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Impact of Patient and Navigator Race and Language Concordance on Care after Cancer Screening Abnormalities

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Abstract

Background—Patient navigation improves timely diagnosis of cancer among minorities but little is known about the effect of patient and navigator race and language concordance on health outcomes.

Methods—We conducted an investigation of patient and navigator race and language concordance on time to diagnosis of cancer screening abnormalities among participants of the Boston Patient Navigation Research Program, a clinical effectiveness trial for women with breast or cervical cancer screening abnormalities identified January 1, 2007 to December 31, 2008. Hazard ratio and 95% confidence intervals were estimated using proportional hazards regression adjusting for clinical and demographic factors.

Results—There were a total of 1257 women with either breast (n= 655) or cervical (n=602) cancer screening abnormalities and 56% were non-White. Language concordance was associated

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with timelier resolution in all patients in the cervical group in the first 90 days, aHR of 1.46 (95% CI: 1.18, 1.80), and specifically for Spanish speakers in the first 90 days, aHR of 1.43 (95% CI: 1.10, 1.84), with no difference after 90 days or for women with breast cancer screening abnormalities. Race concordance was associated with significant decreases in time to diagnosis for minority women with breast and cervical cancer screening abnormalities in analyses stratified by race with no difference found in analyses including all women.

Conclusions—Patient-navigator race and language concordance improves timeliness of care in a minority population.

Impact—Patient navigators that are diverse by race/ethnicity and multilingual may help address barriers to care and improve cancer outcomes for low-income minorities.

Keywords

Race; Language; Patient Navigator; Cancer Screening; Disparities

Introduction

There are longstanding disparities in breast and cervical cancer mortality rates among minority women in the United States, especially Black and Hispanic women[1–3]. Despite similar cancer screening rates, racial/ethnic minorities still have delays in both the follow up of abnormal screening tests and in the initiation of cancer treatment[4,5]. Patient navigation programs have been shown to reduce delays in cancer care, especially among vulnerable populations[6–9]. Patient navigators serve as patient advocates imbedded within the clinical care practice and conduct their work with access to clinical providers as well as scheduling and administrative personnel. Navigators work to reduce barriers to care by helping patients acquire health insurance and gain access to care, address logistical barriers such as scheduling, transportation and child care, educate patients to improve knowledge, facilitate communication between patients and their providers, and encourage patients to follow through with their care[5,10,11].

Understanding and improving patient-provider interactions have been shown to play an important role in improving health outcomes. Race, ethnicity and language concordance between patients and providers may help mitigate health disparities by facilitating improved patient-provider relationships and better health outcomes. Research into the impact of patient-physician race and language concordance have shown mixed findings depending on the health outcome measured and have been primarily studied in retrospective observational or cross sectional studies.[12–22] Little is known about the role of patient-navigator race and language concordance on outcomes of care. The goal of this study was to examine the impact of race/ethnicity and language concordance between patients and navigators on time to diagnostic resolution of breast and cervical cancer screening abnormalities.

Methods

Data Source and Study Population

We conducted a secondary data analysis of subjects in the patient navigation intervention arm of the Boston Patient Navigation Research Program (PNRP), a quasi-experimental patient navigation intervention of 3041 women over the age of 18 with either breast or cervical cancer screening abnormalities diagnosed at one of six Boston neighborhood Community Health Centers (CHCs) from January 1, 2007 to December 31, 2008. The patient navigation intervention consisted of female navigators hired as employees of the community health centers and were imbedded within the clinical care team interacting with patients, clinical providers and staff in their day to day work. They identified and documented barriers to care, developed individual plans to address barriers, and followed women to diagnostic resolution of their cancer screening abnormality or to treatment initiation if diagnosed with cancer. Their initial interaction with patients occurred via telephone after the patient was informed of an abnormal cancer screening result by their clinician. Subsequent patient interactions were face to face, via telephone and/or mail. Navigators had access to interpreter services if they did not share a common language with the patient. Patient navigators attended a standardized national training and received local bimonthly trainings on topics such as local resources, effective communication, cultural competency, and patient empowerment. Each health center identified a clinical supervisor, who was also trained to provide navigation in addition to supervision, and who was available during the navigator's absences or during transition periods in staffing. All interactions were documented in the templates developed for the navigator activities in the electronic medical record. Data on follow up of abnormal screening findings were also collected through manual chart abstraction.[23] The Boston University Institutional Review Board approved the study.[10,23]

Inclusion/Exclusion Criteria

For this analysis, only women on the navigation arm of the study who received navigation services from one navigator were included. Participants with more than one navigator had the possibility of interacting with navigators of various racial/ethnic backgrounds and/or language abilities and were thus excluded (n=223).

The primary outcome was time to diagnostic resolution defined as the time from the initial screening abnormality to definitive imaging study, repeat Pap test, or biopsy after an abnormal screening test. All women included in the study were followed until the time of diagnostic resolution or were censored at date of death or at 365 days if no diagnostic resolution was achieved. Given that patients with a radiographic Breast Imaging Reporting and Data System 3 (BI-RADS 3) abnormality were recommended to have a repeat mammogram in 180 days, time to diagnostic resolution was calculated from 180 days after the initial abnormality and following for a full year.

The two main predictor variables were race/ethnicity concordance and language concordance. Patient race and ethnicity data were identified through health center registration records for all patients and were self-identified for navigators. Prior validation

with a different sample of patients comparing registration data with self-identified race information showed high correlation and agreement measured by a Kappa score with values ranging from 81-91% for all racial/ethnic groups.[24] Race and ethnicity were combined into four mutually exclusive categories of Asian, Hispanic, non-Hispanic Black, and non-Hispanic White. Patients and navigators of the same race or ethnicity were classified as race concordant and pairs of different race or ethnicity were classified as race discordant. Language concordance was also a dichotomous variable based on patient preference or use of an interpreter and navigator language ability. All navigators were English speaking and five navigators also spoke Spanish, Vietnamese, or Albanian. Patients and navigators that were able to communicate in the same language were classified as language concordant and pairs that could not communicate in a common language or required the use of an interpreter were classified as language discordant. There were two navigators with missing race/ethnicity data and they along with the eight patients they navigated (four in the breast cancer screening group and four in the cervical cancer screening group) were excluded from the race/ethnicity concordance analysis but they were retained in the analysis on language concordance.

Statistical Analyses

Patients with breast and cervical screening abnormalities were analyzed separately. Descriptive bivariate associations of demographic and clinical characteristics were examined to compare race concordant to race discordant patient-navigator pairs as well as language concordant to language discordant pairs. In addition, bivariate associations of demographic and clinical characteristics were examined to compare those with screening abnormalities that ever resolved to those that never resolved.

For the primary unadjusted analyses, Kaplan-Meier survival curves were generated to assess the association of race and language concordance on time to diagnostic resolution of breast and cervical cancer screening abnormalities. The Logrank test was used for significance testing. Univariate and multivariate Cox proportional hazards regression models assessed the association between race and language concordance with time to diagnostic resolution. Due to violation of the proportionality assumptions, interaction terms between concordance and time were employed. Since differences in the effect over time occurred at around 90 days for most curves and data that suggest diagnostic delays longer than 90 days lead to decreased survival in breast cancer patients,[9,25,26] hazard ratios were calculated for 0-89 days and 90-365 days where needed for significant time interactions.

Multivariate analyses were adjusted for age, race/ethnicity, language, insurance status (private, public, or no insurance), severity of screening abnormality (clinical breast exam abnormality, BIRADS 0, BIRADS 3, BIRADS 4/5, low grade cervical lesion and high grade cervical lesion). To account for potential interclass correlation by patient navigator, we utilized a clustering variable in all multivariate proportional hazards regression models. To assess the varying effect of race concordance by the different race/ethnicity groups, a stratified analysis was performed comparing White concordant to White discordant, Black concordant to Black discordant, Asian concordant to Asian discordant, and Hispanic concordant to Hispanic discordant patient-navigator pairs. Asian patient-navigator pairs

were excluded in stratified analyses for cervical screening abnormalities due to the small numbers in the study sample. We performed a subgroup analysis of language concordance for Spanish speakers only due to small sample size for other non-English speakers. Stratified analyses were adjusted only for age, insurance status and clustering by navigator. All analyses were performed with SAS statistical software, version 9.3 (SAS Institute, Cary, NC).

Results

Patient and Navigator Characteristics

There were a total of 1257 women with either breast (n= 655) or cervical (n=602) cancer screening abnormalities who received navigation support. Over two thirds of women with breast cancer screening abnormalities were between the ages of 40 and 59 years, 56% were non-White, 63% spoke English, and 50% had public insurance. The most common breast cancer screening abnormality was a BIRADS 0 on screening mammography (66%), which required additional imaging for complete assessment of the abnormality. Women with cervical cancer screening abnormalities were younger than the breast group, with over 80% under 39 years. They were mostly Black and Hispanic and one third of these women spoke only Spanish. Most were uninsured (41%) or had public insurance (37%). Over 96% of the screening abnormalities were low-grade cervical lesions (Table 1). There were 23 female patient navigators and they were primarily White (57%). Navigators with data available on age were mostly between the ages of 24 and 29 years (Table 2). All patient navigators were able to communicate in English and 21% were bilingual and able to communicate in Albanian, Spanish or Vietnamese. 90% of all patients interacted by telephone alone with their navigator, 10% had at least one face to face contact.

Race Concordance, Language Concordance and Breast Cancer Screening Abnormalities

Of the 655 participants with breast cancer screening abnormalities, 286 (44%) had the same race or ethnicity (further referred to as race concordant) as their navigator and 494 (75%) were language concordant with their navigator. White women (74%) were more likely to be race concordant with their navigator than all minority women combined (26%). White, Black, and Hispanic women were all more likely to be language concordant with their navigator compared with Asian women. There were also significant differences in age, insurance status, socioeconomic status, and severity of screening abnormality (Table 1). Overall unadjusted rate of diagnostic resolution of breast cancer screening abnormalities was 85% by 90 days and 95% at 365 days. Multivariate Cox proportional hazards models for time to diagnostic resolution of breast cancer screening abnormalities which included all women did not show a statistically significant difference between race concordant and discordant patient-navigator pairs (Table 3). However, stratified multivariate analysis showed evidence that minority women in race concordant groups compared to minority women within the same minority group and race discordant navigators had timelier resolution of their screening abnormalities. Hazard ratio greater >1 in the Cox models represented timelier resolution (Table 4). Black patients who had screening abnormalities that resolved in greater than 90 days and paired with a Black navigator were more than twice as likely to have timelier resolution of their breast cancer screening abnormality (aHR 2.62,

95% CI: 1.56 to 4.41); although had less timely resolution for abnormalities resolving in less than 90 days. Hispanic and Asian patients with race/ethnicity concordant navigators had a 30% greater likelihood of timelier resolution of screening abnormalities resolved at <90 days. Findings for language concordance in models including all women or the subgroup analysis of Spanish speakers did not reach statistical significance in the breast group.

Race Concordance, Language Concordance and Cervical Cancer Screening Abnormalities

Of the 602 participants with cervical cancer screening abnormalities, 420 (70%) were race concordant and 526 (87%) were language concordant. Black and Hispanic patients were more likely to be in concordant pairings with navigators with about 85% of Black patients having both language and race concordant navigators and Hispanics concordant by ethnicity and language with their navigators by 83% and 90%, respectively. Severity of screening abnormality was balanced among women in both the race/ethnicity concordant and discordant groups as well as the language concordant and discordant group while other covariates varied (Table 1). Overall unadjusted rate of diagnostic resolution of cervical cancer screening abnormalities was 64% by 90 days and 91% at 365 days. The multivariate cox proportional hazard models for time to diagnostic resolution by race concordance status including all women were not statistically significant (Table 3). In the stratified multivariate analysis, minority patients with race concordant navigators compared to patients within the same minority group with race discordant navigators had timelier resolution of their screening abnormalities (Table 4). Hispanic patients with Hispanic navigators compared to Hispanic patients with a non-Hispanic navigator had an 80% more likelihood of having timelier resolution of their cancer screening abnormality (aHR 1.82, 95%CI: 1.39 to 2.39). Black patients with Black navigators were 50% more likely to have timelier resolution of cervical cancer screening abnormality that resolved after 90 days compared to Black patients with non-Black navigators (aHR 1.50, 95%CI: 1.35 to 1.67). There was a consistent negative association between White race concordance status and time to diagnostic resolution (aHR 0.60 95%CI 0.48 to 0.76).

In the multivariate proportional hazard models comparing all patients in language concordant groups to those in language discordant groups, there was a 46% greater likelihood of timelier resolution of cancer screening abnormalities that resolved in less than 90 days (aHR=1.46, 95% CI: 1.18, 1.80) with no association for screening abnormalities resolving after 90 days. In the subgroup analysis of Spanish speakers, Spanish concordant compared to Spanish discordant pairs were 43% more likely to have timelier resolution of cervical cancer screening abnormalities resolving in less than 90 days (aHR 1.43, 95% CI: 1.10, 1.84) and 90 and 365 days (aHR 1.63, 95%CI: 1.00, 2.66).

Discussion

Our findings support the benefit of patient-navigator race and language concordance on health care delivery in a minority population. Black, Hispanic and Asian women with either breast or cervical cancer screening abnormalities paired with a race concordant navigator had timelier resolution of screening abnormalities compared to women within the same racial group with race discordant navigators. There was either no benefit or a negative

association between race concordance and time to resolution of cancer screening abnormalities for White women. All women with cervical cancer screening abnormalities benefitted from having a language concordant patient navigator and subgroup analyses showed a positive association for Spanish language concordance and timelier resolution of screening abnormalities.

There are no prior reports in the literature on the impact of race and language concordance between patients and navigators. Prior studies on patient-provider race concordance and health outcomes have had mixed findings with a few studies showing a modest benefit of concordance for minorities.[16,17,20,27] Meghani and colleagues' literature review of 27 observational studies found inconclusive evidence for the association of patient-provider race concordance on health outcomes and argued that these findings could be a result of small sample size, patient self report of health outcomes, and evaluating race concordance with physician providers only.[28] The design of our study differed from the existing literature in that we prospectively assessed the impact of patient and navigator race/ethnicity concordance using an objectively defined study outcome, time to diagnostic resolution of cancer screening abnormalities.

Our findings show that White patients had no additional benefit from having a navigator who is race concordant and this is possibly explained in part by other interactions with predominantly White physicians and ancillary staff at the health centers. The negative association between race concordance and timeliness of care for White patients in the cervical group is unexplained. It is possible that barriers to care for White women seeking care in safety net systems may differ from that of other racial groups and navigators may need additional training or resources to address these barriers. The negative association of race concordance for Black women with breast cancer screening abnormalities resolving in less than 90 days is also unexplained but was likely due to small numbers in the race concordant group as there were only five Black patients in the breast group with a race concordant navigator.

Our findings on language concordance compared to language discordance demonstrated timelier resolution of cervical cancer screening abnormalities. The subgroup analysis of Spanish speakers, the only subgroup with sufficient sample size to conduct a subgroup analysis, specifically showed a benefit of language concordance among those with cervical cancer screening abnormalities. The lack of benefit of language concordance in the breast group may reflect age of the study population and possibly acculturation. Hispanic women with cervical cancer screening abnormalities were younger, and more likely non-English speaking compared to the breast group; these women may represent newly arrived immigrants and a less acculturated population [21] and therefore had more language barriers which could be directly addressed by a language concordant navigator. Our findings on language concordance were similar to Ngo-Metzger and colleagues[15] suggesting that despite the availability of language interpreters, having a navigator that can communicate in the same language resulted in better outcomes.

While this study is able to elucidate the impact of race and language concordance among a cohort diverse by race, ethnicity, and English proficiency, there are limitations. This was a

secondary data analysis and race and language concordant and discordant groups were not balanced for either the breast or cervical cancer screening groups. Approximately 10% of the patients had a face to face encounter with their navigator; therefore, for some interactions the patient or the navigator may not have been aware of the race/ethnicity of the other. Subgroup analysis on language concordance was limited to Spanish due to the smaller sample size of patients speaking other languages. In addition, we did not have information on physician race, patient acculturation or length of time in the United States to understand whether these variables by subgroups contribute to the mixed findings.

Conclusion

Our data suggest that patient-navigator race/ethnicity and language concordance may be beneficial for minority women. Given poorer cancer outcomes among minority women, the use of patient navigators that are diverse by race/ethnicity and multilingual may help address barriers to care and improve health outcomes for a low-income minority population. If our findings on racial/ethnic differences do reflect cultural competency, additional training of navigators may benefit. Similarly, using knowledge of the language and culture of the patient population might be criteria for consideration when hiring patient navigators.

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Table 1

Baseline characteristics of participants with breast or cervical cancer screening abnormalities by Patient- Navigator race and language concordance status. Boston Patient Navigation Research Program

Breast Cancer Screening Abnormality				**Cervical Cancer Screening Abnormality**			
Characteristic	**Total n=655**	**Race Concordant[a] (n= 286)**	**Language Concordant (n=494)**		**Total n=602**	**Race Concordant[a] (n=420)**	**Language Concordant (n=526)**
		No.	**No.**			**No.**	**No.**
Age[b,c]				**Age**[b]			
18-39	106	61	91	18-29	361	248	328
40-59	437	171	327	30-39	143	108	122
60+	109	54	76	40+	98	64	76
Race/Ethnicity[b,c]				**Race/Ethnicity**[b]			
White	291	215	242	White	115	23	98
Black	100	5	93	Black	202	168	172
Hispanic	137	37	107	Hispanic	278	229	250
Asian	127	29	52	Asian	7	0	6
Language[b,c]				**Language**[b,c]			
English	414	197	414	English	357	220	357
Spanish	90	24	58	Spanish	197	168	168
Vietnamese	96	43	22	Vietnamese	1	0	0
Other	55	22	0	Other	47	32	1
Insurance[b,c]				**Insurance**[b]			
Public	327	113	236	Public	222	144	193
Private	220	128	198	Private	135	80	125
Uninsured	104	45	60	Uninsured	245	196	208
Screening Abnormality[b]				**Screening Abnormality**			
Clinical	161	91	133	LGL[d]	578	403	508
BIRADS 0	431	172	318	HGL[e]	24	17	18

Breast Cancer Screening Abnormality				Cervical Cancer Screening Abnormality			
Characteristic	**Total n=655**	**Race Concordant[a] (n= 286)**	**Language Concordant (n=494)**		**Total n=602**	**Race Concordant[a] (n=420)**	**Language Concordant (n=526)**
		No.	**No.**			**No.**	**No.**
BIRADS 3	51	23	37				
BIRADS 4/5	8	0	6				

Abbreviations: No. number, BIRADS Breast Imaging Reporting and Data System, LGL low grade lesion, HGL high grade lesion

[a] Race concordance data missing for 4 participants in both the breast screening and cervical screening group due to 2 navigators with missing race/ethnicity

[b] P <0.05 χ^2 test comparing characteristic of race concordant to race discordant patient–navigator pairs

[c] P <0.05 χ^2 test comparing characteristic of language concordant to language discordant patient–navigator pairs

[d] LGL includes the following Pap test results: atypical squamous cells of undetermined significance/positive for human papillomavirus and low-grade squamous intraepithelial lesion.

[e] HGL Includes the following Pap test results: atypical glandular cells of undetermined significance, high grade squamous intraepithelial lesion, and carcinoma.

Table 2

Navigator characteristics. Boston Patient Navigation Research Program.

Characteristic	Total (N=23) N(%)
Age	
24–39	7 (30)
40–59	4 (17)
Missing	12 (52)
Race/Ethnicity	
White	13 (57)
Black	4 (17)
Hispanic	3 (13)
Asian	1(4)
Missing	2 (9)
Language	
English only	18 (78)
English +Spanish	3 (13)
English + Vietnamese	1 (4)
English + Albanian	1 (4)

Table 3

Multivariate cox proportional hazard model[a] of patient and navigator race and language concordance predicting time to diagnostic resolution. Boston Patient Navigation Research Program

	Breast				Cervical			
	<90 days		90–365 days		<90 days		90–365 days	
	aHR	CI	aHR	CI	aHR	CI	aHR	CI
Race concordant	1.19	0.97, 1.46	1.19	0.97, 1.46	1.23	0.99, 1.53	1.23	0.99, 1.53
Race discordant	1.00		1.00		1.00		1.00	
Language concordant	1.13	0.80, 1.59	1.04	0.70, 1.55	**1.46**	**1.18, 1.80**	1.16	0.65, 2.07
Language discordant	1.00		1.00		1.00		1.00	

Abbreviations: aHR adjusted hazard ratio, CI 95% Confidence Interval

[a] Adjusted for race/ethnicity, age, language, insurance, type of screening abnormality, and clustering by navigator

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Table 4

Stratified multivariate cox proportional hazard model[a] of patient and navigator race and language concordance predicting time to diagnostic resolution. Boston Patient Navigation Research Program

	Breast				Cervical			
	<90 days		90–365 days		<90 days		90–365 days	
	aHR	CI	aHR	CI	aHR	CI	aHR	CI
White concordant	0.98	0.83, 1.16	0.98	0.83, 1.16	**0.60**	**0.48, 0.76**	**0.60**	**0.48, 0.76**
White discordant	1.00		1.00		1.00		1.00	
Black concordant	**0.86**	**0.75, 0.99**	**2.62**	**1.56, 4.41**	0.91	0.47, 1.79	**1.50**	**1.35, 1.67**
Black discordant	1.00		1.00		1.00		1.00	
Hispanic concordant	**1.37**	**1.06, 1.77**	1.49	0.83, 2.67	**1.82**	**1.39, 2.39**	**1.82**	**1.39, 2.39**
Hispanic discordant	1.00		1.00		1.00		1.00	
Asian concordant[b]	**1.29**	**1.07, 1.55**	0.98	0.83, 1.16	--		--	
Asian discordant[b]	1.00		1.00		--		--	
Spanish concordant	1.10	0.69, 1.75	1.10	0.69, 1.75	**1.43**	**1.10, 1.84**	1.63	1.00, 2.66
Spanish discordant	1.00		1.00		1.00		1.00	

Abbreviations: aHR adjusted hazard ratio, CI 95% confidence interval

[a] Adjusted for age, insurance status, and clustering by navigator

[b] Asian population not included in stratified analysis for cervical screening group due to small sample size