer incidence, mortality, and survival have been previously reported.^{6,7} Specifically, breast cancer is a major cause of illness and the leading cause of cancer-related death among Hispanic women.^{8,9} Moreover, U.S. Hispanic women are approximately 20% more likely than non-Hispanic White women to die from breast cancer.⁸

Research suggests the U.S.-Mexico border states suffer from disproportionately high breast cancer rates in comparison with non-border regions of either country.¹⁰ Specifically, the age-adjusted incidence rate for breast cancer among Mexican women living on the U.S.-Mexico border is about two times higher than that reported for the rest of Mexico (66.95 deaths per 100,000 as opposed to 30.16 deaths per 100,000).¹⁰ Mortality rates for breast cancer are significantly higher in the northern Mexican states than in the southern part of the country.^{10,11} Similarly, among U.S. Hispanics, breast cancer mortality rates are higher in New Mexico (18.4–21.2 deaths per 100,000) than in the majority of other U.S. states.¹² These trends highlight potential similarities in risk factors associated with breast cancer that may uniquely affect Hispanic women residing along the U.S.-Mexico border region.

Among the most important risk factors that must be considered is the presence of a family history of breast cancer. Family history has been shown to increase substantially both a woman's lifetime risk of developing breast cancer and her risk of developing the disease at an earlier age.^{13,14} Studies suggest first-degree relatives (mother, sister, daughter) of women with breast cancer have more than three times the risk of developing breast cancer that the general population has.^{15,16} In addition, lifetime risk of breast cancer increases with the number of relatives affected by the disease.^{17,18} Women with one, two, and three or more first-degree relatives with breast cancer have an increased risk of 1.8, 2.9, and 3.9 times, respectively, compared with women having no family history.¹⁹ Accordingly, guidelines recommend that women at elevated risk for developing breast cancer undergo regular screening procedures such as annual mammography and adjunct magnetic resonance imaging (MRI) at an earlier age than women at average risk.^{8,20,21}

Although researchers have examined the association between family history of breast cancer and screening practices, existing data on the breast cancer screening practices among women with a family history of breast cancer are inconsistent. Previous studies have shown that women with a family history of breast cancer were more likely than women without a family history to adhere to breast cancer screening guidelines.^{14,22–25} However, other investigations have found no association or non-statistically significant associations between family history and ever having received breast cancer screening or screening compliance.^{13,26–29}

Hispanic women with a family history of breast cancer residing along the U.S.-Mexico Border may differ from those without a family history in knowledge, beliefs, and attitudes toward breast cancer and breast cancer screening practices. To the best of our knowledge, there have been no studies related to breast cancer screening compliance in Hispanic women with a family history of breast cancer residing along the U.S.-Mexico border. The present study contributes to the literature by examining the

screening rates and knowledge of breast cancer and preventive practices associated with a lack of compliance to the recommended prevention practices among Hispanic women with and without a family history of breast cancer residing in the U.S. border state of New Mexico.

Methods

Setting. The present study was conducted in three U.S.-Mexico border counties in New Mexico. The participating counties included: Doña Ana County, Grant County, and Luna County, New Mexico. Hispanics constitute 44% of the total population in the state of New Mexico, the highest proportion of any state in the U.S.³⁰ Furthermore, there are approximately 6.6 million inhabitants residing on the U.S. side of the border, with over 1.8 million in New Mexico border counties alone.¹⁶ The U.S.-Mexico border is a medically underserved region characterized by high poverty rates, rapid population growth, high uninsured rates, and high rates of migration on both sides of the border.¹⁰

Study procedures. This cross-sectional analysis of levels of knowledge of breast cancer, attitudes, and use of preventive screening methods of Hispanic females with and without a family history of breast cancer collected data from participants between August 2006 and March 2007. A total of six community health centers, two in each of the three New Mexico counties, took part in the study. Staff members at each of the participating health centers identified approximately 900 women who made appointments to receive routine medical care between August 2006 to March 2007 and who met the basic study eligibility requirements. To be eligible, women had to be age 40 or older; not presently on radiation or chemotherapy treatment for cancer; not pregnant; and able to provide written informed consent. From the women identified as eligible to participate, 300 women were randomly selected for inclusion in the study. Thereafter, at each health center, a trained interviewer approached potential study participants, explained the nature of the study, and invited eligible women to participate. If the client agreed to participate in the study, the research interviewer provided a written document (in the participant's language of preference, English or Spanish) describing the purpose of the study, the above-mentioned eligibility requirements, and an informed consent. Out of the 300 randomly selected women, 266 agreed to participate, for a response rate of 88.7%. Reasons for non-participation included non-attendance at appointment or refusal to participate. Records of reasons for refusal to participate were not kept. For this analysis, we excluded 123 women who were younger than 40 years of age because mammogram screening is not routinely recommended for women under age 40. Consequently, included in this analysis were 143 Hispanic women.

Participants were verbally assured that they were free to refuse participation or terminate their participation at any point during the interview process and that their refusal would in no way compromise the standard of care they were entitled to receive. Women who agreed to participate in the study and have an interview received a \$20 shopping card for use at a local supermarket (with restrictions on purchase of alcohol or tobacco products). Incentives were given after study participation had been attained.

Interviewers were staff members at the participating health clinics and were bilingual (English-Spanish). Prior to initiation of the study, research investigators provided a

single, three-hour in-service training to all hospital staff and medical personnel who were participating in the administration and completion of the study. The purpose of the in-service training was to outline the purpose and objectives of the study, in addition to formalizing the data collection protocol. Significant amounts of time were dedicated to explaining the various protocols used in the recruitment of patients, as well as the efficient and effective distribution, administration, and collection of participant questionnaires. All study procedures were approved by the institutional review boards at New Mexico State University, Ben Archer Health Center Inc., and Hidalgo Medical Services (for participating health centers in Luna and Grant Counties only).

Instrument. Study participants completed an interviewer-administered questionnaire that obtained information on sociodemographic characteristics, beliefs and knowledge about breast cancer and breast cancer screening, family history of breast cancer, preventive screening practices, and recent medical visit(s). The instrument was adapted from one used in previous research examining breast cancer knowledge and experiences among Spanish women.³¹ Information on mammography use was elicited with the question, *Have you ever had a mammogram/breast ultrasound?* Other questions also contained the "mammography/breast ultrasound" phrase. The inclusion of breast ultrasound with mammography is based on the fact that this study was part of a larger binational research project for which women in Mexico were also interviewed. Breast ultrasounds are often more widely used than mammography in countries with limited resources, such as Mexico, as both a screening and a diagnostic test.³² For the purpose of the U.S. side of the study it was assumed that information on mammography use and knowledge would be obtained from these variables, as mammography is typically the primary breast cancer screening tool in the U.S. Research instruments were developed to be culturally appropriate for both Hispanic females in southern New Mexico and the Mexican female population in northern Mexico. The instrument was available in both English and Spanish.

We defined mammogram compliance as having had a mammogram in the past two years, in accordance with the guidelines outlined by the U.S. Preventive Task Force.³³ Clinical breast examination (CBE) compliance was defined as having had a physician-conducted breast exam in the past two years. Compliance with breast self-examination (BSE) recommendations was defined as having performed a BSE within the last month, in accordance with American Cancer Society guidelines.⁸

Women were categorized into two groups: women with a family history of breast cancer (FH⁺) and women without a family history of breast cancer (FH⁻). Family history among relatives was determined by asking, *Have any of your female relatives (such as mother, sister, grandmother, aunt, cousin, or other relative) ever been diagnosed with breast cancer?* For the current analyses, women who responded as having a positive family history were designated (FH⁺), whereas women who responded as not having a family history were designated (FH⁻).

The sociodemographic variables used in the current analyses include age, educational attainment, marital status, and insurance status. Knowledge of breast cancer and preventive screening procedures was assessed by asking, *Do you think a woman could have breast cancer without having symptoms or without feeling ill? Do you know the cause of breast cancer? At what age do you think a woman is more likely to develop*

breast cancer? How often do you think a woman should have a mammogram? as well as level of agreement with the statements *If breast cancer is found early, it can be cured; A breast ultrasound/mammogram will help you find breast cancer early; If you have a breast exam from a doctor there is no need to have a breast ultrasound/mammogram; and After receiving two breast ultrasounds/mammograms where the results were normal, you don't need to have other exams done for at least five years.* Participants' attitudes toward breast cancer were ascertained by responses to *You would prefer not to know if you had breast cancer; At your age you don't need to worry about breast cancer; In the next five years, you believe that you have a good chance to get breast cancer; You are more likely to get breast cancer than women who live in Mexico; and You would be afraid to tell your husband or partner that you have breast cancer because it would affect your relationship.* Previous breast cancer prevention practices were determined using a series of questions. Women were asked, *Have you ever done a self-breast exam? Have you ever had a clinical-breast exam? and Have you ever had a ultrasound/mammogram?* Respondents who indicated they had undergone any of the particular screening procedures were asked about the timing of their last test with the questions, *When did you do your last self-breast exam? When did you have your last clinical-breast exam? and When did you have your last ultrasound/mammogram?* A composite Knowledge Score was calculated to evaluate the levels of knowledge among FH⁺ and FH⁻ participants. All knowledge variables were included in the equation. Answers to each question were given a value based on whether the answer was correct (value of 1) or incorrect (value of 0). For each individual, the sum of values to all knowledge questions was totaled and divided by the number of knowledge variables. Respondents were given an overall score that ranged from 0 to 1 (with a higher score suggesting greater knowledge), which was used to determine their actual breast cancer knowledge.

Data analysis. All statistical analyses were conducted using the SPSS 15.0 statistical software package.³⁴ Statistical analyses used included frequencies, mean values, t-tests, and cross-tabulation with Pearson's chi-squared statistic and Fisher's exact test. Differences in sociodemographic characteristics, breast cancer knowledge and awareness, and preventive screening practices between women with and without a family history of breast cancer were assessed by t-test, Pearson's chi-squared and Fischer's exact tests using a significance level of $p < .05$. Associated p-values are reported as measures of significance.

Results

Sociodemographic characteristics of the study participants are presented in Table 1. The overall sample of 143 Hispanic women was divided into two groups based on their reported family history of breast cancer. Forty-six women (32.2%) reported having a family history of breast cancer (FH⁺), and 91 women (63.6%) reported that they did not have a family history (FH⁻). Six women (4.2%) were unsure if any family relatives had ever been diagnosed with breast cancer or were missing data on family history and were dropped from subsequent analyses.

The FH⁻ and FH⁺ groups did not significantly differ in age or marital status. Conversely, FH⁺ and FH⁻ women were statistically different in educational attainment,

Table 1.**SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS OF STUDY PARTICIPANTS^a**

Characteristic	FH ⁺	FH	p-value
	(n=46)	(n=91)	
	Mean (sd)	Mean (sd)	
Age, years	52.6 (8.6)	51.6 (8.9)	.532
Educational attainment, years	12.7 (2.5)	9.7 (4.1)	<.001
Household weekly income, dollars	706.40 (581.8)	458.5 (353.9)	.029
	n(%)	n(%)	
Marital Status			
Married/Living with intimate partner	28 (62.2)	65 (74.7)	.277
Divorced/Widowed/Separated	10 (22.2)	15 (17.2)	
Single/Never Married	7 (15.6)	7 (8.1)	
Insurance Status			
No Insurance	21 (45.7)	49 (57.6)	.038
Private Insurance	14 (30.4)	10 (11.8)	
Public Insurance	11 (23.9)	26 (30.6)	

^aValues based on those who had valid responses to each individual question.

FH⁺ = with family history

FH⁻ = without family history

household weekly income, and insurance status. Women with a family history of breast cancer had higher mean years of education (12.7 years) than those without a family history of breast cancer (9.7 years). Based on reported weekly incomes, the mean annual household income for the FH⁻ group was relatively low, less than \$25,000 per year, while the FH⁺ group's mean household income was approximately \$36,700 per year. Additionally, more than half (57.6%) of the FH⁻ women reported being uninsured, unlike the FH⁺ group where a significantly smaller proportion (45.7%) were uninsured.

Table 2 summarizes the frequencies of early detection practices by women with and without a family history of breast cancer. No significant differences between the FH⁺ and FH⁻ groups were found with respect to having ever had a mammogram or CBE. However, significantly more women with a family history of breast cancer reported having ever conducted BSE (88.9%) in comparison to FH⁻ women (70.2%) ($p=.017$). When asked about the frequency of early detection practices (including the last time they had received CBE, performed BSE, and how often they had received mammograms since their first) no statistically significant differences were observed between the FH⁺ and FH⁻ groups.

Our analysis of participants' knowledge about breast cancer and breast cancer preventive practices showed varying differences between the FH⁺ and FH⁻ groups

Table 2.
EARLY DETECTION PRACTICES BY FAMILY HISTORY

Characteristic	FH ⁺	FH ⁻	p-value
	(n=46)	(n=91)	
	n (%)	n (%)	
Ever had a mammogram/ultrasound ^a	33 (71.7)	55 (63.2)	.343
In compliance with mammogram guidelines ^{ab}	24 (75.0)	43 (82.7)	.415
Ever had a clinical breast exam (CBE) ^a	37 (84.1)	59 (69.4)	.089
In compliance with CBE guidelines ^a	23 (63.9)	34 (57.6)	.546
Ever performed a breast self-exam (BSE) ^a	40 (88.9)	60 (69.8)	.017
In compliance with BSE guidelines ^{ac}	15 (68.2)	30 (88.2)	.089

^aPercentages based on those who had valid responses to each individual question.

^bMammography recommendation guidelines are based on those outlined by the U.S. Preventive Services Task Force (2005).

^cBreast self-exam recommendation guidelines are based on those outlined by the American Cancer Society (2008).

FH⁺ = with family history

FH⁻ = without family history

(Table 3). The majority of both FH⁺ women (88.9%) and FH⁻ women (86.0%) believed a woman could have breast cancer without having symptoms or feeling ill. Yet, while almost all participants in both the FH⁺ (97.5%) and FH⁻ (93.8%) groups agreed that mammography would help detect breast cancer at an early stage, a significantly higher percentage of FH⁺ participants (93.2%), than of those in the FH⁻ group (77.3%), knew that breast ultrasounds/mammograms are necessary even after receiving a breast exam from a doctor ($p=.04$). Concerning participants' overall breast cancer knowledge score, we found no significant differences between FH⁺ and FH⁻ women, with both groups having a mean score close to 0.8; suggesting that both groups of women had similar levels of knowledge about breast cancer and preventive practices.

Attitudes about breast cancer did not significantly differ between FH⁺ and FH⁻ women (Table 4). It is worthy to note that about three times the percentage of women in the FH⁻ group believed that at their age they did not need to worry about breast cancer, a close-to-significant finding ($p=.07$). Yet, the majority of participants in both the FH⁺ (65.4%) and FH⁻ (68.1%) groups agreed that they had a good chance of developing breast cancer in the next five years.

Discussion

The main findings of this study show that FH⁺ participants, in general, had similar levels of knowledge about breast cancer and preventive screening procedures compared with those of FH⁻ participants. A higher percentage of participants in the FH⁺

Table 3.
BREAST CANCER AND PREVENTIVE
SCREENING KNOWLEDGE^a

Characteristic	FH ⁺	FH ⁻	p-value
	(n=46)	(n=91)	
Can a woman have breast cancer without having symptoms or feeling ill	88.9	86.4	0.788
At what age do you think a woman is more likely to develop breast cancer	74.4	64.0	0.319
If breast cancer is found early it can be cured	89.5	97.7	0.069
A woman only needs a breast ultrasound/mammogram when they feel pain/feel a lump/have discharge	85.0	70.0	0.079
A breast ultrasound/mammogram will help you find breast cancer early	97.5	93.9	0.662
How often do you think a woman should have a mammogram	88.6	96.7	0.114
If you have a breast exam from a doctor there is no need to have a breast ultrasound/mammogram	93.2	77.3	0.040
After receiving two breast ultrasounds/mammograms where the results were normal, you don't need to have other exams done for at least five years	81.1	84.2	0.790
	Mean (sd)	Mean (sd)	
Knowledge Score	0.79 (0.22)	0.77 (0.23)	0.644

^aPercentages based on those who had valid responses to each individual question.
 FH⁺ = with family history
 FH⁻ = without family history

group reported ever having had a mammogram and CBE, although these women did not differ significantly from women without a family history. Our results show that FH⁻ women were significantly more likely to perform BSE compared to FH⁺ women. Interestingly, this study demonstrates a greater lack of compliance with breast cancer screening guidelines among women with a family history of breast cancer compared with women without a family history. While FH⁺ women were more likely to have ever performed the preventive practices, they were not adhering to the recommended screening guidelines.

These results are similar to those of a number of other studies that have examined breast cancer screening practices among women with and without a family history of breast cancer. Other investigations have found no association or statistically non-

Table 4.
PARTICIPANTS' ATTITUDES ABOUT BREAST CANCER^a

Characteristic	FH ⁺	FH ⁻	p-value
	(n=46)	(n=91)	
	% Agreeing		
Can a woman have breast cancer without having symptoms or feeling ill	88.9	86.4	0.788
I would prefer not to know if I had breast cancer	4.9	16.4	0.082
At my age I do not need to worry about breast cancer	7.0	20.7	0.070
In the next five years, you believe you have a good chance to get breast cancer	65.4	68.1	1.000
You are more likely to get breast cancer than Hispanic women who live in Mexico	8.0	22.6	0.204
I would be afraid to tell my partner/spouse that I have breast cancer because it would affect our relationship	12.5	13.8	1.000

^aPercentages based on those who had valid responses to each individual question.
 FH⁺ = with family history
 FH⁻ = without family history

significant associations between family history and ever having received breast cancer screening or screening compliance.^{13,26-29} In addition, Coughlin et al.³⁵ reported that Hispanic women residing in U.S.-Mexico border counties were less likely to have had a recent mammogram than non-Hispanic women in border counties, as well as Hispanics and non-Hispanic women in non-border counties in Texas, New Mexico, Arizona, and California. Some studies have reported that women with a family history were more likely to comply with breast cancer screening guidelines than women without a family history.^{17,22,23,25} Contrarily, our study findings showed that FH⁺ women were less likely, though non-significantly so, to be compliant with mammography and BSE screening guidelines.

Data suggest that lack of knowledge and awareness about breast cancer screening procedures is a factor in the underuse of early detection practices among Hispanic women.³⁶⁻⁴⁰ A study by Ramirez and colleagues⁴¹ showed that over 40% of Mexican American women were unaware of mammography guidelines. Conversely, our results show that close to 90% of women in both FH⁺ and FH⁻ groups knew that mammograms should be obtained every one to two years by women 40 years and older. Yet fewer participants in the FH⁺ group agreed that if breast cancer is found early it can be cured; a finding that was near the level of significance ($p=.07$). A possible explanation for this may be that FH⁺ women have had relatives who have died from breast cancer and consequently do not believe in the full benefits of early detection techniques.

In addition to the sociodemographic, cultural, and knowledge factors associated with breast cancer screening, studies suggest attitude-related factors such as perceived risk and cancer worries also influence early breast cancer detection practices among women with a family history.^{42,43} Among FH⁺ women in the current study, FH⁺ women were more likely to believe that they should worry about breast cancer at their age. Still, a lower percentage of these women believed they could develop breast cancer in the next five years or that they were more likely than women in Mexico to get breast cancer. Thus, U.S. Hispanic women with a family history of breast cancer may underestimate their risk of developing breast cancer, as well as fail to translate their perceived risk into behaviors that support frequent preventive screening.

Notably, there were significant differences between FH⁺ and FH⁻ women in terms of educational attainment, weekly household income, and insurance status. FH⁺ participants had a higher mean education attainment, higher mean weekly household income, and were more likely to be insured. Evidence suggests women with lower educational attainment and lower incomes have lower levels of knowledge about breast cancer and breast cancer screening procedures than those with higher educational levels and incomes.^{44,45} Education, income, and insurance status have all been shown to independently predict breast cancer screening practices,^{46,47,48,49} and may serve as barriers to access to cancer educational information and breast cancer screening services.^{31,35,50,51}

The results from the current study must be considered in light of certain limitations. This analysis focused on Hispanic women with and without a family history of breast cancer who presented at community health clinics in three New Mexico counties along the U.S.-Mexico border. Furthermore, this study has a limited total sample size ($n = 137$) and number of women in the sample with a positive family history ($n = 46$).

A second limitation that must be considered is the study design. The current study was retrospective analysis reliant on self-report data, which is subject to recall bias. Risk behavior data were collected by self-report and may, therefore, not be fully accurate if study participants had difficulty remembering their history and/or frequency of breast cancer screening procedures. However, self-report data, particularly of mammography use, have been validated previously and appear to be reliable.^{52,53} Likewise, the accuracy of self-report of family history of breast cancer has been examined and is considered to be reasonably sound.^{54,55}

The inclusion of breast ultrasound with mammogram on several variables may have affected the responses of some participants, particularly U.S. Hispanic women. However, use of breast ultrasound with mammogram was intended to enable us to make cross-cultural comparisons of breast cancer screening behaviors for both U.S. Hispanic and Mexican female populations.

Conclusion. To the best of our knowledge, the present study was the first to compare breast cancer knowledge, beliefs, attitudes, and breast cancer screening practices among Hispanic women with and without a family history of breast cancer residing along the U.S.-Mexico border. It is probable that this population could benefit from interventions to promote frequent breast cancer screening, especially among women with a family history who are at increased risk for breast cancer. Further research is needed to determine whether there are other predictors of breast cancer screening among Hispanic women with a family history. Similarly, increased research on theory-based strategies

targeted at increasing early detection behaviors among Hispanic women with a family history of breast cancer is warranted.

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