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Parental Health Literacy, Knowledge and Beliefs Regarding Upper Respiratory Infections (URI) in an Urban Latino Immigrant Population

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ABSTRACT *Parents who are recent immigrants and/or non-native English speakers are at increased risk for poor health literacy. For example, misconceptions regarding treatment for upper respiratory infections (URIs), including nonjudicious use of antibiotics, have been described among Latinos. We sought to assess the influence of health literacy on knowledge and beliefs surrounding URI care and to explore the correlation between two health literacy measures among Latino parents in northern Manhattan. A descriptive survey design was used, and a total of 154 Latino parents were enrolled from four early head start programs between September 2009 and December 2009. Health literacy was measured using the Short Test of Functional Health Literacy in Adults (S-TOFHLA) and Newest Vital Sign (NVS); parental knowledge and beliefs regarding antibiotic treatment for URIs were also assessed. Analyses were conducted in 2010 with multivariable logistic regression performed to examine predictors of health literacy. Inadequate health literacy was observed in 83.8 % of respondents using NVS and 35.7 % with the S-TOFHLA. College education was significantly associated with adequate health literacy using either the NVS or S-TOFHLA; however, other results varied between measures. Using NVS, there was a greater likelihood of adequate health literacy with US birth status (AOR 13.8; 95 % CI, 1.99–95.1), >5 years US residency (AOR 7.6; 95 % CI, 1.3–43.1) and higher antibiotic knowledge scores (AOR 1.7; 95 % CI, 1.2–2.4). Using S-TOFHLA, the odds of adequate health literacy increased with access to a regular care provider (AOR 2.6; 95 % CI, 1.2–5.6). Scores consistent with adequate health literacy on the NVS, but not the S-TOFHLA, were associated with correct beliefs regarding antibiotic use for URIs in comparison to scores of participants with inadequate health literacy. Since health literacy levels were low in this population and the risk of viral URI was high during the first few years of life, targeted education to improve health literacy, knowledge, and beliefs about URI and related antibiotic treatment is needed.*

KEYWORDS *Health literacy, Upper respiratory infection (URI), Knowledge of antibiotics, Latinos, Parents*

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In the United States, 90 million people have inadequate levels of health literacy, and racial and ethnic minorities are far more likely to be at or below basic levels in their health literacy skills.[1] Almost half (41 %) of Latinos lack basic health literacy, compared to 24 % of Blacks and 9 % of Whites.[2] Poor health literacy has been described as a stronger predictor of a person's health than age, income, employment status, education level, and race,[3] and the need for improved health literacy is one of the goals set by the national health agenda.[4]

Health literacy requires the skills to gain access to, understand, and use information in ways that promote and maintain health.[5] Research to date has largely relied on measures of general literacy and numeracy to assess health literacy;[6] however, literacy and numeracy skills in the context of understanding health information do not necessarily correlate with health literacy for specific disadvantaged groups.[7] Additionally the correlation between some currently available health literacy instruments has been demonstrated,[8] but these measures have not been compared in certain high risk populations thus precluding identification of the most efficient measure for screening in clinical practice.

The current demographic shift in the United States has resulted in a large number of children living in immigrant families,[9] and evidence suggests that Latino parents with limited English proficiency are more likely to have inadequate health literacy.[10] More specifically, Latino parents have been shown to be at increased risk for poor health literacy regarding upper respiratory infections (URIs) in comparison to non-Latino Whites and Latino parents have been shown to be significantly more likely to expect antibiotic treatment for a child in comparison to non-Hispanic white parents.[11] Nonjudicious use of antibiotics, including antimicrobial treatment of viral URI in pediatric settings, has contributed to the public health threat of antimicrobial resistance.[12] Young children aged 6 months to 3 years have an average of five URIs per year,[13] and lower parental health literacy is associated with poorer health outcomes, most notably for younger children.[14] Hence, the aims of this study were to: (1) describe the influence of health literacy on parental knowledge and attitudes/beliefs surrounding URI care in an immigrant Latino population and 2) examine the correlation between two measures of health literacy, the shortened form of the Short Test of Functional Health Literacy in Adults (S-TOFHLA) and the Newest Vital Sign (NVS) when administered to this particular population.

METHODS

This was part of a larger parent project, the Appropriate Care of Upper Respiratory Infection (ACURI) in Children of Latino Immigrants (RC1 MD004109, National Center on Minority Health and Health Disparities, NIH), evaluating the effectiveness of a tailored educational intervention to improve health literacy levels regarding URIs among Latino households in Early Head Start (EHS)/Head Start (HS) programs. For this study, baseline assessments of parental knowledge, attitudes, and beliefs surrounding care of URI in young children were performed and health literacy levels of parents were measured.

Setting and Participants

Following approval from Columbia University Medical Center's Institutional Review Board, participants were recruited from four EHS programs in Northern Manhattan. The majority of the parents with young children in these EHS locations were Latino, foreign born, and received health care coverage from Medicaid/State

Children's Health Insurance Program (SCHIP). Recruitment of participants was led by four Spanish-speaking research staff who attended EHS parent educational sessions at all four sites and described the ACURI project to parents. Eligibility criteria included being a parent or caregiver with one or more young children ages 0–3 years in any of the four EHS programs.

Measurement of Knowledge and Attitudes

The Knowledge and Attitudes (KA) survey tool was developed by members of the ACURI research team to assess health literacy levels regarding URI. The KA survey tool has been previously used[15] and was adapted from other instruments used in previous community studies.[16–18] The KA survey included 57 close-ended questions assessing knowledge, attitudes, and practices about viral URI and influenza. Seven questions asked participants whether medications commonly used in clinical practice were antibiotics or not. Eight questions asked participants to give an opinion as to whether or not an antibiotic would be needed to treat some common pediatric illnesses including symptoms related to URI such as cough and runny nose, viral throat infections, strep throat, viral throat inflection, influenza, and fever of less than and greater 100 °F. The average time for administration of the survey was approximately 15–20 min.

Measurement of Health Literacy

The two measures of health literacy used in this study were the NVS and the Short Test of Functional Health Literacy Assessment (S-TOFHLA). The S-TOFHLA assesses comprehension of health-related material, including two reading passages and 36 related close items, which requires less than 10 min for administration.[19] The S-TOFHLA total score ranges from 0 to 36. Scores of 23–36 are consistent with adequate health literacy, 17–22 with marginal health literacy, and 0–16 with inadequate health literacy. Internal consistency has been reported as good (Cronbach's alphas for the four numeracy items were 0.68 and 0.97 for the reading comprehension section[19], and it has been validated in Latino populations).[20]

The NVS is a rapid screening test for limited literacy in primary health care settings. The NVS is a nutrition label and includes six questions, requiring 3 min for administration. Answering four or more questions correctly is almost always consistent with adequate literacy, scores of 2–3 suggest the possibility of limited literacy, and scores of 0–1 indicate high likelihood of limited literacy. In general scores of less than 4 suggest the possibility of limited health literacy.[8] The Spanish version of the NVS correlates with the full-length version TOFHLA ($r=0.49$, $p<0.001$); psychometric testing of the NVS demonstrates reliability for both the English (Cronbach's alpha>0.76) and Spanish (Cronbach's alpha$=0.69$) versions.[8] Hence the primary difference between these two health literacy measures is that the S-TOFHLA assesses reading comprehension of health-related material and the NVS focuses more on numeracy and abstract reasoning skills.

Study Procedures

After obtaining informed consent from participants, the ACURI project team scheduled a home visit with eligible participants. The NVS, S-TOFHLA, and KA survey tools were read to participants in the language of their preference, either English or Spanish, and family demographic data were also collected. Data collection was typically performed in one home visit with time to completion

ranging between 50 and 90 min. Participants were not compensated during this phase of the ACURI project.

Variables

Computation of Knowledge and Beliefs Subscales Two composite scores were calculated: knowledge of antibiotics and beliefs regarding the need for antibiotic treatment of URIs. The knowledge score was the combined total score of participant responses to seven selected items from the KA survey tool including recognition or not of each of the following medications as an antibiotic: Motrin, amoxicillin, Tylenol, Vicks, penicillin, Robitussin, and albuterol. Participants received one point for correct responses and 0 points for incorrect responses; 'not sure' selections were also coded as incorrect. The possible range of scores was 0–7, with higher scores indicative of increased knowledge of antibiotics. Seven selected survey items were also used to create a composite score for participant beliefs and attitudes regarding antibiotic use for symptoms of URI/viral illness (e.g., runny nose, cough, and fever). One point was allocated for a 'usually/sometimes' response and 0 points for rarely/never and don't know responses. Scores ranged from 0 to 7, and higher scores indicated greater beliefs in the need for antibiotic treatment of illnesses and symptoms likely to be associated with viral rather than bacterial infection.

The continuous health literacy scores for both the NVS and S-TOFHLA were collapsed into dichotomous variables, inadequate or adequate health literacy. Participants with NVS scores of 0 to 3 were coded as inadequate, and scores of 4 to 6 were coded as adequate health literacy. S-TOFHLA scores of 0 to 22 were categorized as inadequate and scores of 23 to 36 as adequate health literacy. Key independent variables included sociodemographic factors (insurance coverage, education, length of time in US, total weekly hours spent outside the home, and language), access to health care (i.e., having a regular medical provider, regular medical provider with some evening and or weekend hours, and knows how to contact regular medical provider during evenings/weekends), and self-reported health rating.

Statistical Analysis

Correlations between the continuous NVS and S-TOFHLA scores were examined using Spearman's rank correlation coefficient. Pearson's chi-square or Fisher's exact tests were used to examine the relationship between participant health literacy as measured by both S-TOFHLA and NVS scores separately, and birth status, time in US, education, health care coverage, time spent outside the home, having a regular medical provider, knowledge of how to contact medical provider during evening and weekend hours, self rating of English proficiency, language preference of Spanish for speaking with health care provider or reading health/medical instructions, and self rating of health status. Factors found to be significant on bivariate analysis at a p value<0.2 were then included in a multivariable logistic regression, and adjusted odds ratios with 95th percentile confidence intervals were computed.

Mean composite scores for both antibiotic and URI knowledge and beliefs subscales and standard deviations were computed for participants with inadequate/adequate health literacy using both the NVS and S-TOFHLA. Mann–Whitney nonparametric statistical tests were used to examine the relationship between composite antibiotic knowledge and belief subscale scores and binary levels of

health literacy as well as the sociodemographic variables described above. All statistical analyses were performed using SPSS 18.0 (SPSS Inc., Chicago, IL).

RESULTS

Demographic Characteristics

A total of 154 participants were enrolled from the four EHS locations between September 14, 2009 and December 13, 2009, and Table 1 summarizes characteristics of study participants. Participants were predominantly female (98.7 %) and Latino (91.6 %) with a median age of 29 years (range=19–53 years). Although 54 participants of the total sample selected 'other' for race, all but two of these 54 participants further described themselves to be of Latina/Hispanic descent. ACURI participants were primarily born outside the US (89.6 %) but had resided in the US for 5 years or greater (65.6 %). Lack of health care coverage (68.8 %) and level of educational attainment of high school or less (71.5 %) were characteristic of this sample. About one-third of the participants (37.0 %) spent ≥21 h/week outside the home, and all of the children attended an EHS/HS program.

Health Literacy Abilities and Associated Characteristics

Individual health literacy abilities among participants varied when measured by S-TOFHLA or NVS. The median S-TOFHLA score was 29 (range=0–36), consistent with adequate health literacy levels, and the median NVS score was 2 (range=0–6), suggestive of a high likelihood of limited health literacy. Although there was a positive correlation between the S-TOFHLA and NVS, Spearman's rho was equal to 0.51 (p=<0.001) when health literacy levels were dichotomized, and 35.7 % and 83.8 % of participants using S-TOFHLA and NVS, respectively, were rated as having inadequate health literacy. This high correlation was due to almost all of the participants with limited health literacy on S-TOFHLA also having limited health literacy on the NVS and almost all of the participants with adequate literacy scores on the NVS also having adequate literacy on the S-TOFHLA. Nevertheless, the majority of those with adequate literacy scores on the S-TOFHLA were scored as not adequate on NVS, and conversely most of those with inadequate literacy scores on NVS were scored as adequate on S-TOFHLA.

Correlation between Health Literacy Measures Results were similar on both the S-TOFHLA and NVS for many variables; participants with inadequate health literacy on either measure were more likely to have a high school or less education, no regular health care provider, and preferred to read health care instructions in Spanish in comparison to participants with adequate health literacy as measured by both the NVS and S-TOFHLA. Additionally, participants with inadequate health literacy scores on both measures were less likely to report proficiency in English in comparison to those with adequate levels (all p values<0.05) (Table 2).

On the other hand, participants with inadequate health literacy levels on the S-TOFHLA were significantly less likely to report good to excellent health than participants with adequate health literacy, but this association was not observed with the NVS. Participants scoring in the inadequate range for health literacy on the NVS were significantly more likely to have been born outside the US, have lived in the US for less than 5 years, lack health care coverage, and preferred Spanish for speaking with medical providers in comparison to participants with adequate levels

TABLE 1 Socioeconomic characteristics, health literacy abilities and health care interactions among ACURI participants ($N=154$)

	Median (range)	No. (% yes)
Socioeconomic factors		
Age in years	29 (19–53)	
Sex		
Female		152 (98.7)
Male		2 (1.3)
Ethnicity		
Latino		141 (91.6)
Not Latino		11 (7.1)
Prefer no response		2 (1.3)
Race		
White		15 (9.7)
Black		9 (5.8)
American Indian[a]		4 (2.6)
Multiracial		23 (14.9)
Other		54 (35.1)
Prefer no response		16 (10.4)
Don't know		33 (21.4)
Country of birth		
Born inside the US		16 (10.4)
Born outside the US		138 (89.6)
Time in US		
Less than 5 years		37 (24.0)
5 years and greater		101 (65.6)
Born in US		16 (10.4)
Health care coverage		
Insured		48 (31.2)
Not insured		106 (68.8)
Education		
High school/GED or less		110 (71.5)
Some college/college graduate		44 (28.5)
Child attending head start program		154 (100.0)
Weekly hours spent outside home by parent		
10 h and less		51 (33.1)
11–20 h		46 (29.9)
21 h and greater		57 (37.0)
Health literacy abilities		
S-TOFHLA	29 (0–36)	
Inadequate (scores of 0–16)		32 (20.8)
Marginal (scores of 17–22)		23 (14.9)
Adequate (scores of 23–36)		99 (64.3)
NVS	2 (0–6)	
Limited (scores of 0–1)		66 (42.9)
Possibly limited (scores of 2–3)		63 (40.9)
Adequate (scores of 4–6)		25 (16.2)
English proficiency—self-report		
Yes		71 (46.1)
No		83 (53.9)
Access to health care		
Regular medical provider		70 (45.5)
Medical provider open some evenings/weekends ($n=70$)		22 (31.4)
Knows how to contact medical provider evenings/weekends ($n=70$)		25 (35.7)
Health care interactions		
Preferred language for speaking with health care provider		
Spanish[b]		136 (88.3)
English		18 (11.7)
Preferred language for reading health care information		
Spanish		123 (79.9)

TABLE 1 (continued)

	Median (range)	No. (% yes)
English		24 (15.6)
Illiterate		7 (4.5)
Health rating[c]—self-report		
Good to excellent		104 (68.0)
Fair		49 (32.0)
Reported history of illness		
Asthma		5 (3.2)
Non-respiratory chronic illness		18 (11.7)

Denominators vary on some variables due to nonresponse of participant(s)
[a]Mexican but considered American Indian by self-report
[b]Two participants spoke a Mexican dialect (Alisteco and Mixteco but were coded as Spanish)
[c]One participant selected 'don't know' and coded as missing

of health literacy. These differences, however, were not observed when measuring health literacy with the S-TOFHLA (Table 2).

Health Literacy Instruments and Responses on Knowledge and Belief Subscales

Antibiotic Classification Lower mean antibiotic knowledge scores were observed in participants with inadequate health literacy levels on both the NVS and S-TOFHLA in comparison to mean scores of participants with adequate health literacy (Mann–Whitney *U* test, $p<0.01$) (Table 3). For example, for individual items, 56.6 % of those with limited health literacy on NVS reported that Robitussin was an antibiotic compared with 16 % of those with adequate health literacy ($p<0.001$). Similarly, 55 % with limited health literacy and 8 % with adequate literacy reported that Motrin was an antibiotic ($p<0.001$).

Antibiotic Use for URI Families with adequate health literacy on NVS, but not S-TOFHLA, were more likely to report correct beliefs regarding lack of need for antibiotic treatment of URIs in comparison to scores of participants with inadequate health literacy (Mann–Whitney *U* test, $p=0.003$) (Table 3). Participants with adequate health literacy, when compared with those having inadequate health literacy on NVS, were significantly more likely to report that antibiotics were rarely/never indicated for fever of ≤100 °F (88.0 % and 58.1 %, respectively, $p=0.02$), cough (76.0 % and 40.3 %, respectively, $p=0.004$), and runny nose (88.0 % and 57.4 %, respectively, $p=0.015$).

Multivariable Analyses

Using either the NVS or S-TOFHLA, those with some college education had significantly greater odds of having adequate health literacy when compared with respondents with a high school education or less (Table 4). Using NVS, those who were born in or had resided in the US for ≥5 years were significantly more likely to have adequate health literacy and to have higher scores on the composite score for knowledge of antibiotics. Using S-TOFHLA, however, neither of these factors were predictive of adequate health literacy, but those who reported that they had access to a regular medical provider had almost three times greater odds of having adequate health literacy than those without a regular provider (Table 4).

TABLE 2 Characteristics of ACURI sample by health literacy level

	NVS			S-TOFHLA		
	Inadequate health literacy (score = 0–3) (n = 129)	Adequate health literacy (score = 4–6) (n = 25)	P value*	Inadequate health literacy (score = 0–22) (n = 55)	Adequate health literacy (score = 23–36) (n = 99)	P value*
Socioeconomic characteristics						
Born outside the USA	121 (93.8 %)	17 (68.0 %)	**0.001**	52 (94.5 %)	86 (86.9 %)	0.17
Less than 5 years in the USA	35 (27.13 %)	2 (8.0 %)	<**0.001**	11 (20.0 %)	26 (26.3 %)	0.44
High school/GED education or less	103 (79.8 %)	7 (28.0 %)	<**0.001**	48 (87.3 %)	62 (62.6 %)	**0.001**
No health care coverage	95 (73.6 %)	11 (44.0 %)	**0.008**	41 (74.5 %)	65 (65.7 %)	0.28
Spends 21 or more hours outside home per week	45 (34.9 %)	12 (48.0 %)	0.28	21 (38.2 %)	36 (36.4 %)	0.71
Health literacy abilities						
No regular medical provider	77 (59.7 %)	7 (28.0 %)	**0.004**	40 (72.7 %)	44 (44.4 %)	**0.001**
Knows how to contact medical provider evenings/weekends	20 (38.5 %)	5 (27.8 %)	0.57	3 (20.0 %)	22 (40.0 %)	0.23
Medical provider open some evenings	13 (25.0 %)	9 (50.0 %)	0.08	3 (20.0 %)	19 (34.5 %)	0.36
Medical provider open some weekends	14 (26.9 %)	8 (44.4 %)	0.24	5 (33.3 %)	17 (30.9 %)	1.00
Self reported proficiency in English	48 (37.2 %)	23 (92.0 %)	<**0.001**	16 (29.1 %)	55 (55.6 %)	**0.002**
Health care interactions						
Prefers Spanish for speaking with medical provider	120 (93.0 %)	16 (64.0 %)	<**0.001**	51 (92.7 %)	85 (85.9 %)	0.30
Prefers Spanish for reading medical instructions	111 (86.0 %)	12 (48.0 %)	<**0.001**	44 (80.0 %)	79 (79.8 %)	<**0.001**
Health status rating of good to excellent	83 (64.8 %)	21 (84.0 %)	0.06	31 (56.4 %)	73 (74.5 %)	**0.03**

Data are reported as number (%)

Denominators vary on some variables due to nonresponse of participant(s)

Bold Level of significance is 0.05

*Differences between health literacy scores assessed using Pearson's χ^2 test for independence or Fisher's exact two-sided test when cell sizes are <5

TABLE 3 Participant knowledge and beliefs about antibiotics and URIs by health literacy level

	NVS			S-TOFHLA		
	Inadequate health literacy (score = 0–3) (*n* = 129)	Adequate health literacy (score = 4–6) (*n* = 25)	*P* value	Inadequate health literacy (score = 0–22) (*n* = 55)	Adequate health literacy (score = 23–36) (*n* = 99)	*P* value
Mean composite scores (SD)						
Beliefs for antibiotic treatment of URIs	4.12 (SD ± 2.33)	2.68 (SD ± 1.73)	**0.003***	3.94 (SD ± 2.27)	3.86 (SD ± 2.32)	0.864*
Knowledge of antibiotics	3.7 (SD ± 2.24)	5.8 (SD ± 1.21)	**0.000***	3.32 (SD ± 2.08)	4.44 (SD ± 2.25)	**0.002***

Range of beliefs and knowledge composite scores = 0–7
Bold Level of significance is 0.05
*Wilcoxon rank-sum test with mean composite scores and standard deviation

TABLE 4 Predictors of adequate health literacy as measured by the NVS and the S-TOFHLA (*N* = 154)

A. NVS[a]			
	Adjusted odds ratio	95 % CI	*P* value
Length of time in the US			
Born in the US	13.8	1.99–95.1	**0.008**
5 years and more	7.6	1.3–43.1	**0.024**
<5 years[b]			
Education			
College education/college graduate	8.9	2.8–27.8	<**0.001**
≤High school/GED[b]			
Knowledge of antibiotics (score range 0–7)	1.7	1.2–2.4	**0.002**
B. S-TOFHLA[c]			
	Adjusted odds ratio	95 % CI	*P* value
Access to regular medical provider			
Yes	2.6	1.2–5.6	**0.017**
No[b]			
Education			
College education/college graduate	2.9	1.1–8.0	**0.038**
≤High school/GED[b]			

Bold Level of significance is 0.05

[a]Multivariable logistic regression with length of time in US, education, and composite score on knowledge of antibiotics subscale included in the model

[b]Reference group

[c]Multivariable logistic regression with access to regular medical provider, education, and preferred language for reading health care information[*] included in the model

[*]Not statistically significant

DISCUSSION

The findings of this study make several important contributions to the current body of knowledge regarding health literacy. First, we describe the prevalence of inadequate health literacy in a potentially high risk Latino population and demonstrate that health literacy is associated with general knowledge of antibiotics and the need for antibiotic treatment of URIs. We also confirmed a lack of consistency across study variables between two commonly used measures of health literacy in our sample population, the S-TOFHLA and NVS.

It is estimated that one in four or 21 million parents living in the US have limited health literacy skills[21], and poorer literacy and numeracy skills in parents or caregivers may create difficulties in the application of health-related information to the care of their children.[22,23] Latino parents with limited English proficiency are more likely to have inadequate health literacy.[10] Our findings were consistent with this national trend; limited health literacy was observed in the majority of parents when health literacy screening was performed using the NVS and in about one-third of participants with the S-TOFHLA. Not surprisingly, less education was predictive of inadequate health literacy as measured by numeracy (NVS) or reading comprehension (S-TOFHLA). Further, those who had lived in the US for less than 5 years were significantly more likely to have inadequate health literacy as measured by NVS.

Nearly half of those surveyed lacked a regular health care provider for themselves, which is consistent with evidence describing disparities in access to health care among immigrant including Latino populations, in comparison to

US born.[24] Since there was an association in this study between lack of a regular health care provider and limited health literacy, it is possible that increased access to providers may be associated with more accurate knowledge and practices regarding URIs.[25]

Substantial differences existed in classification of health literacy levels between the NVS and S-TOFHLA in this population of Latino parents. Although the NVS has been shown to correlate with the TOFHLA,[8] there were almost twice as many respondents rated as having inadequate health literacy on the NVS as compared with the S-TOFHLA. Similar findings have also been reported in an English-speaking adult population with hypertension.[26] The NVS also requires mathematical calculation and numeracy skills to answer items correctly. Hence the two instruments measure different aspects of health literacy and this needs to be carefully considered when using these measures and/or interpreting health literacy scores. For example, if a complicated medication dosing regimen is prescribed for a young child and the parent's health literacy skills are in doubt, the NVS would be an appropriate screening measure. Yet if the parent is experiencing difficulty understanding preoperative instructions, the S-TOFHLA may be the suitable option. Of note, our results may have differed if the full-length version TOFHLA was used, since it includes 17 numeracy items. Future health literacy research studies with immigrant Latino populations designed to compare the NVS and S-TOFHLA testing a different health outcome may strengthen the evidence from this study, demonstrating the distinctions of each individual measure.

The need for parent education on appropriate antibiotic treatment is supported by prior evidence describing parental misconceptions about the use of antibiotics in children.[27] In addition, knowledge deficits regarding antibiotic use for treatment of viral-related illness has been described in Latino populations.[28] To the best of our knowledge, this is the first study describing a significant relationship between limited health literacy levels and limited knowledge of antibiotics among Latino parents. We also found that beliefs favoring antibiotic treatment of URIs were higher among participants with inadequate health literacy levels. This may be particularly worrisome in an immigrant Latino population. There is evidence that Latinos are more likely to obtain and take antibiotics without a prescription[16,29], since many have immigrated from countries where it is common to buy antibiotics over the counter without prescription. Further, a previous study reported that antibiotics were readily available over-the-counter in small, private delis (bodegas) in upper Manhattan where many participants in this study lived,[30] and most Hispanics residing in upper Manhattan are of Dominican descent. Parents of young children with higher levels of knowledge about antibiotic use for the treatment of URIs were shown to have less antibiotic-seeking behavior in one study[31], and antibiotic overuse is one of the factors contributing to the current problem of antimicrobial resistance.[32]

There were several limitations to this study. Recruitment of participants from EHS/HS child care centers may limit generalizability. Parent education is an integral component of HS, and scores on the knowledge and beliefs about antibiotics scales could have been influenced by health education given at the HS/EHS centers prior to enrollment. Another limitation was that the results describing knowledge and beliefs about antibiotics and health literacy levels may not be relevant to other Latino groups because Latinos are not a homogenous group.[33] The sample size of 154 participants resulted in subgroups with small numbers of participants and may have contributed to wide confidence intervals in the multivariable regression analysis. Finally, as with any self-report survey, responses may be subject to social desirability bias.

CONCLUSIONS

In this study of a primarily Latino population, many of whom had been in the US for less than a decade, one in three had inadequate health literacy as measured by reading comprehension and eight out of ten as measured primarily by numeracy. In addition, a significant relationship between limited health literacy levels and limited knowledge of antibiotics in Latino parents was demonstrated. Considering the risk for URI in young children and potential for nonjudicious use of antibiotics in this population, health care professionals providing care to this population should remain alert to demographic factors related to limited health literacy including educational attainment, length of time living in the US, and having a regular medical provider. Heightened awareness should be followed by the development of targeted educational interventions aimed to improve health literacy regarding URI and related antibiotic treatment.

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