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Breast Cancer Knowledge, Attitudes, and Early Detection Practices in United States-Mexico Border Latinas

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Abstract

Introduction: Evidence suggests Latinas residing along the United States-Mexico border face higher breast cancer mortality rates compared to Latinas in the interior of either country. The purpose of this study was to investigate breast cancer knowledge, attitudes, and use of breast cancer preventive screening among U.S. Latina and Mexican women residing along the U.S.-Mexico border.

Methods: For this binational cross-sectional study, 265 participants completed an interviewer-administered questionnaire that obtained information on sociodemographic characteristics, knowledge, attitudes, family history, and screening practices. Differences between Mexican ($n = 128$) and U.S. Latina ($n = 137$) participants were assessed by Pearson's chi-square, Fischer's exact test, t tests, and multivariate regression analyses.

Results: U.S. Latinas had significantly increased odds of having ever received a mammogram/breast ultrasound (adjusted odds ratio [OR] = 2.95) and clinical breast examination (OR = 2.67) compared to Mexican participants. A significantly greater proportion of Mexican women had high knowledge levels (54.8%) compared to U.S. Latinas (45.2%, $p < 0.05$). Age, education, and insurance status were significantly associated with breast cancer screening use.

Conclusions: Despite having higher levels of breast cancer knowledge than U.S. Latinas, Mexican women along the U.S.-Mexico border are not receiving the recommended breast cancer screening procedures. Although U.S. border Latinas had higher breast cancer screening levels than their Mexican counterparts, these levels are lower than those seen among the general U.S. Latina population. Our findings underscore the lack of access to breast cancer prevention screening services and emphasize the need to ensure that existing breast cancer screening programs are effective in reaching women along the U.S.-Mexico border.

Introduction

Breast cancer is becoming an increasingly significant global public health threat, affecting women of all socioeconomic levels in both developed and developing countries.[1] Although rates of breast cancer mortality in developed countries have historically been far greater than those in developing countries,[2–4] trends suggest breast cancer mortality rates among women in Latin America are rapidly increasing.[5] In Mexico, breast cancer has emerged as the leading cause of death from malignancies among women,[6–8] following the pattern of breast cancer mortality seen among U.S. Latinas.[9] Thus, evidence suggests the disparity in breast cancer mortality rates between U.S. Latina and Mexican women may not be as large as it was in the past.

In 2006, breast cancer mortality among Mexican women residing in the northern border states ranged from 16.7 to 21.3 deaths from breast cancer per 100,000 women,[10] whereas for U.S. Latinas living in the southern border states, breast cancer mortality rates ranged from 20.9 to 29.5 breast cancer deaths per 100,000 women.[11] Consequently, the threat of mortality from breast cancer among Mexican women living on the United States-Mexico border may parallel that seen for their neighboring U.S Latinas.

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Preventive screening methods, such as mammography and clinical breast examinations (CBE), have been shown to reduce a woman's risk of dying from breast cancer by detecting breast malignancies in their early, most treatable stages.[12] Until recently, the recommendations for breast cancer screening in the United States included mammography, with or without CBE, every 1–2 years for women aged ≥40, with no recommendation for routine CBE alone or breast self-examination (BSE).[13] In Mexico during the same period, breast cancer screening recommendations were mammography every 1–2 years for women aged ≥40 with two or more risk factors (i.e., family history of breast cancer, age at first full-term pregnancy >30 years) and every year for women aged ≥50, yearly CBE for women > age 25, and teaching and performing of monthly BSE on initiation of menarche.[14]

Despite the recommendations, the majority of evidence on breast cancer early detection practices (EDPs) of U.S. Latina and Mexican women points to relatively low breast cancer screening rates.[15–25] As a result, data indicate that U.S. Latinas are more likely to be diagnosed with advanced stage breast cancer, as well as with larger tumors.[20,26–33] As for Mexican women, it is reported that only 5%–10% of breast cancers are diagnosed at an early stage (stage 0–1), when the probability of survival is higher.[34,35] Therefore, the aim of this study was to further investigate breast cancer screening among U.S. Latina and Mexican women living along the U.S.-Mexico border, by assessing the levels of breast cancer knowledge, attitudes, and factors that may be associated with EDPs.

Materials and Methods

Information on the study design, recruitment methods, eligibility, and instrumentation has been described in detail.[36,37] Briefly, the present study was conducted in four U.S.-Mexico border communities: Doña Ana County, NM; Grant County, NM; Luna County, NM; and Ciudad Juárez, Chihuahua, Mexico. The study population consisted of 137 U.S. Latina women and 128 Mexican women, aged ≥40 years, who were randomly selected from seven participating community health centers (6 in NM, 1 in Juárez, Mexico).

Participants completed an interviewer-administered questionnaire (in the participant's language of preference, English or Spanish) with questions on sociodemographic information, attitudes and knowledge about breast cancer and breast cancer screening, family history of breast cancer, and breast cancer screening practices. Information on participants' breast cancer screening use was obtained from responses to questions about whether participants had ever had a mammogram/breast ultrasound, ever had a CBE, or had ever performed a BSE. The inclusion of breast ultrasound with mammography was because of the nature of this binational research project. Based on consultations with medical experts at the participating health center in Juárez, Mexico, as well as evidence that breast ultrasounds are often more widely available than mammography in countries with limited resources, such as Mexico,[38] we decided to include breast ultrasound with mammography on the study questionnaire in order to appropriately measure breast cancer screening histories for all participants.

Statistical analysis

Descriptive statistics were used to assess participants' sociodemographic characteristics, breast cancer knowledge and attitudes, and EDPs. Bivariate and multivariate logistic regression analyses were performed to examine the indirect and direct association between participants' nationality (U.S. Latina or Mexican) and history of ever having mammogram/breast ultrasound, CBE, and BSE (yes/no). Each breast cancer screening test was modeled separately.

For multivariate analyses, estimates were adjusted for age (40–49 years old vs. ≥50 years old), educational attainment (continuous, linear variable), household weekly income (continuous, linear variable), marital status (married/living with intimate partner vs. not married/living with intimate partner), insurance status (insured vs. not insured), and family history (yes vs. no). Because breast cancer screening recommendations and practices differ by a woman's age, we modeled age as a binary variable (40–49 years old vs. ≥50 years old). Furthermore, to account for effect modification of the association of interest by age, an interaction term between participants' age and nationality was created.

The Likelihood Ratio Test was used to assess model fit. For all screening practices, inclusion of the interaction term between age and nationality did not significantly improve model fit, indicating a lack of evidence of effect modification in these data. Likewise, knowledge level was not found to significantly improve model fit. Accordingly, the interaction term and knowledge variable were not included in our final models. A significance level of $p<0.05$ was employed. All statistical analyses were conducted using Stata/SE 10.1. (Statacorp, College Station, TX).

Results

Sociodemographic characteristics

A total of 265 eligible women participated in the study, comprising 137 U.S. Latina women (51.7%) and 128 Mexican women (48.3%). Characteristics of the study population are presented in Table 1. Overall, U.S. Latinas were significantly older, reported a higher level of education, and had higher household weekly incomes compared to Mexican participants. A significantly higher proportion of Mexican participants were uninsured compared to their U.S. counterparts.

Breast cancer knowledge and attitudes

Table 2 shows participants' responses to the knowledge measures. Mexican women had a significantly greater proportion of participants with high knowledge levels (54.8%) compared to U.S. Latinas (45.2%, $p=0.01$). In regard to specific knowledge items, significantly more Mexican participants than U.S. Latinas knew that breast cancer can be cured if found early, that women need both mammograms/breast ultrasounds and CBEs, and that mammograms/breast ultrasounds are not necessary only when a women feels pain, a lump, or discharge. Conversely, more U.S. Latinas than Mexican women were aware that women should get mammograms/breast ultrasounds at least once every 2 years ($p=0.002$).

We then examined participants' attitudes about breast cancer (Table 3). To gain an understanding of women's perceived relative risk of breast cancer, we asked participants if they were more likely to develop breast cancer compared to their U.S.-Mexico border counterparts. A significantly greater proportion of U.S. Latinas believed they are more likely to

Table 1. Sociodemographic Characteristics of Study Participants

Characteristic	*U.S. Latina* (n=*137*) *Mean (95% CI)*	*Mexican* (n=*128*) *Mean (95% CI)*	p *value*
Age, years	52.0 (50.5-53.4)	48.2 (47.0-49.4)	< 0.001
Educational attainment, years	10.7 (10.1-11.4)	8.0 (7.5-8.5)	< 0.001
Household weekly income, USD	538.7 (449.7-627.7)	97.6 (90.5-104.8)	< 0.001
	n *(%)*	n *(%)*	
Married/living with intimate partner	93 (70.5)	96 (75.6)	0.648
Insurance status			
Uninsured	70 (53.4)	98 (76.6)	< 0.001
Insured	61 (46.6)	30 (23.4)	
Family history of breast cancer			
Yes	46 (33.6)	31 (24.2)	0.094
No	91 (66.4)	97 (75.8)	

Values based on those who had valid responses to each individual question.
CI, confidence interval.

develop breast cancer compared to Mexican women ($p=0.013$). The number of women who reported that they did not need to worry about developing breast cancer at their age was significantly higher among Mexican women ($p=0.007$).

Early detection practices

Table 4 summarizes the crude and adjusted odds ratios (ORs) of the association between participant nationality and EDPs. The results show that U.S. participants had significantly greater odds of ever obtaining a mammogram/breast ultrasound ($p<0.001$) and CBE ($p<0.001$), as well as ever performing BSE ($p=0.001$) than Mexican women. Even after adjusting for the selected covariates, U.S. Latinas had significantly greater odds of having ever had a mammogram/breast ultrasound ($p<0.01$) and CBE ($p<0.01$) compared to Mexican women; however, the difference between U.S. Latinas and Mexican women in having ever performed BSE was attenuated.

In regard to the association between specific covariates and EDPs, age, education, and insurance status were significantly associated with all EDPs, controlling for all other covariates. Older age was associated with significantly greater odds of having ever received a mammogram/breast ultrasound ($p<0.05$) and CBE ($p<0.05$); however, younger age was significantly associated with having ever performed BSE ($p<0.01$). Participants with greater educational attainment had significantly greater odds of having ever had a mammogram/breast ultrasound ($p<0.05$) and CBE ($p<0.01$) and ever performed BSE ($p<0.01$). Having health insurance was associated with a >2-fold increase in the odds of having ever had a mammogram/breast ultrasound ($p<0.01$), CBE ($p<0.01$), and ever performed a BSE ($p<0.01$).

Differences in levels of knowledge between participant groups were not found to be significantly associated with EDPs (results not shown). To better understand these trends, we carried out further analyses on knowledge. Among U.S. Latinas, women with higher levels of knowledge were more

Table 2. Knowledge of Breast Cancer and Preventive Screening Procedures

Characteristic	*U.S. Latinas* (n=*137*) *% Answered correct*	*Mexican* (n=*128*)	p *value*
A woman can have breast cancer without having symptoms or feeling ill.	87.2	93.6	0.095
At what age do you think a woman is more likely to develop breast cancer?	67.4	67.8	0.953
If breast cancer is found early, it can be cured.	95.2	100	0.014
A woman only needs a mammogram/breast ultrasound when she feels pain/feels a lump/has discharge.	75.0	89.8	0.002
A mammogram/breast ultrasound will help you find breast cancer early.	95.1	96.1	0.765
How often do you think a woman should have a mammogram/breast ultrasound?	94.0	81.5	0.002
If you have a breast examination from a doctor, there is no need to have a mammogram/breast ultrasound.	83.2	93.8	0.014
After receiving two breast ultrasounds/mammograms where the results were normal, you don't need to have other examinations done for at least 5 years	83.2	85.6	0.714
	n *(%)*	n *(%)*	
High knowledge level	71 (45.2)	86 (54.8)	0.011

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

Table 3. Participants' Attitudes About Breast Cancer

Characteristic	U.S. Latina (n = 137) % Agreeing	Mexican (n = 128) % Agreeing	p value
You would prefer not to know if you had breast cancer.	12.3	7.1	0.194
At your age, you do not need to worry about breast cancer.	16.0	30.7	0.007
In the next 5 years, you believe you have a good chance to get breast cancer.	67.1	71.1	0.723
You are more likely to get breast cancer than your Latina counterparts who live in the U.S./Mexico.	18.0	5.2	0.013
You would be afraid to tell your partner/spouse that you have breast cancer because it would affect your relationship.	13.3	11.4	0.699

Percentages based on those who had positive responses to each individual question.

likely to perform all EDPs; however, among Mexican women, high knowledge level was associated with BSE only. The majority of Mexican women reported never having obtained a mammogram/breast ultrasound (67%) or CBE (55%).

Discussion

The U.S.-Mexico border is a distinct region connecting two countries with interdependence in insuring the optimal health of the regional communities. Evidence suggests Latinas residing in the U.S.-Mexico border states have disproportionately higher breast cancer mortality rates compared to the majority of their counterparts in the interior of either country.[39–42] For these reasons, reducing mortality from breast cancer through early detection has become a major priority for both governments and one of the principle objectives of the United States-Mexico Border Health Commission.[42]

Both the United States and Mexico now have national breast cancer screening programs that offer free/reduced-price mammographies; for instance, in the United States, there is the National Breast and Cervical Cancer Early Detection Program (NBCCEDP), which was established in 1990, and in Mexico, the first breast cancer mammography screening program was established in 2005 in Mexico City D.F. Such programs provide critical resources for breast cancer screening prevention for low-income, uninsured, and underinsured women. Variation in program availability and eligibility criteria, however, as well as the lack of awareness among providers and the community at large about the existence of these programs, may limit their potential impact.

The main findings of our study show that Mexican participants had higher levels of knowledge about breast cancer, although U.S. Latinas were more likely to have ever engaged in breast cancer EDPs. Among the risk factors included in multivariate analyses, age, education, and insurance status were significantly associated with a positive history of preventive screening behaviors.

The high levels of knowledge among Mexican study participants may be attributed to both the Mexican government and nongovernmental organizations, such as La Asociacion Mexican Contra el Cancer de Mama (Fundacion Cim*ab), that have launched widespread efforts to disseminate educational information in the fight against breast cancer since the early 2000s.[43] These findings show that previous research suggesting a lack of knowledge on the part of Mexican women, including having little information about the importance of early detection,[44] may underestimate the breast cancer knowledge of Mexican women living along the U.S.-Mexico border.

Even though Mexican participants were knowledgeable about breast cancer, we found low levels of mammography/breast ultrasound and CBE use. Among all Mexican participants, high knowledge level was associated with BSE only, as the majority of participants with both high and low knowledge levels reported to have never had a mammogram/breast ultrasound or CBE. One potential explanation for these results is that women's ability to undergo mammography/breast ultrasound and CBE largely depends on structural factors, including the availability of resources and insurance. In Mexico, data suggest there is an overall lack of access to screening mammography services, partly because of a

Table 4. Results of Logistic Regression of Early Detection Practices

Variable	Ever mammography/breast ultrasound OR[a] (95% CI)	Ever CBE OR[a] (95% CI)	Ever BSE OR[a] (95% CI)
U.S. Latina (crude)	4.00 (2.39-6.71)*	3.62 (2.14-6.15)*	2.39 (1.40-4.08)*
U.S. Latina (adjusted)	2.95 (1.33-6.52)*	2.67 (1.16-6.12)*	1.53 (0.61-3.82)
Family history of breast cancer	1.37 (0.66-2.80)	0.84 (0.40-1.76)	1.31 (0.59-2.89)
Age	2.02 (1.07-3.79)**	1.95 (1.02-3.73)**	0.34 (0.17-0.70)*
Education	1.12 (1.01-1.24)**	1.16 (1.04-1.29)*	1.22 (1.09-1.37)*
Income	1.00 (1.00-1.01)	1.00 (1.00-1.01)	1.00 (1.00-1.01)
Married/living with intimate partner	1.14 (0.56-2.30)	1.10 (0.53-2.28)	1.86 (0.83-4.17)
Insurance	2.46 (1.26-4.78)*	2.93 (1.45-5.92)*	9.15 (3.53-23.70)*

[a]Odds ratios (OR) based on logistic regression of having ever had a mammogram/breast ultrasound, ever had a clinical breast examination (CBE), or ever having performed a breast self-examination (BSE) (modeled separately), with nationality as the main predictor; family history, age, education, income, marital status, and insurance status were included as adjustment variables in the multivariate models.

*$p < 0.01$; **$p < 0.05$.

shortage of units and trained personnel, and CBEs are often left out of routine clinical examinations.[43–45] Second, >75% of participants in our Mexican cohort did not have insurance, which may decrease women's access to healthcare services and, therefore, potentially explain the large proportion of participants who have never obtained a mammogram/breast ultrasound or CBE.

BSEs are a method of detection that women can perform on their own once they have been properly educated on how to carry out the procedure. In the Guidelines for the Prevention, Diagnosis, Treatment, Control, and Epidemiologic Surveillance of Breast Cancer, published by the Secretaria de Salud in Mexico, there is a strong emphasis on promoting BSE as a method of secondary prevention of breast cancer; this report states it is a role of health service providers/agencies to teach BSE to all women who receive care in the health system.[14] Accordingly, Mexican women may take advantage of this screening method largely because it does not rely on the presence of technology or equipment. Data support this notion, showing that approximately 90% of breast cancers diagnosed in Mexico are identified by the woman herself, with only 10% of those tumors in stage I.[40,46] Further, although there is a plethora of evidence that points to BSE as ineffective in reducing breast cancer mortality in populations where the majority of cases are detected in early stages, there is little evidence available for developing countries, where cases are often detected in late stages.[1] Knaul et al.[1] suggest that in these instances, where the infrastructure and human resources for mammography are being developed, other options, such as BSE, may be useful screening modalities.

Among U.S. Latinas, the story is reversed; women have lower levels of breast cancer knowledge and higher levels of EDPs compared to their Mexican counterparts. Approximately 66% of U.S. Latina participants had ever had a mammogram, a finding that suggests mammography rates among U.S. border Latinas may be lower than mammogram rates observed from national data among all U.S. Latinas.[47,48] Consequently, whereas the availability of breast cancer screening resources in the United States may explain the significant differences in EDPs between the U.S. and Mexican participants, breast cancer screening use among U.S. border Latinas may be lower than that see among other U.S. racial/ethnic groups.

Our findings that age, education, and insurance were all associated with breast cancer screening behaviors among U.S.-Mexico border Latinas coincide with existing literature on factors associated with the use of breast cancer screening among both U.S. and Mexican women.[17,44,49–57] These factors appear to be universal in regard to predicting breast cancer screening behaviors and use among women[55] and may serve as barriers to access of breast cancer screening services and cancer educational information.[17,52,54,58]

There are certain limitations to the current study. Our analysis focused on Mexican and U.S. Latina women seeking routine medical care at a community health center/clinic along the U.S.-Mexico border. Accordingly, our findings are most generalizable to similar, clinic-based populations and those who access medical care. Moreover, the present study had a limited total sample size ($n=265$) comprising 137 U.S. Latina women and 128 Mexican women, which also limits the generalizability of our findings.

Another limitation pertains to the study design. The current study was a retrospective, cross-sectional study that relied on participants' self-report, which is subject to recall bias. Specifically, information on EDPs was collected by self-report and, therefore, may not be completely accurate if participants encountered difficulties remembering their history of breast cancer screening use.

Lastly, the decision to include breast ultrasound with mammography may have affected participants' responses, particularly women who are unfamiliar with breast ultrasound. For those participants who had received a breast ultrasound as a diagnostic test, this may have caused an overestimation of mammography/breast ultrasound screening history. It is important to note that breast ultrasounds are not commonly used as the preferred breast cancer screening method in developed countries and that health promotion efforts may not typically include breast ultrasound in breast cancer prevention education. Our use of breast ultrasound was intended to enhance this binational research project, allowing us to make cross-cultural comparisons of breast cancer screening behaviors for both U.S. Latina and Mexican female populations.

Conclusions

Our findings suggest that despite having higher levels of breast cancer knowledge, Mexican women living along the U.S.-Mexico border are not receiving the recommended breast cancer screening procedures. Nevertheless, Mexican women may take advantage of the only early detection practice that does not rely heavily on the availability of resources, BSE. Furthermore, while U.S. border Latinas had higher breast cancer screening levels than their Mexican counterparts, their overall levels of breast cancer screening are lower than those seen among the general U.S. Latina population and other racial/ethnic groups in the United States.

This study provides valuable information about breast cancer knowledge and attitudes, as well as the early detection practices of U.S. Latina and Mexican women living along U.S.-Mexico border. Although the guidelines for breast cancer screening in the United States and Mexico highlight certain differences in breast cancer prevention strategies, our findings underscore an overall lack of access to breast cancer screening prevention among U.S. Latinas and Mexican women along the U.S.-Mexico border. Improving access to breast cancer screening services will take a concerted effort by researchers, health advocates, healthcare providers, and other key stakeholders not only to translate research findings into culturally appropriate prevention strategies but also to ensure that the existing breast cancer screening programs are effective in reaching women with greatest need.

Disclosure Statement

The authors have no proprietary, financial, professional, or other personal interest of any nature or kind in any product, services, and/or company that could be regarded as influencing the position presented in, or the review of, this article.

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