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Racial and Ethnic Differences in Patient Navigation: Results from the Patient Navigation Research Program

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Abstract

Purpose—Patient navigation was developed to address barriers to timely care and reduce cancer disparities. This study explores navigation and racial and ethnic differences in time to diagnostic resolution of a cancer screening abnormality.

Patients and Methods—We conducted an analysis of the multi-site Patient Navigation Research Program. Participants with an abnormal cancer screening test were allocated to either navigation or control. Unadjusted median time to resolution was calculated for each racial and ethnic group by navigation and control. Multivariable Cox proportional hazards models were fit, adjusting for sex, age, cancer abnormality type, and health insurance, stratifying by center of care.

Results—Among a sample of 7,514 participants, 29% were Non-Hispanic White, 43% Hispanic, and 28% Black. In the control group Blacks had a longer median time to diagnostic resolution (108 days) than Non-Hispanic Whites (65 days) or Hispanics (68 days) ($p < .0001$). In the navigated groups, Blacks had a reduction in median time to diagnostic resolution (97 days) ($p < .0001$). In the multivariable models, among controls, Black race was associated with increased delay to diagnostic resolution (HR=0.77; 95% CI: 0.69, 0.84) compared to the Non-Hispanic Whites, which was reduced in the navigated arm (HR=0.85; 95% CI: 0.77, 0.94).

Conclusion—Patient navigation had its greatest impact for Black patients who had the greatest delays in care.

Keywords

Patient navigation; disparities; cancer; race and ethnicity; screening

Introduction

Patient navigation was developed to ameliorate the delays in the delivery of timely cancer care and thereby reduce cancer disparities.¹⁻⁵ Navigation aims to address specific patient barriers to improve timely, quality cancer care, such as transportation, financial assistance, insurance, and social support.⁶ Recent findings have demonstrated a benefit of navigation on

a variety of outcomes including: screening rates,^{4,7} time to diagnostic resolution,⁸⁻¹¹ improved experience of care,^{12,13} increased follow up care,¹⁴ and quality of cancer care.^{15,16}

The relationship between minority race and ethnicity and delays in cancer care has guided the development of patient navigation. While individual studies have reported on the impact of minority race on delays in diagnosis,¹⁷⁻²² and the implementation of navigation to reduce delays in diagnostic resolution,⁸⁻¹¹ the question of whether navigation specifically addresses racial disparities remains. We used the national database developed by the Patient Navigation Research Program (PNRP) to explore whether patient navigation eliminates or ameliorates ethnic and racial differences seen in time to diagnostic resolution.

Methods

Overall Study Design

We analyzed the 2006-2011 Patient Navigation Research Program (PNRP),²³ which consisted of ten research centers across the United States investigating the impact of patient navigation on timeliness of management of an abnormal cancer screening test. The research centers recruited patients from community health centers or outpatient practice settings within or outside of safety-net hospitals, specifically targeting low income, uninsured or publically insured, racially and ethnically diverse patients.

Study Centers

We included data from seven of the PNRP research centers, as one site did not enroll patients with abnormal cancer screening, one did not include their data into the joint dataset, and one used a different method of identifying their control group.^{1,8,10,24,25} All research centers adopted the same inclusion and exclusion criteria, collected the same data elements and reported de-identified data to a data coordinating center. Approval from the institutional review board of each research institution was obtained. The analyses for this study utilized a pooled analysis combining data collected across the study centers and cancer types, adjusting for possible correlation by including research center as a clustering variable.^{23,26}

Eligibility

Participants aged 18 years old or older were included in the study if they had an abnormal cancer screening test which included: breast (positive clinical breast exam or mammogram: BIRADS 0, 4, 5,), cervical (Pap test: LGSIL, HGSIL, CIN and carcinoma in situ), colorectal (positive stool hemoccult, rectal mass or rectal bleeding), and prostate (PSA: 4, PSA velocity) cancers.²³ These specific cancer screening tests were chosen due to their association with cancers in the population that have significant morbidity and mortality but have the potential to be mitigated with early detection. Exclusion criteria included prior history of cancer, prior experience with patient navigation, cognitive conditions that would exclude participation in navigation and pregnancy.

Intervention

All participating centers implemented a patient navigation intervention protocol that focused on addressing barriers to obtain timely care. The theoretically based patient navigator

intervention used a chronic care model²⁷ guided by social support theory²⁸ and the Health Belief model²⁹ to assist in the identification of barriers to care, the development of strategies to overcome barriers, and the tracking of patients through the steps of their medical evaluation. Navigators participated in annual national training and webinars to standardize interventions.³⁰ Supplemental local training provided navigators with relevant community resources and context. Navigators used a standardized checklist of barriers and actions to record their activities. Navigators were in regular contact with participants, families, clinical providers and agencies when appropriate. Examples of navigation services included arranging transportation, financial support and childcare, coordinating care among providers, arranging interpreter services, linking patients to community resources, and addressing any other needs to overcome identified barriers to receiving the recommended follow up.³¹

Data Collection

Definitions of specific study outcome variables to be collected were agreed upon by all PNRP investigators and adhered to by each research center. Coding questions were systematically reviewed weekly to maintain rigorous, consistent data entry standards. Clinical variables (type of screening abnormality, dates and types of clinical services and clinical outcomes) were abstracted from medical records. Each center coded for race and ethnicity uniformly for all participants at their center. For this analysis we collapsed into the following single variable categories of Non-Hispanic White, Non-Hispanic Black and Hispanic. We excluded Asian, Native American, and Unknown from this analysis due to small sample sizes. Primary language was coded as English or Other. Health insurance coverage was categorized as: Uninsured, Public, or Private.

Statistical Analysis

Baseline demographic, clinical, and socioeconomic characteristics were described using mean (standard deviation (SD)) or frequency (percentage). These characteristics were compared across study arms using two-sample t-tests or chi-squared tests, depending on data type.

The outcome of interest was time to diagnostic resolution of the screening abnormality, defined as the time from the date of the initial screening abnormality to the date when the final definitive diagnostic test or evaluation was completed. Participants were censored at 365 days if they did not reach diagnostic resolution. The time to diagnostic resolution was summarized using the Kaplan-Meier curves along with log-rank test by navigation arms and race groups. We calculated the median time and its interquartile range (IQR) (25th-75th percentiles) to diagnostic resolution for each racial and ethnic group by intervention arms, followed by comparing the levels within each arm using the log-rank test. We combined participants who had abnormalities for screening tests into one analysis, adjusting for type of cancer screened, as there are no clear differential guidelines for recommended time for diagnostic resolution by type cancer being screened. Multivariable Cox proportional hazards models were fit using data from both the control and intervention arms, adjusting for sex, age, cancer type and health insurance, and stratifying by center of care to adjust for clustering.

Interaction terms between navigation arm and the race and ethnicity variable were included in these models to assess for effect modification of patient navigation. We calculated adjusted hazard ratios (HRs) for each racial and ethnic group by patient navigation arm using the estimates for the interaction terms. All tests were two-sided, the significant level alpha was set at 0.05 and analyses were conducted using Stata Version 10.0 (2007).

In order to account for independent effects of individual centers, in this analysis we conducted a sensitivity analysis by repeating the analysis removing one of the centers each time. The sensitivity analysis did not demonstrate any undue influence on the outcomes by any one of the centers.

Results

Among the sample of 7,514 participants included in this analysis, the average age was 45.1 years (SD = 15.2) and 89% were women (See Table 1). The sample was diverse with 43% Hispanic, 29% Non-Hispanic White and 28% Black participants. The majority of participants had public insurance (43%) or no insurance (33%) leaving 24% with private insurance. Among the publically insured, 43% had Medicaid, 13% had Medicare, 6% were both Medicaid/ Medicare insured and 38% had some other form of publically funded insurance. Most participants were never married (47%), while 34% were currently married and 19% were previously married. The majority of participants spoke English (65%). Roughly half of the abnormal cancer screening tests were breast (51%), followed by cervical (35%). There were statistically significant differences between the patient navigation intervention and control arms in age, race and ethnicity, health insurance, cancer type and study center. Navigated participants were more likely to be Hispanic, uninsured, and speak a language other than English compared to participants in the control arm.

Time to Diagnostic Resolution by Study Arm

Table 2 lists the median days to resolution for different racial and ethnic groups stratified by control and navigation arms. Both arms showed statistically significant difference in the median time to diagnostic resolution among race and ethnicity groups (p-value=0.0001 each arm). Among the control arms, a considerable difference was seen among the Black participants with a median of 108 days to resolution (IQR of 42 – 315 days, $p < .0001$) compared with Non-Hispanic White participants, (median 65 days, IQR 31 --220 days) and Hispanic participants (68 days, IQR of 31 - 208 days).

We observed a difference among groups of the impact of the intervention in median time to resolution. The median time to resolution decreased from control to intervention Black groups from 108 to 97 days (IQR of 49 - 230 days). In contrast, the reductions in median times in the intervention arms were minimal for the other two groups. Navigated Non-Hispanic White patients had a median time to resolution of 67 days (IQR of 33 – 196 days), similar to controls of 65 days. Navigated Hispanic patients demonstrated a similar median time to resolution of 62 days (IQR of 34 - 120 days) to controls of 68 days. While the median time to resolution decreased the greatest amount from control to intervention Black groups, they continued to demonstrate a longer time to achieve diagnostic resolution compared to navigated Hispanic and Non-Hispanic White participants.

Figure 1 depicts the time to event curves for diagnostic resolution, showing the effect of navigation and race on time to diagnostic resolution from an abnormal cancer screen result. Navigated participants were more likely to have timely diagnostic resolution compared to their respective control group, with most of the difference seen after 90 days. The figure also reveals the differences between racial and ethnic groups. While all racial and ethnic groups show a benefit of navigation, navigated Black participants achieve the greatest benefit compared to their control counterparts.

Race and Ethnicity Effect on Time-to- Diagnostic Resolution for Each Intervention Arm

The multivariable Cox model for each arm are shown in Table 3. In the multivariable adjusted models, Black race was significantly associated with increased risk of delay in both the control group (HR=0.77; 95% CI: 0.69, 0.84) and navigated group (HR=0.85; 95% CI: 0.77, 0.94) compared to the Non-Hispanic White arm groups, respectively. There was no significant difference between the Hispanic control group (HR=0.98; 95% CI 0.89, 1.07) compared to the Non-Hispanic White control group, or the Hispanic navigated group and the non-Hispanic White group. The p-value for the interaction term between racial and ethnic groups and the study arm was 0.07 (Table 3), indicating that the interaction did not reach statistical significance.

Discussion

As patient navigation becomes the standard of cancer care, identifying patient subgroups that will benefit most from the intervention will allow health systems to target resources to appropriate patient populations. Our findings confirm previous research demonstrating delays in timely diagnostic cancer care specifically among Black participants when compared to other race and ethnic groups. Patient navigation, however, was able to reduce this disparity by having a significant reduction in time to diagnostic resolution in the Black population. Although patient navigation did not eliminate the disparity, this population benefited most from this intervention.

Participants from all three racial and ethnic groups benefitted from navigation. In the unadjusted analysis, Black participants derived a greater benefit from navigation compared to the other two groups as demonstrated by a larger decrease in median days to diagnostic resolution. While the interaction term between racial and ethnic groups and the study arm did not reach significance ($p=0.07$), we do report a statistically significant improvement in the adjusted hazard ratios for the Black group from 0.77 (control) to 0.85 (navigated) when compared to the Non-Hispanic White group. In our prior work, we reported that the impact of navigation is greatest in those who did not resolve their diagnostic abnormality within the first 90 days.³² Therefore we did not see differences in median time between the control and navigated groups among non- Hispanic whites, or Hispanic participants, where median time to diagnostic resolution among the control group was under 90 days. For black participants where median time to diagnostic resolution in the control arm was 108 days, we saw a significant drop to 97 days in the navigated group. However, for all racial/ ethnic groups, Figure 1 demonstrates a benefit of navigation after 90 days.

Previous studies have documented improved cancer care with patient navigation among varying racial and ethnic groups. However, few have reported specifically on the interaction of patient navigation and race and ethnicity. For example, Ramirez and colleagues³³ investigated a group of 425 Latina women with abnormal screening mammograms between 2008 and 2011. They found that, among this group of Latina women, navigated patients experienced reduced overall time to diagnosis when compared to historical controls.

Our findings are consistent with other work reporting on the persistent and growing cancer disparities in the African American population,³⁴ and the demonstration of increasing disparities in cancers even with effective treatments available (amenability index).³⁵ Since patient navigation reduced but did not eliminate delays to diagnostic resolution among African American participants, there continues to be an urgent need to identify the specific barriers, and targeted interventions needed to support these patients. Charlot and colleagues³⁶ investigated the effect of race and language concordance between navigators and patients on time to diagnosis, finding that concordance improved timeliness of care specifically for black and Hispanic participants. Ferrante and colleagues³⁷ used qualitative methods to describe the experience of an African American patient navigator and techniques used to develop rapport and trust with patients who were predominantly African American. Natale-Pereira and colleagues, describe the need for both diversity and cultural competency in effective patient navigation.³⁸ Our work and others has documented barriers to care and points to the need for additional interventions.^{4,6,39} Several studies indicate that patients from different racial backgrounds and nativity (place of birth or immigration status) have different needs. John and colleagues⁴⁰ used data from the Cancer Care Outcomes Research and Surveillance Consortium (CanCORS) to investigate perceived unmet needs for supportive services among a diverse population of individuals with lung cancer. They found significant differences by race and ethnicity and nativity, after adjusting for varied factors, reporting that Black US born, Latino foreign born and Asian Pacific Islander foreign born groups have the highest level of perceived unmet needs. As more research addresses social support interventions (such as patient navigation) and best practices, identifying roles that incorporate the needs and differences of specific racial ethnic groups is paramount.

Our findings have immediate relevance for implementation of patient navigation in cancer care. Currently, the Commission on Cancer (CoC) has determined that standards for accreditation include the establishment of patient navigation services that are based on community needs. As cancer centers around the nation are faced with the implementation of unreimbursed navigation services to maintain CoC accreditation,⁴¹ there is an urgent need to determine how to best implement patient navigation and how to determine best practices for navigation services in specific clinical settings with scarce resources. Our study demonstrates racial and ethnic differences in timely care that can assist in the ability to triage and identify patients with the greatest needs, and suggests that programs specifically consider the needs of African American communities when designing navigation programs. Consistent with our findings, Krok-Schoen and colleagues recently published that specific demographic and psychosocial factors were associated with increased barriers to diagnostic resolution among the participants in the Ohio Patient Navigation Research Project.⁴² Recent studies²³ continue to assist in identifying and triaging those with more barriers who may

stand to obtain the greatest benefit from navigation services and thus improve the value of their care.⁴²

Navigation has shown great promise but remains in most locations an unfunded program. The benefit of navigation has been shown among those with the longest delays, and the greatest need for services, including those who are unemployed, those with housing instability and low social support.^{32,43,44} Here, we not only demonstrate the persistent, long and unacceptable delays for Black patients but also the benefit of navigation for this particular group. Identifying patients most at risk for delays is strategic and can maximize the benefit and value of patient navigation.

In order to understand the barriers faced by the most vulnerable populations, further investigation into the specific needs or barriers for the most vulnerable patient populations is essential.^{23,42} Current evidence continues to identify a myriad of barriers and reasons for lingering delays and persistent disparities, only some of which include medical mistrust, knowledge, financial barriers and lack of social support. By continuing to unravel the root causes of cancer outcome disparities that may be cultural, structural and potentially specific to certain populations, we can tailor navigation or other support services as needed. A variety of potential barriers can affect any one individual, highlighting that not a single solution will make a large impact on this problem. This tailoring of health services to specific patients and populations is an alternative definition of personalized medicine. In other words, the goal of personalized medicine can be equally relevant to social determinants of health as it is for genetic determinants. Our findings add to the literature to understand the cancer mortality disparities among Black communities, and suggests that patient navigation, through reducing delays in timely care, may ameliorate some of these disparities.

A limitation of our study is the lack of ability to measure the fidelity and implementation of the navigator intervention at each of the centers, such that one center may have developed a more in depth navigation intervention. We attempted to standardize the intervention with national trainings, webinars and standardization in navigation and data collection. However, differences in the tasks and network actions navigators routinely provided for patients were found by study center.³¹ In order to address this limitation, we controlled for geographic center as a cluster variable in the analysis. We performed an influence or sensitivity analysis and confirmed that our findings were not attributable to any single center.

The results of our study confirmed previous research demonstrating racial differences in timeliness to care. We demonstrate that Black patients benefited the most from patient navigation. Navigation services should be prioritized specifically for patients who have the greatest need and thus stand to benefit the most from patient navigation.

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Figure 1. Effect of Navigation and Race/Ethnicity on Time to Diagnostic Resolution of an Abnormal Cancer Screening

Table 1
Demographic characteristics by navigation arm: Patient National Research Program

	Overall (N=7514)	Control Arm (N=3732)	Navigation Arm (N=3782)
Demographic Characteristics			
Female sex, N (%)	6698 (89%)	3306 (89%)	3392 (90%)
Mean age—yr, mean (SD) ***	45.1 (15.2)	45.2 (15.6)	41.9 (15.1)
Race and ethnicity, N (%) ***			
Non-Hispanic White	2147 (29%)	1143 (31%)	1004 (27%)
Black	2112 (28%)	1139 (31%)	973 (26%)
Hispanic	3255 (43%)	1450 (39%)	1805 (48%)
Health insurance, N (%) ***			
Uninsured	2448 (33%)	1001 (27%)	1447 (39%)
Public	3249 (43%)	1700 (46%)	1549 (41%)
Private	1778 (24%)	1016 (27%)	762 (20%)
Marital Status, N (%)			
Currently married	2438 (34%)	1177 (34%)	1261 (34%)
Previously married	1367 (19%)	646 (19%)	721 (20%)
Never married	3339 (47%)	1640 (47%)	1699 (46%)
Primary Language, N (%) *			
English	4726 (65%)	2327 (67%)	2399 (64%)
Not English	2537 (35%)	1161 (33%)	1376 (36%)
Cancer type, N (%) ***			
Breast	3850 (51%)	2016 (54%)	1834 (48%)
Cervical	2607 (35%)	1169 (31%)	1438 (38%)
Colorectal	455 (6%)	247 (7%)	208 (6%)
Prostate	602 (8%)	300 (8%)	302 (8%)
Sites, N (%) ***			
A	2619 (35%)	1340 (36%)	1279 (34%)
B	856 (11%)	502 (13%)	354 (9%)
C	476 (6%)	236 (6%)	240 (6%)
D	773 (10%)	398 (11%)	375 (10%)
E	587 (8%)	259 (7%)	328 (9%)
F	1023 (14%)	394 (11%)	629 (17%)
G	1180 (16%)	603 (16%)	577 (15%)

Comparing control to navigation arm:

* for $p < 0.05$,

** for $p < 0.01$,

*** for $p < 0.001$

Table 2
Median time to diagnostic resolution by race and ethnicity and patient navigation arm:
Patient Navigation Research Program

	Median Days to Resolution in Control Arm (25 th -75 th percentile)	Log-rank test p-value	Median Days to Resolution in Navigation Arm (25 th -75 th percentile)	Log-rank test p-value
Race and Ethnicity		0.0001		0.0001
Black	108 (42, 315)		97 (49, 230)	
Non-Hispanic White	65 (31, 220)		67 (33, 196)	
Hispanic	68 (31, 208)		62 (34, 120)	

Table 3
Adjusted hazard ratios for time to diagnostic resolution by patient navigation arm: Patient Navigation Research Program

	Adjusted HR for Control Arm (95% C.I.)	p value	Adjusted HR for Navigation Arm (95% C.I.)	p value	p value for interaction term
Race and Ethnicity					0.070
Non-Hispanic White	Ref.		Ref.		
Black	0.77 (0.69, 0.84)	0.000	0.85 (0.77, 0.94)	0.001	
Hispanic	0.98 (0.89, 1.07)	0.596	1.10 (0.998, 1.20)	0.055	

Adjusted for sex, age, cancer type, insurance, and includes an interaction between race and ethnicity and patient navigation arm.