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Latinas' Mammography Intention Following a Home-Based Promotores–Led Intervention

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Abstract

Despite increases in mammography rates among Latinas, screening rates remain lower than in non-Latina Whites (NLW) and Latinas typically present with breast cancer at a later stage. Trained lay community workers (*promotores*) have been successfully used to increase screening mammography intention in Latinas. Little is known, however, about the potential mechanisms of these interventions, such as increased breast cancer knowledge (knowledge) and social interactions concerning mammography practices (social engagement). This prospective pre-post study examined this gap in the literature by 1) documenting changes in knowledge and social engagement after receipt of a *promotores*-based intervention; and 2) establishing if post-intervention knowledge and social engagement predicted mammography intention, after adjusting for socio-demographic and lifetime mammography history. There were significant increases in knowledge and social engagement about mammography. Finally, post-intervention social engagement was a significant predictor of mammography intention. Future *promotores*-based interventions should focus on enhancing social engagement to improve mammography intention and use.

Introduction

Breast cancer is the leading cause of cancer mortality in Latinas.(1) A lower participation rate in mammography is one putative factor that explains why Latinas are more likely to experience late stage diagnoses and die from a breast cancer diagnosis relative to non-Latina Whites (NLW).(2) Previous studies promoting mammography in Latinas and other underserved communities have used interventions that employ a wide array of communication (reminder letters, telephone calls, social networking, media campaigns) and education strategies (community-directed, individual-directed).(3–7) These interventions have shown modest improvements in breast cancer knowledge and mammography use; however, Latina screening rates remain lower than those of NLW.

In the recent past, interventions to promote mammography among Latinas have used bilingual and bicultural female community health workers (*promotores*).(8) *Promotores*-based interventions have been shown to increase breast cancer knowledge as well as mammography intention and use.(8–13) This is likely due, in part, to *promotores*' shared language and cultural perspective, which allows for targeted messages about breast health and maximal comprehension. Although there is a growing body of literature indicating the effectiveness of these interventions, little is known about mechanisms underlying the effectiveness of *promotores*-based interventions. Our study adds to existing literature by examining two potential mechanisms: knowledge and social engagement. We first test if there are changes in breast cancer knowledge and social engagement about mammography after women participate in a *promotores*-based intervention. Second, we explore if knowledge and social engagement promotes mammography intention after participating in a *promotores*-based intervention among Latinas.

Increased knowledge about breast cancer and screening practices is thought to be a major potential factor contributing to Latinas' increased mammography intention after participation in a *promotores*-based intervention. Low knowledge about breast cancer and screening is a recognized barrier contributing to low rates of mammography among Latinas.(14–19) Cultural misconceptions among Latinas also may influence intentions.(20, 21) For example, many Latinas believe they are not at risk for developing breast cancer or that a single mammogram is sufficient to detect breast cancer for life.(22, 23) *Promotores*-based interventions have been effective at addressing misconceptions and increasing knowledge of breast cancer.(11–13, 24, 25) Nonetheless changes in knowledge have not always resulted in changes in mammography intentions.(26) Our study provides additional data to consider first if interventions lead to changes in breast cancer knowledge and second if knowledge after an intervention is associated with subsequent mammography intention.

Social engagement is a second factor that may contribute to Latinas' increased mammography intention after participation in a *promotores*-based intervention. Social engagement is the frequency with which women discuss breast cancer detection practices, including mammography, with members of their social network (family, friends, physician). Observational, generally cross-sectional, studies have indicated Latinas with greater social engagement show greater evidence of changes in mammography intention.(27–29) This

association is likely tied to cultural norms and practices that emphasize strong social interdependence (e.g., *personalismo*, *familismo*, *colectivismo*).⁽³⁰⁾ Latinas rely on the advice and support of their family and friends when making decisions, which may underlie the relationship between social engagement to mammography intention.^(29, 31, 32) Although social engagement has been linked to mammography intention among Latinas⁽²⁸⁾ it has not been demonstrated that *promotores*-based interventions increase social engagement. Nor have increases in social engagement after participation in an intervention been temporally examined in relation to subsequent mammography intention.

In this study, we gathered data from a *promotores*-based intervention in a large Latina community within the Lower Yakima Valley of Washington State. The overall purpose of this study was to determine whether a *promotores*-based intervention could increase mammography intention in Latinas. Our specific aims for this study were: 1) to examine changes in knowledge and social engagement as a result of the intervention, and 2.) to establish if post-intervention knowledge and social engagement predicted subsequent changes in mammography intention.

METHODS

Setting

This project took place in the Lower Yakima Valley of Washington State. Latinos, mostly Mexican-American, constitute the majority of the resident population (67%).⁽³³⁾ The study population is predominantly Spanish-speaking and exhibits high levels of socioeconomic disadvantage (e.g., low-income, less than a high school education).^(13, 34)

Procedures

Guided discussions, called “home health parties,” were led by a *promotores*. Home health parties were conducted between November 2012 and October 2013. The goal was to increase awareness and education of breast cancer and encourage mammography screening. The home health party was built around a strategy where a host invites friends and relatives to come to his/her home to hear about a health topic. This strategy has been used successfully in the Lower Yakima Valley.⁽¹³⁾ The educational content in the flipchart the *promotores* used for this intervention was adapted from the *Cancer 101* curriculum.⁽³⁵⁾ Content was adapted to specifically address breast cancer and was translated into Spanish. Participants were recruited to be “hosts” of the home health parties at a variety of outreach activities, including health fairs, community meetings, faith-based organizations, and other activities in the community. The host received a small gift (e.g., water bottle, lunch bag) for holding the event. Participants who completed pre- and post-tests also received a similar small gift. For this analysis, we limited our sample to participants who: 1) identified as female; 2) were 40 years or older; and 3) had no lifetime history of breast cancer. On average, there were 2 to 3 individuals per home health party in this study.

Home health parties were conducted over two visits. At the first visit, the *promotor/a* began by obtaining informed consent and having the participants complete a baseline survey (socio-demographic, medical insurance status, regular place of care, lifetime mammography

history, knowledge, social engagement). After completion of the baseline survey, the *promotor/a* used a flip chart with visual representations to begin with a discussion of how cancer begins and spreads, what breast cancer is, risk factors for breast cancers, and ways to modify lifestyles to lower risk. During the second visit, the *promotor/a* continued with a discussion of symptoms of breast cancer, and how cancer could be detected with mammography. Treatment options were also discussed. The home health parties concluded with a discussion around survivorship if breast cancer is detected early when a cure is most likely. We partnered with the Yakima Health District's Breast, Cervical and Colon Health Program to develop a resource guide, which was distributed to participants showing where women could obtain low-cost or free mammograms as well as treatment for breast cancer. Questions and open discussion were encouraged throughout. Finally, the *promotor/a* assisted in making appointments for mammograms if desired by the participants. Approximately 1–3 months after the second home health party visit, participants were re-contacted for a follow-up survey (knowledge, social engagement, mammography intention).

Study survey data were collected and managed using REDCap electronic data capture tools hosted at University of Washington.⁽³⁶⁾ REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

Compliance with Ethical Standards

This project has been approved by the Fred Hutchinson Cancer Research Center Institutional Review Board Office and has therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. All participants gave their informed consent prior to their inclusion in the study.

Measures

Mammography Intention—Our primary outcome of interest was measured during the follow-up; women were asked the following questions: “Since you attended the Home Health Party, have you thought about going to a clinic or hospital to get a mammogram?” and “Are you considering getting a mammogram within the next three months?” Sixty-eight women answered “Yes” to both items, nine women indicated they had thought about going to a clinic or hospital to get a mammogram, but answered no to the item concerning getting a mammogram in the next three months, one woman indicated she was considering getting a mammogram within the next three months, but answered ‘No’ to the other item, and fourteen women answered ‘No’ to both items. Given these findings, items were summed together to create summary scores and scores were dichotomized, such that if woman endorsed any *or* both items, she was noted as having ‘mammography intention’ (0 = No intention, 1 = Any intention).

Knowledge—At baseline and follow-up, women were given an index of seven questions. Questions were developed based on the content covered in the breast cancer education

flipchart.(35) Items were administered in both baseline and follow-up questionnaires. Items were as follows: “A tumor is always cancerous.”, “Breast cancer is more common in 64 year old women than in 40 year old women”, “It is better to wait until you have symptoms before you see a doctor about having a mammogram.”, “For some women, being overweight increases their risk of developing breast cancer.”, “Bearing the first child after the age of 30 increases the risk of breast cancer”, “Cancer can be prevented or cured by using herbs or other natural remedies.”, and “Most women survive breast cancer if it is found and treated in an early stage, before it has spread to other areas of the body.” Women could indicate they agreed or disagreed with statements. Items were coded, such that 0 = Incorrect response, 1 = Correct response. Items were summed together to create summary scores. The potential range of summary scores was 0–7.

Social Engagement—We defined social engagement as to whether the women had a conversation with members within her social network. Conversations with doctors, family, and friends about mammography for breast cancer screening assessed at baseline and at follow-up were compared. During the baseline survey, engagement data were collected (“Have you ever talked to any of your family members about mammograms for breast cancer screening?” “Have you ever talked to any of your friends about mammograms for breast cancer screening?” “Have you ever asked a doctor about mammograms for breast cancer screening?”). During the follow-up survey, data were collected about conversations occurring after the intervention (“Since you attended the Home Health Party, have you talked to any of your family members about mammograms for breast cancer screening?”; “Since you attended the Home Health Party, have you ever talked to any of your friends about mammograms for breast cancer screening?”; “Since you attended the Home Health Party, have you asked a doctor about mammograms for breast cancer screening?”). Women could indicate they had not had a conversation (0) or did have one (1). Items were summed together to create summary scores. The potential range of summary scores was 0–3.

Socio-demographic, healthcare access, and lifetime mammography history of mammography variables—The baseline questionnaire included demographic variables (age, education), healthcare access (insurance status, regular place of care), and lifetime mammography history.

Data Analysis

Our sample included 101 Latina participants. Because there were very few missing cases (<1%), we used case deletions to accommodate them. This is considered a simplistic, adequate method for limited amount of missing data.(37) We first conducted bivariate analyses with study variables of interest (mammography intention, knowledge, social engagement) to identify potential covariates. Multivariate analyses were adjusted for age, education and lifetime mammography history based on preliminary bivariate analyses and their associations with subsequent breast cancer screening practices.(38, 39) To answer our first research question, we first conducted separate paired t-tests to examine pre-post intervention changes in knowledge and social engagement. To adjust for covariates, we next conducted separate repeated measures analyses of covariance with knowledge and social engagement as the outcomes of interest and between-participant covariates (age, education,

lifetime mammography history). To answer our second question, we conducted two multivariable logistic regression models with post-intervention mammography intention as the outcome. Covariates (age, education, lifetime mammography history) and post-intervention knowledge and social engagement scores were included as predictors.(40)

RESULTS

Table 1 provides basic socio-demographic, healthcare access, and lifetime mammography history. Our population had relatively low levels of education and access to private insurance coverage. Nonetheless, 76% of women indicated they had a regular place of care (clinic, doctor) and 77% reported they had received a mammogram in the past.

Approximately 84% of women indicated mammography intention after attending the home health party. Notably, mammography intentions were not associated with lifetime mammography history ($\chi^2 = 0.49$, $df = 1$, $p = .48$) nor were other socio-demographic and healthcare variables. Other preliminary bivariate analyses revealed women with lower levels of education had lower follow-up knowledge scores, $r = -0.26$, $df = 98$, $p = .009$. Other socio-demographic and healthcare variables were not associated with knowledge or social engagement. Given these results and previous research,(38–40) all subsequent analyses adjusted for age, education and lifetime mammography history.

Preliminary analyses from paired t-tests indicated significant changes in knowledge, $t(97) = 7.34$, $p < .0001$, and social engagement, $t(100) = 6.93$, $p < .0001$. After adjusting for covariates (Table 2), increases in participants' knowledge were attenuated, but trended towards significance ($n = 97$; $F(1,93) = 3.21$, $p = .08$). Additionally, even after adjusting for covariates, women were significantly more likely to discuss mammography with more individuals, including their doctors, family, and friends after the intervention ($n = 100$; $F(1, 96) = 5.38$, $p = .02$).

We conducted two multivariable logistic regression models, adjusted for age, education and lifetime mammography history, to examine the respective associations of follow-up knowledge and social engagement to post-intervention mammography intention ($n = 97$ and 100 respectively; Table 3). After adjusting for covariates, post-intervention social engagement was a significant predictor for intention, $aOR = 2.02$, 95%CI [1.11, 3.69], $p = .01$, but knowledge was not, $aOR = 0.91$ [0.48, 1.71], $p = .99$.

Study data were collected and managed using REDCap electronic data capture tools hosted at University of Washington.(36)

DISCUSSION

Our work adds to a growing body of evidence on the effectiveness of *promotores*-based interventions in increasing knowledge and intention to be screened.(8–13) Eighty-four percent of women in our study intended to obtain a mammogram at the follow-up after the intervention. Our data further demonstrate increased knowledge and social engagement concerning mammography. Our work provides pilot data concerning mechanisms underlying the effectiveness of *promotores*-based interventions. Specifically, post-

intervention social engagement was a significant predictor of mammography intention. These findings suggest that *promotor/a* might successfully influence healthy intentions in Latinas through increasing women's social interactions concerning mammography.

Our findings confirm the results of previous *promotores*-based studies, which have shown a marginally significant, but meaningful, increase in breast cancer knowledge and mammography intention,(13, 40) and extend the literature to demonstrate a change in social engagement. Finding an increase in social engagement among Latinas after a *promotores*-led intervention is significant because it suggests a possible mechanism for how group-based interventions may be more effective than individual-based interventions in Latinas because group-based formats facilitate social engagement. To our knowledge, no study has demonstrated a change in social engagement resulting from a *promotoress*-led intervention. Future study is warranted to test how intervention formats may lead to differences in outcomes of interest.

Our second research question was to examine if post-intervention knowledge and social engagement predicted mammography intention. After adjustment for healthcare history and socio-demographic factors, social engagement was a significant predictor for a positive change in screening intention. Social engagement may improve mammography intention among Latinas because the women attending the intervention seek reinforcing factors within their community (e.g., social support).(41) Such work aligns directly with patient activation models as well as previous theory and evidence linking social engagement to increased self-efficacy.(29, 31, 32, 42) Further, increased social engagement may lead to community-wide increases in intentions to engage in mammography screening, as the participants may benefit from the training they received and disseminate the information to others in the community. (43) Finally, social engagement may be a sustainable solution to improve mammography screening in Latinas, as women who attend the home health party intervention may talk to women who did not attend the intervention and convince them to think about obtaining a mammogram.

Although knowledge is a common outcome measured in intervention research,(44) increased knowledge has not always resulted in increased intention.(28) Our study did not demonstrate that increased knowledge resulted in increased mammography intention. This is contrary to theoretical expectations and other extant literature.(11–13, 45) This finding may be the result of our relatively small sample size, be the result of a short follow-up interval or suggest that cultural components are more important than an increase in knowledge to increase mammography intention in Latinas. For example, community support and encouragement for mammography screening may be more important than knowledge of breast cancer risks.

There are a number of limitations of this study. These included the absence of a control arm. Our study relied on a small, convenience-based sample and thus our findings may not be generalizable to all Latina populations. For example, given the rate of lifetime mammography history in this sample, participants may be already at a higher level of knowledge and social engagement, than the general population of Latinas in the community. Nonetheless, this is also not known, given we did not collect data concerning mammography

use across the past two years, which would arguably be more sensitive to women's current non-adherence status than lifetime history.(26) Second, our relatively small sample further did not allow us to examine the independent effects of communication with family, friends, and physicians. Future studies should test the relative contributions of increased communication with different members of one's social network to explore which interactions may be particularly effective in improving mammography intention and behavior. Finally, our small sample size hindered us from multilevel techniques to adjust for the potential clustering effects of the group component of the intervention.

It should also be noted that one of our primary outcomes was a change in intentions rather than a change in behavior. While a change in intention is likely necessary for a change in behavior to occur, a change in intention does not always lead to the recommended behavior. (46, 47) It is possible that women attending the *promotores*-based intervention responded that they intended to obtain a mammogram and will not obtain one. Our study design hindered our ability to obtain mammography behavior, given the relatively short follow-up period. Future studies should extend the follow-up period and specifically assess for changes in screening behavior. Despite these limitations, our study adds to existing literature by first examining if *promotores*-based interventions increase social engagement and second examining if social engagement after an intervention is related to subsequent mammography intention.

Conclusions

Our findings suggest that education and discussion in a comfortable environment, facilitated by *promotores*, are an effective method for improving breast cancer knowledge, social engagement, and screening intention in Latinas. Our work serves as pilot data and a call for studies that can explore if community-wide change in social engagement resulting from the *promotores*-based intervention is an effective grassroots method to increase Latina breast cancer screening rates.

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Table 1

Study sample characteristics (n = 101)

Variable	M (SD)
Age, years	50.41 (9.18)
	N (%)
Education	
4 th Grade	38 (37)
5–8 th Grade	32 (32)
9–12 th Grade	18 (18)
Completed High School	13 (13)
Has Private Health Insurance	13 (13)
Regular Place of Care	
None	11 (11)
Had Regular Place of Care	12 (12)
Had Regular Place of Care and Doctor	77 (76)
Lifetime Mammography History	78 (77)
Mammography Intention	85 (84)

Table 2

Intervention-based changes in knowledge and social engagement, adjusted for age, education and lifetime mammography history

Outcome	n	Baseline M (SE)	Follow-up M (SE)	F
Knowledge ^{1,3}	97	4.84 (0.11)	5.86 (0.11)	3.21 ⁺
Social Engagement ^{2,3}	100	1.67 (0.10)	2.53 (0.08)	5.38 [*]

¹ Seven knowledge items were coded, such that 0 = Incorrect response, 1 = Correct response. Items were summed together to create summary scores. The potential range of summary scores was 0–7.

² Three items (family, friends, provider) were coded, such that 0 = No conversation, 1 = Conversation. The potential range of summary scores was 0–3.

³ Adjusted for age, education and lifetime mammography history.

⁺ $p < .10$.

^{*} $p < .05$.

Table 3

Multivariable logistic regression models of post-intervention knowledge and social engagement on mammography intention, adjusted for age, education and lifetime mammography history

Outcome	n	aOR	95%CI
Knowledge ^{1,3}	97	0.91	0.48, 1.71
Social Engagement ^{2,3}	100	2.02*	1.11, 3.69

¹ Seven knowledge items were coded, such that 0 = Incorrect response, 1 = Correct response. Items were summed together to create summary scores (sample size = 101).

² Three items (family, friends, provider) were coded, such that 0 = No conversation, 1 = Conversation. The potential range of summary scores was 0–3 (sample size = 101). The potential range of summary scores was 0–7.

³ Adjusted for age, education and lifetime mammography history.

* $p < .05$