




Inpatient care experiences differ by preferred language within racial/ethnic groups

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Objective: To describe differences in patient experiences of hospital care by preferred language within racial/ethnic groups.

Data Source: 2014-2015 HCAHPS survey data.

Study Design: We compared six composite measures for seven languages (English, Spanish, Russian, Portuguese, Chinese, Vietnamese, and Other) within applicable subsets of five racial/ethnic groups (Hispanics, Asian/Pacific Islanders, American Indian/Alaska Natives, Blacks, and Whites). We measured patient-mix adjusted overall, between- and within-hospital differences in patient experience by language, using linear regression.

Data Collection Methods: Surveys from 5 480 308 patients discharged from 4517 hospitals 2014-2015.

Principal Findings: Within each racial/ethnic group, mean reported experiences for non-English-preferring patients were almost always worse than their English-preferring counterparts. Language differences were largest and most consistent for *Care Coordination*. Within-hospital differences by language were often larger than between-hospital differences and were largest for *Care Coordination*. Where between-hospital differences existed, non-English-preferring patients usually attended hospitals whose average patient experience scores for all patients were lower than the average scores for the hospitals of their English-preferring counterparts.

Conclusions: Efforts should be made to increase access to better hospitals for language minorities and improve care coordination and other facets of patient experience in hospitals with high proportions of non-English-preferring patients, focusing on cultural competence and language-appropriate services.

KEYWORDS

patient assessment, quality of care (measurement), survey research

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1 | INTRODUCTION

For the 65.5 million U.S. residents who speak languages other than English at home,^{1,2} health and health care may be compromised by difficulty in communicating their medical needs to providers who do not speak their preferred language.³⁻⁶ This may partly explain higher rates of infectious disease and infant mortality and higher rates of risk factors for serious and often chronic diseases, such as diabetes and heart disease among racial-, ethnic-, and linguistic-minority patients.⁷

Language barriers can also compromise patients' experiences of care and compliance with provider recommendations. Spanish-preferring patients report more problems with primary care provider communication, access to care, timeliness of care, and health plan customer service than English-preferring peers.^{5,8-14} Additionally, immunization rates,¹⁵ outpatient follow-up compliance,¹⁶ and adherence to medication^{17,18} and treatment¹⁹ are significantly lower for linguistic minorities than they are for English-preferring patients. Notably, linguistic-minority patients make more outpatient visits, fill more prescriptions, and have better experiences of care when provided with an interpreter.^{20,21}

Disparities in care related to preferred language have been examined across a variety of health care setting and domains: adult Medicare managed care,²² adult immunization disparities,¹⁵ adult diabetes care in community clinics,²³ and adult family member care in the neurological intensive care setting.²⁴ Still, disparities in patient experience of care across language preference groups have received little attention in the hospital setting.

In the hospital setting, adverse events during hospitalization were more severe and more likely to be related to communication problems for linguistic minorities than English-preferring inpatients.²⁵ For example, discharge diagnosis and instructions were understood less often for linguistic-minority inpatient.^{26,27} Studies using Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) patient experience data have found racial/ethnic differences.²⁸⁻³¹ Since language preferences are embedded within race/ethnicity, observed racial/ethnic differences in hospital care may be partially attributable to language barriers.

The current study extends earlier findings³¹ by isolating the role of language preference within race/ethnicity and investigating whether the quality of hospital inpatient care varies by preferred language within racial/ethnic groups. Our analysis aimed to understand whether racial/ethnic differences in care may be in part attributable to language barriers and to identify any racial/ethnic and language groups at particular risk.

Analyses considered both between- and within-hospital differences, since policy implications differ for between-hospital differences (eg, patients' access to hospitals, or patients' hospital preference) and within-hospital differences (eg, delivery of care within a hospital).

2 | METHODS

2.1 | Data

We used 2014-2015 HCAHPS data to investigate differences in inpatient experiences by preferred language within racial/ethnic groups. HCAHPS is a survey of recently discharged patients' experiences of hospital care in the United States and includes information on self-reported language preference and race/ethnicity that permits this analysis.³² Specifically, the HCAHPS survey asks which of seven languages the patient primarily speaks at home.³³ Sample sizes used were sufficient to examine all preferred-language groups for which HCAHPS provides translations. As such, this dataset allows one to examine preferred language within racial/ethnic groups among even smaller groups, such as Portuguese-preferring Hispanics and Vietnamese-preferring Asian/Pacific Islanders (API).

HCAHPS measures experiences of inpatients of all payer types (Medicaid, Medicare, and all others) who are 18 years or older at admission, stay overnight in the hospital with a principal diagnosis for medical, surgical, or maternity care, and are discharged alive.³⁴ Our analysis included the 5 480 308 completed surveys from all 4517 hospitals in the 50 states and DC that submitted HCAHPS data to the Centers for Medicare & Medicaid Services (CMS) during the eight quarters of calendar years 2014-2015.

We examined six HCAHPS composite measures: *Communication with Doctors*, *Communication with Nurses*, *Responsiveness of Hospital Staff*, *Communication about Medication*, *Discharge Information*, and *Care Coordination*. Three measures were excluded because they do not rely on conversing in a shared language (*Quietness*, *Cleanliness*) or are no longer used for incentive payments (*Pain Management*). Two global measures (*Ratings of Hospital* and *Recommendation of Hospital*) were excluded because prior research suggests that such items may elicit different evaluations of the same care from different racial/ethnic and language groups.^{31,35,36} The survey items comprising five of the six retained composite measures (all but *Discharge Information* items, which employ yes/no responses) use a standard set of response options: *never*, *sometimes*, *usually*, and *always*. A description of the composite measures is included in the Table S1 in Appendix S1.

HCAHPS respondents are asked to self-report whether they are of Spanish, Hispanic or Latino origin or descent. They are then asked to select at least one race, with response options of White, Black or African American, American Indian or Alaska Native (AI/AN), Asian, Native Hawaiian or other Pacific Islander, and some other race. Six mutually exclusive racial/ethnic categories were created using these two items: (a) Hispanic; and non-Hispanic, (b) White, (c) Black, (d) API, (e) AI/AN, and (f) multiracial. Following the Office of Management and Budget approach, we classified any patient as Hispanic who endorsed Hispanic ethnicity. Non-Hispanic patients who endorsed exactly one race were classified as that race; those who endorsed Asian plus Native Hawaiian or other Pacific Islander were classified as API; the remaining non-Hispanic patients who endorsed two or

more races were classified as multiracial. Our analysis excluded data from multiracial patients (3 percent), a heterogeneous and difficult-to-interpret group, and patients who did not answer the race item (7 percent).

Because several languages measured by the survey are associated almost exclusively with a single racial/ethnic group, language was considered *within* racial/ethnic categories. The HCAHPS survey asks, “What language do you mainly speak at home?” with response options of English, Spanish, Chinese, Russian, Vietnamese, Portuguese, and “some other language.” We included all combinations of preferred language (ie, language spoken at home) and race/ethnicity among our seven languages and five racial/ethnic groups for which at least 400 completed surveys were available nationally: Hispanics (languages included Spanish, English, Portuguese, Other), API (English, Chinese, Vietnamese, Other), Blacks (English, Spanish, Other), AI/AN (English, Other), and Whites (English, Russian, Spanish, Portuguese, Other).

2.2 | Analytic approach

To analyze the types of hospitals utilized by language-within-race/ethnicity groups, we examined key hospital characteristics of bed size (200 or more beds), rural location, profit status (for profit, not for profit, governmental status), and service line composition (percent medical, surgical, maternity). We also calculated by preferred language within racial/ethnic groups: the average hospital-level proportion of non-English language-preferring patients, the average hospital-level proportion of the matching racial/ethnic group, and the average hospital-level proportion of their same racial/ethnic and language group. Linear regression compared overall, within-hospital and between-hospital patient experiences by preferred language within racial/ethnic groups using standard patient-mix adjusters. Following the CMS approach,^{32,37} we used patient-mix adjusted top-box-scored measures for all composite measures, scoring the most positive response option as 100 and all other responses as 0 prior to averaging nonmissing items to create composite scores. The top-box response is “always” for four HCAHPS composites (*Communication with Nurses, Communication with Doctors, Responsiveness of Hospital Staff, and Communication about Medication*), “yes” for the *Discharge Information* composite, and “strongly agree” for the *Care Coordination* composite. To illustrate, the score for a respondent who answered “always,” “always,” “never,” and “sometimes” to four items within a composite would be $(100 + 100 + 0 + 0 = 200)/4 = 50$. “Patient mix” refers to patient characteristics not under the control of the hospital that may affect scores of patient experience measures. Patient-mix adjustment accounts for between-hospital differences in the patient population to estimate the scores each hospital would have received if all had treated the same patients. Standard HCAHPS patient-mix adjusters are patient age; service line (maternity, surgical, and medical [reference category]); self-reported education; self-reported overall patient health; response percentile (a rank-based measure of the latency between discharge date and survey completion that addresses the tendency of later responders to indicate worse care

experiences); interactions of maternity and surgical service line with linearly scored patient age; and preferred language spoken at home. Here, preferred language spoken at home was treated as the primary independent variable, rather than as a patient-mix adjuster.

Within each racial/ethnic group, overall differences by language were estimated for each measure via a linear regression model that included fixed effects for language indicators (omitting the reference group), patient-mix adjusters, and an indicator for survey year. The language coefficients correspond to estimates of overall difference between each non-English-preferring group and the English-preferring group. Within-hospital differences were estimated by additionally incorporating hospital fixed effects to control for the hospital from which each patient received care. Between-hospital differences were calculated by subtracting within-hospital differences (from the second model) from overall differences (from the first model). Joint tests of language within each racial/ethnic group were performed for each measure for overall, within- and between-hospital differences.

Previous analyses of CAHPS scores have suggested that statistically significant differences of 1 point on a 0-100 scale, that is, a difference of 1 percentage point when top-box scores are used can be considered small; differences of three points can be considered medium, and differences of five points can be considered large.³⁸ In what follows, we will refer to nonsignificant differences as “similar” scores.

3 | RESULTS

3.1 | Patient and hospital characteristics by preferred language within racial/ethnic group

Within our sample, race/ethnicity was as follows: Hispanic (10 percent), Black (9 percent), API (3 percent), AI/AN (<1 percent), and White (78 percent). Race/ethnicity/language was as follows: English-preferring White (77 percent), English-preferring Black (9 percent), English-preferring Hispanic (5 percent), Spanish-preferring Hispanic (5 percent), English-preferring API (2 percent), other-language-preferring API (1 percent), and English-preferring AI/AN (1 percent); all the remaining non-English language groups were <1 percent each.

Table 1 shows patient characteristics by preferred language *within* racial/ethnic groups (with a panel of results within Table 1 for each racial/ethnic group). In general, non-English-preferring patients were younger than their English-preferring counterparts; for example, 41 percent of Spanish-preferring Whites were younger than 55, compared to 26 percent of English-preferring Whites, with some exceptions (eg, Vietnamese-preferring API compared to English-preferring API).

In general, educational attainment was lower for non-English-preferring patients; for example, 42 percent Portuguese-preferring Whites compared to 10 percent English-preferring Whites had less than high-school-level education, with some exceptions such as 59 percent Russian-speaking Whites compared to 28 percent English-speaking Whites with a Bachelor’s degree or more.

TABLE 1 Patient characteristics by preferred language within racial/ethnic group, 2014–2015 HCAHPS survey

Racial/ethnic group	Preferred language	N	Age			Service line by gender
			18-54 (%)	55-74 (%)	75+ (%)	Maternity (%)
Total		5 480 308	32	44	25	13
White	English	4 238 120	26	46	28	10
White	Spanish	7367	41***	36***	23***	19***
White	Russian	8851	35***	30***	36***	21***
White	Portuguese	1696	29*	41***	31**	13***
White	Other language	25 306	47***	29***	25***	28***
Black	English	477 330	42	44	14	10
Black	Spanish	568	40	43	18*	12
Black	Other language	6871	70***	23***	7***	39***
Hispanic	English	272 948	58	31	11	26
Hispanic	Spanish	252 760	59***	29***	12***	28***
Hispanic	Portuguese	1389	64***	27***	9*	33***
Hispanic	Other language	5978	52***	34***	14***	21***
API	English	83 384	55	29	16	33
API	Chinese	17 268	56	24***	20***	40***
API	Vietnamese	7463	47***	35***	18***	25***
API	Other language	31 769	58***	28*	14***	38***
AI/AN	English	38 993	44	44	12	13
AI/AN	Other language	2247	36***	49***	15***	5***

* $P < 0.5$. ** $P < 0.01$. *** $P < 0.001$ for chi-square tests comparing each non-English group to the English group within the racial/ethnic group.

Table 2 shows hospital characteristics by preferred language within racial/ethnic groups (with a panel of results for each racial/ethnic group). Table 2 describes the types of hospitals where non-English-preferring patients received care. In general, non-English-preferring patients attended larger and for-profit hospitals more often than their English-preferring counterparts. For example, 78 percent of Chinese-preferring API compared to 71 percent of English-preferring API received care at large hospitals (200 or more beds). There were two exceptions to this pattern: other-language-preferring AI/AN and other-language-preferring Hispanics received care at smaller hospitals than their English-preferring counterparts. In terms of profit status, for example, 31 percent Spanish-preferring Whites compared to 15 percent English-preferring Whites received care at for-profit hospitals, with some exceptions to this pattern (eg, Russian-preferring Whites received care at nonprofit hospitals more often than English-preferring Whites). In general, non-English-preferring patients more often received care at urban hospitals, hospitals with lower surgical proportions and higher maternity proportions than their English-preferring counterparts.

Typically, non-English-preferring patients were very much the minority in the hospitals where they received care. Spanish-preferring Hispanics received care at hospitals that averaged 24 percent non-English language-preferring patients; the percentage of non-English language-preferring patients was lower for every other group. Furthermore, Black, Hispanic, API, and AI/AN patients typically received care at hospitals where fewer than half of the patients shared their race/ethnicity.

3.2 | Overall differences in patient experiences by preferred language within racial/ethnic group

In Table 3, differences in patient experiences for six HCAHPS measures are shown by language within racial/ethnic group. Generally, non-English-preferring Black, Hispanic, API, and AI/AN patients reported worse experiences than their English-preferring counterparts, except for Russian-preferring White patients. Differences between English-preferring and non-English-preferring patients within the same racial/ethnic group were largest and most consistent (ie, the findings were both statistically significant and had the same sign) for *Care Coordination* and smallest and least consistent for *Discharge Information* and *Communication about Medication*.

The experiences of White patients were not consistent across measures and language preference. Spanish-preferring and other-language-preferring Whites reported less positive experiences than English-preferring Whites, except for *Doctor Communication* where experiences were similar for English-preferring and other other-language-preferring Whites. Russian-preferring Whites reported the best experiences among Whites, except for *Care Coordination*.

Non-English-preferring Black patients reported consistently worse experiences than their English-preferring counterparts, with all differences at least moderate in magnitude (3+ points).

Medical for female (%)	Surgical for female (%)	Medical for male (%)	Surgical for male (%)	Education			Overall health
				<High school (%)	High school/ some college (%)	BA degree or more (%)	Fair/poor (%)
26	18	21	17	13	61	26	25
26	19	22	18	10	62	28	25
28***	14***	21	12***	43***	43***	14***	24
25*	14***	22	14***	7***	34***	59***	38***
25	15***	26***	17	42***	41***	17***	27*
21***	13***	20***	14***	24***	42***	34***	20***
34	17	22	11	20	64	16	30
31	13**	24	13	38***	47***	15	28
19***	11***	17***	8***	21*	55***	24***	12***
23	16	18	13	15	65	20	22
23	14***	17***	12***	46***	44***	10***	22***
19**	14**	17	12	23***	41***	36***	16***
25***	13***	22***	12**	31***	50***	19	20***
20	15	16	12	5	41	54	16
17***	12***	16	10***	20***	31***	49***	20***
20	12***	23***	14**	28***	50***	23***	18***
19***	12***	17*	11***	15***	35***	50***	16
28	16	23	15	19	68	13	31
30	13***	28***	15	36***	55***	9***	24***

Among Hispanics, Spanish-preferring and other-language-preferring patients reported worse experiences than English-preferring Hispanics except for similar experiences for *Communication about Medication* for English-preferring and other-language-preferring patients. Portuguese-preferring Hispanics reported worse experiences for only *Doctor Communication* and *Care Coordination*. Generally, differences between English-preferring and non-English-preferring Hispanics were small (<3 points), except for *Care Coordination*.

Among API patients, each non-English-preferring group (Chinese-, Vietnamese-, and other-language-preferring) reported worse experiences than English-preferring API, except for *Discharge Information*. Within API, negative differences compared to English-preferring API tended to be largest for Chinese-preferring API.

Within AI/AN, other-language-preferring AI/AN reported worse care experiences than English-preferring AI/AN; differences were moderate or larger, except for *Communication About Medicines*.

3.3 | Within-hospital differences in patient experiences by preferred language within racial/ethnic group

Estimates in Table 4 reflect within-hospital differences in patient experience of care from English-preferring patients of the same

racial/ethnic group. In general, within the same hospital, non-English-preferring Whites reported better experiences than their English-preferring White counterparts. However, for other racial/ethnic groups, non-English-preferring patients generally reported worse experiences than their English-preferring racial/ethnic counterparts within the same hospitals.

Among White language groups in the same hospital, Russian-preferring and Portuguese-preferring Whites reported significantly better within-hospital experiences than did English-preferring White patients on all measures, except *Care Coordination*. Similarly, Spanish-preferring and other-language-preferring Whites reported significantly better experiences than English-preferring Whites in the same hospital for *Nurse Communication*, *Doctor Communication*, and *Hospital Staff Responsiveness*.

Among Black language groups in the same hospital, non-English-preferring Blacks reported significantly worse care experiences for all measures than English-preferring Blacks.

Among Hispanic language groups in the same hospital, Spanish-preferring Hispanics reported significantly worse care experiences than English-preferring Hispanics on some measures, but better experiences than English-preferring Hispanics on other measures. Portuguese-preferring Hispanics reported similar care experiences to English-preferring Hispanics, except for worse *Care Coordination* experiences. Other-language-preferring Hispanics reported significantly

TABLE 2 Hospital characteristics by preferred language within racial/ethnic group, 2014-2015 HCAHPS Survey (N = 5 480 308)

Racial/ethnic group	Preferred language	Count	Bed size 200 or more beds (%)	For profit (%)	Rural (%)	Average percent surgical (%)	Average percent maternity (%)	Average percent non-English language–preferring patients (%)	Average percent of matching racial/ethnic patients (%)	Average percent of matching racial/ethnic and preferred language patients (%)
White	English	4 238 120	60	15	15	36	12	1	84	83
White	Spanish	7367	71***	31***	7***	31***	16***	2***	52***	1***
White	Russian	8851	76***	7***	1***	35***	13***	9***	72***	8***
White	Portuguese	1696	66***	19***	2***	34***	13***	2***	73***	1***
White	Other language	25 306	72***	14***	7***	34***	16***	3***	73***	2***
Black	English	477 330	72	23	10	33	12	0	26	25
Black	Spanish	568	76**	22	6**	31**	14***	1***	22***	0***
Black	Other language	6871	79***	21***	3***	31***	16***	1***	21***	1***
Hispanic	English	272 948	67	26	7	34	16	12	26	14
Hispanic	Spanish	252 760	71***	32***	5***	30***	18***	24***	36***	24***
Hispanic	Portuguese	1389	71**	21***	2***	33***	16	12	19***	0***
Hispanic	Other language	5978	65***	26	10***	31***	16	15***	26	1***
API	English	83 384	71	10	4	36	17	4	17	13
API	Chinese	17 268	78***	13***	1***	34***	18***	11***	18	8***
API	Vietnamese	7463	79***	14***	1***	36	16***	6***	11***	2***
API	Other language	31 769	73***	16***	3***	34***	18***	4	10***	3***
AI/AN	English	38 993	46	16	27	32	15	2	18	16
AI/AN	Other language	2247	35***	13***	33***	27***	18***	9***	43***	9***

*P < 0.5. **P < 0.01. ***P < 0.001 for chi-square tests comparing each non-English group to the English group within the racial/ethnic group.

TABLE 3 Differences in HCAHPS top-box scored composite measures by preferred language within racial/ethnic group, adjusted for patient-mix and survey year (N = 5 480 308)

Racial/Ethnic group	Preferred language	Nurse communication		Doctor communication		Hospital staff responsiveness		Communication about medication		Discharge information		Care coordination	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
White	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
White	Spanish	-3.2	***	-1.5	***	-2.4	***	-1.7	**	-3.3	***	-5.9	***
White	Russian	2.0	***	4.8	***	5.6	***	2.4	***	0.9	**	-5.8	***
White	Portuguese	-0.4		2.1	**	-1.7		1.0		0.8		-2.1	*
White	Other language	-0.6	**	-0.2		-0.9	***	-1.7	***	-1.2	***	-7.1	***
<i>Joint test of language within r/e group</i>		NA	***		***		***		***		***		***
Black	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
Black	Spanish	-5.4	***	-5.1	***	-6.6	***	-10.1	***	-3.9	**	-8.2	***
Black	Other language	-4.1	***	-4.2	***	-4.0	***	-4.2	***	-4.9	***	-6.8	***
<i>Joint test of language within r/e group</i>		NA	***		***		***		***		***		***
Hispanic	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
Hispanic	Spanish	-2.2	***	-0.4	***	-1.1	***	-0.9	***	-0.5	***	-3.7	***
Hispanic	Portuguese	0.5		-1.8	*	-0.3		-2.4		0.1		-4.6	***
Hispanic	Other language	-1.4	***	-1.5	***	-2.9	***	-0.2		-0.8	*	-8.4	***
<i>Joint test of language within r/e group</i>		NA	***		***		***		***		***		***
API	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
API	Chinese	-8.8	***	-7.6	***	-7.6	***	-6.0	***	3.2	***	-10.6	***
API	Vietnamese	-5.9	***	-5.7	***	-4.4	***	-1.5	*	3.3	***	-2.8	***
API	Other language	-1.5	***	-1.6	***	-3.1	***	-1.1	***	1.6	***	-4.6	***
<i>Joint test of language within r/e group</i>		NA	***		***		***		***		***		***
AI/AN	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
AI/AN	Other language	-6.0	***	-5.6	***	-4.2	***	-2.3		-3.9	***	-6.8	***

Notes: Bold font is used to highlight statistically significant positive coefficients greater than 3. *Italics* is used to highlight statistically significant positive coefficients less than 3. Underlining is used to highlight statistically significant negative coefficients less than 3. Bold font and underlining is used to highlight statistically significant negative coefficients greater than 3.

Est, estimate.

*P < 0.5. **P < 0.01. ***P < 0.001.

worse care experiences than English-preferring Hispanics in the same hospital, except for similar *Communication about Medication*.

Among API language groups in the same hospital, the within-hospital differences closely mirror overall differences. Other-language-preferring AI/AN reported significantly worse care experiences than English-preferring AI/AN in the same hospital, with at least a moderate difference for all measures.

3.4 | Between-hospital differences in patient experience by preferred language within racial/ethnic group

Estimates in Table 5 reflect between-hospital differences in patient experience—differences in the average quality of hospitals from

which different groups receive care. Negative between-hospital differences indicate that a group was served by hospitals that on average provided poorer experiences to all patients than was the case for the reference group; this corresponds to a negative coefficient in Table 5.¹³ Between-hospital differences suggest that non-English-preferring groups usually received care from worse hospitals than their English-preferring counterparts. For non-English-preferring Whites, within-hospital and between-hospital differences were of similar magnitude but in opposite directions, such that they generally reported better care experiences in worse hospitals than English-preferring Whites. For all other groups, both between-hospital and within-hospital groups were negative. For non-English-preferring Blacks and AI/AN, within-hospital differences (Table 4) were generally larger than between-hospital differences (Table 5). For

TABLE 4 Within-hospital differences in HCAHPS top-box scored composite measures by preferred language within racial/ethnic group, adjusted for patient-mix, survey year, and hospital fixed effects (N = 5 480 308)

Racial/ ethnic group	Preferred language	Nurse communication		Doctor communica- tion		Hospital staff responsive- ness		Communication about medication		Discharge information		Care coordination	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
White	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
White	Spanish	1.3	***	1.8	***	2.9	***	1.3		-0.5		<u>-1.4</u>	**
White	Russian	5.8	***	7.2	***	10.3	***	5.7	***	3.5	***	-3.2	***
White	Portuguese	2.1	**	3.8	***	2.4	*	3.7	**	2.0	**	0.5	
White	Other language	1.6	***	1.5	***	2.0	***	0.2		0.1		<u>-5.0</u>	***
<i>Joint test of language within r/e group</i>		NA	***		***		***		***		***		***
Black	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
Black	Spanish	<u>-3.7</u>	**	<u>-4.0</u>	**	<u>-4.2</u>	*	<u>-8.6</u>	***	<u>-2.6</u>	*	<u>-7.0</u>	***
Black	Other language	<u>-2.1</u>	***	<u>-2.7</u>	***	<u>-1.5</u>	**	<u>-2.5</u>	***	<u>-3.9</u>	***	<u>-5.5</u>	***
<i>Joint test of language within r/e group</i>		NA	***		***		**		***		***		***
Hispanic	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
Hispanic	Spanish	<u>-1.0</u>	***	0.3	**	0.7	***	0.2		0.5	***	<u>-2.0</u>	***
Hispanic	Portuguese	1.1		-1.5		1.4		-0.5		1.1		<u>-4.8</u>	***
Hispanic	Other language	<u>-1.4</u>	***	<u>-1.4</u>	***	<u>-2.4</u>	***	<u>-0.0</u> ^a		<u>-0.8</u>	*	<u>-5.6</u>	***
<i>Joint test of language within r/e group</i>		NA	***		***		***				***		***
API	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
API	Chinese	<u>-5.5</u>	***	<u>-5.2</u>	***	<u>-4.6</u>	***	<u>-3.4</u>	***	4.2	***	<u>-7.6</u>	***
API	Vietnamese	<u>-5.1</u>	***	<u>-5.0</u>	***	<u>-3.5</u>	***	-0.6		3.6	***	<u>-2.1</u>	***
API	Other language	<u>-0.5</u>	*	<u>-0.7</u>	**	<u>-1.5</u>	***	-0.2		1.5	***	<u>-2.2</u>	***
<i>Joint test of language within r/e group</i>		NA	***		***		***		***		***		***
AI/AN	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
AI/AN	Other language	<u>-5.6</u>	***	<u>-4.7</u>	***	<u>-3.9</u>	***	<u>-2.8</u>	*	<u>-4.0</u>	***	<u>-3.9</u>	***

^a-0.1 < χ < 0.0; Est, estimate. Bold font is used to highlight statistically significant positive coefficients >3. *Italics* is used to highlight statistically significant positive coefficients <3. Underlining is used to highlight statistically significant negative coefficients <3. Bold font and underlining is used to highlight statistically significant negative coefficients >3.

*P < 0.5. **P < 0.01. ***P < 0.001.

non-English-preferring Hispanic and API patients, within-hospital and between-hospital differences were similar in magnitude.

4 | DISCUSSION

While there is clear evidence of racial/ethnic disparities in patient experience and barriers to care in hospital and other health care settings,^{11,13,31,39-42} only a few studies have directly examined the role of language preference within a racial/ethnic group in patient experiences, generally in outpatient settings and comparing only English and Spanish languages.^{9,12}

We extend prior research by examining differences in adult inpatient care by preferred language within racial/ethnic groups

for 18 racial/ethnic and language groups. We found that within each racial/ethnic group (White, Black, Hispanic, API, and AI/AN), non-English-preferring patients reported worse care experiences than their English-preferring counterparts. Differences were largest and most consistent (ie, results were statistically significant and had the same sign across) for *Care Coordination* and smallest and least consistent for *Discharge Information* and *Communication about Medication*. These results suggest that language barriers may be especially consequential for the more complex, individualized health care interactions involved in effective care coordination than for more standardized communications, such as conveying discharge instructions or information about new medication, which may in some cases only require preprinted materials in a variety of languages.

TABLE 5 Between-hospital differences (total difference minus within-hospital difference) in HCAHPS top-box scored composite measures by preferred language within racial/ethnic group (N = 5 480 308)

Racial/ethnic group	Preferred language	Nurse communication		Doctor communication		Hospital staff responsiveness		Communication about medication		Discharge information		Care coordination	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
White	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
White	Spanish	<u>-4.5</u>	***	<u>-3.3</u>	***	<u>-5.3</u>	***	<u>-3.0</u>	***	<u>-2.8</u>	***	<u>-4.5</u>	***
White	Russian	<u>-3.7</u>	***	<u>-2.4</u>	***	<u>-4.8</u>	***	<u>-3.3</u>	***	<u>-2.6</u>	***	<u>-2.6</u>	***
White	Portuguese	<u>-2.5</u>	***	<u>-1.7</u>	**	<u>-4.1</u>	***	<u>-2.8</u>	***	<u>-1.2</u>	***	<u>-2.6</u>	***
White	Other language	<u>-2.2</u>	***	<u>-1.7</u>	***	<u>-2.9</u>	***	<u>-1.9</u>	***	<u>-1.3</u>	***	<u>-2.1</u>	***
<i>Joint test of language within r/e group</i>		NA	***		***		***		***		***		***
Black	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
Black	Spanish	<u>-1.7</u>	***	<u>-1.1</u>		<u>-2.3</u>	**	<u>-1.6</u>		<u>-1.3</u>		<u>-1.2</u>	
Black	Other language	<u>-1.9</u>	***	<u>-1.5</u>	***	<u>-2.5</u>	***	<u>-1.7</u>	**	<u>-1.0</u>		<u>-1.3</u>	
<i>Joint test of language within r/e group</i>		NA	***		***		***		***		***		***
Hispanic	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
Hispanic	Spanish	<u>-1.2</u>	***	<u>-0.6</u>	***	<u>-1.8</u>	***	<u>-1.1</u>	***	<u>-1.0</u>	***	<u>-1.7</u>	***
Hispanic	Portuguese	<u>-0.6</u>		<u>-0.3</u>		<u>-1.7</u>	*	<u>-1.9</u>	**	<u>-1.0</u>		<u>0.3</u>	*
Hispanic	Other language	<u>-0.1</u>		<u>-0.1</u>		<u>-0.5</u>		<u>-0.2</u>		<u>-0.0^a</u>		<u>-2.8</u>	***
<i>Joint test of language within r/e group</i>			***		***		***		***		***		***
API	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
API	Chinese	<u>-3.3</u>	***	<u>-2.4</u>	***	<u>-3.0</u>	***	<u>-2.6</u>	***	<u>-1.0</u>	***	<u>-3.0</u>	***
API	Vietnamese	<u>-0.8</u>	**	<u>-0.7</u>		<u>-0.8</u>	**	<u>-0.9</u>		<u>-0.2</u>	*	<u>-0.7</u>	
API	Other language	<u>-1.0</u>	***	<u>-0.9</u>	***	<u>-1.6</u>	***	<u>-1.0</u>	***	<u>0.1</u>		<u>-2.4</u>	***
<i>Joint test of language within r/e group</i>		NA	***		***		***		***		***		***
AI/AN	English	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA
AI/AN	Other language	<u>-0.4</u>		<u>-0.9</u>		<u>-0.3</u>		<u>0.5</u>		<u>0.1</u>		<u>-2.9</u>	**
												<u>-2.9</u>	**

^a-0.1 < x < 0.0; Est, estimate. Bold font is used to highlight statistically significant positive coefficients >3. *Italics* is used to highlight statistically significant positive coefficients <3. Underlining is used to highlight statistically significant negative coefficients <3. Bold font and underlining is used to highlight statistically significant negative coefficients >3.

*P < 0.5. **P < 0.01. ***P < 0.001.

Differences by language were especially large within Black, AI/AN, and API patients, suggesting that non-English-preferred patients in these groups may require particular language assistance from the hospitals where they obtain care. These differences also highlight important linguistic heterogeneity within racial/ethnic groups and the importance of language group-specific analysis and care. Stratifying HCAHPS data (and other hospital-wide data) by preferred language within racial/ethnic groups could help determine which language minority groups need most help navigating the health system and receiving quality care. Examining patient experience by racial/ethnic/language groups would increase awareness of their linguistic needs and could lead to both provision of materials (eg, education materials, discharge instructions, medication information, etc.) and linguistic support (eg, number of translators available across which languages) for patients in their preferred language.

The finding of worse care experiences by non-English-preferred API compared to English-preferred API across all measures, except *Discharge Information*, requires careful interpretation. There is evidence that some of the lower scores for English-preferred API compared to English-preferred Whites may reflect differences in scale use: that is, the tendency for English-preferred API to select the extremes of an ordinal response scale less often than English-preferred Whites.⁴³ This difference in scale use may be greater for non-English-preferred API than English-preferred API.^{35,44} If so, some of the within-hospital component of the language differences in the API responses, which constitute almost all of the language differences among API, may reflect scale use. Scale use would likely not affect between-hospital differences. The hypothesis that differences in scale use play a significant role in within-hospital and overall differences by language among

API is supported by the very different findings for the *Discharge Information* measure (yes/no), the only measure that does not employ an ordinal response scale.

We found that among White patients in the same hospital, Spanish-preferring and other-language-preferring Whites reported significantly better experiences than English-preferring Whites for *Nurse Communication*, *Doctor Communication*, and *Hospital Staff Responsiveness*. Focus groups or cognitive interviews with linguistically diverse patient group regarding provider communication and staff responsiveness may provide insight into this unexpected finding.

By examining between-hospital and within-hospital differences, we find that in almost every instance non-English-preferring patients attended hospitals whose average patient experience scores for all patients were lower than the average scores for the hospitals attended by their English-preferring counterparts. In most instances, non-English-preferring API, AI/AN, and Black patients reported worse experiences than their English-preferring counterparts within the same hospitals and received care from hospitals with worse overall scores than those used more often by their English-speaking counterparts. Our findings suggest that linguistic minorities may face location or other access barriers to better hospitals or may select poorer-performing hospitals for linguistic or cultural reasons. Non-English-preferring patients may live in neighborhoods with poorer-performing hospitals; unfortunately, HCAHPS data do not contain patient-level address information to assess patient-level neighborhood effects.

Two of the strongest predictors of worse patient experience are larger hospital bed size and for-profit status.^{45,46} The fact that for the most part non-English-preferring patients were most likely to be treated in large and for-profit hospitals may partly explain the between-hospital disadvantages for non-English-preferring patients. These between-hospital differences suggest the need to prioritize general quality improvement efforts focused on access and quality in hospitals serving linguistic minorities and especially in large, for-profit hospitals. Within-hospital differences by preferred language were generally similar or larger than between-hospital differences by language. These within-hospital differences may reflect limitations in cultural competency (eg, providing professional medical interpreters, including family members in medical discussions, working with an extended care team, etc.), linguistically appropriate services (eg, providing materials and communications in the stated preferred languages of patients), linguistic support (eg, shared decision making) for groups who may differ from their English-speaking counterparts in acculturation (eg, definitions of diseases, understanding of U.S. health care system, etc.),⁴⁷ health literacy (eg, limited knowledge of medical condition, poor ability to manage medications and self-care, nonadherence to treatment plans), and preferences.⁴⁸ These within-hospital differences suggest that hospitals should stratify their HCAHPS data by language within race/ethnicity to identify at-risk language groups for which to develop targeted quality improvement efforts.

Adverse events have been shown to be more severe and more often related to communication for linguistic minorities, especially Spanish-preferring limited English proficient (LEP) patients.^{25,49}

Consequently, LEP patients are at greater risk for medical errors than others;^{25,49} enhanced language services may reduce this risk. Medication labels could employ tailored bilingual printing (in English and the patient's preferred language) to improve understanding of medications. Providing discharge diagnosis, discharge instructions, and information on medication in appropriate languages and at appropriate literacy levels may improve HCAHPS performance, patient adherence, and patient outcomes.^{4,26,50}

Our study has several limitations. While HCAHPS provides official surveys in six of the named languages (English, Spanish, Chinese, Russian, Vietnamese, and Portuguese) and encourages their use, hospitals may be under-supplying translations in the non-English languages. Table S2 in Appendix S1 shows the percent of respondents whose HCAHPS survey language matched their stated preferred language. For example, the second row of Table S2 indicates that of Spanish-preferring White respondents, only 57 percent were provided with and completed the HCAHPS survey in Spanish, suggesting that others who might have preferred to have received the survey in Spanish may not have responded. Whereas more than 99 percent of English-preferring patients responded to the HCAHPS survey in English (Table S2 in Appendix S1), only 26-61 percent of Spanish-preferring patients and 3-16 percent of patients preferring Chinese, Portuguese, Russian, and Vietnamese filled out an HCAHPS survey in the language they mainly speak at home. Our non-English-preferring language groups may be underrepresenting the numbers of people who have non-English language preferences. We hypothesize that those who are omitted are non-English monolingual-preferring patients; if so, our finding of worse care experiences is a conservative estimate of the degree of disparities related to language preference. Response rates were modest and nonresponse bias may have influenced our findings. However, research on CAHPS surveys has found little evidence of nonresponse bias after adjustment for case-mix and nonresponse.^{51,52}

These differences in patient experiences for linguistic minorities also imply that more research is needed to assess whether appropriate services are being offered and whether providers are assisting and supporting these specific racial/ethnic and language groups during their inpatient stays, discharge, and posthospital care. There is some evidence in ambulatory care research that Hispanic and API patients who needed and always used interpreters reported similar or significantly better provider and office staff communication and access to care than patients who did not need interpreters.⁵³

Our findings should encourage hospitals to consider the literacy level and the preferred language of patients and/or caregiver to ensure that discharge information and educational materials are communicated simply and in the preferred language. However, simply translating instructions may be insufficient to ensure patient understanding.^{54,55}

Our finding should also encourage hospitals to tailor quality improvement efforts and improvements in culturally competent practices to the needs of these at-risk linguistic groups to both reduce disparities and improve care. Cultural competency includes such practices as including family members and/or caregivers in care as

appropriate, working with members of the extended care team (such as community health workers), and coordinating with other providers to help facilitate culturally competent care for patients. Weech-Maldonado et al⁵⁶ found that more culturally competent hospitals have better HCAHPS scores and smaller racial/ethnic disparities.

Greater cultural competency, linguistic support for shared decision making, providing professional medical interpreters^{57,58} and providing low-literacy discharge and education materials in the patients' and families' preferred language could reduce disparities for linguistic-minority groups in general (as defined by both preferred language and race/ethnicity) and for those at particular risk, such as non-English-preferring Black, AI/AN, and API patients.

To reduce disparities for linguistic-minority groups (as defined by both preferred language and race/ethnicity), hospitals can provide more culturally competent care, linguistic support for decision making, professional medical interpreters, and low-literacy discharge and education materials in patients' preferred language. This is especially important for those at particular risk, such as non-English-preferring Black, AI/AN, and API patients. Efforts should also be made to increase access to better hospitals and to improve overall patient experience in hospitals with high percentages of non-English-preferring patients.

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CONFLICT OF INTEREST

All authors have no potential conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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