Impact of Patient Navigation Interventions on Timely Diagnostic Follow Up for Abnormal Cervical Screening

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Abstract

Objective: As part of the Patient Navigation Research Program, we examined the effect of patient navigation versus usual care on timely diagnostic follow-up, defined as clinical management for women with cervical abnormalities within accepted time frames.

Methods: Participants from four Patient Navigation Research Program centers were divided into low- and high-risk abnormality groups and analyzed separately. Low-risk participants ($n = 2088$) were those who enrolled with an initial Pap test finding of atypical squamous cells of undetermined significance (ASCUS) with a positive high-risk human papillomavirus (HPV) serotype, atypical glandular cells, or low-grade squamous intraepithelial lesion (LGSIL). High-risk participants were those with an initial finding of high-grade squamous intraepithelial lesion (HGSIL) ($n = 229$). A dichotomous outcome of timely diagnostic follow-up within 180 days was used for the low-risk abnormality group and timely diagnostic follow-up within 60 days for the high-risk group, consistent with treatment guidelines. A logistic mixed-effects regression model was used to evaluate the intervention effect using a random effect for study arm within an institution. A backward selection process was used for multivariable model building, considering the impact of each predictor on the intervention effect.

Results: Low-risk women in the patient navigation arm showed an improvement in the odds of timely diagnostic follow-up across all racial groups, but statistically significant effects were only observed in non-English-speaking Hispanics (OR 5.88, 95% CI 2.81–12.29). No effect was observed among high-risk women.

Conclusion: These results suggest that patient navigation can improve timely diagnostic follow-up among women with low-risk cervical abnormalities, particularly in non-English-speaking Hispanic women.

Introduction

DESPITE THE FACT that treatment after an abnormal Pap test result is essential for the prevention of cervical cancer, research suggests that anywhere from 20%–50% of women who present with abnormal cervical cell cytology changes do not adhere to current treatment recommendations,

putting them at increased risk for development of cervical cancer.^{1–3} Women from groups of racial/ethnic minorities and low education and income have limited access to health-care and are less likely to seek care after an abnormal result.^{4–8}

In 1990, Freeman introduced the model of patient navigation as a way to support screening for, timely diagnosis of, and then treatment of cancer among vulnerable women.⁹ The

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Presented at the American Society of Clinical Oncology Meeting, May 30–June 3, 2014.

primary function of patient navigators is to reduce barriers to care by assisting participants in navigating the healthcare system. Examples of navigator functions include such activities as helping with scheduling of appointments, arranging childcare and transportation to appointments, and conducting language translations.⁹

The Patient Navigation Research Program was initiated in 2005 as a combined effort of nine healthcare institutions across the United States, funded through the National Cancer Institute, with additional support from the American Cancer Society and the Avon Foundation. This program targeted underserved populations with abnormal cervical, breast, or colorectal cancer screening tests who may be more at risk for lack of timely diagnostic follow-up of positive cancer screening, including racial and ethnic minorities and those of low socioeconomic status.¹⁰

Patient navigators may serve an important role in eliminating healthcare barriers to assist patients in obtaining timely care.^{5,6,11,12} Therefore, the current study evaluated the effect of patient navigation on timely diagnostic follow-up for women with cervical abnormalities at four of the nine institutions (Boston, Ohio, Chicago, and San Antonio) that recruited this population. We hypothesized that women with cervical abnormalities assigned to patient navigation would have more timely diagnostic follow-up of their abnormality and this effect would be evident across all abnormality types and socioeconomic status/demographic levels.

Methods

Study participants and outcomes

This study consisted of a secondary analysis of the multicenter Patient Navigation Research Program.¹⁰ A total of 2660 individuals with cervical abnormalities were enrolled at the four sites. On the basis of the findings of the initial Pap test, participants were classified as having either low- or high-risk abnormalities. Low risk was classified as those individuals with an ASCUS (atypical squamous cells of undetermined significance) abnormality along with a positive high-risk human papillomavirus (HPV) serotype, atypical glandular cells (AGCs), or low-grade squamous intraepithelial lesion (LSIL). High-risk abnormalities were classified as those with high-grade squamous intraepithelial lesion (HSIL). Participants with missing or other Pap smear findings were omitted from these analyses ($n=216$), as well as those with documentation confirming that they left the health system following study enrollment ($n=7$). Participants missing key covariate information such as age, marital status, insurance status, race, or primary language information were also excluded from these analyses ($n=120$). Since the majority of participants who identified a language other than English as primary were Hispanic (86.0%), race/ethnicity and language were combined into a four-level categorical variable of white, black, Hispanic/English as primary language and Hispanic/non-English as primary language.

Definition of timely follow-up

Follow-up was defined as the time from the date of the initial abnormality screening to the date when the diagnostic test was completed. Timely diagnostic follow-up for the low-risk group was defined as within 180 days from the date of the

initial abnormal screening. Conversely, timely diagnostic follow-up for the high-risk group was defined as within 60 days of the date of the initial abnormal screening. These recommendations for time to diagnostic follow-up are consistent with guidelines published within the National Breast and Cervical Cancer Early Detection Program.¹³

Study centers and design

Four Patient Navigation Research Program centers (Boston, Chicago, Ohio, and San Antonio) contributed data to the present study. Table 2 outlines the total number of high- and low-risk participants allocated to each study arm from each site. The study design used at each site is described below.

Ohio. The Ohio Patient Navigator Research Program conducted a group-randomized trial. A total of 18 clinics were randomized to either receive Patient Navigation or usual care, and individual participants from these clinics were followed over time.¹⁴ The first group of four clinics began participant recruitment in November 2006, while the last group of clinics began recruitment in April 2007. To be eligible, participants must be older than 18 years, a regular patient at the practice, able to provide informed consent, no history of cancer except for melanoma of the skin, living outside of a nursing home or institutional setting, without history of medical navigation, and able to speak and understand English or Spanish. Patient navigators were female, older than 30 years, and college graduates who had worked within the healthcare system before. One Hispanic navigator was fluent in both Spanish and English. The Chronic Care Model was used to guide implementation of the intervention.¹⁵ The assigned patient navigators contacted participants within 5 days of assignment to identify barriers and then tailor actions to the specific needs of the individual. A total of 168 low-risk participants were recruited, of which 88 were from usual care and 80 from patient navigation. Of the 10 high-risk participants, 4 were from usual care and 6 were from patient navigation clinics. Approval to conduct this study was obtained from the Ohio State University Institutional Review Board.

Boston. The Boston Patient Navigation Research Program implemented a quasi-experimental intervention across six inner-city community health centers. Each included clinic site served different racial/ethnic communities. Therefore, a strategic allocation protocol was developed to balance the navigation and usual care groups by race/ethnicity. All women presenting with abnormalities during the intervention period were included in the study. Data were collected from a random sample of all subjects with abnormal screening from 2004 to 2005. In addition, data on all subjects with abnormal screening were collected during the intervention period from January 2007 to December 2008. Women were excluded if they were cognitively impaired or pregnant at the time of the screening abnormality.¹⁶ Patient navigators were hired employees of the health center. All navigators had at least a high school education and some prior healthcare experience. Five navigators spoke a language in addition to English, and all navigators could access interpreter services, if needed. Patient navigators contacted participants by phone to begin navigation following abnormal screening results. The patient

navigators utilized a care management model to identify barriers to care for the participants.¹⁷ Patient contacts occurred by telephone, mail, and face-to-face meetings. A total of 1105 low-risk participants were recruited, 433 received usual care and 672 were assigned to the patient navigation intervention. Of the 50 high-risk participants, 24 received usual care and 26 were assigned to the patient navigation intervention. The Boston University Institutional Review Board approved this study with a waiver of written informed consent.

Chicago. The Chicago Cancer Navigation Project was conducted from 2005 to 2010 and utilized a quasi-experimental nonrandomized study design across five federally qualified health center sites and one safety net hospital.¹⁸ Similar numbers of navigated and control participants were recruited using individual and nonrandom assignment. Navigated participants were drawn from these sites, while those receiving usual care were selected from 20 other clinic sites. Adult women whose cervical cancer screening test was abnormal were eligible to participate in the study. Women were ineligible if they were younger than 18 years, being treated for another cancer, or pregnant. Patient navigators consisted of three licensed social workers and two lay patient navigators. One of the navigators was fluent in both English and Spanish. Navigators recruited participants by phone, as well as in person, within 1 week of abnormal screening results. Patient navigators were assigned to specific clinics and worked together to resolve barriers and facilitate timely care. A total of 412 low-risk participants were recruited, of which 248 received usual care and 164 received the intervention. Of the 45 high-risk participants, 18 received usual care and 27 received patient navigation. This study was approved by the Institutional Review Board of the University of Illinois at Chicago.

San Antonio. The San Antonio site implemented a quasi-experimental design conducted at University Health Systems in San Antonio and the University of Texas Health Science Center at San Antonio. Participants were recruited from November 2006 to May 2010 and a convenience sampling approach was used to recruit study participants from the county hospital system and community health clinics. Mentally competent individuals, 18 years of age and older residing in South Texas, who had abnormal cervical cancer screening results were eligible. Women were excluded if they were pregnant or had a history of cancer treatment within the last 5 years.¹¹ The San Antonio Patient Navigation Research Program employed a novel partnership of navigators and promotoras, defined as lay community health workers who were members of the Hispanic community. Two navigators addressed barriers to medical care, while one promotora addressed cultural barriers to care. The rationale for pairing the promotora and navigators was to capitalize on the benefits of the promotora's liaison role between the target population and the healthcare system. The promotora in this study was Hispanic and a member of the target population with respect to language and race/ethnicity. Consequently, the ability of the promotora to build rapport with participants and provide health information in a culturally sensitive way was key to overcoming cultural barriers to care. Women with positive Pap tests from multiple outlying clinics were referred into a central referral clinic for colposcopy for definitive diagno-

sis and treatment. The navigator/promotora team identified possible participants at the time of referral and approached them for consent at their presentation for colposcopy or by telephone before their scheduled appointment. Control participants received colposcopy by other providers in the same health system and were either not seen in the central referral clinic or declined navigation services. There were 403 women with low-risk lesions enrolled, including 121 control women and 282 navigated women, as well as 124 women with high-risk lesions, including 49 control and 75 navigated. The Institutional Review Board at the University of Texas Health Science Center at San Antonio approved this study.

Statistical analysis

Patient data across the four sites were combined and analyzed using the individual patient data meta-analytic approach.¹⁹ Due to the different definitions of timely care, the low- and high-risk patient groups were modeled separately. To adjust for heterogeneity in the treatment effect between program centers, logistic mixed-effects regression models were used with a random effect for treatment arm specifying center as the subject. Program center, patient-level covariates, and interactions with treatment arm were considered fixed effects. As the goal of these analyses was to determine what, if any, patient-level predictors impacted the efficacy of treatment, a model building approach examining the impact of the covariates on the treatment effect was adopted.²⁰ Sensitivity analyses, sequentially eliminating the data from one site and retaining the remaining three, were conducted for the final model to evaluate the robustness of the results for all four sites.

For the low-risk participants, a backward selection procedure was utilized. First, a full model was fit, including all main effects and interactions with treatment arm. Interactions were eliminated one by one in decreasing order of significance, until only those with p -values below 0.01 remained. Next, main effects were eliminated if their exclusion did not meaningfully impact the treatment effect (less than roughly 10% change) within the strata created by any of the significant interactions with arm. The Patient Navigation Research Program center categorical variable was retained in all models. Thus, the final model only included the main effects that were considered meaningful confounders of the treatment effect and the interactions that substantially modified it. Degrees of freedom for the fixed effects were determined by the Kenward–Roger method.²¹ Due to the smaller number of high-risk participants, which limited the ability to fit a large model, a forward selection process was utilized.

Results

A total of 2317 patients were included in the analyses. Among the 2088 low-risk participants, 795 (38.1%) had ASCUS with a positive high-risk HPV serotype, 46 (2.2%) had AGCs of undetermined significance, and 1247 (59.7%) had LGSIL. High-risk Pap test results (HGSIL) were found in 229 women. Table 1 shows the frequency distribution by arm for the demographic factors and risk status. More participants were recruited into the navigation arm ($n=1332$, 57.4%) compared to the usual care arm ($n=985$, 42.5%). Among navigation arm participants, the proportion of uninsured was higher than among those receiving usual care (34.7% vs.

TABLE 1. DESCRIPTIVE STATISTICS OF PARTICIPANTS WITH CERVICAL CANCER ABNORMALITIES BY STUDY ARM AND STUDY SITE (N=2317)

Variable	Boston		Chicago		Ohio		San Antonio	
	Usual care (n=457), n (%)	Navigation (n=698), n (%)	Usual care (n=266), n (%)	Navigation (n=191), n (%)	Usual care (n=92), n (%)	Navigation (n=86), n (%)	Usual care (n=170), n (%)	Navigation (n=357), n (%)
Pap risk status								
Low risk	433 (94.7)	672 (96.3)	248 (93.2)	164 (85.9)	88 (95.7)	80 (90.3)	121 (71.2)	282 (79.0)
High risk	24 (5.3)	26 (3.7)	18 (6.8)	27 (14.1)	4 (4.3)	6 (7.0)	49 (28.8)	75 (21.0)
Age (years)								
<30	331 (72.4)	436 (62.5)	168 (63.2)	127 (66.5)	56 (60.9)	51 (59.3)	76 (44.7)	191 (53.5)
30–39	83 (18.2)	155 (22.2)	59 (22.2)	34 (17.8)	19 (20.7)	15 (17.4)	51 (30.0)	105 (29.4)
40+	43 (9.4)	107 (15.3)	39 (14.7)	30 (15.7)	17 (18.5)	20 (23.3)	43 (25.3)	61 (17.1)
Insurance								
Uninsured	58 (12.7)	230 (33.0)	49 (18.4)	15 (7.9)	6 (6.5)	5 (5.8)	26 (15.3)	212 (59.4)
Public insurance	196 (42.9)	302 (43.3)	155 (58.3)	153 (80.1)	18 (19.6)	19 (22.1)	125 (73.5)	130 (36.4)
Private insurance	203 (44.4)	166 (23.8)	62 (23.3)	23 (12.0)	68 (73.9)	62 (72.1)	19 (11.2)	15 (4.2)
Marital status								
Single/never married	403 (88.2)	573 (82.1)	225 (84.6)	146 (76.4)	55 (59.8)	49 (57.0)	92 (54.1)	145 (40.6)
Married	39 (8.5)	94 (13.5)	29 (10.9)	30 (15.7)	22 (23.9)	21 (24.4)	58 (34.1)	131 (36.7)
Divorced/widowed/ separated	15 (3.3)	31 (4.4)	12 (4.5)	15 (7.9)	15 (16.3)	16 (18.6)	20 (11.8)	81 (22.7)
Race								
Black	105 (23.0)	273 (39.1)	172 (64.7)	127 (66.5)	34 (37.0)	23 (26.7)	10 (5.9)	22 (6.2)
White	248 (54.3)	125 (17.9)	5 (1.9)	3 (1.6)	57 (62.0)	59 (68.6)	29 (17.1)	25 (7.0)
Hispanic/English	69 (15.1)	91 (13.0)	11 (4.1)	16 (8.4)	1 (1.1)	3 (3.5)	76 (44.7)	137 (38.4)
Hispanic/non-English	25 (7.7)	209 (29.9)	78 (29.3)	45 (23.6)	0 (0.0)	1 (1.2)	53 (32.4)	173 (48.5)

14.1%). Similarly, the proportion of Hispanics with a primary language other than English was higher among the navigation participants than usual care (32.1% vs. 17.1%). Among the navigated participants, 68.9% had an encounter with a navigator before diagnostic follow-up and the median overall time to first encounter was 40 days.

Low-risk participants

A total of 2088 participants were low risk and had expected timely diagnostic follow-up within 180 days. Table 2 shows the unadjusted rate of diagnostic follow-up within 180 days by site and arm. In all centers, participants in the navigation arm were more likely to have diagnostic follow-up of abnormality within 180 days. Following the multivariable model building process described in the methods, only the interaction between arm and race/ethnicity was retained

($p = 0.0003$, in a model containing all main effects). Only age approached the 10% treatment effect change threshold within one of the race/ethnicity strata for inclusion in the model, with a change of roughly 9%. Marital status and insurance status were both under 5%. Table 3 shows the fixed-effects parameter estimates for the final model and Table 4 shows the estimated effects of navigation by race/ethnicity adjusted for age and center. While some benefits of navigation were seen across all race/ethnicity groups, only Hispanic women with a primary language other than English who experienced patient navigation were significantly more likely to experience timely diagnostic follow-up, compared to usual care (OR 5.88, 95% CI 2.81–12.29). Sensitivity analyses, eliminating the data from one site at a time and rerunning the final model, were conducted for the contrast comparing navigation versus control for Hispanics with a primary language other than English. While the estimated effects varied across the four

TABLE 2. RISK GROUP FREQUENCY BY STUDY ARM AND PERCENTAGE OF PATIENTS RESOLVED WITHIN RECOMMENDED TIME

Program center	Low risk, n (% resolved within 180 days)		High risk, n (% resolved within 60 days)	
	Usual care	Patient navigation	Usual care	Patient navigation
Boston	433 (68.4)	672 (78.7)	24 (37.5)	26 (50.0)
Chicago	248 (46.4)	164 (72.0)	18 (33.3)	27 (55.6)
Ohio	88 (60.2)	80 (66.3)	4 (25.0)	6 (50.0)
San Antonio	121 (79.3)	282 (87.6)	49 (59.2)	75 (42.7)

Resolution within recommended guidelines defined as 180 days for low-risk patients and 60 days for high-risk patients.

TABLE 3. FIXED-EFFECT PARAMETER ESTIMATES FOR THE FINAL MULTIVARIABLE LOGISTIC REGRESSION MIXED-EFFECTS MODEL ($N=2088$)

<i>Effect</i>	<i>Level</i>	<i>Parameter estimate</i>	<i>Standard error</i>	<i>p</i>
Intercept	—	0.9590	0.3662	0.0212
Site	Boston	0.4123	0.3136	0.2862
	Chicago access	-0.0300	0.3324	0.9330
	San Antonio	0.5687	0.3498	0.1740
	Ohio	0.0000		
Navigation arm	Yes	0.7055	0.3534	0.0658
	No	0.0000		
Age	<30	-0.4983	0.1603	0.0019
	30–39	0.0579	0.1910	0.7620
	40+	0.0000		
Race/ethnicity	Black	-0.6665	0.2635	0.0115
	White	-0.1610	0.2578	0.5323
	Hispanic/non-English	-0.2718	0.2911	0.3506
	Hispanic/English	0.0000		
Navigation by race/ethnicity	Yes/Black	-0.3649	0.3597	0.3107
	Yes/White	-0.2506	0.3830	0.5132
	Yes/Hispanic/Non-English	1.0654	0.4029	0.0083
	Yes/Hispanic/English	0.0000		

models, all indicated a significant navigation benefit ranging from 4.08 ($p=0.0144$, eliminating Boston) to 8.5 ($p=0.0004$, eliminating San Antonio) for timely diagnostic follow-up.

High-risk participants

A total of 229 participants were high risk with expected timely diagnostic follow-up within 60 days. Table 2 shows the rate of timely diagnostic follow-up within 60 days by site and arm. Relatively few participants enrolled with an initial pap finding of HGSIL and a consistent direction of effect was not observed across all centers. A crude model adjusting only for program center revealed no impact of navigation over usual care for timely diagnostic follow-up among high-risk participants (OR 1.26, 95% CI 0.28–5.76). However, the wide confidence interval revealing a lack of precision in this estimate precludes making definitive conclusions. No significant effect modifiers or confounders were observed. Sensitivity analyses, eliminating one site at a time and re-

running the model, all indicated nonsignificant effects of the intervention with wide confidence intervals.

Discussion

We report a multicenter study to examine the impact of patient navigation on timely diagnostic follow-up after an abnormal cervical cancer screening test. Reducing the cervical cancer burden relies heavily on understanding barriers to timely diagnostic follow-up for women who have had an abnormal Pap test result. Patient navigation has emerged as a way to reduce cancer disparities in the medically underserved by facilitating the receipt of appropriate and timely care.²² We evaluated the efficacy of a patient navigation intervention, implemented at four centers, on improving the time to diagnostic follow-up for cervical abnormalities in comparison to usual care.

As hypothesized, we found that patient navigation shortened the time to diagnostic follow-up for low-risk participants, compared to those receiving usual care. However, the effect was most prominent and statistically significant in Hispanics for whom English was not their primary language. These results are applicable to Hispanic immigrants who may have more language and acculturation barriers than English-speaking individuals. The results of our study are consistent with a recent report indicating that language concordance of patient navigators improved the timeliness of follow-up after cancer screening abnormalities.²³ Moreover, we observed that patient navigation significantly improved timely care among women with low-risk abnormalities, but not among women with high-risk abnormalities. This difference may potentially be explained by the intense follow-up that women with high-risk abnormalities already receive. For example, women with high-risk lesions may be more likely to be contacted and followed up by their healthcare providers than would women who do not experience these abnormalities. Perhaps women with low-risk abnormalities are not normally followed up as intensely as those with high-risk lesions, leading to fewer women who receive timely follow-up care.

TABLE 4. MODEL ESTIMATED EFFECTS OF NAVIGATION BY RACE/ETHNICITY ON RESOLUTION OF ABNORMALITY WITHIN 180 DAYS FOR LOW-RISK PATIENTS, ADJUSTED FOR AGE AND CENTER ($N=2088$)

<i>Variable</i>	<i>Odds ratio (95% CI)</i>	<i>p</i>
Race/ethnicity		
Black (navigation vs. usual care)	1.41 (0.69–2.88)	0.2621
White (navigation vs. usual care)	1.58 (0.78–3.17)	0.1691
Hispanic/English (navigation vs. usual care)	2.02 (0.95–4.32)	0.0658
Hispanic/non-English (navigation vs. usual care)	5.88 (2.81–12.29)	0.0002

Hispanic women experience almost twice the incidence rate of cervical cancer and 1.5 times the mortality rate associated with cervical cancer when compared to non-Hispanic Caucasian women.²⁴ In addition, reading and speaking a language more fluently other than English has been shown to be negatively associated with receipt of cervical cancer screening, putting these individuals at increased risk for the development of cervical cancer.²⁵ Specifically, Latinas have cited barriers such as fear, lack of knowledge, scheduling difficulties, and inadequate communication as salient barriers to care.^{5-7,26}

Our findings add to previous research which found that comprehensive patient navigation approaches, such as those that are culturally specific and language concordant, can significantly improve cancer screening rates among multi-ethnic populations.⁵⁻⁷ Notably, very few women included in our study did not maintain contact with clinical staff. In addition to language barriers, cultural barriers and Hispanic beliefs surrounding the diagnosis of cancer may contribute to observed lack of care as well. For example, Hispanic women tend to believe that cancer is not preventable, have fatalistic beliefs regarding their cancer diagnosis, and may have misconceptions regarding the treatability of cancer.²⁷ Fatalistic beliefs have also been shown to be associated with delays in diagnosis and treatment of abnormal Pap tests.²⁸ Patient navigators can aid in correcting these misconceptions of cancer, as well as quelling fears and demonstrating the importance of timely care in preventing cervical cancer.

The American College of Surgeons Commission on Cancer currently requires that hospitals and cancer programs have patient navigation practices in place to gain accreditation. Despite this requirement, healthcare providers who do not work in these settings and wish to ensure timely follow-up of patients can follow patient navigation practices such as contacting patients, either in person or on the phone, regarding barriers to follow-up to facilitate timely diagnostic care.

A significant limitation of our study relates to the nature of the data for combined sites. The differences in study design among the study sites were predetermined by the study investigators before patient enrollment, acknowledging that patient navigation programs must be designed to address the particular needs of the specific population being served. Thus, no one study design can account for all site-specific needs. For example, some study sites used a randomized design, while others used a quasi-experimental or non-randomized design. Therefore, differences in the randomization procedures at the level of the study site may alter the observed effect of patient navigation. For example, the effect of selection bias cannot be ruled out if women who were most likely to delay diagnostic procedures were also more likely to be assigned to patient navigators. Another weakness in our study was some imbalance in demographics between the navigated and control women. As all program sites in this analysis implemented navigation at the clinic level, some imbalance is to be expected due to different patient populations. While covariate adjustment cannot completely eliminate such differences, our methodology considered confounders of the treatment effect in an effort to minimize the impact. However, we feel that including and combining data from all four Patient Navigation Research Program (PNRP) sites is beneficial to allowing researchers to understand differences in the application of patient navigation.

For example, the San Antonio site used more of a real-world navigation process compared to the designed interventions that were used at the other sites. Despite this fact, sensitivity analyses revealed that sequential exclusion of study sites did not alter the results we observed. Furthermore, we believe that including data from all four sites, including different randomization and study design procedures, is beneficial because it allows for greater generalizability of the findings, reflecting the challenges of the specific needs of different clinical populations.

Our study also has several strengths, including a large and diverse population of participants as well as the mix of clinic types from the different study sites. This lends to external generalizability to women from multiple communities and cultures, notably underserved populations such as racial and ethnic minorities and women of low socioeconomic status. Moreover, patient navigators underwent extensive standardized training regardless of educational background, providing quality assurance of patient navigation. In addition, all study sites had at least one patient navigator fluent in both English and Spanish, effectively reducing potential language barriers.

Despite continuing efforts aimed at reducing cancer disparities, research indicates that disparities persist, particularly among racial and ethnic minorities. We have demonstrated the effectiveness of patient navigation in facilitating timely diagnosis and treatment among Hispanic women with low-risk abnormalities who did not speak English as their primary language. Patient navigation holds promise as an important advance in addressing and overcoming barriers to care for some disadvantaged women with abnormal Pap test results.

Acknowledgments

This work was supported by the National Cancer Institute, National Institutes of Health (U01 CA116892, U01 CA117281, U01CA116903, U01CA116937, U01CA116924, U01CA116885, U01CA116875, U01CA116925, and R25 CA090314); the American Cancer Society (No. SIRSG-05-253-01 and CRP-12-219-01-CPRB); and the Avon Foundation.

Author Disclosure Statement

No competing financial interests exist.

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