Limited English Proficiency, Primary Language at Home, and Disparities in Children's Health Care: How Language Barriers are Measured Matters

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SYNOPSIS

Background. Approximately 3.5 million U.S. schoolchildren are limited in English proficiency (LEP). Disparities in children's health and health care are associated with both LEP and speaking a language other than English at home, but prior research has not examined which of these two measures of language barriers is most useful in examining health care disparities.

Objectives. Our objectives were to compare primary language spoken at home vs. parental LEP and their associations with health status, access to care, and use of health services in children.

Methods. We surveyed parents at urban community sites in Boston, asking 74 questions on children's health status, access to health care, and use of health services.

Results. Some 98% of the 1,100 participating children and families were of non-white race/ethnicity, 72% of parents were LEP, and 13 different primary languages were spoken at home. "Dose-response" relationships were observed between parental English proficiency and several child and parental sociodemographic features, including children's insurance coverage, parental educational attainment, citizenship and employment, and family income. Similar "dose-response" relationships were noted between the primary language spoken at home and many but not all of the same sociodemographic features. In multivariate analyses, LEP parents were associated with triple the odds of a child having fair/poor health status, double the odds of the child spending at least one day in bed for illness in the past year, and significantly greater odds of children not being brought in for needed medical care for six of nine access barriers to care. None of these findings were observed in analyses of the primary language spoken at home. Individual parental LEP categories were associated with different risks of adverse health status and outcomes.

Conclusions. Parental LEP is superior to the primary language spoken at home as a measure of the impact of language barriers on children's health and health care. Individual parental LEP categories are associated with different risks of adverse outcomes in children's health and health care. Consistent data collection on parental English proficiency and referral of LEP parents to English classes by pediatric providers have the potential to contribute toward reduction and elimination of health care disparities for children of LEP parents.

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Forty-seven million Americans, or 18% of the U.S. population, speak a language other than English at home, up from 31.8 million (14% of the population) in 1990 and 23.1 million (11% of the population) in 1980.[1] The number of people speaking a language other than English at home grew by 38% in the 1980s and 47% in the 1990s, and while the U.S. population increased by one-fourth between 1980 and 2000, the number of people speaking a language other than English at home more than doubled.[1] Eight percent of Americans, or 21.3 million persons, are limited in English proficiency (LEP), which is defined as self-reporting speaking English "less than very well" (i.e., self-rating the ability to speak English as "not at all," "not very well," or "well");[2] this represents an increase from 14 million LEP persons (6% of the population) in 1990 and 10 million (5% of the population) in 1980.[2,3] The number of LEP Americans thus grew by 40% in the 1980s, 52% in the 1990s, and more than doubled from 1980–2000. In 2000, there were 3.5 million LEP American schoolchildren 5–17 years old, representing one out of every 15 schoolchildren and a 168% increase since 1979.[4]

Disparities in children's health and health care are associated with both speaking a language other than English at home and LEP. For example, speaking a non-English language at home or having parents who choose to be interviewed in a non-English language are associated with impaired health status,[5] a lower likelihood of having a usual source of medical care,[5,6] lower parental ratings of pediatric care,[7] and impaired access to care for children with special health care needs.[8] Children with LEP parents (compared to those with English-proficient parents) have higher resource utilization for diagnostic testing,[9] longer duration visits in the emergency department,[9] and a greater risk of intubation when they have asthma,[10] and LEP parents have a higher risk of a poor understanding of their child's managed care coverage.[11]

A critical issue that has never been addressed in the published literature (to our knowledge) is which metric of language barriers in health care—the primary language spoken at home or LEP—is most useful in examining disparities in health status, access to health care, and use of health services. In addition, prior research has not investigated whether any of the specific four LEP categories (self-reported ability to speak English very well, well, not very well, or not at all) is more strongly associated with various health outcomes, and whether there is a "dose-response" relationship between progressively worse English proficiency and the risk of adverse health outcomes. Our study objectives, therefore, were to (*1*) compare primary language spoken at home vs. LEP in regards to their associations with health status, access to care, and use of services in children; and (*2*) examine associations between the four individual parental LEP categories and selected child health and health care outcomes, including whether a "dose-response" relationship exists between parental English proficiency and these outcomes in children.

METHODS

Design/study population

A cross-sectional survey was conducted of the primary caretakers (henceforth referred to as "parents") of children 0–18 years old in the six communities in the Greater Boston, Massachusetts, metropolitan area with the highest proportion of Latinos.[12] These communities included Chelsea, East Boston, Hyde Park, Jamaica Plain, Roxbury, and Roslindale. This study was part of a larger community-based project examining access barriers to health care for Latino children. Parents who agreed to participate in the study and had more than one child were asked to provide responses only about their youngest child's health care (to avoid introduction of bias due to clustering effects for families with multiple children). Within each community, surveys were administered at supermarkets, bodegas, laundromats, beauty salons, restaurants, a homeless shelter, and a day care center. These community sites were selected to obtain a sample of parents consisting of both documented and undocumented families in proportions reflective of the population in each community.[11] This sampling method was chosen because traditional census block methods have the potential to undercount undocumented children and their families, given the fear of deportation when a stranger appears at the front door of a dwelling.[11]

From February 2, 2000, to December 22, 2000, we interviewed a consecutive series of parents during times when they were most likely to be going to the market, laundering clothes, or using beauty salons or daycare: from 9:00 am to 6:00 p.m. on weekdays, and 10:00 a.m. to 3:00 p.m. on weekends. Permission was obtained from business owners to conduct the survey. Potential participants were approached by trained bilingual research assistants as they exited the business establishments. The survey took approximately 20 minutes to complete. Parents received a participation incentive in the form of a cash honorarium or voucher for use at the business establishment. Parents were excluded if they had completed the survey before. The study was approved by the Institutional Review Board of Boston Medical Center, and oral informed consent was obtained from each participant.

Survey instrument

The study questionnaire consisted of 74 multiple choice, yes/no, and open-ended questions on the family's sociodemographic characteristics; children's health insurance, access barriers to health care, health status, and use of health services; and the parents' knowledge and practices regarding managed care. Questions on sociodemographics, health insurance, access to health care, health status, and use of services were derived from a previously validated questionnaire.[13] The survey instrument was translated into Spanish, then back translated by a separate observer to ensure validity. Both the English and Spanish versions of the survey were piloted extensively at all of the community sites.

This article focuses on findings concerning parental LEP, the primary language spoken at home, and how these factors are associated with children's health status, access barriers to health care, and use of health services (data on managed care issues for the children have been reported separately elsewhere).[11] We also examined whether either the language that the child speaks most comfortably or the language that the parent speaks most comfortably were associated with children's health and health care outcomes, but because the findings did not differ from those for the primary language spoken at home, the results of these analyses are not reported here.

The cognitive validity of survey questions was established in a community-based pilot study of 600 subjects. In this pilot study, we asked for feedback from participants about the 74 questions, and more detailed explanations of their responses, to ensure that respondents understood the items as intended. Parental English proficiency was determined by asking parents to rate how well they spoke English using the following four choices: very well, well, not very well, and not at all. The question and these response choices were taken verbatim from the item on English proficiency used by the U.S. Census.[1] Parents were also asked the primary language spoken at home; choices included English, Spanish, both, or other. The child's race/ethnicity was by parental self-report; "Latinos" were classified as a separate racial/ethnic group, so Latinos are not included in any of the counts for the remaining racial/ethnic groups (including African Americans, Caribbean blacks, non-Latino whites, Africans, and Asians/Pacific Islanders).

Statistical analyses

Bivariate comparisons were done using two different approaches, since self-reported ability to speak English was considered ordinal and primary language spoken at home was nominal. LEP category trends were analyzed using the Cochran-Armitage test of trend for two-level nominal risk factors, the chi-square test for multi-level nominal risk factors, Pearson's correlation coefficient for ordinal risk factors (health insurance coverage: uninsured=0, public=1, private=2; employment status: no parent working=0, one parent working=1; both parents working=2; and family income), and the Kruskal-Wallis test for continuous risk factors. For bivariate trends in sociodemographic factors and physician visit outcomes in relation to the three categories of the primary language spoken at home, analyses were performed using the chi-square test for discrete risk factors and the Kruskal-Wallis test for continuous risk factors. Crude odds ratios were computed through logistic regression. Multivariate logistic regression was used to further adjust for factors found to be relevant to the outcomes in previous research. Factors adjusted for included the parent's marital status (married and living with partner vs. other), age, educational attainment (high school graduate vs. not high school graduate), citizenship status, number of years living in the U.S. ($\geq$10 years vs. $<$10 years) and employment status (not working, one parent working, or both parents working); the child's age, ethnicity (Latino vs. non-Latino) and insurance status (uninsured, public, private); the number of siblings in the family; and annual combined family income. Because the event-per-variable ratios were small and unstable for forced multiple linear regression of the number of physician visits in the past year and for forced multiple logistic regression of having gone more than one year since the last check-up, stepwise multivariate analyses were performed only for these outcomes. Tests of trend were conducted by treating self-reported ability to speak English as a continuous variable in the multivariate model. Epi Info Version 6[14] was used to examine initial descriptive statistics; all other statistical analyses were performed using SAS Version 8.2 software.[15]

RESULTS

Limited English proficiency, sociodemographics, and physician visits

Child characteristics. The race/ethnicity of the 1,100 participating children was as follows: 82% were Latino; 10%, African American; 4%, Caribbean black; 2%, non-Latino white; 1%, African; 0.3%, Asian/Pacific Islander; and 1%, other/mixed. Twenty-eight percent of the children's parents rated their ability to speak English as "very well," 14% as "well," 31% as "not very well," and 27% as "not at all." There were no statistically significant differences among the four parental LEP categories in the children's gender, age, or number of siblings (Table 1). An inverse relationship was noted between the proportion of uninsured children and parental English proficiency (Table 1), ranging from 27% uninsured for the "not at all" LEP category to 6% for the "very well" LEP category ($p<0.0001$ for test of trend). In contrast, there was a direct "dose-response" relationship between private insurance coverage for children and parental English proficiency, ranging from 10% for the "not at all" LEP category to 26% for the "very well" category ($p<0.0001$ for test of trend). No relationship was observed between public insurance coverage and the parental LEP category ($p=0.14$). The median number of children's physician visits in the past year did not differ by parental LEP category, and there were statistically significant but quantitatively small differences in children having gone more than one year since their last checkup when analyzed by parental LEP category.

Parental characteristics. A "dose-response" relationship was observed between parental educational attainment and English proficiency, with only 15% in the "not at all" LEP category having graduated high school compared with 63% in the "very well category" (Table 1). In contrast, the proportion of parents married and living with their spouses was inversely associated with English proficiency, ranging from 64% for the "not at all" category to 37% for the "very well category." For a non-English language primarily spoken at home, there was an inverse relationship with parental English proficiency ($p<0.0001$ by the Cochran-Armitage test of trend), ranging from 86% for the "not at all" LEP category to 5% of the "very well" category, whereas English as primary language spoken at home directly correlated with English proficiency ($p<0.0001$ by the Cochran-Armitage test of trend), ranging from 0.3% to 53% across the LEP categories (from "not at all" to "very well"). The pattern for households where the primary language was a combination of both English and at least one other language, however, was more complex. The plurality of the parental "well" LEP category (about half) was comprised of this combination primary language group; among parents in the "very well" LEP, the combination primary language group accounted for 42%, which was not significantly different ($p=0.06$, chi-square test for equality of proportions) from the 53% of the "very well" group consisting of the English-only primary language spoken at home group.

Parental U.S. citizenship and residence in the U.S. for at least 10 years significantly correlated with English proficiency,

whereas undocumented immigrant or expired visa status was inversely associated with English proficiency (Table 1). For example, among parents reporting that they spoke English very well, 86% were U.S. citizens and 97% had lived in the U.S. for at least 10 years. Among parents reporting they spoke English not at all, 7% were U.S. citizens and 30% had resided in the U.S. for at least 10 years. Parents with the highest English proficiency reported slightly but statistically significantly higher proportions of neither parent working (25%; $p=0.02$) and lower proportions of both parents working (22%; $p=0.007$). Annual combined family income at or below the federal poverty level was inversely correlated with English proficiency, ranging from 89% for the "not at all" parental LEP category to 56% for the "very well" category, whereas the proportion of children living in families with the highest annual income quartile (≥$20,000) was directly related to English proficiency ($p<0.0001$), ranging from 20% for the "not at all" group to 44% for the "very well" group (Table 1).

Primary language spoken at home

The primary language spoken at home most frequently was Spanish, accounting for more than half of households (Table 2). This was followed by a combination of both Spanish and English in about one-quarter of households and English alone in 17% of households. Fifteen other primary language categories were reported in the remaining 5% of households, including 11 additional languages alone or in combination with English. The additional languages included Haitian Creole, Portuguese, Cape Verdean, French, Polish, Cambodian, Ibo, Arabic, Endo-Marakwet, Italian, and Luganda. Four households reported speaking a combination of three languages.

Table 1. Parental English proficiency categories, sociodemographic characteristics of study children and their parents (*N*=1,100), and selected physician visit outcomes for study children

	Self-reported parental ability to speak English				
Characteristic	*Not at all (n=294)*	*Not very well (n=336)*	*Well (n=156)*	*Very well (n=314)*	p[a]
Children					
Female	53%	49%	46%	51%	0.54
Median age in years (range)	7 (0–18)	7.5 (0–18)	6 (0–17)	7 (0–18)	0.07
Median number of siblings (range)	1 (0–5)	1 (0–4)	1 (0–4)	1 (0–8)	0.15
Health insurance coverage[b]					0.02
None	27%	21%	13%	6%	
Public	64%	62%	65%	68%	
Private	10%	18%	22%	26%	
Median number of physician visits in past year (range)	3 (0–50)	3 (0–24)	3 (1–30)	2 (0–40)	0.44
More than 12 months since last checkup	3%	4%	0%	5%	0.04
Parents					
High school graduate	15%	33%	55%	63%	<0.0001
Married and lives with spouse	64%	55%	44%	37%	<0.0001
Primary language spoken at home[b]					<0.0001
Non-English language	86%	79%	37%	5%	
English and at least one other language	14%	21%	49%	42%	
English	0.3%	0.3%	15%	53%	
U.S. citizen	7%	20%	49%	86%	<0.0001
Undocumented immigrant or expired visa	51%	30%	8%	0%	<0.0001
Lived in U.S. ≥10 years	30%	55%	71%	97%	<0.0001
Employment status[b,c]					<0.0001
No parent working	17%	20%	18%	25%	
One parent working	55%	50%	49%	53%	
Both parents working	28%	30%	33%	22%	
Annual combined family income at or below federal poverty threshold	89%	78%	62%	56%	<0.0001
Combined annual family income[b]					<0.0001
≥$20,000	20%	29%	35%	44%	
$15,000–19,999	22%	25%	34%	19%	
$10,000–14,999	22%	25%	17%	21%	
<$10,000	36%	21%	15%	16%	

[a]Cochran-Armitage test of trend for bivariate factors; Pearson's correlation coefficient for factors with greater than two ordinal levels; chi-square test for primary language spoken at home; Kruskal-Wallis test for continuous factors.

[b]Column totals may not sum to 100% due to rounding.

[c]Includes both one-parent and two-parent families.

Table 2. Primary language spoken at home for study children and their parents (*N*=1,100)

Primary language spoken at home	*Percent (number)*
Spanish	52.2 (574)
Spanish and English	25.8 (284)
English	17.3 (190)
Haitian Creole and English	1.8 (20)
Portuguese	0.6 (7)
Cape Verdean	0.3 (3)
Haitian Creole, English, and French	0.3 (3)
French and English	0.3 (3)
Polish	0.3 (3)
Portuguese and English	0.3 (3)
Cambodian and English	0.2 (2)
Ibo	0.2 (2)
Arabic	0.1 (1)
Arabic, English, and French	0.1 (1)
Cambodian	0.1 (1)
Endo-Marakwet and English	0.1 (1)
Italian and English	0.1 (1)
Luganda and English	0.1 (1)

Primary language spoken at home, sociodemographics, and physician visits

Child characteristics. There were no differences in children's gender or the number of siblings among the three groups of primary language spoken at home, but slight but statistically significant group differences were noted in the median age (Table 3). There was a gradient in the proportion of uninsured children according to what can be termed "exposure" to English as the primary household language ($p<0.0001$), with English only having the lowest uninsured rate (3%), followed by English in combination with another language (11%), and a non-English language associated with the highest uninsured rate (25%). A less pronounced inverse gradient was noted for public insurance coverage ($p=0.02$), but for private insurance, English alone and English combined with another language did not differ significantly from each other ($p=0.51$), with private coverage for each significantly higher than for children in non-English primary language households ($p<0.0001$ and 0.0002, respectively). Neither the median number of children's physician visits in the past year nor the proportion of children who had no check-up in the past 12 months differed by primary language spoken at home.

Parental characteristics. For parents, the degree of household exposure to English as the primary language was associated with a gradient in educational attainment ($p<0.0001$ by the Cochran-Armitage test of trend), with parental high school graduation rates ranging from 68% in English primary language households to 30% in non-English language households (Table 3). This gradient was reversed for marital status, with only 25% of English primary language households containing parents who were married and living with their spouse, compared with 61% among non-English language households ($p<0.0001$ by the Cochran-Armitage test of trend). Household exposure to English as a primary language also showed a "dose-response" relationship (all comparisons with a $p<0.0001$ by the Cochran-Armitage test of trend) with parental U.S. citizenship (ranging from 87% in English households to 15% in non-English households) and residence in the U.S. for at least 10 years (from 96% to 42%, respectively), but an inverse association with undocumented immigrant or expired visa status (ranging from 1% to 38%, respectively). Household exposure to English as a primary language was directly associated with neither parent working (ranging from 33% in English households to 17% in non-English households; $p<0.0001$ by the Cochran-Armitage test of trend), but inversely associated with both parents working (ranging from 14% to 31%, respectively; $p<0.0001$ by the Cochran-Armitage test of trend).

Households speaking a non-English primary language were significantly more likely than other households to have an annual combined family income at or below the federal poverty level, at 82%, but poverty rates did not differ between English and combined English and non-English households (Table 3). Both English and the combined English plus non-English primary language households were most likely to have household incomes in the highest quartile, whereas the non-English only households had approximately equivalent proportions across all four income quartiles.

Limited English proficiency and selected child health outcomes

In both bivariate analyses and the multivariate analyses adjusting for 11 covariates, LEP parents were associated with about triple the odds of a child having fair or poor health status, and double the odds of the child spending at least one day in bed for illness in the past year (Table 4). No association, however, was found between parental English proficiency and the child either having a regular physician or being up-to-date on vaccinations. Further multivariate analyses by individual parental LEP category (Table 4) revealed a "dose-response" relationship (p for trend <0.0001) between the severity of LEP and the magnitude of the adjusted odds ratios for fair/poor child health status, ranging from 2.6 times the odds of fair/poor health for children with parents rating their English-speaking ability as "well" to 5.2 times the odds for children with parents reporting English-speaking ability as "not at all" (compared with the "very well" LEP category reference group). For bed days for illness in the past year, children with parents in the "not very well" LEP category had the highest odds (2.8), followed by children with parents in the "not at all" LEP category (2.4) and those with parents in the "well" category (1.7).

Limited English proficiency and access barriers to health care for children

Bivariate analyses revealed that LEP parents were associated with significantly greater odds of children not being brought in for needed medical care for six of nine access barriers to care (Table 5). After multivariate adjustment, parental LEP was no longer significantly associated with immigration problems causing parents not to bring in children for needed care, but now showed a significant association with the child not being brought in for needed care due to transportation difficulties. In multivariate analyses, LEP parents were associated with approximately double the odds of a child not

Table 3. Primary language spoken at home, sociodemographic characteristics of study children and their parents (*N*=1,100), and selected physician visit outcomes for study children

Characteristic	*Primary language spoken at home*			
	English (n=190)	*English and at least one other language (n=319)*	*Non-English language (n=591)*	p[a]
Children				
Female	55%	46%	51%	0.11
Median age in years (range)	7 (0–18)	8 (0–18)	6 (0–18)	0.003
Median number of siblings (range)	1 (0–8)	2 (0–7)	1 (0–5)	0.24
Health insurance coverage[b]				<0.0001
None	3%	11%	25%	
Public	71%	66%	62%	
Private	26%	23%	14%	
Median number of physician visits in past year (range)	2 (0–24)	3 (0–40)	3 (0–50)	0.07
More than 12 months since last checkup	6%	2%	3%	0.06
Parents				
High school graduate	68%	43%	30%	<0.0001
Married and lives with spouse	25%	48%	61%	<0.0001
U.S. citizen	87%	56%	15%	<0.0001
Undocumented immigrant or expired visa	1%	11%	38%	<0.0001
Lived in U.S. ≥10 years	96%	82%	42%	<0.0001
Employment status[b,c]				<0.0001
No parent working	33%	21%	17%	
One parent working	53%	52%	52%	
Both parents working	14%	28%	31%	
Annual combined family income at or below federal poverty threshold	60%	62%	82%	<0.0001
Combined annual family income[b]				<0.0001
≥$20,000	39%	41%	24%	
$15,000–19,999	24%	20%	26%	
$10,000–14,999	18%	19%	25%	
<$10,000	19%	21%	25%	

[a]Chi-square or Kruskal-Wallis test.

[b]May not total to 100% due to rounding.

[c]Includes both one-parent and two-parent families.

being brought in for needed care due to cost issues, transportation problems, and difficulty making appointments, triple the odds of not being brought in for care due to the child being uninsured, and quadruple the odds of not being brought in for needed care due to the medical staff not understanding the family's culture and the health care facility being too far away (Table 5).

Multivariate analyses of the associations of specific parental LEP categories with access barriers that caused parents to not bring in children for needed care revealed only one "dose-response" relationship, which was increasing odds of not bringing children in for needed care due to inability to afford the care, ranging from a non-significant odds ratio of 2.0 for the "well" LEP category to 3.1 for the "not at all" LEP category (Table 5). The most common pattern observed in the specific LEP category multivariate analyses (for four of the six significant associations between LEP and access barriers) was the "not very well" parental LEP category having the highest odds of children not being brought in for care due to the barrier, followed by the "not at all" and "well" categories. The four access to care dependent variables for which this pattern was noted were lack of health insurance, transportation difficulties, the health care facility being located too far away, and difficulty making appointments. For example, the odds of not bringing children in for needed care due to the health care facility being too far away was 5.2 for the "not very well" parental LEP category, 4.4 for the "not at all" category, and 3.1 for the "well" category. In contrast, for the medical staff does not understand the family's culture barrier, the greatest odds ratio (12.5) was associated with the "not at all" LEP category, followed by 5.5 times the odds for the "well" LEP category, but no significant association was observed with the "not very well" category.

Primary language spoken at home and selected child health outcomes

In bivariate analyses, a non-English language and both English and another language as the primary language spoken at home were significantly associated with about twice the odds of a child being in fair/poor health (Table 6). But primary language spoken at home was not significantly associated in bivariate analyses with the child having a regular

Table 4. Parental limited English proficiency (LEP), parental LEP categories, and their relationships with selected child health outcomes[a]

	Child health outcome							
	No regular physician		*Fair/poor health status*		*≥1 Bed days for illness in past year*		*Not up to date on vaccinations*	
Independent variable	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*
LEP parent	1.65 (0.79, 3.47)	0.97 (0.23, 4.15)	2.82 (2.12, 3.75)	3.04 (2.00, 4.60)	1.56 (1.15, 2.12)	2.15 (1.39, 3.32)	0.88 (0.30, 2.55)	0.99 (0.18, 5.44)
Parental LEP Category								
Very well	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Well	1.11 (0.37, 3.36)	0.71 (0.13, 3.76)	2.14 (1.43, 3.20)	2.61 (1.64, 4.14)	1.35 (0.87, 2.10)	1.69 (1.03, 2.77)	1.21 (0.29, 5.14)	1.23 (0.19, 7.77)
Not very well	1.35 (0.57, 3.20)	1.61 (0.26, 9.91)	2.62 (1.88, 3.63)	3.59 (2.21, 5.83)	1.90 (1.34, 2.69)	2.84 (1.71, 4.71)	0.93 (0.27, 3.26)	0.69 (0.07, 6.62)
Not at all	2.31 (1.03, 5.19)	2.24 (0.31, 15.97)	3.57 (2.54, 5.02)	5.22 (2.97, 9.18)	1.33 (0.92, 1.92)	2.37 (1.31, 4.29)	0.64 (0.15, 2.69)	0.44 (0.03, 5.93)

[a]All adjusted odds ratios are adjusted for the child's age, ethnicity, insurance coverage, and the number of siblings; parental marital status, age, educational attainment, citizenship status, number of years living in the U.S., and employment status; and annual combined family income.

Table 5. Parental limited English proficiency (LEP), parental LEP categories, and their relationships with access barriers to health care for children that resulted in parents not bringing their child in for needed care[a]

	Child not brought in for needed care due to									
	Couldn't afford medical care		*Child has no health insurance*		*Immigration problems*		*Medical staff doesn't understand culture*		*Transportation difficulties*	
Independent variable	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*
LEP	2.32 (1.39, 3.85)	2.13 (1.01, 4.50)	2.63 (1.63, 4.22)	3.39 (1.69, 6.82)	11.05 (2.68, 45.65)	2.08 (0.35, 12.27)	4.29 (1.70, 10.85)	4.28 (1.40, 13.10)	1.11 (0.78, 1.57)	2.39 (1.42, 4.00)
Parental LEP category										
Very well	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Well	1.90 (0.96, 3.77)	1.95 (0.86, 4.43)	2.18 (1.17, 4.07)	3.01 (1.42, 6.39)	6.24 (1.25, 31.28)	2.76 (0.45, 17.08)	4.69 (1.60, 13.74)	5.47 (1.65, 18.15)	1.03 (0.62, 1.73)	1.84 (1.02, 3.32)
Not very well	2.28 (1.30, 4.00)	2.47 (1.03, 5.92)	3.00 (1.80, 5.02)	4.03 (1.82, 8.96)	9.35 (2.16, 40.48)	1.55 (0.24, 9.88)	2.29 (0.80, 6.57)	2.93 (0.79, 10.36)	1.38 (0.93, 2.06)	3.31 (1.81, 6.07)
Not at all	2.59 (1.47, 4.56)	3.11 (1.16, 8.30)	2.46 (1.44, 4.21)	3.61 (1.4, 8.93)	15.78 (3.72, 66.95)	2.30 (0.34, 15.75)	6.51 (2.48, 17.09)	12.46 (3.01, 51.65)	0.86 (0.55, 1.34)	2.64 (1.28, 5.44)

	Child not brought in for needed care due to							
	Health care facility too far away		*Too difficult to make appointment*		*Wait too long to see doctor*		*Clinic hours inconvenient*	
Independent variable	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*
LEP	1.57 (1.03, 2.39)	3.85 (2.12, 6.97)	1.76 (1.23, 2.52)	2.27 (1.37, 3.77)	1.04 (0.77, 1.40)	1.36 (0.88, 2.10)	0.92 (0.62, 1.37)	0.73 (0.40, 1.31)
Parental LEP category								
Very well	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Well	1.66 (0.94, 2.94)	3.08 (1.59, 5.96)	1.60 (0.98, 2.64)	1.94 (1.10, 3.41)	1.40 (0.92, 2.13)	1.42 (0.88, 2.28)	1.13 (0.64, 1.97)	0.82 (0.43, 1.57)
Not very well	1.94 (1.22, 3.10)	5.24 (2.63, 10.44)	2.15 (1.45, 3.21)	2.75 (1.54, 4.91)	1.38 (0.98, 1.94)	1.37 (0.83, 2.26)	0.85 (0.53, 1.37)	0.61 (0.31, 1.22)
Not at all	1.12 (0.66, 1.89)	4.35 (1.92, 9.88)	1.44 (0.94, 2.21)	2.22 (1.12, 4.41)	0.56 (0.38, 0.84)	0.64 (0.35, 1.17)	0.90 (0.55, 1.46)	0.79 (0.35, 1.77)

[a]All adjusted odds ratios are adjusted for the child's age, ethnicity, insurance coverage, and the number of siblings; parental marital status, age, educational attainment, citizenship status, number of years living in the U.S., and employment status; and annual combined family income.

Table 6. Primary language spoken at home and the relationship with selected child health outcomes[a]

	Child health outcome							
	No regular physician		*Fair/poor health status*		*≥1 Bed days for illness in past year*		*Not up to date on vaccinations*	
Primary language spoken at home	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*
English	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Both English and at least one other non-English language	1.27 (0.48, 3.41)	0.95 (0.19, 4.90)	1.98 (1.35, 2.90)	1.11 (0.66, 1.88)	0.82 (0.54, 1.24)	0.46 (0.25, 0.83)	4.86 (0.60, 39.18)	3.85 (0.28, 53.78)
Non-English language	1.44 (0.58, 3.53)	0.32 (0.04, 2.32)	2.25 (1.58, 3.20)	1.08 (0.60, 1.93)	1.30 (0.90, 1.87)	0.79 (0.42, 1.50)	2.27 (0.28, 18.53)	1.57 (0.07, 34.49)

[a]All adjusted odds ratios are adjusted for the child's age, ethnicity, insurance coverage, and the number of siblings; parental marital status, age, educational attainment, citizenship status, number of years living in the U.S., and employment status; and annual combined family income.

physician, bed days for illness, or being up-to-date on vaccinations. In multivariate analyses, the primary language spoken at home was no longer associated with children's health status; indeed there was only one association noted: a reduced odds of a bed day in the past year for illness for children in households where the primary language was both English and another language (Table 6).

Primary language spoken at home and access barriers to health care for children

Bivariate analyses revealed that a non-English primary language at home was associated with double the odds of a child not being brought in for care due to lack of insurance, about seven times the odds of not being brought in due to medical staff not understanding the family's culture, and reduced odds of not being brought in due to transportation difficulties (Table 7). The combined English and another language as the primary language at home was associated with five times the odds of not being brought in for care due to the medical staff not understanding the family's culture and reduced odds of not being brought in due to transportation difficulties and the health care facility being too far away. All of these significant findings disappeared after adjustment for relevant covariates in multivariate analyses (Table 7). Indeed, the only other significant multivariate finding was that there were substantially reduced odds of children not being brought in due to inconvenient clinic hours for children both in non-English language and both English and another language households. Primary language spoken at home was not significantly associated with children not being brought in for care due to any of the seven remaining access barriers for which odds ratios could be calculated. For the immigration problems barrier, however, odds ratios were non-estimable, as none of the parents in households with English as the primary language reported not bringing in their child due to immigration problems.

In the stepwise multivariate analyses of the number of physician visits in the past year and having gone >12 months since the last checkup (not shown), neither parental LEP nor the primary language spoken at home entered into any of the models as significant independent variables. The only statistically significant variables that entered in the final model for either outcome were children's age, the number of siblings, and family income.

DISCUSSION

The study findings indicate that parental LEP is more useful than primary language spoken at home as a measure of children's health and health care. After adjustment, parental LEP is associated with triple the odds of fair/poor health status in children and double the odds of at least one bed day for illness in the past year, but primary language spoken at home was not significantly associated with children's health status, and, indeed, speaking both English and another language at home was found to be associated with reduced odds of bed days for illness in the past year. The findings for access barriers causing parents to not bring children in for needed care were similar. Parental LEP was associated with higher odds of not bringing children in for care for six of nine barriers studied, but the primary language spoken at home was not associated with increased odds for any of these nine barriers, and for one barrier reduced odds were noted.

Examining disparities: why is LEP the variable of choice?

Although there is an association between parental LEP and the primary language spoken at home (Table 1), parental LEP was found to be superior to the primary language spoken at home in assessing access to care, health status, and use of health services. This raises an interesting question: Why does this discrepancy exist? One can hypothesize that the reason why parental LEP is superior to the primary language spoken at home in assessing children's health outcomes is that parental LEP is a more precise measure of a language barrier in health care. It seems reasonable to expect that the more severely limited a parent's English proficiency, the greater likelihood there is of difficulty accessing needed pediatric care (due to problems obtaining health insurance and regular health care providers and scheduling clinic visits), of poor communication between a family and the child's health care provider and other clinical staff, and of parental misunderstanding of a child's diagnosis, treatment, and follow-up plans. Conversely, our data show that a parent may have a high level of English proficiency when there is a non-English primary language spoken at home. We suggest that primary language spoken at home is best considered an acculturation marker, consistent with the primary household language being a major component of commonly used acculturation scales in health services research.[16–19]

LEP categories and child health outcomes

Another noteworthy study finding is that individual parental LEP categories are associated with different risks of adverse health status and access to care outcomes. In the case of fair/poor child health status, there was a clear "dose-response" relationship with the severity of the parental LEP. But unexpectedly, the highest risk of adverse child outcomes was most frequently associated with the "not very well" parental LEP category, which had the highest odds of bed days for illness in the past year, and deferral of needed care for children due to no health insurance coverage, transportation difficulties, health care facilities located too far away, and difficulty making appointments. Why the "not very well" parental LEP category was associated with the worst child health and access outcomes is not clear, and merits additional study. Possible explanations include that the "not at all" LEP category parents might be less aware that their child's health status and access to care are sub-optimal, and/or they may feel less "entitled" to better health and access to care for their children because of recent immigration, short duration of U.S. residence, or prior discrimination.

Limitations

Certain limitations of this study should be noted. Although the 1,100 study subjects included families who spoke 12 non-English languages, Spanish was the dominant non-English language, so it would be useful to replicate this study in populations where a larger proportion of households speak non-English languages other than Spanish. The survey

Table 7. Primary language spoken at home and the relationship with access barriers to health care for children that resulted in parents not bringing their child in for needed care[a]

	Child not brought in for needed care due to									
	Couldn't afford medical care		*Child has no health insurance*		*Immigration problems*		*Medical staff doesn't understand culture*		*Transportation difficulties*	
Primary language spoken at home	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*
English	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Both English and at least one other non-English language	1.48 (0.79, 2.79)	1.10 (0.45, 2.69)	1.38 (0.75, 2.51)	1.67 (0.71, 3.94)	NE	NE	4.64 (1.05, 20.50)	2.99 (0.50, 17.95)	0.51 (0.33, 0.81)	0.59 (0.31, 1.13)
Non-English language	1.57 (0.88, 2.81)	0.87 (0.32, 2.36)	2.00 (1.16, 3.44)	2.33 (0.90, 6.04)	NE	NE	6.64 (1.59, 27.76)	4.40 (0.69, 28.01)	0.60 (0.40, 0.89)	0.86 (0.43, 1.75)

	Child not brought in for needed care due to							
	Facility was too far away		*Too difficult to make appointment*		*Too long wait to see doctor*		*Clinic hours inconvenient*	
Primary language spoken at home	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*	*Crude OR (95% CI)*	*Adjusted OR (95% CI)*
English	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Both English and at least one other non-English language	0.48 (0.28, 0.81)	0.50 (0.24, 1.07)	1.20 (0.76, 1.90)	0.75 (0.40, 1.41)	1.18 (0.79, 1.78)	1.23 (0.70, 2.17)	0.72 (0.42, 1.24)	0.26 (0.12, 0.56)
Non-English language	0.79 (0.51, 1.23)	1.26 (0.56, 2.78)	1.22 (0.80, 1.89)	0.62 (0.31, 1.27)	1.01 (0.69, 1.47)	1.34 (0.71, 2.54)	0.84 (0.52, 1.35)	0.26 (0.11, 0.61)

[a]All adjusted odds ratios are adjusted for the child's age, ethnicity, insurance coverage, and the number of siblings; parental marital status, age, educational attainment, citizenship status, number of years living in the U.S., and employment status; and annual combined family income.

NE = Not estimable because no participants primarily speaking English at home had immigration problems that prohibited them from bringing their child in for care

language was not recorded (because the bilingual research assistants sometimes simultaneously translated from English to Spanish and vice versa, depending on the availability of surveys transported to the field site), and thus the impact of survey language on the selected outcomes could not be analyzed. Although we assume that the survey language highly correlates with the primary language spoken at home, it would be useful for future studies to verify this hypothesized association. This study was conducted in urban communities in the northeastern U.S., so the findings may not necessarily generalize to suburban and rural populations and to other regions of the country.

Implications

This is the first study (to our knowledge) to compare the primary language spoken at home vs. parental LEP and their associations with health status, access to care, and use of health services in children, and to examine associations between individual parental LEP categories and selected child health outcomes. In the past, selecting a metric to examine language barriers in health services research was a highly variable, haphazard process that resulted in a proliferation of approaches, including use of the language of interview, the primary "preferred" language used on a daily basis, the primary language spoken at home, and LEP. Our study findings are thus a useful contribution to the field because, for the first time, health services researchers have evidence-based guidance available when seeking the most useful language measure for evaluating health, access to care, and use of services. We suggest that there are several important implications of the study findings for public health and health services research. If a single measure of the impact of language barriers is needed, the evidence indicates that parental LEP is preferred to primary language spoken at home, especially when examining disparities in health, access to care, and use of health services. If language barriers are a central study focus, however, we recommend the use of parental LEP, the primary language spoken at home, and the survey language chosen, to provide the most in-depth analysis of the impact of language and language barriers on health and health care. In addition, our study data suggest that analyses be performed whenever possible of the association between individual parental LEP categories and the study outcomes of interest.

Another key implication of this research is that health care institutions, health plans, managed care organizations, states, and the federal government should consistently collect parental LEP data on all pediatric patients (and LEP data on all patients), given the importance of LEP as an independent variable. Unfortunately, however, there are widespread misconceptions among health care providers, insurers, the public, and federal agency staff that the federal government prohibits the collection of data on a patient's primary language (and race and ethnicity).[20] Indeed, a recent study of more than 80 federal program-specific statutes that require reporting or collection of data revealed that most require general data collection, a few directly address racial/ethnic data, and none mention primary language data.[20] Collection of accurate patient LEP data permits assessment and monitoring of disparities in the quality of care, processes, outcomes, and patient satisfaction, in addition to providing essential information on interpreter services needs for patients and their families, and complying with the federal Title VI prohibition against national origin discrimination.[21,22]

The study findings suggest that efforts by pediatric health care providers to assist parents in improving their English proficiency could substantially benefit both families' overall well-being as well as children's health and access to care. Parental English proficiency was observed to have a direct "dose-response" relationship with parental educational attainment, parental U.S. citizenship, a lower risk of family poverty, a higher probability of being in the highest quartile of combined family income, and a greater likelihood of children having insurance coverage. In multivariate analyses, higher parental English proficiency was associated with the improved health status and access to care for children. Perhaps the best way for pediatric providers to assist LEP parents in improving their English proficiency is to become familiar with and refer parents to low- and no-cost English as a Second Language (ESL) classes. Such information, for example, is available on the Internet at various websites.[23,24]

CONCLUSIONS

In conclusion, our study findings indicate that parental LEP is superior to the primary language spoken at home as a measure of the impact of language barriers on children's health and access to care. Individual parental LEP categories are associated with different risks of adverse outcomes in child health and access to care, with the "not very well" parental LEP category generally associated with the highest risk of suboptimal outcomes. Consistent data collection on parental English proficiency by health care institutions and state and federal governments and referral of LEP parents to ESL classes by pediatric providers have the potential to contribute to substantial progress toward reduction and elimination of disparities in health and health care for the children of LEP parents.

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