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ORIGINAL PAPER

Improving Care of Upper Respiratory Infections Among Latino Early Head Start Parents

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Abstract Misconceptions about upper respiratory infections (URI) and their treatment are widely held, especially among Latino parents, and are associated with increased health care visits. The Centers for Disease Control and Prevention recommends community based interventions to educate families about URI. We designed a community-based, culturally competent health literacy intervention regarding URI, which was pilot tested with Latino Early Head Start (EHS) parents. In depth interviews were conducted to understand parents' perceptions. A paired-sample Wilcoxon signed rank test was used to assess change in pre-post knowledge/attitudes scores. Changes in care practices are described. Parents were very positive about this education, were open to non-antibiotic URI care, and reported that materials were helpful. Following the intervention, the mean composite knowledge/attitude score increased from 4.1 (total: 10) to 6.6 ($P < .05$). Families also reported improved care practices. EHS sites are promising locations for health literacy interventions regarding URI.

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Background

Children age 6 months to 3 years have on average 3–5 episodes of upper respiratory infections (URI) per year, most occurring during the winter months. Children in daycare or other group activities such as Head Start (HS) and preschool are at highest risk for URI and are also a common source of infection for household contacts [1, 2].

Misconceptions about the causes of URI and antibiotics use for their treatment are widely held [3], including insufficient understanding of antibiotic resistance [2]. Limited health literacy regarding URI, especially as related to knowledge, attitudes and care practices, can lead to increased pediatric emergency department (ED) visits. Younger children are most at risk for being brought to a physician for URI symptoms [4]. In a study by Lee et al, 23% of parents reported they would visit the ED when their child had a cold and 60% would visit their doctor's office [2]. One of the predictors of both ED and ambulatory care use was the belief that antibiotics treat colds. The cost of an ED visit for a URI can be twice as much as an ambulatory visit [5]. Such visits not only add a cost burden to the health care system, but also can lead to inappropriate antibiotic prescribing and subsequent resistance. Studies have shown that during URI visits, a significant number of antibiotic prescriptions are written, especially if parents are expecting them and are unhappy if none are prescribed [3, 6–9].

Latinos are at high risk for poor health literacy in general and about URI specifically. Almost half (41%) of

Latinos lack basic health literacy, compared to 24% of Blacks and 9% of Whites [10]. Latinos, along with Asian and Black parents, have been shown to be more likely to believe antibiotics are necessary for URI and expect one to be prescribed than non-Latino white parents [11]. In one study, Latinos who spoke only Spanish were less knowledgeable about antibiotic resistance than Latinos who spoke English [12]. Latino immigrants also often come from countries where antibiotics are sold over the counter. In addition, some immigrant Latino families do not only seek antibiotics from health care providers, but also bring antibiotics from their native country or buy them over-the-counter within the United States from small local stores, particularly for URI [13]. Among 939 Hondurans surveyed, 55% reported taking an antibiotic for a cold or the flu within the previous 6 months [14].

In addition, Latino families may use home remedies for URI, but they and their providers may not be aware of potential side effects [15]. For example, many common home remedies used to treat URI in this population contain camphor oil that, if ingested or used in large quantities, can cause seizures [16]. Sancochito, a cold medicine sold in Latino botanicas for URI, contains castor oil which can cause diarrhea in young children [17]. According to the National Health Interview Survey (NHIS), 27% of adult Latinos surveyed used complementary/alternative medicine [18].

The Centers for Disease Control and Prevention (CDC) recommend community based culturally appropriate interventions, especially in daycare centers, to educate families about URI and antibiotic resistance [19]. Early Head Start (EHS) is a community-based, federally funded program for low-income families with infants, toddlers and pregnant women. Throughout the United States, nearly 100,000 children 0–3 years old are enrolled in EHS [20]. All states have EHS/Head Start (HS) programs, and 35% of enrollees are Latino. These programs provide comprehensive child development, health, nutrition, and family support services; parent participation is mandated. EHS/HS sites have been shown to be effective venues for educational interventions [21–24]. In one study, HS parents who were provided a reference book and training session to help them care for their child when they were sick with a variety of illnesses, had a 48% reduction in pediatric emergency department visits and a 37.5% reduction in clinic visits from pre to post intervention [25]. Additional interventions are needed to assess the use of EHS sites for health literacy interventions. Therefore, the aim of this study was to describe and conduct a pilot evaluation of the impact of a community-based, culturally competent health literacy intervention regarding appropriate care for URI, specifically focusing on knowledge, attitudes and care practices of a group of Latino EHS parents.

Theoretical Framework

Our implementation and evaluation of a health literacy intervention for URI was guided by the educational and environmental approach of the PRECEDE-PROCEED model, as espoused by Green and Kreuter [26]. PRECEDE-PROCEED integrates the health belief model into a contextual framework, focusing on factors that predispose, reinforce or enable healthy behaviors. Predisposing factors include knowledge, beliefs and opinions. Enabling factors include having the necessary skills, equipment and resources. Reinforcing factors relate to peer support, feedback, and systems in which people function. According to the model, in order to change a person's behavior, it is necessary to change the factors that predispose a person to take a certain action, enable them to take that action and then reinforce the action.

Materials and Methods

In this project, we designed and completed a pilot evaluation of three health literacy educational modules and a URI care kit, using a knowledge, attitudes, and practices survey, telephone reporting, indepth interviews and post-class evaluations. This study was approved by the Institutional Review Board of Columbia University Medical Center.

Study Setting

The project was conducted at the Columbia University EHS located in the Washington Heights community of New York City. Washington Heights is one of the most underserved areas in New York City, the majority of residents are Latino and half are foreign born. Approximately one third of families live below the poverty line [27]. The composition of EHS families differed from the community in that all participants were low-income and a greater proportion were recent immigrants from Central and South America. Almost all families participating in this EHS are Latino. Two EHS classes were selected based on availability of staff. All fifteen parents who were in the selected EHS classes were approached to take part in the evaluation. All participating families were Latino.

Educational Intervention

Researchers and practitioners from the disciplines of pediatrics, nursing, public health, health literacy and early childhood education collaborated to create and evaluate the three education modules (Table 1). The modules were targeted to address the preceding, enabling and reinforcing

Table 1 Topics for educational modules

Module 1	Module 2	Module 3
Differences between virus and bacteria	Understanding over-the-counter (OTC) meds	Preparing for child's medical visit
How to prevent spread of a virus	Age group for OTC meds	Understanding/following dosage instruction
What a parent can do to treat a cold	Reading OTC med labels	Side effects of medicine
When to call the healthcare provider	Comprehending dosage directions	Importance of completing entire treatment
Flu shot importance and misconceptions	Medicine administration	Generic brands and effectiveness
What are antibiotics?	Tracking medication administration	Medical terminology
Effective antibiotic use and bacterial resistance	Home remedies side effects	

factors of care for URI using the Precede-Proceed framework (Fig. 1) and were developed in consultation with the Literacy Assistance Center of New York [28]. The first module, entitled *The Supportive Care for URI/Antibiotic Resistance* was based on the CDC's "Get Smart" Campaign [19], and previously published research studies [29, 30]. It also included providing and training parents to use a URI care kit, similar to ones successfully used in several states, but renamed and reformatted to be culturally appropriate for a Latino population. These kits, named "*botiquíns*", included a variety of items useful when a child had a URI such as nasal saline and bulb suction, digital thermometer, oral syringe and hand sanitizer. The last two modules *OTC Medication Management and Home Remedies*, and *Making Preparations for a Medical Visit and Understanding Prescribed Medications* were originally created by a health literacy program (HEAL) at Columbia University Medical Center that aims to decrease medical errors by caregivers of children 0–5 years old. The HEAL curriculum was informed by a series of focus groups of Latino parents in the community, and is being used at community based health centers as well as in a community based home visitation program. There has not previously been a formal evaluation of the HEAL curriculum.

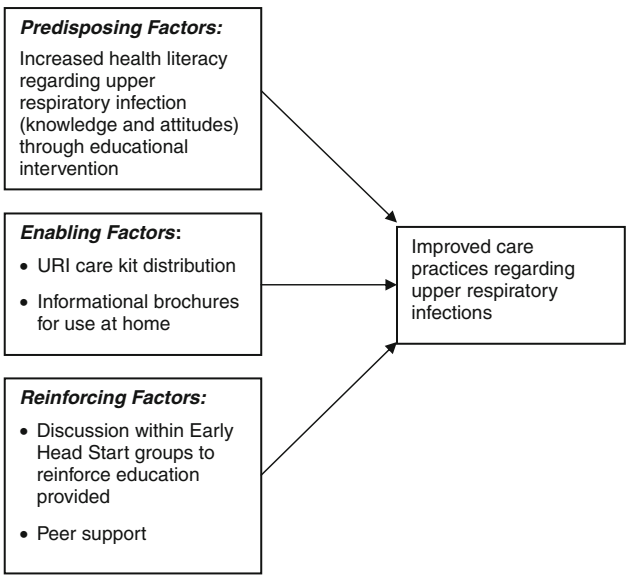

Fig. 1 Theoretical framework of educational intervention

Implementation of Pilot

The three modules were taught to each class individually during class time and took place sequentially once per week over a 3-weeks period. At the beginning of each module, the information from the previous module was reviewed. The modules were presented in English and Spanish and were taught either by a health educator or a second-year pediatric resident with the help of the health educator. The modules, each about 1.5 h, were taught in an interactive format, during which parents were given information, expressed their opinions and experiences, and then were asked questions to verify knowledge.

Evaluation

Changes in parental knowledge and attitudes regarding URI and health literacy level were assessed via a Knowledge, Attitudes, Practices (KAP) instrument, which was verbally administered to parents before the educational modules and again 3 months later, 2 weeks after the last module was taught. The KAP instrument was adapted from three other instruments used in previous community studies [2, 29, 31]. In addition, questions from focus groups with Latino caregivers in Washington Heights regarding home remedies, over-the-counter medications and medication management were included. The instrument was translated into Spanish by a professional translator, and then back-translated to ensure cultural and linguistic equivalency. Content and face validity were ensured by adapting previously tested psychometrically sound instruments [2, 29, 31] and having the final instrument reviewed by five experts in pediatrics, psychology and health literacy who were members of the study team. To control for variations in literacy, the survey was administered by a trained, experienced bilingual research coordinator after informed

Table 2 Composite knowledge/attitude score

	Points
In your opinion	
Do most colds and flu get better by themselves without medicines	1
Can you help your child who is sick with a cold without medicine	1
In your opinion, how often are antibiotics needed to treat each of the following illnesses?	
Viral throat infections[a]	1
Flu[a]	1
Colds[a]	1
Mild fever (less than 100 degrees)[a]	1
Wheezing[a]	1
If I think my child needs an antibiotic, I would go to…[b]	1
When a prescription that your child's doctor gives you says to give the medicine orally, what does that mean?	1
The doctor has given you a prescription for an antibiotic for your 5-months old child. Based on the child's age, what is the best way to measure the medicine	1
Total score	10

[a] Reverse scored. One point was given if respondent did NOT select this option

[b] One point was given if respondent did NOT list any site other than a health care provider

consent was received. The interviews required approximately 20 min to complete. A composite score was calculated from the KAP instrument. Each of 10 questions measuring knowledge and attitudes received a value of either 0 (incorrect) or 1(correct) (Table 2). Items included in the score were selected based on reliability testing using Cronbach's alpha.

Changes in care practices regarding URI were evaluated through practice-related questions in the KAP survey and a series of telephone reports before and after the completion of the educational intervention, which triggered home visits. Parents reported, by telephone, URI symptoms in household members, as well as medications and remedies taken and how they were measured. Parents began reporting prior to the intervention, were asked to call in twice per week, and those who made 75% of calls per month received $25. Upon receiving the phone call, the research coordinator made a home visit within 48 h to physically verify the information. This type of reporting, called Ecological Momentary Assessment (EMA), has been shown to improve reporting by decreasing recall bias and allowing for a real-time assessment of experiences of participants [32–35].

In addition, 33 open-ended post class evaluations with all parents and 17 individual in-depth interviews with a small representative sample of parents were conducted to understand what parents perceived that they learned from the educational sessions and how the education had an impact on their decision making. Both evaluations and interviews were conducted after each educational session. For the in-depth interviews, a semi-structured 25-item open ended question guide was used and parents who participated received $20 per interview. Interviews were conducted by a trained research assistant, and parents and the interviewer had the opportunity to elaborate and explore themes.

Analysis

The post class evaluations and transcribed in-depth individual interviews were hand coded to identify dominant themes. Using SPSS 16.0, (SPSS Inc, Chicago, Ill), frequencies were described and paired-sample Wilcoxon signed rank test was used to assess the changes in mean composite knowledge/attitudes score pre and post completion of the intervention.

Results

Parent Interviews

Qualitative analysis of the post-class evaluations and the transcribed in-depth individual interviews brought forth the following themes (Table 3). *Opinion of parents on educational sessions* revealed that parents wanted longer sessions, liked visual aides and would prefer their children to not be present so that they would be able to better focus on the sessions. The parents felt they were learning vital information they would utilize, wanted the sessions to continue, and liked the *botiquíns*. *New information* included use of medications, difference between viruses and bacteria, proper antibiotic use, use and creation of saline drops, methods of giving medications to children, checking for medication expiration, and home remedies that were not safe. *Intended behavior change* included cleaning hands more frequently, avoidance of antibiotics from any source except health care providers and for anything except suspected bacterial infections, proper medication measurement, avoidance of certain home remedies, and utilization of supportive techniques for children with viral infections such as using bulb suction and nasal saline to help clear the nasal passages. This qualitative analysis revealed that parents were very positive about this type of education, understood why antibiotics are not indicated for viruses, were open to alternative non-antibiotic methods for the supportive care of viral infections, and found it helpful to be given instructions and materials for this type of care.

Table 3 Illustrative quotations from in-depth interviews

Opinion of educational sessions
"Yes, the classes influenced on me because now I know when to use an antibiotic which I didn't know, before."
"I liked what they talked about the medicine, verifying the medicine, how it should be given."
"I liked it a lot especially about recording the time that I give my kids their medicine so that I don't get confused."
New information
"Antibiotics are not for the common cold but for bacteria."
"I feel more comfortable when the doctor does not prescribe any thing, I understand the reason."
"I used to have antibiotic until I felt better. Now, I know that it's important to have them for the amount of time the doctor prescribes."
"How to make saline water. Difference between flu and cold, I always wanted to know about that."
"I learned a little more about how to give the kids their medicine….Difference between virus and bacteria."
Intended behavior change
"I won't get antibiotics from the bodega."
"The botiquín, the saline water and the bulb syringe to extract mucus."
"Making a list of what I will ask the doctor."
"Now, I am more careful, I keep cleaning more, I use more (hand sanitizer). I verify the medicine that I will give my son, what are the ingredients, the side effects, I verify the label. I know that I shouldn't keep the leftover medicines."
"If, for example, my kids have fever I give them Tylenol but if the fever persists, I will take them to the doctor. I like (hand sanitizer) very much to sanitize the hands. I clean everything at home, windows, blankets. We cover our mouth while coughing."

Results of Knowledge, Attitude, Practices Measurement

Of the 15 parents in the participating EHS classes, 11 (73%) consented to take part in the pilot evaluation. Ten of those completed the study. There were no systematic differences between parents who agreed to participate or not. The mean age of children in the group was 20 +/− 7.9 months. All were Latino and spoke primarily Spanish; all but one were born outside the US. Most parents ($n = 9$; 81.8%) had ≤high school education. Two thirds ($n = 7$; 63.6%) of mothers were <25 years old. The average household size was 7 members (range: 4–10).

We assessed the feasibility of the 35-item KAP instrument by calculating the percent of "do-not-know" values and the floor and ceiling effects. The mean percent of "do not know" responses for an individual question was 5% (range 0–33%, median 0%) and there were low floor and ceiling effects, suggesting that parents had an adequate range for their responses. The Cronbach's alpha of the final ten item score was .85.

The intervention had a significant effect on changes in knowledge and attitudes. Following the intervention, the mean score on the composite knowledge/attitude health literacy score increased 61.0%, from 4.1 (total possible: 10) to 6.6 ($P < .05$). In addition, the intervention had an impact on care practices. Before the intervention, six parents reported that the last time their child was sick they sought antibiotics without a prescription instead of, or in addition to, seeing their health care provider. After the intervention, only one parent reported seeking antibiotics elsewhere ($P = .06$). In addition, through telephone reporting and home visits, we confirmed that for the six families for whom household members had an illness before and after the intervention, three inappropriately used over the counter medications before the intervention compared to none post intervention. Likewise, there was one confirmed case of unprescribed antibiotic use pre-intervention and none post. Finally, there were three households in which a member received medications before and after the intervention. In all three, an incorrect measurement tool for medications was used prior to the intervention, and a correct measurement tool was used after the intervention.

Discussion

Healthy People 2010 includes mandates regarding improvement of health literacy [36]. This goal can be met by following the Institute of Medicine's recommendation to incorporate health knowledge and skills into the existing curricula of community programs [37]. This pilot project demonstrated that an educational intervention focusing on health literacy regarding URI could be successful among EHS parents to improve knowledge, attitudes and care practices. While other educational interventions have been successful in increasing knowledge, attitudes and care practices regarding URI [29, 30, 38, 39], they have focused on a predominately white population. This intervention demonstrates that educational interventions regarding URIs could also be successful in economically disadvantaged, minority families, who are at high risk for limited health literacy.

We believe that a key to our pilot educational intervention being successful was its integration into EHS, which ensured ongoing parent participation, and built upon the foundation of trust that exists between families and EHS staff. Health literacy interventions at EHS sites also fit well into the theoretical framework of the PRECEDE-PROCEED Model [26]. The educational modules provided the necessary knowledge base. The provision of the URI care kits gave the parents additional tools to help them act upon the knowledge taught in class. Finally,

discussion within the EHS groups, the peer support of an already established group, and reinforcement by EHS teachers help strengthen the intervention. EHS/HS programs have also been successfully used for teaching other health related topics such as injury prevention and obesity [22, 40].

Our intervention also allowed the inclusion of parents who may not currently be seeking care; this differs from many previous educational interventions that have taken place in primary care offices or pharmacies, missing portions of the population with decreased access to care.

The basic health literacy principles and URI information given in our intervention would be useful for all families of young children, not just Latinos, and the methodology of embedding the intervention in EHS has wide-spread potential. The use of EHS sites also enhances sustainability since such interventions help to meet a number of standard performance indicators. Nearly one million families attend EHS/HS nationwide, therefore successful health literacy interventions are scalable and could have a national impact [20]. Key to sustainability would be training EHS health coordinators to teach the intervention, which would also build capacity in these organizations.

Future studies could test this intervention on a larger scale with EHS/HS parents, and with other populations at risk for limited health literacy, such as others from low income households and/or those with limited English proficiency [10]. It is important for future interventions, though, that the specific content of this curriculum be tailored to the particulars of the target population based on an understanding of the common health beliefs and practices. Future interventions are also needed to determine how long the effects on knowledge, attitudes and care practices will be sustained and whether reinforcement sessions would be needed. Other studies have shown a continued effect at a 6 month time point [25, 29].

Limitations

There are many limitations to this study. First, because it was a feasibility pilot study, the sample size is small, which may have limited statistical significance. Despite this, we feel that the significant pilot results highlight the need for a larger scale study of such a health literacy intervention. In addition, the pre-post non-randomized study design makes it difficult to attribute the observed changes to the intervention itself, suggesting that future studies should use a randomized control design. Furthermore, while this pilot assessed the impact of this intervention on changes in knowledge, attitudes and care practices, changes in care seeking, such as emergency department use, were not assessed.

Conclusion

Early Head Start sites are promising locations for health literacy interventions regarding URI specifically, and likely for health literacy interventions overall. Future interventions should evaluate the use of these sites as key venues for needed health education.

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