Healthcare Factors for Obtaining a Mammogram in Latinas With a Variable Mammography History

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Purpose/Objectives: To understand the relationship between mammography history and current thoughts about obtaining a mammogram among Latinas and examine the mediation effects of several healthcare factors.

Design: Cross-sectional survey.

Setting: Federally qualified health centers (Sea Mar Community Health Centers) in western Washington.

Sample: 641 Latinas nonadherent and adherent with screening mammography.

Methods: Baseline survey data from Latinas with a mammography history of never, not recent (more than two years), or recent (less than two years) were analyzed. Preacher and Hayes methods were used to estimate the mediation effect of healthcare factors.

Main Research Variables: The survey assessed mammography history, sociodemographic and healthcare factors, and current thoughts about obtaining a mammogram.

Findings: Latinas' thoughts about obtaining a mammogram were associated with mammography history. Having had a clinical breast examination mediated 70% of differences between Latinas with a never and recent mammography history. Receipt of a provider recommendation mediated 54% of differences between Latinas with and without a recent mammography history.

Conclusions: These findings emphasize the importance of the patient–provider relationship during a clinic visit and help inform how nurses may be incorporated into subsequent screening mammography interventions tailored to Latinas.

Implications for Nursing: As providers, health educators, and researchers, nurses have critical roles in encouraging adherence to screening mammography guidelines among Latinas.

Breast cancer is the leading cause of cancer death for Latinas, and Latinas are more likely than non-Latina Caucasians to be diagnosed with breast cancer at a later stage and to die from the disease (American Cancer Society [ACS], 2015; DeSantis, Ma, Bryan, & Jemal, 2014). The causes of this disparity in late-stage diagnosis have many origins; however, Latinas' lower adherence to screening mammography guidelines compared to other races and ethnicities remains a major contributing factor (ACS, 2015). Healthcare factors, such as having health insurance and a usual source of care, appear to be important and may contribute to behavioral disparities (Gonzalez et al., 2012; Jerome-D'Emilia & Suplee, 2015; Nuño, Castle, Harris, Estrada, & Garcia, 2011). The impact of healthcare factors on women's thoughts about mammograms may underlie these associations, based on psychosocial research concerning conscious thought and behavior (Baumeister, Masicampo, & Vohs, 2011). However, despite interventions to address these factors, nonadherence

to guidelines persists (Terán, Baezconde-Garbanati, Márquez, Castellanos, & Belkic, 2007).

One of the issues limiting the impact of interventions to improve adherence to screening mammography guidelines among Latinas is how previous research informing these interventions compares groups at different stages of screening mammography adoption (never, initiation, maintenance). Although previous studies have shown that Latinas with a prior history of obtaining a mammogram are more likely to think about and plan to obtain a mammogram in the future, the barriers and facilitators at each stage may be different (Gonzalez et al., 2012; Schueler, Chu, & Smith-Bindman, 2008). For example, knowledge barriers to initiating screening mammography may include not knowing one's breast cancer risk, whereas knowledge barriers to maintaining screening mammography may include not knowing that a lifetime history of one mammogram is insufficient to detect all breast cancer during one's life (Austin, Ahmad, McNally, & Stewart, 2002). However, previous research typically only compares women with a lifetime history (ever) to women without a lifetime history of screening mammography (never) to study initiation of screening mammography or compares women with a history of a mammogram in the past two years (recent) to women with a mammogram more remote than the past two years (not recent) to study maintenance of screening mammography (Cronan et al., 2008; Kapp, Walker, Haneuse, & Yankaskas, 2011; Lopez-McKee, McNeill, Bader, & Morales, 2008). Most studies do not compare all three groups (never, not recent, recent) simultaneously to understand how mammography history relates to obtaining future mammograms. Therefore, interventions to improve adherence to screening mammography guidelines among Latinas need to consider the barriers at different stages separately.

The relationship between past and future mammography thoughts, plans, and behavior is mediated by a complex combination of sociodemographic, intrapersonal, and interpersonal factors. The majority of theory and empirical interventions for Latinas has focused primarily on sociodemographic, intrapersonal, and interpersonal factors outside the healthcare context (Jerome-D'Emilia, 2015). However, healthcare factors, operationalized as access and experience, may also influence the relationship between past and future mammography behavior (Gierisch, Earp, Brewer, & Rimer, 2010; Zorogastua, Erwin, Thelemaque, Pulley, & Jandorf, 2016). For example, women reporting adherence to screening mammography guidelines are more likely to also report greater healthcare access, including having health insurance and a regular provider, and experiences with their providers, including having had a clinical breast examination (CBE) and a provider recommendation (Nuño et al., 2011; Watson-Johnson et al., 2011). Despite extant empirical work documenting these patterns, to the authors' knowledge, no extant theory or framework has addressed if or how health care influences longitudinal mammography patterns. In addition, this is the first study that has quantified the mediating effects of healthcare factors on relationships between past mammography behavior and future thoughts, intentions, and behavior. Therefore, the current study will provide preliminary evidence to inform adaptation of extant theories and conceptual frameworks regarding longitudinal mammography use, such as the Transtheoretical Model and Theory of Planned Behavior, to incorporate the mediating roles of healthcare factors more explicitly.

The Role of Nurses in Health Equities

Nurses serve a major role in promoting equity in early breast cancer detection. Nurses operate across the spectrum of healthcare delivery and can translate research into improved patient experiences, awareness, and receipt of screening mammography (Shackelford, Weyhenmeyer, & Mabus, 2014). Nurses may be better able to provide culturally appropriate care to Latinas, given that they are more likely than physicians to be similar sociodemographically (e.g., female, Spanish speaker, Latina ethnicity, socioeconomic background) (Association of American Medical Colleges, 2014). As the U.S. population becomes older and more racially diverse, nurses and nurse practitioners are ideally suited to eliminate disparities in adherence to screening mammography guidelines (Yeo, Phillips, Delengowski, Griffiths, & Purnell, 2011), particularly as these guidelines change.

Nurse researchers, particularly oncology nurse researchers, serve as pivotal stakeholders in addressing cancer inequities. Oncology nurse researchers have conceptualized the importance of patients' interactions with the healthcare system and other factors associated with optimal breast cancer care in terms of access and experience (Downey & Happ, 2013; Kennedy Sheldon, 2005; Traeger et al., 2013), particularly among underserved ethnic minority communities (Jerome-D'Emilia, Suplee, & Akincigil, 2015; Mott-Coles, 2014; Royak-Schaler et al., 2008; Russell, Perkins, Zollinger, & Champion, 2006). These researchers have further indicated the importance of nurses in addressing barriers to healthcare access and positive experiences with their providers by women from marginalized groups (Giger et al., 2007; Larsen & Reif, 2011). Therefore, the current article seeks to address gaps in the literature and identify possible ways to

improve the health and well-being of Latinas across the breast cancer continuum.

Methods

To understand the relationship between mammography history and current thoughts about obtaining a mammogram among Latinas, the mediation effects of several healthcare factors were examined. First, the authors assessed differences in hypothesized healthcare factor mechanisms (e.g., health insurance status, regular provider, CBE, provider recommendation) by mammography history. Second, they examined if mammography history and healthcare factors were associated with thoughts about obtaining a mammogram. Finally, the authors conducted a formal analysis to directly test the mediating effects of healthcare factors in the relationship between mammography history and thoughts about obtaining a mammogram.

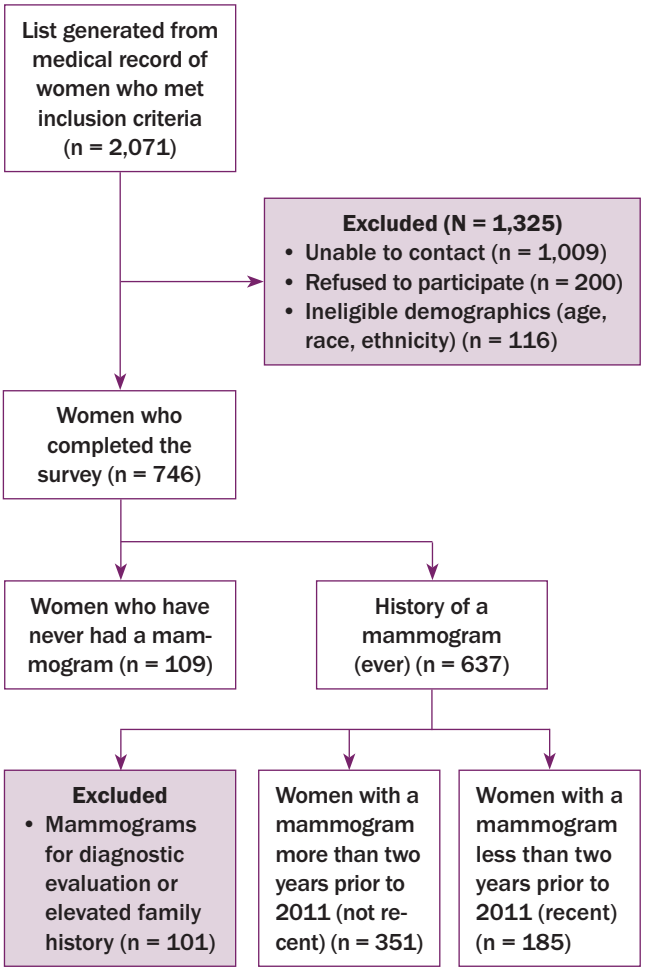
Procedures

Recruitment: The current study used baseline data from a multi-clinic randomized, controlled trial (¡Fortaleza Latina!) that involved partnerships among the Fred Hutchinson Cancer Research Center, the University of Washington, the Seattle Cancer Care Alliance, and Sea Mar, a federally qualified health center (FQHC) with multiple clinic sites (Coronado et al., 2014; Molina et al., 2015). The primary aim of ¡Fortaleza Latina! is to increase participation in breast cancer screening among Latinas. The institutional review boards of all institutions approved the study. Baseline data were collected from 2012–2014 and analyzed in 2014. The recruitment and interview procedures have been reported previously (Coronado et al., 2014). The electronic health records (EHRs) from the four clinics of the FQHC identified potential participants. Enrollment criteria consisted of: (a) identified as Latina or Hispanic in the EHR and confirmed during in-person interviews; (b) aged from 42–74 years; and (c) received care from one of the four clinics within the past five years. FQHC staff invited, screened, and consented patients for the study. Patients signed a Health Insurance Portability and Accountability Act waiver to be contacted by project staff to participate (Coronado et al., 2014).

Interviews: The methodology used to translate and validate the survey and train the promotores was described previously (Coronado et al., 2014). After obtaining consent to participate in ¡Fortaleza Latina!, staff contacted participants by telephone to schedule an interview, and promotores conducted these in-person baseline interviews. Five promotores were trained to consistently obtain consent and interview participants to reduce bias and to support the validity and reliability of the survey results. The 161-item baseline survey was developed from previous instruments addressing breast cancer screening in Latinas (Byrd et al., 2013; Gallo et al., 2014; Puschel et al., 2010). Participants completed the survey in their preferred language (English or Spanish).

Data entry: Trained operators at the Fred Hutchinson Cancer Research Center Collaborative Data Services performed data entry using DatStat Illume. Data were then exported to SAS®, version 9.0, for analysis.

FIGURE 1. Study Design



Measures

Sociodemographic information: Sociodemographic questions assessed information at the time of the survey. Women also gave information regarding their country of birth, the year they arrived in the United States, and their language of preference. Finally, women were asked how many of their primary relatives (mother, sisters, daughters) ever had breast cancer.

Mammography history: Figure 1 illustrates how the mammography history groups for the current study were derived from ¡Fortaleza Latina!. Women self-reported their lifetime mammography history and

number of years since their last mammogram. Self-report of recent mammogram was substantiated with the relevant provider's medical record. Discrepancies were resolved by confirming mammograms at the appropriate institutions. In cases for which screening mammograms could not be confirmed, the participant was considered not to have had a mammogram. Women were categorized as never had a mammogram (never), had a mammogram more than two years before study enrollment (not recent), and had a mammogram two years or less before study enrollment (recent). Women obtaining a diagnostic mammogram (non-screening) as their most recent mammogram were excluded.

TABLE 1. Sociodemographic Information by Mammography History

	Never (N = 109)		Not Recent (N = 351)		Recent (N = 185)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
High school or less	38	35	97	28	62	34
Employed	56	51	124	35	72	39
Household income less than $15,000*	46	42	141	40	66	36
Mexican	93	85	280	80	145	78
Primarily Spanish speaking	100	92	324	92	170	92
Family history of breast cancer	8	7	27	8	11	6
Characteristic	**$\bar{X}$**	**SD**	**$\bar{X}$**	**SD**	**$\bar{X}$**	**SD**
Age (years)**	47.9	6.5	52.6	8.1	51.8	7.7
Number of years in the United States	17.7	7.2	19.2	10.4	20.2	10.6

*p < 0.05; **p < 0.001

Note. Women were grouped by mammography history: never (has never undergone screening mammography), not recent (had screening mammogram but greater than two years prior to the survey), and recent (had screening mammogram within two years of the survey).

Note. Education and income were analyzed as continuous variables but are presented dichotomously to facilitate interpretability.

Note. Ninety-eight participants did not respond to the question regarding household income (never = 18, not recent = 61, recent = 19).

Women were asked if they had thought or were thinking about getting a or another mammogram; if they had health insurance coverage at the time of taking the survey; if they had a personal doctor or medical provider who was their main provider; if they had a provider examine their breasts within the past year; and if a doctor, nurse, or other healthcare professional (provider) had recommended a mammogram within the past year (0 = no, 1 = yes).

Statistical Analysis

Simple bivariate analyses identified potential sociodemographic covariates for thoughts about obtaining a mammogram. First, four multivariable logistic regression models were conducted to examine if health insurance status, having a regular provider, having a CBE performed, and receiving a provider recommendation varied across mammography history (four separate coefficients "a"). Next, the authors conducted a multivariable logistic regression model to examine the direct associations of mammography history on thoughts about obtaining a mammogram (coefficient "c"). Another multivariable logistic regression model examined the relationship between healthcare factors and thoughts about obtaining a mammogram. It yielded four separate coefficients "b." Finally, two mediation models were conducted using Preacher and Hayes methods (using 5,000 samples) (Hayes & Preacher, 2014; Preacher & Hayes, 2008). To determine the mediating effect, 95% confidence intervals (CIs) were calculated and the percentage mediated was calculated as a function of the indirect effect (a*b) divided by the sum of the direct effect and indirect effect ([a*b]/[a*b+c^1]). Women with a recent history were used as the referent group, and dummy coded variables were included in accordance with recommendations for analyses with categorical predictors (Hayes & Preacher, 2014; Preacher & Hayes, 2008). This method allows models to retain all information about how the three groups differ from one another while focusing on one specific comparison (e.g., recent versus never, recent versus not recent).

Results

Sample Characteristics

Table 1 provides sociodemographic factors across mammography history. Less than 1% of women had missing data for each variable of interest, except income (15% of women did not report income). Women with a never history of a mammogram were younger than women with not recent and recent mammography histories. Women with a recent history of mammography reported greater household income relative to other groups; however, the proportion of missing data for income varied across mammography history (p = 0.05). Consequently, analyses always included age as a covariate; given differences in the amount of missing data across mammography history, models with and without income as a covariate were conducted.

TABLE 2. Healthcare Variables by Mammography History, Adjusted by Age

	Never (N = 109)				Not Recent (N = 351)				Recent (N = 185)			
Variable	**n**	**%**	**OR**	**95% CI**	**n**	**%**	**OR**	**95% CI**	**n**	**%**	**OR**	**95% CI**
Health insurance			0.4	[0.2, 0.7]*			0.6	[0.4, 0.8]*			REF	REF
No	88	81			248	71			108	58		
Yes	21	19			102	29			77	42		
Missing					1	–						
Regular provider			0.5	[0.3, 0.8]*			0.5	[0.4, 0.8]*			REF	REF
No	78	72			217	62			90	49		
Yes	31	28			133	38			95	51		
Missing					1	–						
Had a clinical breast examination			0.04	[0.02, 0.07]**			0.07	[0.04, 0.01]**			REF	REF
No	92	84			265	75			31	17		
Yes	17	16			85	24			152	82		
Missing					1	–			2	1		
Received provider recommendation			0.3	[0.2, 0.4]**			0.3	[0.2, 0.4]**			REF	REF
No	79	73			248	71			76	41		
Yes	30	28			103	29			109	59		

* $p < 0.01$; ** $p < 0.0001$
CI—confidence interval; OR—odds ratio; REF—referent group (those with a recent mammography history)
Note. Unadjusted descriptive information (except age) is provided to facilitate interpretability.
Note. Women were grouped by mammography history: never (has never undergone screening mammography), not recent (had screening mammogram, but greater than two years prior to the survey), and recent (had screening mammogram within two years of the survey).
Note. Logistic regression models include age as a covariate.
Note. Because of rounding, percentages may not total 100.

Healthcare Variables

Table 2 provides descriptive characteristics and results from multivariable logistic regression models for each mammography history. Age was included as a covariate because of its significant association with mammography history. Relative to women with a recent history, women with a never and not recent mammography history were less likely to be insured, have a regular provider, have had a CBE performed within the past year, and have received a provider recommendation to have a mammogram within the past year. Associations did not differ when including age and income or when including only age as covariates.

Thoughts About Obtaining a Mammogram

Table 3 provides unadjusted descriptive characteristics and results from multivariable logistic regression models using mammography history, health insurance status, having a regular provider, having had a CBE performed within the past year, and receipt of a provider recommendation. After adjusting for age, mammography history was significantly associated with thoughts about obtaining a mammogram. Relative to women with a recent history, women with never and not recent histories were less likely to state that they had thoughts about obtaining a mammogram. When including age and income as covariates, women with a never history were still less likely than women with a recent history to report thoughts about obtaining a mammogram (odds ratio [OR] = 0.2, 95% CI [0.1, 0.7], p = 0.003). Differences were attenuated when including income between women with recent and not recent histories (OR = 0.7, 95% CI [0.2, 1.5], p = 0.28). After adjusting for age, having a CBE performed and receipt of a provider recommendation were associated with thoughts about obtaining a mammogram but not health insurance status or having a regular provider. These patterns persisted, even when including income as a covariate. Given these findings, having a CBE performed and receiving a provider recommendation were identified as potential mediators, but health insurance status or having a regular provider were not.

Mediation Model

Prior to mediation models, the authors assessed the potential moderating effects of healthcare factors. Multivariable logistic regression models revealed no significant interaction terms (p = 0.44–0.99). The mediating effects of having a CBE performed and receiving a provider recommendation within the past year on differences in thoughts about obtaining a mammogram were explored among women with never and recent histories (see Figure 2). Evidence existed

of full mediation effect, which was driven by having a CBE performed (70% mediated, mediated effect = –0.94, 95% CI [–1.9, –0.35]). One reason contributing to the lower thoughts about obtaining a mammogram among women with a never history, relative to women with a recent history, was their lower odds of having a CBE performed. Similar patterns were observed when including or excluding income as a covariate. Second, the mediating effects of these variables among women with not recent and recent were explored (see Figure 3). This model did not include income as a covariate, given findings discussed previously. Full mediation was also suggested for this model and appeared to be driven by receipt of a provider recommendation (54% mediated, mediated effect = –0.58, 95% CI [–1.2, –0.1]). One reason contributing to the lower thoughts among women with a not recent history, relative to women with a recent history, was their lower odds of receiving a provider recommendation.

Discussion

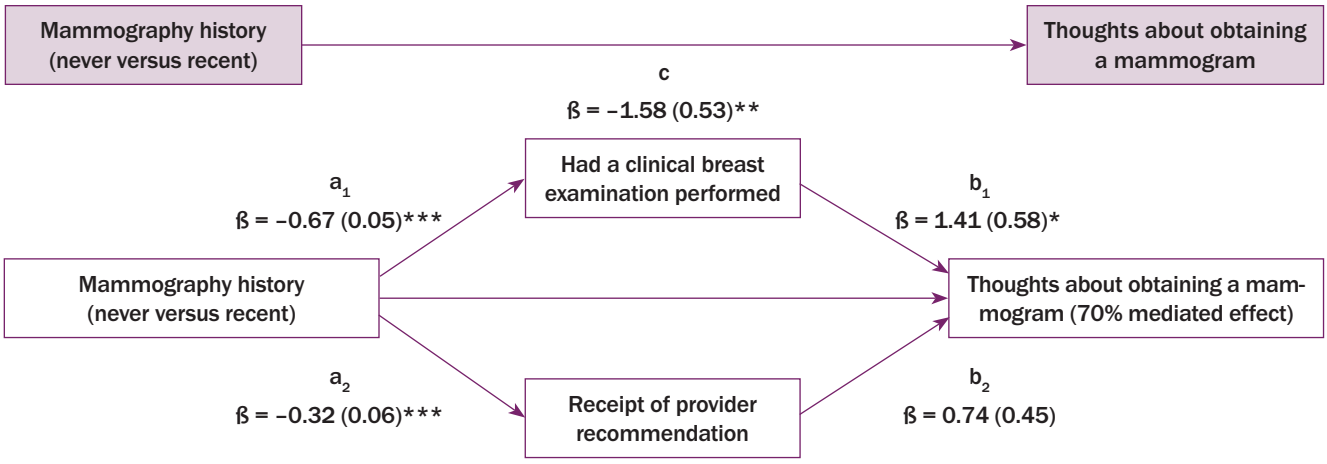
Because the U.S. healthcare system focuses more on performance, preventive care, and increasing access, providers need to understand how to increase the proportion of women adhering to screening mammography guidelines (Albright et al., 2011; Moy et al., 2011). In the current study, the authors showed that Latinas with a recent mammography history were more likely to have thoughts about obtaining a mammogram than members of the other two groups (never and not recent). The findings also suggest that healthcare factors vary by past behavior and future thoughts. Finally, findings emphasize the value that Latinas place on the relationship with their providers regarding adhering to screening mammography guidelines.

A major gap in the literature addressed by the current study was a more comprehensive assessment of healthcare factors across different mammography histories. A previous study of Latinas demonstrated significant differences in healthcare factors across different mammography histories (Castañeda et al., 2014). However, Castañeda et al. (2014) categorized their population into recent and not recent/never because too few women reported a not recent mammography history (n = 16, 8%). The current authors' work extends this understanding by simultaneously

TABLE 3. Mammography History and Healthcare Variables by Thoughts About Obtaining a Mammogram (N = 642)

	Women Not Thinking About Obtaining a Mammogram (N = 55)		Women Thinking About Obtaining a Mammogram (N = 587)			
Variable	**n**	**%**	**n**	**%**	**OR**	**95% CI**
Mammography history						
Never	17	31	92	16	0.1	[0.05, 0.4]***
Not recent	32	58	317	54	0.4	[0.1, 0.9]*
Recent	6	11	178	30	REF	REF
Health insurance status						
No	37	67	407	69	1	[0.5, 1.8]
Yes	18	33	179	30	REF	REF
Missing			1	–		
Has a regular provider						
No	32	58	351	60	0.9	[0.5, 1.6]
Yes	23	42	235	40	REF	REF
Missing			1	–		
Had clinical breast examination						
No	45	82	341	58	0.3	[0.2, 0.6]**
Yes	10	18	243	41	REF	REF
Missing			1	–		
Received provider recommendation						
No	46	84	355	60	0.3	[0.1, 0.6]**
Yes	9	16	232	40	REF	REF

* p < 0.05; ** p < 0.01; *** p < 0.0001
CI—confidence interval; OR—odds ratio; REF—referent group (those with a recent mammography history)
Note. Unadjusted descriptive information (except age) is provided to facilitate interpretability.
Note. Women were grouped by mammography history: never (has never undergone screening mammography), not recent (had screening mammogram, but greater than two years prior to the survey), and recent (had screening mammogram within two years of the survey).
Note. Logistic regression models include age as a covariate.
Note. Because of rounding, percentages may not total 100.



* p < 0.05; ** p < 0.01; *** p < 0.001

Note. All coefficients represent unstandardized regression coefficients (ß = regression coefficient [standard error]). Age, income, and a dummy-coded variable concerning women without a recent history of a mammogram were included as covariates.

FIGURE 2. Mediation Model of the Relationship of Mammography History (Never Versus Recent) and Thoughts About Obtaining a Mammogram

assessing Latinas with different mammography histories, including women with never, not recent, and recent histories. The current study found that Latinas with a never or not recent history had less healthcare access (medical insurance, regular provider) and use (CBE, provider recommendation) relative to Latinas with a recent history. Previous cross-sectional research has largely attributed differences in mammography histories to be a result of past healthcare factors (González & Borrayo, 2011); however, the current study shows that past mammography history predicts current healthcare factors.

The authors hypothesize that both of these relationships were longitudinal, such that continuous healthcare access and use resulted in adherence to screening mammography guidelines. In this case, Latinas with a recent history may have had greater healthcare access and positive experiences with their providers (influencing their receipt of mammography) and may continue to have greater healthcare access and positive experiences (influencing their future use) relative to Latinas with a never and not recent history. Consistently, different healthcare factors mediated the relationship between mammography history and thoughts. Latinas with a recent history of mammography had greater thoughts about obtaining a mammogram relative to Latinas with a never history of mammography, in part because they were more likely to have a CBE performed in the past year. Simultaneously, they had greater thoughts about obtaining a mammogram relative to Latinas with a not recent mammography history, in part because they were more likely to have received a provider recommendation in the past year. The current authors' work indicates the importance of additional research that quantifies these longitudinal patterns and examines the role of continuous healthcare access and use.

Of note, the current findings suggest that experiences with their providers during healthcare visits (CBE, provider recommendation) were more strongly associated with thoughts about obtaining a mammogram than healthcare access variables (insurance, regular provider). A previous meta-analysis of 195 studies on screening mammography use demonstrated that a woman's previous screening behaviors (breast, cervical, and colon cancer) and a physician's recommendation were the strongest predictors of recent mammography use (Schueler et al., 2008). However, this meta-analysis included insufficient Latinas for a subanalysis of factors associated with mammography history. Also, the studies used in this meta-analysis focus on a physician's recommendation. This narrow focus on physicians ignores other healthcare professionals providing health education and recommendations, particularly nurses. The authors asked a more inclusive question ("Has any doctor, nurse, or other health professional recommended a mammogram within the past year?") to account for changes in healthcare delivery. The authors' work suggests that any provider recommending a mammogram increases adherence in Latinas with a not recent mammography history; this emphasizes a need to include other healthcare professionals when assessing impact of recommendations.

Although Latinas' experiences with their providers appeared to serve as mediators (e.g., CBE, provider recommendation), the current study also suggests

that the mediators for the relationship between mammography history and thoughts are different for Latinas with not recent and never histories. A need exists for more qualitative and quantitative research to understand these effects. One potential explanation is that these factors are associated with different intrapersonal factors unique to women's mammography history. For example, lower levels of knowledge and psychocultural attitudes about mammography have been found among Latinas with a never mammography history (Madadi, Zhang, Yeary, & Henderson, 2014). Conversely, women with a not recent and recent mammography history have overcome these barriers to obtain their first mammogram. A provider recommendation among women with a history of mammography use may differ from those given to women with a never history and involve more discussion about the need for regular mammography. This type of tailored recommendation would address the lower levels of knowledge among Latinas with a not recent history (González & Borrayo, 2011; Hall, Hall, Pfriemer, Wimberley, & Jones, 2007). Alternatively, provider recommendations may serve as a reminder to women with a recent mammography history.

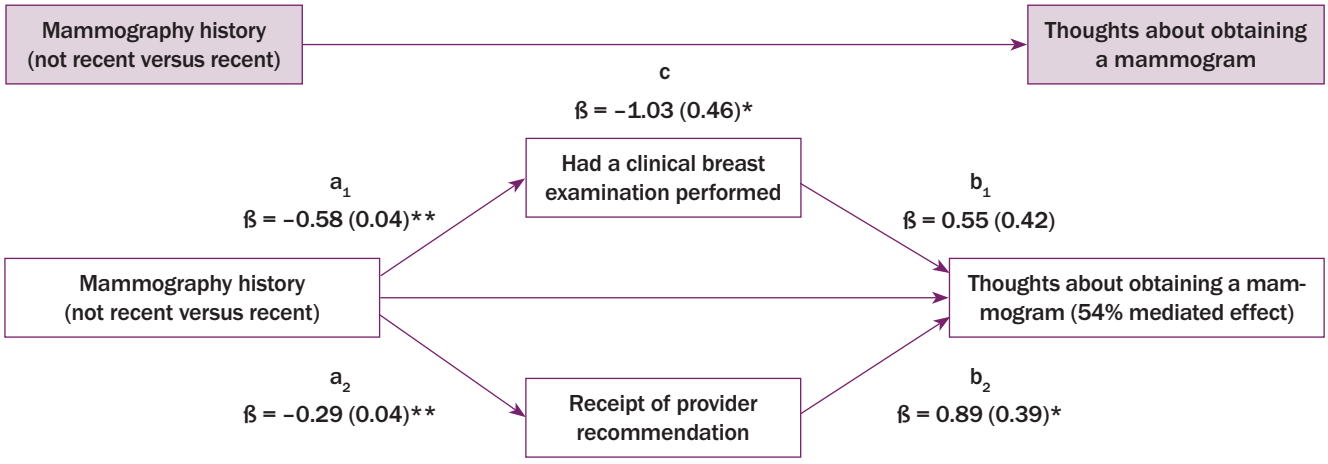
Limitations

The current study is limited by several factors. First, previous studies have used different definitions for recent and not recent mammography history, some using the previous American Cancer Society definition (Smith, Cokkinides, Brooks, Saslow, & Brawley, 2010) of one year or less for recent and others using the U.S. Preventive Services Task Force ([USPSTF], 2009) definition of two years or less for recent. During the current study, the USPSTF changed its recommendations to every two years and advised that routine screening begin at age 50 years (Siu, 2016). Because this was a recent change, the current authors included women aged 42 years and older but considered women adherent if they had a mammogram within two years. Second, the authors used thoughts about obtaining a mammogram, rather than obtaining a mammogram, as one of the outcome variables. Previous research typically used thoughts or intentions to obtain a mammogram as a surrogate measure for obtaining one in the future because it can be measured immediately after an intervention (Madadi et al., 2014). Although current thoughts about obtaining a mammogram do not imply that one will obtain a future mammogram, they are a prerequisite because a woman who does not think about obtaining a mammogram is unlikely to obtain one. Third, the current analysis relies on cross-sectional data. However, the operationalization of mammography history, current healthcare factors, and thoughts about obtaining a mammogram approximate a temporal sequence. Fourth, differences in missing data on income limited the authors' ability to understand the role of income on screening intention. Finally, although insurance status was collected at the time of the survey, changes in insurance status may have occurred.

Conclusion

To the authors' knowledge, this is the first study to quantify healthcare factors as potential mechanisms

FIGURE 3. Mediation Model of the Relationship of Mammography History (Not Recent Versus Recent) and Thoughts About Obtaining a Mammogram



* p < 0.05; ** p < 0.001

Note. All coefficients represent unstandardized regression coefficients (ß = regression coefficient [standard error]). Age and a dummy-coded variable concerning women who had never had a mammogram were included as covariates.

underlying past and future mammography use. Additional research on the role of provider visits and the patient–provider relationship is needed to understand why mammography history predicts future screening behavior. The current results suggest that, although a referral for a mammogram is not necessarily needed, providers maintain a key role in Latinas' breast cancer screening practices.

Implications for Nursing

The current study has important implications for the high impact of nursing interventions for Latinas across different mammography history groups. Specifically, nurses often interact with patients when providing health communications and are more frequently from similar sociodemographic groups (e.g., gender, ethnicity, language) and, therefore, more likely to recognize and address health needs (e.g., barriers to obtaining a mammogram) (Cottrell et al., 2012; Eggenberger, Grassley, & Restrepo, 2006; Engelman et al., 2011). Therefore, nurses may improve Latinas' adherence to screening mammography guidelines through their role as health communicators in the clinic, as well as medical experts within their racial and ethnic communities. CBE may be a unique opportunity within the patient–provider interaction for providers to discuss breast cancer and the importance of screening mammography. Latinas may be more comfortable asking questions about sensitive topics, such as breast health, with females from their community. Nurses operating as health educators or primary care providers need to discuss screening mammography with their patients (Hall et al., 2007; Shackelford et al., 2014; Tupper & Holm, 2014). Although CBE is no longer recommended by the USPSTF for breast cancer screening, the National Comprehensive Cancer Network continues to recommend CBEs, and both organizations recognize the importance of breast cancer awareness (National Comprehensive Cancer Network, 2016; USPSTF, 2009). Nurse providers should recognize that, in addition to their potential to screen for breast cancer, CBEs may provide an important opportunity for delivering education on screening mammography to Latinas.

In addition, the current study provides important information for oncology nursing researchers. As noted previously, many conceptual models that articulate factors affecting the relationship between past and future mammography behavior focus on sociodemographic, intrapersonal, and interpersonal factors (Jerome-D'Emilia, 2015). Simultaneously, oncology nursing researchers have emphasized the importance of healthcare factors, including access and experiences with their providers, for patients' health and well-being (Downey & Happ, 2013; Kennedy Sheldon, 2005; Traeger et al., 2013). The current study provides evidence for the need of oncology nursing researchers in expansion of extant conceptual frameworks, particularly regarding inclusion of healthcare access and experience factors.

Knowledge Translation

- Latinas with a recent history of mammography were more likely to think about a future mammogram than Latinas without a recent history and those who had never had a mammogram.
- Experiences with Latinas' providers (clinical breast examination [CBE], provider recommendation) were more strongly associated with current thoughts about obtaining a mammogram than healthcare access (insurance, regular provider).
- Nurses, in their roles as health educators and providers, should perform a CBE and provide recommendations to increase Latinas' adherence to screening mammography guidelines.

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References

Albright, H.W., Moreno, M., Feeley, T.W., Walters, R., Samuels, M., Pereira, A., & Burke, T.W. (2011). The implications of the 2010 Patient Protection and Affordable Care Act and the Health Care and Education Reconciliation Act on cancer care delivery. *Cancer, 117,* 1564–1574. doi:10.1002/cncr.25725

American Cancer Society. (2015). *Cancer facts and figures for Hispanics/Latinos, 2015–2017.* Retrieved from http://www.cancer.org/acs/groups/content/@research/documents/document/acspc-046405.pdf

Association of American Medical Colleges. (2014). Diversity in the physician workforce: Facts and figures 2014. Retrieved from http://aamcdiversityfactsandfigures.org/section-ii-current-status-of-us-physician-workforce

Austin, L.T., Ahmad, F., McNally, M.J., & Stewart, D.E. (2002). Breast and cervical cancer screening in Hispanic women: A literature review using the health belief model. *Women's Health Issues, 12,* 122–128. doi:10.1016/S1049-3867(02)00132-9

Baumeister, R.F., Masicampo, E.J., & Vohs, K.D. (2011). Do conscious thoughts cause behavior? *Annual Review of Psychology, 62,* 331–361. doi:10.1146/annurev.psych.093008.131126

Byrd, T.L., Wilson, K.M., Smith, J.L., Coronado, G., Vernon, S.W., Fernandez-Esquer, M.E., . . . Fernandez, M.E. (2013). AMIGAS: A multicity, multicomponent cervical cancer prevention trial among Mexican American women. *Cancer, 119,* 1365–1372. doi:10.1002/cncr.27926

Castañeda, S.F., Malcarne, V.L., Foster-Fishman, P.G., Davidson, W.S., Mumman, M.K., Riley, N., & Sadler, G.R. (2014). Health care access and breast cancer screening among Latinas along the

California-Mexican border. *Journal of Immigrant and Minority Health, 16,* 670–681. doi:10.1007/s10903-013-9938-x

Coronado, G.D., Jimenez, R., Martinez-Gutierrez, J., McLerran, D., Ornelas, I., Patrick, D., . . . Beresford, S.A. (2014). Multi-level intervention to increase participation in mammography screening: ¡Fortaleza Latina! study design. *Contemporary Clinical Trials, 38,* 350–354. doi:10.1016/j.cct.2014.06.008

Cottrell, J.E., Jonas, M., Bergsten, U., Blaas, E., de la Torre Aboki, J., Howse, C., . . . Bulinckx, L. (2012). The nurse's role in addressing unmet treatment and management needs of patients with rheumatoid arthritis: Delphi-based recommendations [Epub ahead of print]. *International Journal of Nursing Knowledge*. doi:10.1111/j.2047-3095.2012.01231.x

Cronan, T.A., Villalta, I., Gottfried, E., Vaden, Y., Ribas, M., & Conway, T.L. (2008). Predictors of mammography screening among ethnically diverse low-income women. *Journal of Women's Health, 17,* 527–537. doi:10.1089/jwh.2007.0331

DeSantis, C., Ma, J., Bryan, L., & Jemal, A. (2014). Breast cancer statistics, 2013. *CA: A Cancer Journal for Clinicians, 64,* 52–62. doi:10.3322/caac.21203

Downey, D., & Happ, M.B. (2013). The need for nurse training to promote improved patient-provider communication for patients with complex communication needs. *Perspectives on Augmentative and Alternative Communication, 22,* 112–119. doi:10.1044/aac22.2.112

Eggenberger, S.K., Grassley, J., & Restrepo, E. (2006). Culturally competent nursing care: Listening to the voices of Mexican-American women. *Online Journal of Issues in Nursing, 11*(3), 7.

Engelman, K.K., Cupertino, A.P., Daley, C.M., Long, T., Cully, A., Mayo, M.S., . . . Greiner, A. (2011). Engaging diverse underserved communities to bridge the mammography divide. *BMC Public Health, 11,* 47. doi:10.1186/1471-2458-11-47

Gallo, L.C., Penedo, F.J., Carnethon, M., Isasi, C.R., Sotres-Alvarez, D., Malcarne, V.L., . . . Talavera, G.T. (2014). The Hispanic Community Health Study/Study of Latinos Sociocultural Ancillary Study: Sample, design, and procedures. *Ethnicity and Disease, 24,* 77–83.

Gierisch, J.M., Earp, J.A., Brewer, N.T., & Rimer, B.K. (2010). Longitudinal predictors of nonadherence to maintenance of mammography. *Cancer Epidemiology, Biomarkers, and Prevention, 19,* 1103–1111. doi:10.1158/1055-9965.EPI-09-1120

Giger, J., Davidhizar, R.E., Purnell, L., Harden, J.T., Phillips, J., & Strickland, O. (2007). American Academy of Nursing Expert Panel report: Developing cultural competence to eliminate health disparities in ethnic minorities and other vulnerable populations. *Journal of Transcultural Nursing, 18,* 95–102. doi:10.1177/1043659606298618

González, P., & Borrayo, E.A. (2011). The role of physician involvement in Latinas' mammography screening adherence. *Women's Health Issues, 21,* 165–170. doi:10.1016/j.whi.2010.09.001

Gonzalez, P., Castaneda, S.F., Mills, P.J., Talavera, G.A., Elder, J.P., & Gallo, L.C. (2012). Determinants of breast, cervical and colorectal cancer screening adherence in Mexican-American women. *Journal of Community Health, 37,* 421–433. doi:10.1007/s10900-011-9459-2

Hall, C.P., Hall, J.D., Pfriemer, J.T., Wimberley, P.D., & Jones, C.H. (2007). Effects of a culturally sensitive education program on the breast cancer knowledge and beliefs of Hispanic women. *Oncology Nursing Forum, 34,* 1195–1202. doi:10.1188/07.ONF.1195-1202

Hayes, A.F., & Preacher, K.J. (2014). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology, 67,* 451–470. doi:10.1111/bmsp.12028

Jerome-D'Emilia, B. (2015). A systematic review of barriers and facilitators to mammography in Hispanic women. *Journal of Transcultural Nursing, 26,* 73–82. doi:10.1177/1043659614530761

Jerome-D'Emilia, B., Suplee, P., & Akincigil, A. (2015). Validation of the Spanish version of the mammography-specific self-efficacy scale [Online exclusive article]. *Oncology Nursing Forum, 42,* E279–E286.

Jerome-D'Emilia, B., & Suplee, P.D. (2015). Mammogram use and self-efficacy in an urban minority population. *Public Health Nursing, 32,* 287–297. doi:10.1111/phn.12162

Kapp, J.M., Walker, R., Haneuse, S., & Yankaskas, B.C. (2011). A prospective assessment of racial/ethnic differences in future mammography behavior among women who had early mammography. *Cancer Epidemiology, Biomarkers, and Prevention, 20,* 600–608. doi:10.1158/1055-9965.EPI-10-1070

Kennedy Sheldon, L. (2005). Communication in oncology care: The effectiveness of skills training workshops for healthcare providers. *Clinical Journal of Oncology Nursing, 9,* 305–312. doi:10.1188/05.CJON.305-312

Larsen, R., & Reif, L. (2011). Effectiveness of cultural immersion and culture classes for enhancing nursing students' transcultural self-efficacy. *Journal of Nursing Education, 50,* 350–354. doi:10.3928/01484834-20110214-04

Lopez-McKee, G., McNeill, J.A., Bader, J., & Morales, P. (2008). Comparison of factors affecting repeat mammography screening of low-income Mexican American women. *Oncology Nursing Forum, 35,* 941–947. doi:10.1188/08.ONF.941-947

Madadi, M., Zhang, S., Yeary, K.H., & Henderson, L.M. (2014). Analyzing factors associated with women's attitudes and behaviors toward screening mammography using design-based logistic regression. *Breast Cancer Research and Treatment, 144,* 193–204. doi:10.1007/s10549-014-2850-9

Molina, Y., Ornelas, I.J., Doty, S.L., Bishop, S., Beresford, S.A., & Coronado, G.D. (2015). Family/friend recommendations and mammography intentions: The roles of perceived mammography norms and support. *Health Education Research, 30,* 797–809. doi:10.1093/her/cyv040

Mott-Coles, S. (2014). Patients' cultural beliefs in patient-provider communication with African American women and Latinas diagnosed with breast cancer. *Clinical Journal of Oncology Nursing, 18,* 443–448. doi:10.1188/14.CJON.443-448

Moy, B., Polite, B.N., Halpern, M.T., Stranne, S.K., Winer, E.P., Wollins, D.S., & Newman, L.A. (2011). American Society of Clinical Oncology policy statement: Opportunities in the patient protection and affordable care act to reduce cancer care disparities. *Journal of Clinical Oncology, 29,* 3816–3824. doi:10.1200/JCO.2011.35.8903

National Comprehensive Cancer Network. (2016). *NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®): Breast cancer screening and diagnosis* [v. 1.2016]. Retrieved from http://www.nccn.org/professionals/physician_gls/pdf/breast-screening.pdf

Nuño, T., Castle, P.E., Harris, R., Estrada, A., & Garcia, F. (2011). Breast and cervical cancer screening utilization among Hispanic women living near the United States-Mexico border. *Journal of Women's Health, 20,* 685–693. doi:10.1089/jwh.2010.2205

Preacher, K.J., & Hayes, A.F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40,* 879–891. doi:10.3758/BRM.40.3.879

Puschel, K., Coronado, G., Soto, G., Gonzalez, K., Martinez, J., Holte, S., & Thompson, B. (2010). Strategies for increasing mammography screening in primary care in Chile: Results of a randomized clinical trial. *Cancer Epidemiology, Biomarkers, and Prevention, 19,* 2254–2261. doi:10.1158/1055-9965.EPI-10-0313

Royak-Schaler, R., Passmore, S.R., Gadalla, S., Hoy, M.K., Zhan, M., Tkaczuk, K., . . . Hutchison, A.P. (2008). Exploring patient-physician communication in breast cancer care for African American women following primary treatment. *Oncology Nursing Forum, 35,* 836–843. doi:10.1188/08.ONF.836-843

Russell, K.M., Perkins, S.M., Zollinger, T.W., & Champion, V.L. (2006). Sociocultural context of mammography screening use. *Oncology Nursing Forum, 33,* 105–112. doi:10.1188/06.ONF.105-112

Schueler, K.M., Chu, P.W., & Smith-Bindman, R. (2008). Factors associated with mammography utilization: A systematic quantitative

review of the literature. *Journal of Women's Health, 17,* 1477–1498. doi:10.1089/jwh.2007.0603

Shackelford, J.A., Weyhenmeyer, D.P., & Mabus, L.K. (2014). Fostering early breast cancer detection: Faith community nurses reaching at-risk populations [Online exclusive]. *Clinical Journal of Oncology Nursing, 18,* E113–E117. doi:10.1188/14.CJON.E113-E117

Siu, A.L. (2016). Screening for breast cancer: U.S. Preventive Services Task Force recommendation statement. *Annals of Internal Medicine, 164,* 279–296. doi:10.7326/M15-2886

Smith, R.A., Cokkinides, V., Brooks, D., Saslow, D., & Brawley, O.W. (2010). Cancer screening in the United States, 2010: A review of current American Cancer Society guidelines and issues in cancer screening. *CA: A Cancer Journal for Clinicians, 60,* 99–119. doi:10.3322/caac.20063

Terán, L., Baezconde-Garbanati, L., Márquez, M., Castellanos, E., & Belkic, K. (2007). On-time mammography screening with a focus on Latinas with low income: A proposed cultural model. *Anticancer Research, 27,* 4325–4338.

Traeger, L., Park, E.R., Sporn, N., Repper-DeLisi, J., Convery, M.S., Jacobo, M., & Pirl, W.F. (2013). Development and evaluation of targeted psychological skills training for oncology nurses in managing stressful patient and family encounters [Online exclusive]. *Oncology Nursing Forum, 40,* E327–E336. doi:10.1188/13.ONF.E327-E336

Tupper, R., & Holm, K. (2014). Screening mammography and breast cancer reduction: Examining the evidence. *Journal for Nurse Practitioners, 10,* 721–728. doi:10.1016/j.nurpra.2014.07.018

U.S. Preventive Services Task Force. (2009). Screening for breast cancer: U.S. Preventive Services Task Force recommendation statement. *Annals of Internal Medicine, 151,* 716–726.

Watson-Johnson, L.C., DeGroff, A., Steele, C.B., Revels, M., Smith, J.L., Justen, E., . . . Richardson, L.C. (2011). Mammography adherence: A qualitative study. *Journal of Women's Health, 20,* 1887–1894.

Yeo, T.P., Phillips, J., Delengowski, A., Griffiths, M., & Purnell, L. (2011). Oncology nursing: Educating advanced practice nurses to provide culturally competent care. *Journal of Professional Nursing, 27,* 245–254. doi:10.1016/j.profnurs.2011.03.004

Zorogastua, K., Erwin, D., Thelemaque, L., Pulley, L., & Jandorf, L. (2016). Intrinsic factors of non-adherence to breast and cervical cancer screenings among Latinas. *Journal of Racial and Ethnic Health Disparities, 3,* 658–666. doi:10.1007/s40615-015-0184-x