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The role of language in mammography orders among low-income Latinas over a 10-year period

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Abstract

Introduction: Latinas in the United States have higher mortality from breast cancer, but longitudinal studies of mammography ordering (a crucial initial step towards screening) in primary care are lacking.

Methods: We conducted an analysis of mammography order rates in Latinas (by language preference) and non-Latina white women ($N = 181,755$) over a > 10 year period in a multi-state network of community health centers (CHCs). We evaluated two outcomes (ever having a mammogram order and annual rate of mammography orders) using generalized estimating equation modeling.

Results: Approximately one-third of all patients had ever had a mammogram order. Among those receiving mammogram orders, English-preferring Latinas had lower mammogram order rates than non-Hispanic white women (RR = 0.92, 95% CI = 0.89–0.95). Spanish-preferring Latinas had higher odds of ever having a mammogram ordered than non-Hispanic whites (odds ratio = 2.12, 95% CI = 2.06–2.18) and, if ever ordered, had a higher rate of annual mammogram orders (rate ratio = 1.53, 95% CI = 1.50–1.56).

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Author contributions

Heintzman obtained funding, conceived of the idea, and drafted and revised the manuscript. Hodes performed the analysis, wrote portions of and significantly edited the manuscript. Marino oversaw the analysis and significantly edited the manuscript. Parras, Lucas, Vasquez-Guzman, Chan, and Banegas and significantly edited the manuscript.

Declaration of Competing Interest

The authors have no possible, perceived or real financial conflicts of interest.

Conclusion: These findings suggest that breast cancer detection barriers in low-income Latinas may not stem from a lack of orders in primary care, but in the subsequent accessibility of receiving ordered services.

Keywords

Breast cancer; Hispanic/Latino; Primary care; Healthcare disparities; Mammography; Spanish language

1. Introduction

Breast cancer is the most common cancer in Latinas in the United States (U.S.), and some groups of Latinas may experience worse outcomes from the disease (Nobel et al., 2020), especially a greater prevalence of diagnosis at later cancer stages than non-Hispanic whites (Miller et al., 2021). Mammography remains the foundation of screening, early detection, and prevention of early death from breast cancer (United States Preventive Services Task Force, 2016). However, findings on the existence, nature, degree, and cause of mammography in Latinas conflict regarding many specific, crucial questions. Some studies report reduced mammogram utilization in Latinas (Luque et al., 2019) and others report more compared to non-Hispanic whites (Nobel et al., 2020; Rivadeneira et al., 2020). Some studies demonstrate increased use of mammography services with increased acculturation (Lapeyrouse et al., 2017), health literacy/education (Banegas et al., 2012), or English language proficiency (Meersman et al., 2009); other studies report reduced associations with these characteristics and mammography use (Banegas et al., 2012; Castañeda et al., 2014).

These conflicting findings often rely on patient recall of mammography in the past 1–2 years. Patient recall has been shown to have poor agreement with receipt of mammography (Allgood et al., 2014). Furthermore, mammography is a cancer preventive service delivered repeatedly over time (United States Preventive Services Task Force, 2016), and there is little data on this service over time in Latinas. Mammography screening ideally involves provider-patient discussion of the risk/benefits of screening, followed by mammography ordering, and subsequent completion of mammography by the patient. As primary care is the first point of healthcare for most people, it is ideal setting in which to measure mammography orders, a crucial step in early cancer detection. Community health centers (CHCs, clinics funded to provide care for under resources areas and patients) provide primary care for a disproportionate number of Latinas in the United States (National Association of Community Centers, 2020), and care for many Latinas with financial and insurance barriers, who may not receive adequate breast cancer screening (Lapeyrouse et al., 2017). The association of language preference with adequate breast cancer screening is unclear, as noted above, and requires evaluation over a long period in a real-world setting, in order to best provide screening services to those Latinas who may receive them less. Therefore, to fill the gap in knowledge regarding the language preference and mammography orders, we conducted an analysis of mammography orders in Latinas, by language preference, over a > 10-year study period in a multi-state network of community health centers (CHCs), a setting in which it is crucial to understand breast cancer screening equity.

2. Methods

2.1. Data source

Electronic health record (EHR) data were obtained from the Accelerating Data Value Across a National Community Health Center Network (ADVANCE) Clinical Research Network of PCORnet.

2.2. Study sample

Data were extracted from the EHRs of women aged 50–74 years (United States Preventive Service guidelines recommend mammography at least every 2 years for women in this age range) (United States Preventive Services Task Force, 2016) with 1 primary care visit to a primary care CHC (561 clinics) across 21 states between 1/1/2005–12/31/2020. Women with a documented history of breast cancer or mastectomy were excluded.

2.3. Dependent variables

We evaluated two outcomes during the study period: 1) ever having a mammogram order and 2) among women who had received 1 mammogram order, annual rate of mammography orders. Orders were measured by signed orders with CPT codes or a signed referral in the EHR.

2.4. Independent variable

The independent variable combined ethnicity and language preference: Spanish-preferring Latina and English-preferring Latina, with non-Latina white as a comparison group. We chose to include the latter as the comparator to specifically understand ethnic and language differences in these services across a low-income sample receiving care in similar settings. Ethnicity and language are self-reported and documented in discrete EHR fields.

2.5. Covariates

The following patient-level characteristics were extracted from the EHR and included in regression models as potential confounders: age, sex, household income (percent of federal poverty level (FPL)), insurance, annual rate of primary care visits, body mass index, and family history of breast cancer. Clinic urbanity/rurality, state, and health system also were also included.

2.6. Statistical analysis

Patient characteristics were described by ethnicity/language group. First, to examine the receipt of mammograms ever, generalized estimating equations (GEE) logistic regression (JW H, JM H, 2012) was utilized including indicator variables for the ethnicity language groups and all covariates listed above. Estimates of covariate-adjusted odds ratios (ORs) derived from the GEE logistic model and their corresponding 95% confidence intervals are reported. Second, for the outcome of rates of mammography orders, we subsetted to patients with 1 mammogram orders and estimated the number of mammogram orders annually per patient while the patient was empaneled in the clinic. Each patient was observed for study outcomes over an individualized observation time. A patient's timeframe was determined

based on the number of years between their primary care visit and up to three years after the last visit or the end of the study, whichever occurred first (Heintzman et al., 2022). We used GEE Poisson regression including indicator variables for the ethnicity language groups and all covariates to estimate covariate-adjusted rate ratios (RRs) and 95% confidence intervals. Both models used a robust sandwich variance estimator to account for patient clustering within clinics and assumed exchangeable correlation structure (Mancl and Leroux, 1996). Analyses were conducted in R.v.4.1.2 and statistical significance was set at p -value<0.05. This study was approved by our Institutional Review Board.

3. Results

Study patient characteristics and unadjusted outcomes are reported in Table 1. Descriptively, Spanish-preferring Latinas in our sample had a higher percentage of incomes always <138% of the FPL, showed a higher prevalence of obesity, and were less often current smokers compared to other groups. More Spanish-preferring Latinas in our sample ever had mammograms ordered, and had a higher annual rate of these when ordered. All three groups had similar mean observation times during the study.

From Fig. 1, Spanish-preferring Latinas had higher odds of ever having a mammogram ordered than non-Hispanic whites (OR = 2.12, 95% CI = 2.06–2.18) and, if ever ordered, had a higher rate of annual mammogram orders (RR = 1.53, 95% CI = 1.50–1.56). English-preferring Latinas did not significantly differ from non-Hispanic whites in their odds of ever having a mammogram ordered (OR = 0.99, 95% CI = 0.95–1.03) and, when ever having an order, had a lower rate of mammogram orders (RR = 0.92, 95% CI = 0.89–0.95) than non-Hispanic whites.

4. Discussion

We conducted a longitudinal analysis of mammogram orders by ethnicity/language in a large, multistate CHC population. While only about one-third of women in our study had received a mammogram order in the study period, the community health centers studied provided thousands of mammograms. This both highlights the existing and potential role of community health centers in delivering needed prevention to low-income populations, but also the opportunity to continue to increase breast cancer screening in these women to decrease morbidity and mortality from the disease.

Spanish-preferring Latinas were more likely to have a mammogram order in the study period and, when ordered, had a higher annual mammography order rate than non-Hispanic white women. This finding may suggest more frequent screening among Spanish-preferring Latinas. However, this could mean that Spanish-preferring Latinas returned frequently to the clinic for care and received repeat mammogram orders, but never or less commonly actually utilized the service, which is performed outside of the CHC. Receiving the service would entail receiving understandable information about the procedure and its location, scheduling the procedure, navigating any administrative barriers to getting the test scheduled, and ensuring available transportation during hours of operation for the mammography provider. Understanding the association of these more frequent orders, through all of these potential

barriers, with mammogram results and/or receipt is an important next step. Our findings demonstrate that Spanish-preferring Latinas did not experience a relative disparity to non-Hispanic white women in receiving a mammogram order from a clinician.

English-preferring Latinas did not differ from non-Hispanic white women in their odds of ever receiving a mammogram order, and English-preferring Latinas had lower annual mammogram order rates than non-Hispanic white women. This adds to growing literature on the relative inequity that low-income, English-preferring Latina patients face in healthcare service utilization (Heintzman et al., 2022; Heintzman et al., 2021). Further, this finding may be associated with the barriers that accompany increasing acculturation (of which language has been used as a proxy (Adam et al., 2005)), or the loss of protective cultural values. Regardless, English-preferring Latinas should be a persistent population of focus for improvements in breast cancer screening.

4.1. Limitations

Our dataset does not have widespread mammogram result and/or receipt information. Evaluating provider orders over time is important to better understanding the patterns of breast cancer screening in Latinas: before a mammogram is received it needs to be ordered. We may not have captured orders placed outside of the primary care CHC, although this population often has limited access otherwise. We also do not have information on declinations, which could differ between these groups.

5. Conclusion

In an analysis of mammogram order frequency in a large, multistate network of thousands of women seen at CHCs. Spanish-preferring Latino women had higher odds of ever having a mammogram order than non-Hispanic white women, and higher annual mammogram order rates. These findings suggest that breast cancer detection barriers in low-income Latinas may not stem from a lack of orders in primary care, but in the subsequent accessibility of receiving ordered services.

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Data availability

The authors do not have permission to share data.

References

- Adam MB, McGuire JK, Walsh M, Basta J, LeCroy C, Mar 2005. Acculturation as a predictor of the onset of sexual intercourse among Hispanic and white teens. *Arch. Pediatr. Adolesc. Med* 159 (3), 261–265. 10.1001/archpedi.159.3.261. [PubMed: 15753270]
- Allgood KL, Rauscher GH, Whitman S, Vasquez-Jones G, Shah AM, Aug 2014. Validating self-reported mammography use in vulnerable communities: findings and recommendations. *Cancer Epidemiol. Biomark. Prev* 23 (8), 1649–1658. 10.1158/1055-9965.EPI-13-1253.
- Banegas MP, Bird Y, Moraros J, King S, Prapsiri S, Thompson B, Jan 2012. Breast cancer knowledge, attitudes, and early detection practices in United States-Mexico border Latinas. *J. Women's Health (Larchmt)* 21 (1), 101–107. 10.1089/jwh.2010.2638. [PubMed: 21970564]
- Castañeda SF, Malcarne VL, Foster-Fishman PG, et al. , Aug 2014. Health care access and breast cancer screening among Latinas along the California-Mexican border. *J. Immigr. Minor. Health* 16 (4), 670–681. 10.1007/s10903-013-9938-x. [PubMed: 24150421]
- Heintzman J, Hwang J, Quiñones AR, et al. , Dec 02, 2021. Influenza and pneumococcal vaccination delivery in older Hispanic populations in the United States. *J. Am. Geriatr. Soc* 10.1111/jgs.17589.
- Heintzman JD, Ezekiel-Herrera DN, Quiñones AR, et al. , 2022. Disparities in colorectal cancer screening in latinos and non-hispanic whites. *Am. J. Prev. Med* 62 (2), 203–210. 10.1016/j.amepre.2021.07.009. [PubMed: 34649735]
- JW H, JMH, 2012. *Generalized Estimating Equations*. CRC Press.
- Lapeyrouse LM, Miranda PY, Morera OF, Heyman JM, Balcazar HG, 2017. Healthcare use and mammography among Latinas with and without health insurance near the US-Mexico border. *J. Racial Ethn. Health Disparities* 4 (2), 282–287. 10.1007/s40615-016-0227-y. [PubMed: 27072542]
- Luque JS, Logan A, Soulen G, et al. , 2019. Systematic review of mammography screening educational interventions for hispanic women in the United States. *J. Cancer Educ* 34 (3), 412–422. 10.1007/s13187-018-1321-0. [PubMed: 29330754]
- Mancl LA, Leroux BG, Jun 1996. Efficiency of regression estimates for clustered data. *Biometrics*. 52 (2), 500–511. [PubMed: 10766502]
- Meersman SC, Breen N, Pickle LW, Meissner HI, Simon P, Oct 2009. Access to mammography screening in a large urban population: a multi-level analysis. *Cancer Causes Control* 20 (8), 1469–1482. 10.1007/s10552-009-9373-4. [PubMed: 19543987]
- Miller KD, Ortiz AP, Pinheiro PS, et al. , 2021. Cancer statistics for the US Hispanic/Latino population, 2021. *CA Cancer J. Clin* 71 (6), 466–487. 10.3322/caac.21695. [PubMed: 34545941]
- National Association of Community Centers, 2020. *Community Health Center Chartbook 2020*. Accessed May 19, 2020. <https://www.nachc.org/wp-content/uploads/2020/01/Chartbook-2020-Final.pdf>.
- Nobel TB, Asumeng CK, Jasek J, et al. , 2020. Disparities in mortality-to-incidence ratios by race/ethnicity for female breast cancer in New York City, 2002–2016. *Cancer Med*. 9 (21), 8226–8234. 10.1002/cam4.3309. [PubMed: 33006431]
- Rivadeneira NA, Hoskote M, Le GM, et al. , 2020. Advancing cancer control in san francisco: cancer screening in under-represented populations. *Am. J. Prev. Med* 58 (1), e1–e9. 10.1016/j.amepre.2019.08.024. [PubMed: 31862104]
- United States Preventive Services Task Force, 2016. Final recommendation statement. In: *Breast Cancer Screening* <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/breast-cancer-screening>. Accessed June 7, 2023.

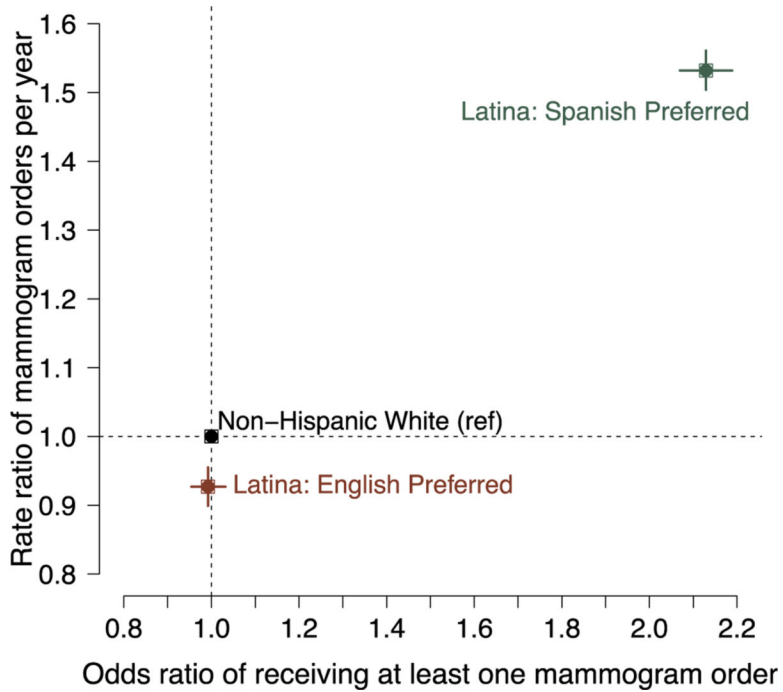


Fig. 1. Covariate-adjusted odds ratio of receiving at least one EHR mammogram order, and covariate-adjusted rate ratios of EHR mammogram orders per year (in those with at least 1 mammogram) in study participants by ethnicity/language cohorts.
Note: To examine the receipt of mammograms ever, generalized estimating equations (GEE) logistic regression was used to estimate covariate-adjusted odds ratios (ORs). We used GEE Poisson regression to obtain covariate-adjusted rate ratios (RRs). Both models used a robust sandwich variance estimator and assumed exchangeable correlation structure to account for patient clustering within clinics. Both models controlled for age, sex, household income (percent of federal poverty level (FPL)), insurance, annual rate of primary care visits, body mass index, family history of breast cancer, clinic urbanity/rurality, state, and health system.

Table 1

Demographic, Healthcare Utilization, and Comorbidity Characteristics, from Electronic Health Record Data, of Female Sex Patients with at Least 1 Face-to-face Visit in a Study Community Health Center from 2005 to 2020.

Characteristic	Non-Hispanic White	Latina English	Latina Spanish
Total sample (%)	101,088 (55.6)	23,192 (12.8)	57,475 (31.6)
Age in years, %			
50–54	11.9	10.5	9.2
55–59	33.9	35.4	33.6
60–64	36.9	38.3	38.8
65–69	14.7	12.8	15.4
70–74	2.7	2.9	3.0
Type of insurance, %			
Never insured	18.0	20.4	22.4
Some private	17.5	15.1	10.8
Some private and public	50.3	47.3	49.9
Some public	14.2	17.2	16.9
Visits per year, %			
<1	17.4	17.4	14.3
1–3	26.7	31.4	28.2
3.01–5	15.0	19.6	18.5
5.01–10	18.2	20.3	22.9
>10	22.7	11.3	16.1
Household income, %			
Always under 138% FPL	47.9	65.0	74.1
Ever above 138% FPL	31.8	21.2	14.2
Never documented	20.4	13.8	11.6
Diabetes diagnosis, %	17.5	27.1	33.2
Obesity ever, %	41.6	47.3	50.6
Ever a smoker, %	38.0	20.0	13.6
Family hist. of breast cancer, %	2.3	1.2	1.0
Ever mammogram ordered, %	28.8	22.3	36.6
If ever, avg. # mammograms	2.21	1.97	2.22
Mean observation time (yrs)	5.63	5.26	5.5