Reducing Parental Demand for Antibiotics by Promoting Communication Skills

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ABSTRACT

Antibiotic-resistant strains of bacteria are continuing to emerge as high rates of antibiotic use persist. Children are among the highest users of antibiotics, with parents influencing physician decision-making regarding antibiotic prescription. An intervention based on Social Cognitive Theory (SCT) to reduce parents' expectations for antibiotics in favor of communication with the physician was tested. A randomized factorial design study was conducted testing a communication skills intervention against an information-based intervention, a combined intervention and a control condition. Parents receiving the communication skills intervention reported higher efficacy to communicate with the physician ($p = 0.021$). Interaction between the communication skills and information interventions was observed for specific treatment expectations prior to the visit ($p = 0.049$). The communication skills intervention was protective against antibiotic prescribing ($p = 0.042$). Satisfaction was positively associated with parents' efficacy to communicate ($p = 0.002$) and when an antibiotic was not prescribed ($p = 0.005$).

Interventions using information to reduce antibiotic use may be based on the false assumption that such approaches are sufficient for motivating appropriate health practices. Using demonstrated behavior change approaches to promote communication behaviors by parents might result in the dual benefits of reducing unwarranted antibiotic use and improving satisfaction with the clinic visit.

INTRODUCTION

The link between emerging antibiotic resistance and the overuse of antibiotics is well documented.[1] High rates of antibiotic use persist, with antibiotic resistance continuing to emerge.[2] Overprescribing of antibiotics occurs most frequently in children.[3] Patient expectations regarding antibiotics have been associated with increased likelihood of antibiotics being prescribed.[4,5] Further, when children are the patients, the parents' expectations influence

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the children's treatment. When physicians perceive a parental expectation that an antibiotic is needed for their child with a cough, they are more likely to prescribe an antibiotic with an associated diagnosis of bronchitis.[6]

Parents often lack understanding regarding the appropriate use of antimicrobial therapy for upper respiratory infections.[7] Interventions ameliorating parents' expectations for antibiotics may lead to a reduction in unwarranted antibiotic use. General recommendations for reducing parental demand for antibiotics include educating parents regarding the appropriate use of antibiotics and providing them with guidelines to more successfully communicate with their children's physicians.[8] Successful communication includes helping parents feel that they can successfully manage their child's symptoms (i.e., fever, cough, pain, etc.).

Health behavior-change models have had limited use in the provision of primary care.[9] Typical efforts for addressing health behavior change in primary care settings have been limited to approaches that are based on providing information. The underlying assumption behind these information-based approaches is that the recipient will fully understand the information presented, synthesize it and appropriately relate it to his or her situation and, finally, align their behaviors. Instead, interventions in primary care settings need to go beyond the typical information-based approach by utilizing proven health behavior-change theories to direct health promotional efforts.[10]

Social Cognitive Theory (SCT),[11] including Expectancy-valence[12] and Self-efficacy,[13] provides a useful theoretical framework for addressing parental expectations of antibiotics. In detail, components of Expectancy-valence emphasize the role of outcome expectancies in changing behaviors. Predicting that the likelihood of an individual engaging in a specific behavior is based on both the *expectation* that the outcome will be achieved and the *importance*, or valence, placed on the outcome. For parents seeking care for an ill child, their behaviors may be viewed as a function of the subjective probability that their actions will successfully lead to the desired outcome of resolution of the child's illness and the subjective value they place on the importance of this outcome.[14] Further, as indicated by Self-efficacy, a parent's belief—or efficacy—in his or her ability to perform a behavior is predictive of engaging and persevering in that behavior.

Using these behavioral principles to guide interventions to promote parental communication as the means of acquiring the needed medical care for achieving illness resolution for an ill child can reduce parental expectation for antibiotics.[12,15,16,17] Satisfaction with the clinic visit has been found to be associated with parents' ability to communicate with their child's physician rather than whether an antibiotic is prescribed.[18] Enhancing communication between parents and physicians may jointly reduce unwarranted antibiotic prescribing and increase satisfaction with the clinic visit.

The notion of promoting patient communication is not new. Past studies have looked specifically at promoting patient question asking,[19] expanding patients' involvement in their medical care,[20] and the link between physician-patient interactions and chronic disease outcomes.[21] Results of these studies have been generally favorable in regards to health outcomes and patients' assessment of the medical visit, yet no studies have specifically addressed the issue of antibiotic treatment expectations.

We conducted a study to test a parent-focused intervention based on Expectancy-valence and Self-efficacy theories. The main intent of the tested intervention was to promote more effective interaction between parents and physicians as a means of reducing unwarranted antibiotic prescribing. Specifically, the communication intervention is designed to 1) promote communication by the parent with the physician as the way to determine the best means of resolving the child's illness and 2) promote the parent's efficacy to effectively engage in a communicative dialogue with his or her child's physician. Thus, the ultimate goal is to change parents' expectations for antibiotics, linked with antibiotic-seeking behavior, to expectations for information that will help them best address their children's illnesses, linked with effective communication practices. We tested two main hypotheses: that participation in the intervention will 1) improve parents' self-reported ability to communicate with their child's medical provider and 2) lead to a reduction in parents' expectations for a specific treatment for their child resulting from the clinic visit. Differences regarding antibiotic use and receipt of an antibiotic prescription by study group are explored. A secondary focus of this study regards parents' satisfaction with the clinic visit. To address this focus we also tested the hypotheses that improvement in parents' belief in their ability to communicate with their children's medical providers will lead to improved satisfaction with the clinic visit and that receipt of an antibiotic is not associated with higher satisfaction.

METHODS

Subjects

Two suburban primary care clinics with multiple providers in the Salt Lake City, Utah metropolitan area served as study sites. A trained researcher was present at the clinics during a series of scheduled time blocks from August to December 2000. During these times, clinic intake staff invited parents of eligible patients to participate in the study. Parents were invited to participate if their child was aged 1 to 10, presenting with complaints of ear pain, sore throat, cough, congestion and/or fever, and had not received antibiotic therapy during the previous two weeks.

Eighty parents were enrolled and randomized to one of four intervention conditions, including 1) the intervention to promote parental ability to communicate with the medical provider (or *communication intervention*), 2) an information-based antibiotic education intervention (or *information-only intervention*), 3) a combination of the communication promotion and antibiotic education interventions (or *com-*

Figure 1. Talk to Your Doctor About Your Child's Illness

Questions recommended for parents when meeting with child's physician:

1. What is causing my child's illness?
2. When should I expect my child to feel better?
3. When should I call your office back if my child is not feeling better?
4. What can I do to help my child feel better at home?

bined intervention) and 4) a control condition based on nutrition for children (or *control*).

Interventions Used with Patients

Communication Intervention

Parents who were enrolled in the communication intervention were asked to review four questions to be answered during the clinic visit (Figure 1). These questions were adapted from the *Talk to Your Doctor* approach used in the *Use Antibiotics Wisely* campaign conducted by the Maryland Department of Health and Mental Hygiene, Johns Hopkins University School of Hygiene and Public Health, and the Centers for Disease Control and Prevention (CDC). These questions were designed to enable parents to obtain information about their child's illness during the clinic visit. Based on Expectancy-valence, the researcher stated that the purpose for a clinic visit with the physician was to obtain the necessary information to address the child's illness. Parents were also asked to write any additional questions they had for their child's provider during the clinic visit.

The next step in the intervention was to promote parents' efficacy to be assertive in asking and receiving answers to the recommended questions. Bandura[15] identifies four principle sources from which self-efficacy beliefs are constructed, including: *vicarious experience* (modeling), *enactive mastery experience* (role playing), *verbal persuasion* (verbal feedback from significant others), and *physiological and affective states* (emotional arousal). A short series of role-playing exercises was used to provide *vicarious* and *enactive mastery* experiences. This activity began with the researcher taking on the role of a parent and the parent taking on the role of the physician. The researcher then modeled asking the recommended questions to provide a *vicarious experience* for the parent. Roles were then switched, with the researcher playing the part of the physician and the parent taking on his or her own role creating an *enactive mastery experience*. Following this interaction, the researcher provided specific feedback to the parent regarding positive and negative aspects of the interaction as a means of *verbal persuasion*.

Parents were then asked to describe physician characteristics that they perceived may make it difficult for them to ask the recommended questions. Top responses included physicians who were hurried and those that did all the talking without allowing the parent to influence the interaction. Two to three additional role-playing exercises were conducted with the researcher acting the part of the physician with the difficult characteristics reported by the parents. Following each role-play exercise, specific feedback was given to the parent regarding his or her performance in successfully asking the questions and persisting until the answers were satisfactorily provided.

The final step for the intervention was to address the *physiological and affective state* of the parent. A simple breathing technique of concentrating on three successive, normal breaths was introduced to the parent. The researcher practiced this technique with the parents and directed them to use this exercise when the physician entered the examination room.

Information-only Intervention

Parents randomized to the antibiotic information-based intervention group received educational information about antibiotics, antibiotic resistance, and the link between misusing antibiotics and the emergence of antibiotic resistance. Included in this intervention were the pamphlet *Antibiotics and Your Child*, published by the Centers for Disease Control and Prevention (available at: *http://www.cdc.gov/drugresistance/community//tools.htm*),[22] and a fact sheet about antibiotics use and antibiotic resistance adapted from information obtained from the *Use Antibiotics Wisely* campaign. These materials include educational information for the following topics: bacteria and viruses, resistant bacteria, how bacteria become resistant, when antibiotics are and are not needed, and following recommended instructions if an antibiotic is prescribed.

The researcher introduced the topic of antibiotic resistance and explained to the parent the increasing seriousness of the problem. The pamphlet and antibiotic fact sheet were reviewed in detail. Emphasis was place on the judicious use of antibiotics, with parents encouraged to apply this information to their child's current illness.

Combined Intervention.

To assess potential interaction between the communication and information-only interventions, a combined intervention was included in this study. This intervention initially followed the protocol of the information-only intervention and then, once the parent had been encouraged to use antibiotics for his or her child only when necessary, the researcher transitioned to the communication intervention. Due to the increased length of time needed to administer both interventions, the role-playing exercises were reduced when necessary.

Control: Nutrition for Children Intervention.

A control condition unrelated to antibiotic use or parent-physician communication was included. Child nutrition was the focus of this intervention, which utilized materials from the Food and Drug Administration entitled *TIPS for Using the FOOD GUIDE PYRAMID for Young Children 2 to 6 Years Old*. Nutritional guidelines and ideas

for achieving these guidelines provided in the materials were discussed.

Instrument

Study interventions were designed to be fewer than seven minutes in length. Questionnaires were administered to participating parents before receiving the intervention, following the intervention but prior to seeing the physician, and after the clinic visit was concluded. Study questionnaires were pre-tested with parents who had children of ages similar to those included in the study sample.

In the baseline and post-intervention questionnaires, parents were asked to rate their level of expectation for a specific therapy when visiting the physician. Response options ranged from *almost always* (1) to *rarely* (7). Differences between baseline and post-intervention responses were calculated and used as an indicator of change in general treatment expectation.

At the conclusion of the clinic visit, parents were asked to rate their own ability to ask their child's physician to respond to questions about their child's illness, to take time to explain the illness, and to discuss the appropriateness of treatment options before a treatment decision is made. Parents were also asked to rate their ability to express disagreement with their child's physician. Parents were asked to respond to each of these four questions using 0 (certainly cannot) to 100 (certainly can) scales. Internal consistency of the items was assessed using Cronbach's α. The four items had a high level of internal consistency ($\alpha = 0.89$). Internal consistency was improved when the item regarding the ability of parents to disagree with their child's physician was dropped from the scale ($\alpha = 0.93$).

Included in the final questionnaire was an adapted version of the Short-form Patient Satisfaction Questionnaire, developed by the RAND Corporation. This questionnaire was designed to assess patient satisfaction regarding various aspects of a clinic visit. The purpose of this assessment was to examine whether receipt of an antibiotic was associated with increased satisfaction with the clinic visit by the parent. Items in this questionnaire were altered to refer to a parent's satisfaction with his or her child's care (e.g., 'Those who provide my child's medical care sometimes hurry too much when they treat my child' rather than 'Those who provide my medical care sometimes hurry too much when they treat me'). The following subscales were included in the analysis: *General Satisfaction*, *Technical Quality*, *Interpersonal Manner*, *Communication* and *Time Spent With Doctor*. Internal consistency of these scales ranged from 0.61 to 0.86.

Data Analysis

Data were entered into Microsoft Access 2000 and imported into SPSS 9.0 for Windows for analysis. Descriptive statistics were used to describe the study participants. Demographic variables were compared among the four treatment conditions to identify where statistically significant differences existed. Where appropriate, these variables were included in multivariate analyses of outcomes between groups. Multivariate analyses included factorial two-way analysis of covariance and multivariate logistic regression. Associations between parents' communication efficacy and satisfaction were tested using Spearman's rank-order correlation. The University of Utah Institutional Review Board reviewed and approved this study.

RESULTS

Demographic characteristics of study participants are reported in Table 1. Significant differences existed among study groups in the percent of participating parents who were the primary caregiver for the child visiting the clinic ($p = 0.009$), with marginally significant differences among the percent of parents who were female ($p = 0.087$), the hours per week the primary caregiver worked outside the home ($p = 0.054$), and the hours per week the child was in school or day care ($p = 0.076$).

Communication Efficacy

Results of the comparison between interventions regarding parents' self-reported efficacy to communicate with their child's provider are shown in Table 3. Parents who received the communication intervention, either alone or in conjunction with the antibiotic information intervention, reported a significantly higher sense of efficacy to communicate with their child's provider (p=0.021) than those that did not receive this intervention. The antibiotic information intervention did not demonstrate improvement in parents' communication efficacy ($p = 0.337$). There was no interactive effect between the communication intervention and the antibiotic information intervention ($p = 0.615$).

Expectation for Treatment

Significant main effects for reduction in parents' general expectation of treatment for their child were not observed for either the communication or antibiotic information interventions alone (Table 3). However, a significant interaction effect was present ($p = 0.049$) with the communication intervention, leading to a reduction in expectation for treatment by parents when it was implemented without the antibiotic information intervention (-0.45 versus 0.31) compared to implementation with the antibiotic intervention (-0.10 versus -0.05).

Antibiotic Prescription

Predictors of the final outcome of interest, antibiotic prescription, are included in Table 5. It is notable that the model reported does not control for signs/symptoms or diagnosis, and as such, should be considered suggestive. A significant protective effect is demonstrated for the SCT-based communication intervention (OR = 0.171, $p = 0.042$), with parents' increased anxiousness and decreased coping tending toward an increased likelihood of antibiotic prescription (OR = 1.34, $p = 0.06$ and OR = 1.61, $p = 0.07$, respectively).

Satisfaction with the Clinic Visit

Parents' sense of efficacy to communicate with their child's physician was positively correlated with multiple dimensions of satisfaction with the clinic visit. Significant associations were observed for *General Satisfaction* ($p = 0.002$), *Interpersonal Manner* ($p = 0.010$), and *Time Spent with Doctor* ($p = 0.002$). Satisfaction with the clinic

Table 1. Study Participant Demographics

Intervention Groups					
Topic	Antibiotic Education	Parental Assertion	Combined	Control	*p*
	(n=20)	(n=20)	(n=20)	(n=20)	
Percent of female parents	80	70	100	80	0.087
Percent of parents who are child's primary caregiver	95	70	100	68	0.009
Percent of Caucasian parents	90	95	80	90	0.498
Age—Parent*	30.0 (6.5)	30.2 (6.7)	30.7 (6.4)	32.6 (9.0)	0.673
Age—Child*	3.2 (3.0)	4.6 (3.6)	3.9 (2.2)	3.7 (2.7)	0.545
Hours per week primary caregiver works outside the home*	25.2 (18.5)	26.1 (22.0)	10.7 (16.0)	18.3 (21.6)	0.054
Hours per week child is in school or daycare*	23.1 (15.6)	22.4 (16.2)	12.5 (15.4)	14.4 (15.8)	0.076
Number of children in family*	2.2 (1.2)	2.5 (1.3)	1.9 (0.8)	2.3 (1.3)	0.443

* Mean (Standard Deviation)
** Proportions tested using Pearson's χ^2 test; mean values tested using one-way analysis of variance.

Table 2. Parental Efficacy to Communicate with Child's Physician*

	Mean (S.D.)	N	F(*df*)	*p*
Main Effects				
Communication Assertion	93.47 (8.89)	40	5.600 (1,71)	0.021
No Communication Assertion	86.28 (17.63)	39		
Antibiotic Education	91.19 (11.98)	40	0.935 (1,71)	0.337
No Antibiotic Education	88.62 (16.37)	39		
Interaction Effects			0.225 (1,71)	0.615
Antibiotic Education				
Communication Assertion	95.13 (8.28)	20		
No Communication Assertion	87.25 (13.91)	20		
No Antibiotic Education				
Communication Assertion	91.81 (9.37)	20		
No Communication Assertion	85.26 (21.21)	19		

* Results based on a factorial two-way analysis of covariance. Covariates include: hours per week primary caregiver works outside home, hours per week child spends in school or child care, number of children in family and respondent's age. Due to missing data, one subject in the control condition is not included in this analysis.

visit was also compared between parents whose children received an antibiotic prescription and those that did not. Parents reported that all dimensions of satisfaction were higher when an antibiotic was not prescribed (Table 5).

DISCUSSION

The results of this study demonstrate that information-only approaches to addressing antibiotic overuse are not sufficient, and in some respects may have no bearing on the intended outcome of improving appropriate use. In this study, behavior change theory was used as a basis for designing and implementing an alternate approach to antibiotic reduction. The results reported signify that moving beyond information-based approaches may be warranted for clinic-based interventions directed at patients or parents of patients.

The results reported in Table 2 support the first hypothesis that the described communication intervention leads to

improvement in parents' sense of efficacy for communicating with their child's physician. The improvement was similar whether the communication intervention was administered alone or in conjunction with the information-based intervention. However, use of the communication intervention in the absence of the information-only intervention led to a greater reduction in parents' expectation of specific therapy prior to visiting with the medical provider (Table 3).

The provision of information when working to promote healthy practices is pervasive. The success of such efforts may be greatly enhanced by intervening to improve their skills to engage in the desired behaviors, either directly or indirectly. A general flaw in the common practice in clinic settings of providing information alone may be that the ability of individuals to take information and make the necessary translations into action is generally overestimated. The results of this study support providing more explicit direction regarding behaviors needed to achieve the goals of the educational effort.

One of the primary rationales given for providing antibiotics is that of patient (or parent) satisfaction. The belief is that if an antibiotic is not given when it is expected, the patient will be dissatisfied and seek medical care elsewhere. The results of this study do not support this link. The positive correlation between efficacy to communicate and multiple dimensions of satisfaction with the clinic visit indicate that the interaction with the medical provider may play a substantial role in how satisfied the patient or parent is with the care received. Satisfaction was higher when an antibiotic was not prescribed (Table 5). More investigation is needed to better understand the association between failure to receive an antibiotic and higher satisfaction with the clinic visit.

This study was designed to test whether promoting parental communication efficacy will lead to a reduction of expectation for antibiotics, with trained research personnel administering the interventions. For

Table 3. Change in Parents' Expectation of Treatment from Pre-intervention to Post-intervention*

	Mean (S.D.)	N	F(*df*)	*p*
Main Effects				
Communication Assertion	-0.28 (0.75)	40	2.465 (1,67)	0.121
No Communication Assertion	0.11 (1.39)	35		
Antibiotic Education	-0.08 (0.98)	39	0.272 (1,67)	0.604
No Antibiotic Education	-0.11 (1.24)	36		
Interaction Effects			4.018 (1,67)	0.049
Antibiotic Education				
Communication Assertion	-0.10 (0.85)	20		
No Communication Assertion	-0.05 (1.13)	20		
No Antibiotic Education				
Communication Assertion	-0.45 (0.61)	19		
No Communication Assertion	0.31 (1.66)	16		

*Results based on a factorial two-way analysis of covariance. Covariates include: hours per week primary caregiver works outside home, hours per week child spends in school or child care, number of children in family and respondent's age.
Due to missing data, one subject in the *Communication Intervention* and four subjects in the control condition were not included in this analysis.

Table 4. Multivariable Logistic Regression Model of Antibiotic Prescription*

	Odds Ratio (n=75)	95% Confidence Interval	*p*
Communication Assertion	0.171	0.031, 0.934	0.042
Antibiotic Education	0.398	0.082, 1.924	0.252
Interaction: Communication Assertion x Antibiotic Education	4.146	0.432, 39.810	0.218
Number of Days Child Has Been Ill	0.944	0.822, 1.083	0.408
How Well Parent is Coping With Child's Illness (Negatively Scaled)	1.608	0.958, 2.699	0.073
How Anxious Parent is About Child's Illness	1.335	0.983, 1.812	0.064
Age of Child	0.879	0.711, 1.087	0.233
Respondent's Sex (Female = 1)	6.963	0.727, 66.743	0.092

* Analysis is based on multivariable logistic regression – antibiotic prescription is coded as 1, no antibiotic prescription is coded as '0.' Due to missing data, one subject in the *Communication Intervention* and four subjects in the control condition were not included in this analysis.

Table 5. Parent Satisfaction with Clinic Visit and Whether an Antibiotic was Prescribed

	Was an Antibiotic Prescribed? Yes Mean (S.D.)	No Mean (S.D.)	*t* (*df*)	*p*
General Satisfaction	3.74 (0.83)	4.22 (0.65)	2.868 (76.07)	0.005
Technical Quality	3.50 (0.67)	4.03 (0.62)	3.657 (77.00)	<0.001
Interpersonal Manner	4.01 (0.66)	4.32 (0.51)	2.273 (77.00)	0.026
Communication	3.50 (0.78)	4.04 (0.59)	3.472 (75.51)	0.001
Time Spent with Doctor	3.54 (0.87)	3.86 (0.81)	1.687 (77.00)	0.096

such approaches to be practical, existing clinical personnel will need to provide the information and training. Further, the use of trained research personnel to administer the interventions likely resulted in more strict adherence to the designed interventions than would have occurred using clinic personnel as a routine part of delivering care. Research is needed in order to determine whether the same effects are present when using clinic personnel in the day-to-day clinical context and how to efficiently implement the interventions in such a setting. Also, diagnoses and better evaluation of the appropriateness of antibiotic prescription need to be included in future research in order to better understand the benefit gained by intervention.

Even though assignment was randomized, differences exist between treatment groups. Research is needed to verify that differences in outcomes are due to the study interventions and not the characteristics of the participating parents. Future studies that include larger samples will be better suited to adjust for potentially confounding factors that may have influenced study outcomes.

Items used in study questionnaires did not undergo formal validity and reliability assessments. While the Short-form Patient Satisfaction Questionnaire is a standardized questionnaire, altering the items to focus on the experience of parents visiting medical clinics for their children needs to be evaluated. More research is needed to establish standardized measures consistent with the constructs included in this study, especially regarding expectation of medical treatment during the clinic visit. Research is also needed to better understand the link between antibiotic prescription and satisfaction with the clinic visit, including whether the reported results translate to similar interventions administered by clinic personnel.

CONCLUSIONS

Existing approaches to patient/parent-physician interaction may be based on the false assumption that providing information is sufficient to motivating appropriate health practices. The health promotional approach used in this study moves beyond an information-only based approach that is often the means of providing education in primary care settings. Helping patients or parents to communicate in the clinic setting may provide a substantial improvement in the provision of medical care, including the reduction of unwarranted antibiotic prescribing.

Current practices in primary care settings regarding education generally are limited to providing information to patients, especially in regards to the provision of acute care. The results of this study provide promising evidence that better utilization of theoretically based health promotion will lead to more appropriate care. Linking patient and health education professionals with those in the primary care medical delivery system to better incorporate approaches that will lead to more effective interaction between medical providers and patients is an area that needs further consideration.

The cost of failing to make progress in improving antibiotic prescribing is high. By working with patients and parents to engage in communication behaviors and to seek an interaction-oriented medical consultation rather than a specific treatment, the dual benefits of reducing unwarranted antibiotic use and improved satisfaction with clinical care may be gained. Based on the findings presented, further research is merited, especially regarding development of sound health promotional approaches that can be efficiently and effectively implemented within the primary care delivery system rather than by research study personnel.

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