

# Health Literacy, Language, and Cancer-Related Needs in the First 6 Months After a Breast Cancer Diagnosis

Christine M. Gunn, PhD<sup>1,2</sup>; Michael K. Paasche-Orlow, MD, MA, MPH<sup>3</sup>; Sharon Bak, MPH<sup>1</sup>; Na Wang, MA<sup>4</sup>; Jennifer Pamphile, MPH<sup>1</sup>; Kerrie Nelson, PhD<sup>5</sup>; Samantha Morton, JD<sup>6</sup>; and Tracy A. Battaglia, MD, MPH<sup>1</sup>

**QUESTION ASKED:** What are the relationships between health literacy (HL), spoken language, and dimensions of cancer-related needs in the first 6 months after a breast cancer diagnosis?

**SUMMARY ANSWER:** Having lower health literacy was associated with higher cancer-related needs scores and lower self-efficacy scores at the time of a cancer diagnosis, but health literacy-related differences dissipated by 6 months. Haitian-Creole speakers had lower cancer-related needs and lower self-efficacy scores than did English or Spanish speakers at diagnosis, but only self-efficacy differences remained 6 months later.

**WHAT WE DID:** Women (N = 262) speaking English, Spanish, or Haitian Creole and enrolled in a patient navigation study at diagnosis completed a survey in their primary spoken language within 30 days of their diagnosis and 6 months later to characterize their cancer-related needs and self-efficacy. The outcomes of cancer-related needs and self-efficacy and their subscales were examined by both literacy and language separately using Kruskal-Wallis tests to explore the independent associations between these constructs. Multivariate linear regression models tested potential effects among language and literacy on cancer-related needs and self-efficacy, adjusting for age, insurance, stage, employment status, and language. Models were created separately for baseline and 6-month outcomes.

**WHAT WE FOUND:** Multivariable linear regressions demonstrated that having inadequate and marginal HL was associated with higher average cancer-related needs scores at diagnosis compared with those with adequate HL. Haitian-Creole language was associated with significantly lower cancer-related needs scores, as was older age. On average, having inadequate HL was associated with lower self-efficacy scores at baseline, as was being unable to work. Older age and higher baseline self-efficacy scores were associated with higher self-efficacy scores at 6 months, whereas speaking Haitian Creole was associated with lower self-efficacy scores, after adjusting for other factors.

**BIAS, CONFOUNDING FACTORS, DRAWBACKS:** This study was conducted in the setting of a larger patient navigation study. Measures were self-reported and validated in English and Spanish, but not in Haitian Creole.

**REAL-LIFE IMPLICATIONS:** Findings suggest that interventions oriented to mitigating HL and language barriers might reduce distress at the time of diagnosis and improve self-efficacy over the course of treatment. Hiring multilingual personnel in medical oncology settings, like patient navigators, and ensuring cancer communications are available in accessible, culturally appropriate formats and multiple languages are foundational to achieving a health literate organization and may improve cancer outcomes.

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# Health Literacy, Language, and Cancer-Related Needs in the First 6 Months After a Breast Cancer Diagnosis

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## abstract

**PURPOSE** Low health literacy (HL) and language negatively affect cancer screening and prevention behaviors; less is known about how they affect the patient's experience during cancer treatment. This study explores associations among HL, spoken language, and dimensions of cancer-related needs within 6 months of receiving a breast cancer diagnosis.

**METHODS** Women speaking English, Spanish, or Haitian Creole, enrolled in a patient navigation study at diagnosis, completed a survey in their primary spoken language at baseline and 6 months to characterize their cancer-related needs. HL was measured using the Brief Health Literacy Screening Tool. Outcomes included the Cancer Needs Distress Inventory (CaNDI;  $n = 38$  items) and the Communication and Attitudinal Self-Efficacy scale (CASE-Cancer) for cancer ( $n = 12$  items). Linear regressions measured the impact of HL and language on total CaNDI and CASE-Cancer scale for cancer scores and subscales, adjusted for demographics.

**RESULTS** At baseline, 262 women participated and 228 (87%) followed up at 6 months. Of these, 38% had adequate HL, 33% had marginal HL, and 29% had inadequate HL. Women with inadequate or marginal HL had higher median baseline CaNDI scores ( $P = .02$ ) and lower self-efficacy scores ( $P = .008$ ), relative to those with adequate HL. Haitian-Creole speakers had significantly lower CaNDI scores at baseline ( $P = .03$ ). Adjusting for demographics, differences in CaNDI scores at baseline remained significant for those with lower HL and Haitian-Creole speakers. At 6 months, differences in self-efficacy persisted for Haitian-Creole speakers.

**CONCLUSION** Findings suggest that interventions oriented to mitigating HL and language barriers might reduce distress at the time of diagnosis and improve self-efficacy over the course of treatment.

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## INTRODUCTION

Cancer remains a leading cause of morbidity and mortality. Advances in cancer biology, the development of targeted therapies, and the introduction of personalized medicine to clinical practice have improved physiologic outcomes and survival.<sup>1,2</sup> However, these advances add complexity to treatment choices, tasking patients with assimilating genetic, lifestyle, and pharmacologic information to choose therapies while managing potentially debilitating disease and treatment effects in the short and long term.<sup>3</sup> Patients with cancer may be vulnerable to poor outcomes during treatment if they lack the necessary skills to meet high informational demands and manage psychosocial stressors. Two such skills are health literacy (HL) and English proficiency, because these independently

affect a patient's ability to understand, integrate, and communicate about medical information.<sup>4</sup>

Literature suggests that patients with breast cancer have unmet informational needs over the course of treatment in the context of health care interactions<sup>5,6</sup> and printed materials,<sup>7,8</sup> and needs are higher among those with low HL and non-English speakers.<sup>5,9,10</sup> One proposed mechanism for these disparities is that HL is a predictor of successful learning and of ability to cope with psychosocial challenges<sup>11-13</sup>: Those with adequate HL are better able to recognize relevant health problems and process related information. As such, evidence indicates that lower HL is associated with disengagement in health care and psychosocial distress, including anxiety, fear, depression, disempowerment, feelings of being overwhelmed, and having decision

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regret.<sup>14-20</sup> Likewise, non-English speakers are less likely to understand treatment effects and the reasons for cancer tests, are less likely to discuss advantages and disadvantages of treatment with a doctor,<sup>6</sup> have poorer symptom management, and higher anxiety and symptom-related distress.<sup>21,22</sup> Thus, HL and spoken language are crucial elements in effectively managing one's health care, supporting positive patient-centered outcomes. Given the high demand for these skills during cancer diagnosis and treatment, identifying patients at risk for poor outcomes and providing appropriate information and psychosocial support could have an important impact on a variety of outcomes.<sup>23,24</sup>

Although research has documented that low HL and limited English proficiency negatively affect understanding about cancer screening and prevention behaviors,<sup>25-30</sup> less is known about how HL and spoken language independently affect patients during cancer treatment. Thus, we used data from a single-center, randomized, controlled trial to examine the associations among language, HL, cancer-related needs and self-efficacy among a sample of patients with newly diagnosed breast cancer. We hypothesized that marginal or inadequate HL would be associated with more cancer-related needs at both baseline and 6 months relative to adequate HL, but this would differ across three language groups, after adjusting for relevant demographics. We also posited that marginal or inadequate HL and non-English language would be associated with lower mean self-efficacy scores relative to adequate HL and English speakers. Building a better understanding of the relationships among these factors in the immediate aftermath of a breast cancer diagnosis and during treatment may inform the development of targeted psychosocial interventions to empower patients as partners in their health care and identify services that are responsive to patients' needs.

## METHODS

This is a secondary analysis of data collected during a randomized, comparative effectiveness trial. Women speaking English, Spanish, or Haitian Creole who had received a diagnosis of breast cancer within the prior 30 days and had yet to receive their first breast cancer treatment were enrolled in a patient navigation intervention study at a single, urban, safety-net hospital.<sup>31</sup> Women diagnosed with cancer within the prior 5 years, cognitive impairment, or those who sought to transfer their care to another institution were excluded. Women were surveyed in their primary spoken language at enrollment and again 6 months later. Surveys included in this secondary analysis were used to characterize the impact of HL and language on cancer-related needs and self-efficacy at baseline and 6 months.

### Measures

Data sources for this study included research assistant-administered surveys lasting 30 minutes and electronic

medical record abstraction. All demographic variables were collected at the time of enrollment via the electronic medical record and included age, race, ethnicity, cancer stage, and type of insurance. Race and ethnicity were recorded as white (non-Hispanic), black, Hispanic, or other. Language was captured from the medical record and verified in person; all participants spoke English, Spanish, or Haitian Creole. Insurance was classified as either private or public, with public including Medicare, Medicaid, and other government-funded insurances. Employment was elicited via self-report and categorized as employed, unemployed, unable to work, and non-working/unknown. The nonworking group included those who identified as retired, a student, a homemaker, and those whose employment status was unknown. The main independent variable of interest, HL, was measured using the Brief Health Literacy Screening Tool (BRIEF) at enrollment.<sup>32,33</sup> This four-item HL screening tool includes three items developed by Chew et al<sup>34</sup> and a fourth item that assesses how well people understand verbal health communication. BRIEF scores < 12 denote inadequate HL, scores from 13 to 16 suggest marginal HL and from 17 to 20 indicate adequate HL.<sup>35</sup>

Cancer-related needs, the primary outcome, were measured using an adapted version of the Cancer Needs Distress Inventory (CaNDI) instrument collected at enrollment and 6 months. The CaNDI is a 39-item, validated survey measuring anxiety, depression, and emotional, social, health care, practical, and physical needs.<sup>36</sup> The version used in this study removed one question about suicidality that was not included in any validated subscale. The main outcome was the average total CaNDI score, which minimizes the impact of occasional missing data on individual items.<sup>36</sup> The subscales of anxiety (two items; score range: 2 to 10), depression (four items; score range: 4 to 20), health care distress (four items; score range: 4 to 20), and practical distress (six items; score range: 6 to 30) were examined as secondary outcomes. Each item was scored from one (not a problem) to five (very severe problem), with a total possible range of 38 to 190. Scores are reported as the average across items overall and for each subscale.

To measure patient self-efficacy, the Communication and Attitudinal Self-Efficacy scale for cancer (CASE-cancer) was collected at the time of enrollment and again 6 months after diagnosis. It is a validated, 12-item, self-reported measure covering three domains<sup>37</sup>—seeking and obtaining information, understanding and participating in care, and maintaining a positive attitude—each assessed via four items rated on a four-point scale. The theoretical range of the CASE-cancer score is 12 to 48, with higher scores capturing higher self-efficacy. We report the total summed score overall and for each subscale.

Although HL and both outcome measures were validated in English and Spanish, all three measures required translation

into Haitian Creole. Translation was conducted by a bilingual staff member with independent back-translation to English by a second bilingual staff member. The back-translation was compared with the original and consensus was obtained to ensure questions' meaning were appropriately reflected in the translated version.

### Data Analysis

Descriptive data were compiled and examined for differences by HL and language. The outcomes of cancer-related needs and self-efficacy and their subscales were examined by both literacy and language separately using Kruskal-Wallis tests to explore the independent associations between these constructs. Before performing the multivariate analyses, we examined variables for collinearity and removed race from subsequent models, due to high collinearity with language (Fisher exact test,  $P < .0001$ ). Because there were no statistically significant differences in the primary clinical outcomes by study arm in the parent study, all data are pooled.

**Initial and final multivariate analyses.** Multivariate linear regression models that incorporated an interaction term between the two categorical variables (literacy  $\times$  language) tested potential differential effects among language and literacy on cancer-related needs and self-efficacy, adjusting for age, type of insurance, disease stage, employment, and language. Models were created separately for baseline and 6-month outcomes. In 6-month multivariate models, baseline outcome score was included as a covariate. When we examined the primary adjusted model with the total cancer-related needs score at baseline with and without the interaction term, the interaction term model added 0.5% to the total explanatory power. Given that these models became much more complex, and the interaction added only marginally to the explanatory power, our final models do not include an interaction between HL and language.

After final models were constructed, we tested the normality assumption by generating residual plots. Data were not normally distributed, so outcomes were log-transformed and models rerun. These models resulted in findings consistent with nontransformed variables. Models are presented without log transformation to facilitate interpretation.

## RESULTS

A total of 262 individuals were eligible for analysis and completed surveys at enrollment; 228 (87%) were retained at 6 months. The median number of days from enrollment to baseline survey completion was 3 (first quartile, 0 days, third quartile, 8 days). An analysis of those retained versus those not retained indicated that women with missing cancer stage data were less likely to be retained at 6 months. Demographics are described in [Table 1](#), displayed for the entire sample and by HL level. Participants with adequate HL were more likely to be white (37%  $\nu$  18% with marginal HL and 12% with inadequate HL). When

examining the distribution of HL within language groups, the Haitian-Creole group ( $n = 29$ ) had 41% inadequate, 52% marginal, and 7% adequate HL. Similarly, the Spanish-speaking group ( $n = 57$ ), had 39% inadequate, 54% marginal, and 7% adequate. These groups varied significantly from the distribution among English-speaking participants ( $n = 173$ ), among which 23% were classified each as having marginal and inadequate HL, and 54% had adequate HL ( $P < .001$  for the between-language difference). These differences are reflected in the HL distribution in the sample overall, where 94% of the adequate HL group spoke English, relative to 46% marginal HL and 55% in the inadequate HL group. Although most (75%) of the sample had public insurance, a higher proportion of those in the adequate HL group had private insurance (40%  $\nu$  17% marginal HL and 15% inadequate HL). Finally, the majority of participants with adequate HL were employed (56%), in contrast to the marginal and inadequate HL groups (47% and 32%, respectively). There were no significant differences across literacy groups by age or in the stage of diagnosis (early  $\nu$  late).

### Bivariate Associations

[Figure 1](#) illustrates the variation in cancer-related needs across literacy and language groups. Bars represent median scores and lines represent the interquartile range. There were significant differences in the median cancer-related needs score at baseline across literacy groups, with those with adequate HL having lower total cancer-related needs scores. This trend was also seen for the depression, health care needs, and practical needs subscales, whereas anxiety was not significantly different by literacy group. By 6 months postdiagnosis, these differences dissipated such that those with adequate HL still had lower median practical needs but all other associations were no longer significant ([Fig 1B](#)). Language-related differences were also significant only at baseline ([Fig 1C](#)). Those speaking Haitian Creole had lower cancer-related needs scores relative to English and Spanish speakers. Health care needs were lowest among English speakers, whereas Spanish speakers had the highest median scores on the practical needs subscale.

For the outcome of self-efficacy using the CASE-cancer scale, self-efficacy scores were significantly higher among those with adequate HL at baseline, as were the information-seeking and understanding patient care subscales relative to those with marginal or inadequate HL ([Fig 2](#)). There was no difference in the subscale for maintaining a positive attitude. Unlike cancer-related needs, where differences did not persist at 6 months, the total self-efficacy score and two subscales that were significant at baseline remained significant at 6 months across HL groups. Examining scores by language, English speakers had higher self-efficacy related to the information-seeking subscale both at baseline and 6 months relative to the non-English-speaking groups. No other significant differences were observed across language groups.

**TABLE 1.** Demographics of Study Population by Health Literacy Level

Variable	Overall (N = 262)	Inadequate HL (n = 75)	Marginal HL (n = 85)	Adequate HL (n = 99)	P
Age, years, mean (SD)	55.6 (11.8)	57.7 (12.6)	55.0 (11.8)	54.9 (11.0)	.22
Race					
White	61 (23.6)	9 (12.0)	15 (17.6)	37 (37.4)	< .0001 <sup>a</sup>
Hispanic	61 (23.6)	22 (29.3)	33 (38.8)	6 (6.1)	
Black	127 (49.0)	43 (57.3)	34 (40.0)	50 (50.5)	
Other	10 (3.9)	1 (1.3)	3 (3.5)	6 (6.1)	
Language					
English	173 (66.8)	41 (54.7)	39 (45.9)	93 (93.9)	< .0001 <sup>a</sup>
Spanish	57 (22.0)	22 (29.3)	31 (36.5)	4 (4.0)	
Haitian Creole	29 (11.2)	12 (16.0)	15 (17.6)	2 (2.0)	
Insurance					
Public	194 (74.9)	64 (85.3)	71 (83.5)	59 (59.6)	< .0001 <sup>a</sup>
Private	65 (25.1)	11 (14.7)	14 (16.5)	40 (40.4)	
Cancer stage					
Early	153 (59.1)	41 (54.7)	51 (60.0)	61 (61.6)	.22
Late	84 (32.4)	24 (32.0)	31 (36.5)	29 (29.3)	
Missing	22 (8.5)	10 (13.3)	3 (3.5)	9 (9.1)	
Employment					
Employed	118 (45.6)	23 (30.7)	40 (47.1)	55 (55.6)	.03 <sup>a</sup>
Out of work	48 (18.5)	17 (22.7)	14 (16.5)	17 (17.2)	
Nonworking/unknown	43 (16.6)	13 (17.3)	15 (17.6)	15 (15.2)	
Unable to work	50 (19.3)	22 (29.3)	16 (18.8)	12 (12.1)	

NOTE. Data reported as No. (%) unless otherwise indicated.

Abbreviations: HL, health literacy; SD, standard deviation.

<sup>a</sup>Statistically significant at  $P = .05$ .

### Multivariate Models

Multivariable linear regressions (Table 2) demonstrated that having inadequate and marginal HL was associated with higher average cancer-related needs scores at baseline compared with those with adequate HL. Haitian-Creole language was associated with significantly lower cancer-related needs scores, as was older age. Older age, having public insurance, being nonworking, and baseline CaNDI score remained significant predictors of cancer-related needs at 6 months, after adjusting for other factors. For self-efficacy, on average, having inadequate HL was associated with lower self-efficacy at baseline, as was being unable to work. Older age and baseline self-efficacy were associated with higher self-efficacy at 6 months; speaking Haitian Creole was associated with lower self-efficacy after adjusting for other factors. The large difference in  $R^2$  values in 6-month models were driven by the baseline score adjustment.

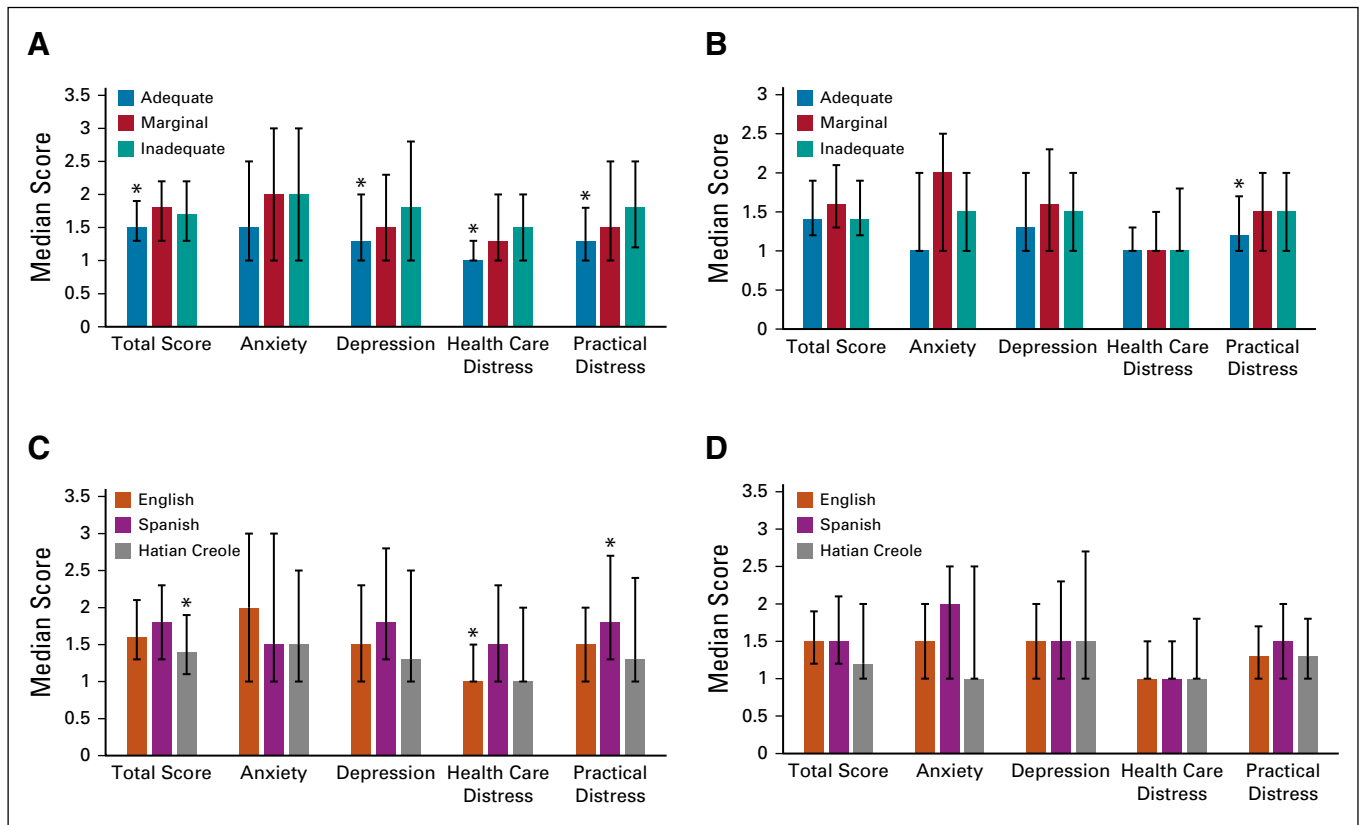
### DISCUSSION

HL and language independently contributed to differences in cancer-related needs and self-efficacy in the immediate

aftermath of a breast cancer diagnosis. Lower HL was associated with higher cancer-related needs scores at diagnosis, but differences dissipated by 6 months. Those speaking Haitian Creole had lower cancer-related needs scores at baseline and lower self-efficacy at 6 months. Finally, self-efficacy scores were significantly lower among those with inadequate HL at baseline.

Consistent with other data that suggest patients with breast cancer who have low HL have greater unmet information needs relative to those with higher HL,<sup>5,10</sup> we have shown that those with low HL report more cancer-related needs at the time of a diagnosis. Although this study could not ascertain the informational needs of women and how these might relate to cancer-related needs, we posit that meeting informational needs could be a mechanism through which cancer-related needs and self-efficacy outcomes are improved. We base this on observed differences in self-efficacy related to information seeking. Other researchers have found that there are few informational materials that address the needs of patients with breast cancer who have low HL.<sup>7,8</sup> Although some published, video-based informational resources and decision aids do exist, they are





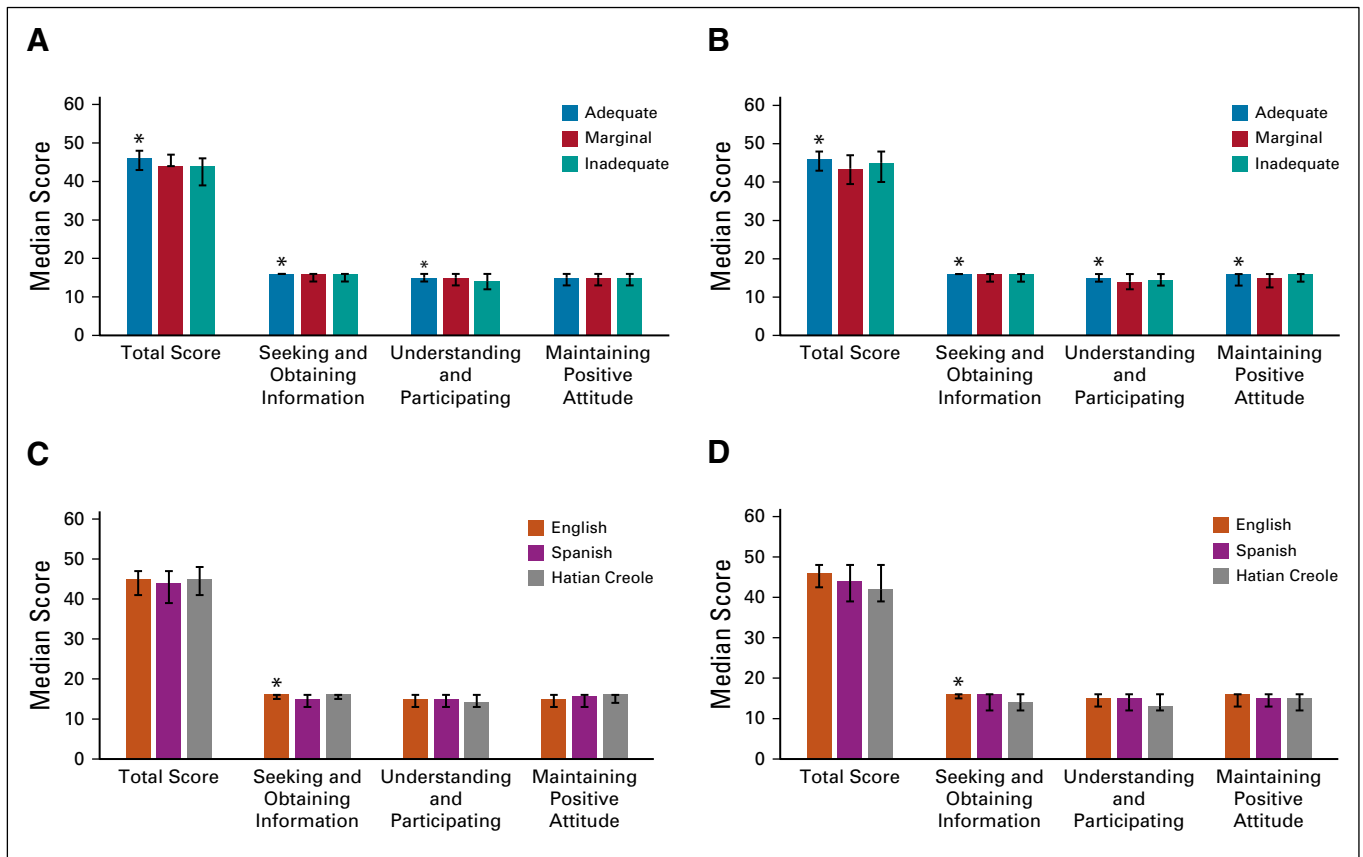
**FIG 1.** Differences in cancer-related needs scores (CaNDIScores) by literacy and language through 6 months after diagnosis. (A) Cancer-related needs by health literacy level at baseline. (B) Cancer-related needs by health literacy level at 6 months. (C) Cancer-related needs by language at baseline. (D) Cancer-related needs by language at 6 months. (\*)Difference statistically significant at  $P < .05$ .

not in widespread use.<sup>38,39</sup> Use of simple text and illustrations boost informed decision-making and understanding among those with lower HL without compromising attitudes or outcomes among those with higher HL.<sup>40</sup> Clear, simple information sources in multiple languages may help women navigate this time when self-efficacy is lower, especially because we observed lower self-efficacy among Haitian-Creole speakers over time, which was driven by lower scores in seeking and obtaining information. Lower self-efficacy is associated with poorer symptom management,<sup>41</sup> which, in turn, is associated with functional health status, treatment interruptions or delays, and disease status.<sup>41,42</sup> There are tested interventions that health care providers can use to improve women's knowledge and self-efficacy to manage symptoms during cancer treatment.<sup>43-45</sup> However, few of these trainings are tested in non-English speakers, a group for whom our findings suggest this capacity building could have greatest benefit, especially if cultural and linguistic differences are attended to in tandem.<sup>46</sup> Medical oncology teams may benefit from evaluating their capacity to provide support to patients throughout treatment, with special attention to how linguistic services can best support non-English speakers.

We also observed differences in cancer-related needs by language. Those who spoke Haitian Creole had lower

cancer-related needs scores at baseline relative to English speakers and lower self-efficacy at 6 months in adjusted models. The mechanisms driving these associations are unknown, and findings should be interpreted with caution because surveys were not validated in Haitian Creole. However, lower cancer-related needs scores could be influenced by unmet communication needs related to having limited English proficiency, cultural perceptions of cancer, or other social factors. Other research has described that women of Haitian descent have more fatalistic and spiritually driven beliefs in the causes and outcomes of cancer.<sup>47,48</sup> These certainly may influence dimensions of cancer needs, emotional response to a diagnosis, and treatment choice, but the interplay of these factors is not yet clear.<sup>49,50</sup> Alternatively, these women may have greater social support, which can mitigate distress associated with a cancer diagnosis.<sup>51</sup> We did obtain Berkman-Syme social network scores<sup>52</sup> for a subset of patients and observed higher reported social support among non-English participants (data not shown), suggesting a potential relationship that requires additional exploration to understand the causal links among social support, culturally based beliefs, and perception of cancer-related needs.

This exploratory analysis demonstrated differences in cancer-related needs and self-efficacy over the first 6 months after



**FIG 2.** Differences self-efficacy by literacy and language through 6-months after diagnosis. (A) Self-efficacy by health literacy level at baseline. (B) Self-efficacy by health literacy level at 6 months. (C) Self-efficacy by language at baseline. (D) Self-efficacy by language at 6 months. (\*)Difference statistically significant at  $P < .05$ .

a breast cancer diagnosis. However, this analysis does not discern the clinical meaning of these measures. The cancer-related needs measures, in particular, have little data on what is considered a meaningful change or difference in scores.<sup>36</sup> Thus, although we saw small differences on the average scale, how changes relate to patient experience is not discernable. These data represent these psychosocial outcomes alone, and they have not been linked with clinical data, including treatment adherence, completion, experienced adverse effects, or other health outcomes. The multiple contributors to clinical outcomes are important: other studies have begun to establish associations between self-efficacy and treatment choice, demonstrating disparities by literacy and language.<sup>50,53-56</sup> Although not powered to do so in this study, better characterizing drivers of self-efficacy, and its influence on cancer-related needs and clinical outcomes is warranted. How psychosocial measures relate to patient outcomes in both the short and long term should be an area of investigation. Timing in the course of cancer care is particularly salient, because many support resources are provided to patients in the early months after diagnosis, and later distress may influence treatment adherence once

such supports are no longer in place; however, the role of these factors is not yet well characterized in the literature.

As a secondary analysis, this study has limitations. Cancer-related needs scores may have been influenced by all women in this study being assigned to a patient navigator as part of the parent trial. Although all women had navigators at the time of diagnosis, they were not language concordant with patients. Language-concordant navigators have been associated with women achieving timelier diagnostic resolution among the screening population<sup>57</sup> and may be a solution to overcome differences in needs and self-efficacy observed here. Furthermore, the HL, cancer-related needs, and self-efficacy measures were not validated in Haitian Creole, which limits conclusions that can be drawn about this group's experiences. Validation studies of patient-reported measures in multiple languages are needed to strengthen the quality of evidence of patient experiences during cancer care and must go beyond language to characterize the unique contributions of cultural beliefs and values in addition to language.

Exploring these concepts in a more representative segment of oncology patients without such access to one-on-one

**TABLE 2.** Multivariable Linear Regression Models for Total CaNDI and Total CASE-Cancer Scores

Variable	Model 1: CaNDI Score (BL)	Model 2: CaNDI Score (6 months)	Model 3: CASE Score (BL)	Model 4: CASE Score (6 months)
Model $R^2$	0.18	0.56	0.08	0.47
Health literacy (referent: adequate)				
Inadequate	0.27 ± 0.1 <sup>a</sup>	-0.10 ± 0.08	-2.39 ± 0.93 <sup>a</sup>	0.28 ± 0.69
Marginal	0.28 ± 0.10 <sup>a</sup>	-0.11 ± 0.08	-1.90 ± 0.92	-0.71 ± 0.68
Language (referent: English)				
Spanish	0.00 ± 0.10	0.21 ± 0.11	0.67 ± 0.91	-0.38 ± 0.67
Haitian Creole	-0.42 ± 0.13 <sup>a</sup>	-0.08 ± 0.07	0.88 ± 1.22	-2.38 ± 0.97 <sup>a</sup>
Age	-0.16 ± 0.04 <sup>a</sup>	-0.08 ± 0.03 <sup>a</sup>	0.46 ± 0.34	0.52 ± 0.26 <sup>a</sup>
Public insurance (referent: private)	0.19 ± 0.1	0.16 ± 0.08 <sup>a</sup>	-0.45 ± 0.95	-0.59 ± 0.70
Cancer stage				
Late	-0.04 ± 0.08	0.04 ± 0.06	0.11 ± 0.75	0.42 ± 0.56
Missing	0.24 ± 0.14	0.02 ± 0.11	-0.31 ± 1.29	1.72 ± 1.02
Employment				
Out of work	0.07 ± 0.12	0.01 ± 0.09	-0.09 ± 1.09	-0.66 ± 0.83
Nonworking/unknown	0.11 ± 0.13	0.20 ± 0.10 <sup>a</sup>	-2.10 ± 1.19	-0.85 ± 0.88
Unable to work	0.21 ± 0.12	0.09 ± 0.09	-2.19 ± 1.07 <sup>a</sup>	0.0 ± 0.81
Baseline score	N/A	0.70 ± 0.05 <sup>a</sup>	N/A	0.60 ± 0.05 <sup>a</sup>

NOTE. Data reported as  $R^2 \pm$  standard error, unless otherwise indicated.

Abbreviations: BL, baseline; CaNDI, Cancer Needs Distress Inventory; CASE, Communication and Attitudinal Self-Efficacy; N/A, not applicable.

<sup>a</sup>Statistically significant at  $P < .05$ .

support is essential. This study was conducted in a single, safety-net institution, sampling only 262 women with recently diagnosed breast cancer. The small sample size may have limited our ability to detect potentially meaningful differences in these outcomes. These findings also represent point-in-time associations, and causality cannot be established. However, findings do point to the importance of understanding associations between cancer care and experiences, with particular attention to the distinct roles of patient HL and language. Language is one facet of culture and offers a window into how people perceive health and illness.<sup>46</sup> This particular analysis is limited by data collected in the parent trial; thus, factors that may contribute to these understandings, including acculturation, country of birth, years of schooling, and related cancer beliefs, are unmeasured. Additional research should enhance our understanding of the interconnectedness of language, culture, beliefs, and values as they relate to cancer care and the tailoring of services to match patients' desired health practices.

In conclusion, the contributions of language and HL to patient well-being during cancer treatment is an important area for quality improvement. Health systems

and cancer centers are building programs such as patient navigation and/or social work services that seek to address patient needs. Understanding how patient needs may differ according to various characteristics and over time may assist health systems in determining appropriate services and supports.<sup>49</sup> Hiring multilingual personnel in medical oncology settings, like patient navigators, and ensuring cancer communications are available in accessible, culturally appropriate formats and multiple languages is foundational to achieving a health literate organization and may improve cancer outcomes.<sup>46,58</sup> Characterizing needs across the cancer continuum may also help programs make decisions about effectively deploying limited personnel and material resources. Finally, attending to the experiences of patients during treatment is essential as a means of reducing disparities. In this article, we focused on HL and language as potential contributors to disparities in psychosocial outcomes. Engaging patients who speak other languages and/or have low HL and recognizing their background, cultural beliefs, and values may empower them to participate fully in their cancer care and reduce disparities in adherence and outcomes.



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## AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST AND DATA AVAILABILITY STATEMENT

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**AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST**

**Health Literacy, Language, and Cancer-Related Needs in the First 6 Months after a Breast Cancer Diagnosis**

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