3-2018

The Impact of Antibiotic Stewardship Education on Parental Care Satisfaction and Follow-up

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Date of Submission: 03/2018

Table of Contents

Abstract

Parental satisfaction with antibiotic stewardship has been investigated extensively in pediatric inpatient settings; however, there has been relatively little research in pediatric outpatient settings. In 2014 upper respiratory infections were the most common infections seen among the general population with children having an average of 3 to 8 viral respiratory illnesses per year and receiving 34.6% of all antibiotic prescriptions. Escalating antibiotic resistance and increased emphasis on patient/parental satisfaction necessitates the exploration of a method to improve antibiotic stewardship while maintaining parental satisfaction. The purpose of this project was to assess parental satisfaction with care and follow-up visits after antibiotic stewardship education was offered and no antibiotic was given for a viral upper respiratory infection (VURI), compared to those parents with no education provided. A convenience sample of 398 parents was interviewed via telephone. Patients were ≤ 8 years of age, diagnosed with a VURI within 7-10 days prior to being surveyed, and did not receive an antibiotic. Inclusion criteria also involved only English speaking parents. Antibiotic stewardship education consisted of an educational pamphlet obtained from the Center for Disease Control and Prevention (CDC). Overall satisfaction was calculated and compared for parents who received additional education and parents who did not receive additional education. Additional inquiries included whether or not an unscheduled follow-up visit occurred. If a follow-up visit was scheduled the use of an antibiotic at that time was assessed. Statistical significance was found, indicating improved parental satisfaction and fewer unscheduled follow-ups with antibiotic stewardship education during the treatment of a VURI with no antibiotic prescription. A low cost, quick and easy intervention has the potential to improve pediatric health care, maintain satisfaction, and protect societal antibiotic effectiveness.

***Keywords**:* Antibiotic resistance, patient education, pediatrics, patient satisfaction

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Introduction and Background

Healthcare faces the challenge of bacteria growing more resistant to traditional and modern antibiotic treatments. Inappropriate prescribing of antibiotics is the leading aspect of concern within this detrimental issue. One causative factor of this problem is excessive prescribing of antibiotics for viral illnesses such as viral upper respiratory infections (VURIs). Antibiotic resistance can be reduced if antibiotics are not used when a viral infection is the likely cause of illness (Palit, 2009). Studies indicate that inappropriate use of antibiotics is associated with increased bacterial resistance. Antimicrobial resistance leads to difficulty curing illnesses caused by bacteria, therefore misuse of antibiotics in pediatric VURIs is of great concern. In 2009, the United States spent $6.5 billion on antibiotics from physician office visits (Get Smart About Antibiotic Resistance, 2015). This indicates a significant issue with financial expenditure on clinic visits in the United States. The risk of creating resistant or untreatable infections, as well as increased financial burden are indicators of the pressure that this issue places on our society.

Upper respiratory infections (URIs) are the most common infections seen among the general population (Lakić, Tadić, Odalović, Tasić, Sabo, & Mećava, 2014). In a study conducted by Matuz et al. (2015) children received 34.6% of all antibiotic prescriptions, which is three times more often than adults. Antibiotic use in children can potentially have harmful effects and is too great a risk unless it is the necessary treatment. Inappropriate antibiotic use can be hazardous to an individual child, to the community, and the nation. For example, taking antibiotics can cause adverse effects such as diarrhea, stomach pain, rash, and nausea (Murray & Amin, 2014). Antibiotic misuse is known to cause resistance within communities and nations.

Concurrently, Healthy People 2020 and the CDC have advocated for antibiotic stewardship at a national level due to the overwhelming increase in resistant bacteria. Antibiotic stewardship is defined as "The optimal selection, dosage, and duration of antimicrobial treatment that results in the best clinical outcome for the treatment or prevention of infection, with minimal toxicity to the patient and minimal impact on subsequent resistance" (Gerding, 2001, p. 403).

Effective methods of improving antibiotic stewardship are of great interest. Mangione-Smith and colleagues (2015) suggest a barrier to appropriate antibiotic prescribing is that providers believe parents are dissatisfied when they feel that they leave the appointment empty-handed. If satisfaction can be maintained without prescribing an antibiotic, antibiotic stewardship can be expanded. A study conducted by Poza and colleagues articulates that giving an individual an antibiotic prescription and instructing to wait to fill it unless symptoms do not improve, results in greater antibiotic use compared to no prescription at all (as cited in CDC, 2017). In the same study, satisfaction levels were the same as if no prescription was given. It is of utmost importance that barriers to antibiotic stewardship are addressed.

Problem Statement

A gap has been identified in the current literature regarding outpatient pediatric parental satisfaction and follow-up visits. Pediatric inpatient antibiotic use and stewardship are heavily studied, however, pediatric outpatient antibiotic use and stewardship lack investigation. Literature exists on prescribers' perceptions of pediatric outpatient antibiotic use and stewardship; however, parent satisfaction and perceptions of follow-ups throughout illnesses has not been explored. The researcher is optimistic that by exploring parents' perceptions, providers will feel more comfortable not prescribing antibiotics when they are not recommended.

Antibiotic resistance has been an increasing issue causing failed treatment and poor prognosis to individuals who experience certain bacterial infection. Due to antibiotic resistance, infections that were once easy to treat are now becoming increasingly more difficult to cure (Hart, 2011). This project has been employed as a method of assessing the barriers to antibiotic stewardship, including parental education and perceived satsifaction.

Purpose/Objectives/Aims

The aim of this project was to assess parental satisfaction with care and follow-up visits after antibiotic stewardship education was offered and no antibiotic was given for a VURI, compared to those parents with no education provided. The results of this study were expected to answer the following question: In parents of children eight years of age and younger, does antibiotic stewardship education improve care satisfaction and unscheduled follow-up? Satisfaction is defined conceptually as the parent's perception of the quality of care and attention during the initial office visit for the illness. There were four objectives of this study. The first objective was to identify the effects of antibiotic stewardship education on parental satisfaction of care. Antibiotic stewardship education was provided to qualifying parents and satisfaction of educated parents was compared to those parents who did not receive education. The second objective was to measure if parental education on antibiotic stewardship affects the rate of follow-up visits. It is important to know if parents are returning to the clinic for unscheduled follow-ups or to other clinics after the initial visit. If education can decrease unscheduled follow-up visits this can further assist in decreasing inappropriate antibiotic use, improve access to care, and decrease unnecessary cost. The third objective was to determine if the child had a follow up visit, was an antibiotic prescribed? If so, what was the reason? Lastly, the fourth objective was to disseminate the findings appropriately. The project leader considered it probable that patient

education, along with quality care, and effective communication would increase parental satisfaction, consequently decreasing antibiotic prescribing for VURIs in children. This study aimed to address parental satisfaction and follow-up visits when education was provided during antibiotic stewardship for VURIs.

Review of Evidence

Antibiotic Resistance

The issue of antibiotic resistance continues to emerge as antibiotics are inappropriately prescribed and utilized. Avoidance of unwarranted antibiotic use will slow bacterial resistance to these medications (Mangione-Smith, Zhou, Robinson, Taylor, Elliott, & Heritage, 2015). In the past, antibiotics more easily treated infections; however, these infections are now more difficult to cure due to resistance from recurrent over-prescribing of antibiotics.

The common cold, viral upper respiratory infections, and acute bronchitis are typical viral illnesses that are self-limiting without the need of antibiotics (Berthiaume, Chernicoff, Kim, Chung, Pang, & Legorreta, 2003). Current practice guidelines recommend treating viral infections with supportive care and to reserve antibiotics for bacterial infections (Marshall, Myers, Nesse, & Short, 2013). It is crucial that prescribers follow these guidelines in order to protect children, communities, and society from untreatable infections and financial strain. If antibiotics are reserved for only bacterial infections then resistance can decrease and antibiotic efficacy will be reserved. Pediatric respiratory illnesses are predominantly viral due to children frequently being in close contact with other children. Treating URIs with antibiotics signifies a gap in quality health care considering the viral etiology. There is a great need to understand how antibiotic stewardship can be improved in the treatment of these illnesses. Antibiotics are known to be ineffective in the treatment of VURIs and are considered inappropriate (Berthiaume,

Chernicoff, Kim, Chung, Pang, & Legorreta, 2003). This leads to increasing antibiotic resistance in community infections and signifies inefficient utilization of medical resources.

Commonality of Viral Infections

Children have an average of three to eight viral respiratory illnesses per year, occurring mainly during fall and winter (Meneghetti, Mosenifar, Brawerman, & Brawerman, 2016). In a study conducted by Hersh, Shapiro, Pavia, & Shah (2011), 70% of antibiotics prescribed at pediatric office visits were for respiratory conditions. An exponential increase in antibiotic resistance is likely if these illnesses are continually treated inappropriately. A century ago, the introduction of antimicrobials brought benefits to healthcare (Sefton, 2002). Those benefits have been threatened after unnecessary and inappropriate use. This issue must be addressed immediately due to the overwhelming number of viral infections in pediatric patients.

Why Providers Prescribe Antibiotics

Providers may prescribe antibiotics for viral infections for numerous reasons; one reason is to maintain patient satisfaction. Lang (1999) and Horwood and associates (2016) propose that clinicians prescribe antibiotics because they believe parents expect it and they aim to maintain satisfaction and retention. A study conducted by Mangione-Smith and colleagues indicates that parents expected antibiotics 50% of the time but only verbally requested them 1% of the time, while providers perceived parents to want antibiotics 34% of the time (as cited in CDC, 2017b). However, satisfaction can be sustained even when antibiotics are not prescribed for viral infections. A study conducted by Mangione-Smith and colleagues (2015) shows that providers often prescribe antibiotics simply because they believe parents are dissatisfied when they feel that they leave the appointment empty-handed. If a parent leaves with a valuable educational tool, confidence in his/her abilities to provide care, and recommendations for supportive therapy

this can help to ease the feeling of leaving with nothing. Therefore, it is necessary to offer providers tools to recommend that will replace antibiotics, in addition to exploring techniques to decrease over-prescribing of antibiotics.

Aside from satisfaction, providers have pointed out other reasons that they prescribe antibiotics when unnecessary. According to Horwood and colleagues (2016), providers insinuate that inappropriate prescribing is due to prognostic uncertainty and non-clinical reasons, while some providers are simply unable to articulate a rationale for antibiotic prescriptions. Grossman and associates (2012) connect this action with pediatricians having insufficient knowledge of the natural history of URIs. Inappropriate antibiotic prescribing is due to prescribers believing that it will save time according to Hare and colleagues (2006) and Lang (1999), however, the study conducted by Hare and colleagues (2006) proved this rationale untrue.

Existing Data and Effect of Education

Education can change the mindset of individuals in many different ways. Numerous studies have shown that clear communication and education for parents about how to report symptoms, reasons for not prescribing antibiotics, and symptom relief treatment have been proven as effective methods to decrease antibiotic prescriptions and maintain patient/parental satisfaction (Goolsby 2007; Harrington, Norling, Witte, Taylor & Andrews, 2007; Mangione-Smith et al., 2015). Specifically, education that includes positive and negative recommendations has been shown to decrease antibiotic prescribing by 85% (Mangione-Smith and colleagues, 2015). Positive recommendations are suggestions of what a parent can do to help a child's symptoms and negative recommendations are the explanations of why antibiotics are an inappropriate choice (Mangione-Smith and colleagues, 2015). Patient satisfaction has been shown to increase when a provider explains why antibiotics are not given, offers

recommendations for symptom management, and gives instructions when to seek further medical care (Sanchez, Fleming-Dutra, Roberts, & Hicks, 2016).

Primary care providers receiving feedback from patients, along with additional provider education, have also shown to impact prescribing rates. Banka et al. (2015) found that real-time feedback to physicians on results of patient surveys, monthly recognition of the leading physician in the surveys, and provider educational conferences increased patient satisfaction. Results of this project will be presented to the participating providers as a way to provide feedback. However, provider education was not included.

The literature is clear that education improves patient satisfaction and compliance; however, no studies have been found that were conducted to assess parental satisfaction and follow-up in a pediatric outpatient clinic. Evidence supports the fact that education for parents/patients reduces antibiotic prescribing (McDonagh, Peterson, Winthrop, Cantor, Holzhammer, Buckley, 2016). Likewise, patient education in the waiting room has been shown to improve patient satisfaction with their education but not with the overall visit (Oermann, Masserang, Maxey, & Lange, 2002). These details were taken into consideration in the development of this project.

Additional information suggests take-home educational videos prior to surgery improves anxiety, saves providers' time, and improves patient satisfaction (Gadler, 2016). With years of studies and research, evidence shows that patient education improves satisfaction and knowledge in the adult care setting. Another study also shows that a provider's technical and interpersonal skill level, along with patient education is associated with patient satisfaction and recommendation of that clinic (Tung & Chang, 2009). These findings indicate a clear need for education in adult care; however, little is known about parental education related to satisfaction

and follow-up in pediatric primary care. This scholarly project explores parents' perceptions, with the intent to eliminate parent satisfaction as a reason for providers to prescribe antibiotics when they are not indicated.

Theoretical Model

The Social Cognitive theory has been selected as the theoretical framework that underpins this project. The theory can be used in multiple ways to promote behavior change through an organized process (Glanz, Burke, & Rimer, 2015). These methods of use include setting small attainable goals, using a formal contract to set specific goals, and monitoring and reinforcing the goals. The Social Cognitive theory is described as a path of behavior change through cognitive patterns, affective experiences, behavioral patterns, and environmental events (Bandura, 1999). Human motivation comes from anticipation and goals for specific outcomes. Self-efficacy is considered to play a pivotal role in the social cognitive theory due to its multiple effects on determinants of change. Bandura explains the Social Cognitive theory in multiple aspects and its application in various forms.

Overview

The Social Cognitive Theory was created in the 1960s as the Social Learning Theory and was later modified to become the Social Cognitive Theory in 1986 (Behavioral Change Models, 2016). Albert Bandura developed this theory as a model that illustrates the causal factors of personal behaviors and change. The model considers the way humans maintain behaviors and the environment in which those behaviors are conducted. Three-way causation with reciprocal effects is the basis of the design that makes up this model (Bandura, 1988).

Concepts and Assumptions

The three main divisions of this theory include cognitive, behavioral, and environmental features. All three divisions are used to guide the framework of the study as parenal satisfaction and follow-up visits are assessed. Cognitive, behavioral, and environmental factors play a role in the need for the study, the education intervention, and expected outcomes. It is assumed that these components are the causal factors of behavior maintenance and change (Behavioral Change Models, 2016). Cognitive, behavioral, and environmental elements are assumed to interact in a reciprocal manner with bidirectional influence on human behavior (Bandura, 1988).

Application

The cognitive, behavioral, and environmental elements of the Social Cognitive Theory will construct the underpinning and support of this project. Cognition, behavior, and environment are considered as factors in antibiotic stewardship, parental satisfaction, and unscheduled follow-up visits. Please see Figure 1 for a diagram of the components of the Social Cognitive Theory. Each division of this theoretical framework will be utilized in relation to this project as illustrated in Figure 2.

Factors that influence education, satisfaction, and follow-up visits include parental knowledge prior to intervention, the current push for patient satisfaction, and parental expectations to leave with a treatment plan. Please see highlighted sections in Figure 2. Additional aspects include parental self-efficacy to treat symptoms and accept education, which affect the outcome of the educational intervention. Areas of concern include, access to care, the cost for unscheduled follow-up visits, and providers' antibiotic stewardship practice, all of which are involved in the utilization of this theory.

It is hypothesized that antibiotic stewardship education will increase parental satisfaction through changed expectations. The educational intervention is expected to alter cognitive factors that determine parental expectations in accordance to the theory in use. Parents often come to a clinic visit expecting to leave with a treatment plan that results in a quick fix. Educated parents can better understand the course of a VURI, the safest treatment options, and expect an appropriate treatment plan, which does not include an antibiotic. Parents who are aware of best practices, risks imposed upon their child with antibiotic use, and healthy treatment options are less likely to leave upset, surprised, or uncomfortable. The project leader believes that educated parents will follow-up less than parents in the control group. Empowered and educated parents have the ability to provide appropriate at-home treatment and the confidence to manage treatment at home rather than making follow-up visits due to questions or concerns. Furthermore, knowledgeable and confident parents will follow-up more appropriately, in-turn, increasing access to care and cutting unnecessary costs. It is proposed that when parents who have received education do schedule a follow-up, the child will need an antibiotic. Increased self-efficacy and transformed expectations allow parents to make proper decisions when a follow-up and an antibiotic are needed, rather than follow-up due to fear or apprehension.

A study conducted by Hieronymus, Combs, Coleman, Ashford, and Wiggins (2016) suggests that women who are at increased risk for gestational diabetes, who receive prenatal education feel more prepared for labor, delivery, and parenting. Another study conducted by Wagner, Pizzimenti, Daniel, Pandya, and Hardigan (2008) indicates that diabetic education along with a highly involved health care team results in optimal diabetes management. The project team posits that the educational intervention in this study will also advance parental comfort levels, appropriate decision-making, and pediatric health management.

Design

The scholarly project was conducted as a quasi-experimental post-test only study. The project was a 2x2 between-subjects design. A convenience sample of providers was recruited along with a convenience sample of eligible parents. A post-test only design was utilized to assess the differences between parental care satisfaction and unscheduled follow-ups of parents who received antibiotic stewardship education and parents who did not receive education. A follow-up visit is defined as a phone call to the clinic, a child returning to the clinic or seeking care at a different office, urgent care center, or emergency department regarding the same illness for a visit that was not previously scheduled. A convenience sample of six providers was recruited with three providers assigned to the intervention group and three providers assigned to the control group. The independent variable was the provision of antibiotic stewardship education. Level of satisfaction and frequency of unscheduled follow-up visits for the same illness were identified as the dependent variables. The project leader hypothesized that parental satisfaction will improve and follow-up visits will decrease in the intervention group. The project was strategically designed to be conducted in a practical manner and produce credible results. To prevent bias or distorted findings, providers were instructed to present education in the same manner to each patient. Also, a script was used during data collection in order for all parents to be surveyed in the same manner. All survey responses were entered into Qualtrics immediately as answers were received. The Institutional Review Board at Belmont University approved the project.

Clinical/Practice Setting

The scholarly project recruitment took place at a pediatric primary care clinic in the Southeast United States from August 7th through November 11th, 2017. The data collection, that

included phone calls, took place at an affiliated clinic due to convenience and cost of travel for the project leader. The clinical site was a pediatric primary care clinic treating newborn through adolescent children for sickness and well child checkups. The clinic has 15 patient rooms, a business office, two nurses' stations, a lab, a divided sick and well waiting area, a newborn waiting room, and an office for providers. The office hours were Monday through Friday 7:00am to 6:00pm, Saturday 7:30am to 12:00pm, and Sunday 2:00pm to 4:00 pm. The study was conducted Monday through Sunday, with data collection on Tuesdays and Fridays. Analysis of the data occurred from January-May 2018.

Project Population

A convenience sampling method was utilized to recruit pediatric primary care providers at the pediatric primary care clinic to provide antibiotic stewardship education at the end of each clinic visit when the child was diagnosed with a VURI. Six providers were recruited, three of which were conveniently assigned to provide education and three who provided no education. A convenience sampling method was also employed to recruit parents of children less than eight years of age who were diagnosed with a VURI and did not receive an antibiotic prescription. Inclusion criteria consisted of parents of children ≤ 8 years of age who could read and speak English, who were diagnosed at the clinic visit with a VURI and did not receive an antibiotic. Exclusion criteria included parents of children >8 years of age, not diagnosed with a VURI, received an antibiotic at the visit, or were non-English speaking. Participants were identified using an electronic medical record generated list, filtered by the visit date, age, provider, and ICD 10 code for VURIs. The maximum number of parents recruited for the project was 400 due to budget and cost of educational pamphlets. The study groups consisted of 198 parents in the educational group and 200 parents not receiving antibiotic stewardship education.

Sources of Data/Instruments/Measurements

Educational pamphlets were obtained from the Center for Disease Control and Prevention's (CDC) program that promoted antibiotic stewardship, known as "Get Smart: Know When Antibiotics Work" (Center for Disease Control and Prevention, 2015). Please see Appendix A. One pamphlet was given to each parent at the clinic visit. Satisfaction was evaluated with The Ambulatory Patient Satisfaction Survey that was utilized by Juli-anne Evangelista and colleagues (2012) and derived from NCR Picker Institute Outpatient Survey. Please see Appendix B. The original survey was developed in 2007 by the Picker Institute and has been modified to assess issues more specific to the outpatient setting (Evangelista et al., 2012). Each item in the survey was developed and content validity was verified through focus groups with a hospital Parent's Advisory Group (PAG) (Evangelista et al., 2012). The tool was tested with a pilot study of 300 families and has been administered annually in primary care since 2007 providing reliable results (Evangelista et al., 2012). Additionally, the project leader asked two questions that assessed patient follow-up. The two questions were as follows:

1. Was there an unscheduled follow-up for this illness within the 7-10 days? If so, was it a phone call to the office, return visit to the office, emergency room visit, or urgent care visit?
2. Has the child received an antibiotic since the initial visit? If so, what was the reason?

Data Analysis

Data collection was conducted using Qualtrics, including gender, age, mean satisfaction scores, follow-up visits in relation to education, and antibiotic prescription after initial visit. Data were analyzed utilizing descriptive statistics. Satisfaction scores were computed. Levines test and a T test were utilized to analyze the relationship between antibiotic stewardship education

and parental satisfaction and between antibiotic stewardship education and unscheduled follow-up for the same illness. See Tables 1-2 for group statistics.

Statistical Analysis

SPSS was used to perform statistical analysis including descriptive analysis, χ^2, and independent t test. It should noted that this clinic has particularly high satisfaction scores which cause the normality to be negatively skewed for both the control and treatment groups. The satisfaction measure was assessed for normality using the Shapiro-Wilk (1965) test; $W(198)= 0.721$, $p < 0.001$ for the treatment group and $W(200)= 0.846$, $p < 0.001$ for control group. The t-test is robust to violations particularly when the group sizes are equal and sample size reaches 200 and is superior to the Wilcoxon test when there are differences in variance (Stonehouse 1998; Gayen 1949; Geary, 1936; Hair, 2006). Overall analysis of the violations to the normality assumption of the t-test indicated that the t-test was the recommended test to use on the data (Lumley, T., Diehr, P., Emerson, S., & Chen, L., 2002; Zimmerman Zumbo, Skovlund D, Fenstad GU, 2001) .

Power was assessed a priori using G*Power to determine a sample size of 128 was required to detect a medium effect size 0.50, $\alpha = 0.05$, power = 0.80 with the independent t test. Post hoc power analysis $\alpha = 0.05$, n(198, 200), determined this study to have a power = 0.80 to detect an effect size of 0.28 (Erdfelder, Faul, & Buchner, 1996).

Results

An independent samples t-test was conducted to compare satisfaction between the control and treatment groups. Levene's test indicates heteroscedasticity $F(200,198)=17.73$, $p<0.001$. There was a significant difference in the control group satisfaction scores ($M=29.47$, $SD=1.63$) and the treatment group satisfaction scores ($M=30.09$, $SD=1.3$) conditions; $t(379.6)=4.24$, $p<$

0.001; d=0.42. These results suggest that our treatment of increasing knowledge on antibiotic stewardship increases satisfaction. Thus, the findings supported the researcher's first assertion.

A chi-square test of independence was performed to examine the relation between groups and follow-up visits. The relation between these variables was significant, $\chi^2(1)=22.12$, $p<0.001$. The control group was 3.53 times more likely to follow-up than the treatment group. Thus, the findings supported the researcher's second assertion.

A chi-square test of independence was performed to examine the relation between prescriptions written and follow-up visits. The relation between these variables was significant, χ^2 Fishers Exact (1)=7.00, p=0.019. The treatment group was 4.57 times more likely to have a prescription written at follow-up than the control group. Thus, the findings supported the researcher's third assertion. Please see Table 3-5.

Discussion

This study found that parental antibiotic stewardship education improves satisfaction with care during VURIs treated with no antibiotics and improved appropriateness of unscheduled patient follow-ups. The findings of this study were consistent with other reports in the literature that parental education improves satisfaction with care. Findings were consistent with the results found by Harrington, Norling, Witte, Taylor, & Andrews (2007) that education increases patient satisfaction. Similarly, Banka et al. (2015) found that physician feedback and surveys improve patient satisfaction. Sanchez, Fleming-DutraRoberts, & Hicks (2016) found that parental satisfaction and self efficacy in providing care for a child can be improved through providing clear explanations, recommendations, instructions, and education. Other studies have found that parental education improves satisfaction with education but does not improve satisfaction with the overall visit (Oermann, Masserang, Maxey, & Lange, 2002). The authors assumed that

educating patients while in the waiting room also helped occupy time and improved satisfaction with wait time. These improvements did impact specific areas of satisfaction but did not improve overall visit satisfaction. This study differed from other studies in several ways. First, face-to-face parental education through pamphlet dispersal was the sole component of education. Second, surveys were only conducted within seven to ten days after the office visit. Also, this study focused only on children eight years of age and younger and only English speaking parents.

Three assumptions were made upon project initiation. The first assumption was that antibiotic stewardship education would increase patient satisfaction through changed expectations. The second assumption was that educated parents will follow-up less than parents in the control group. The third assumption was that when parents who have received education do schedule a follow-up, the child would need an antibiotic. The average satisfaction of the control group was 29.47, whereas the treatment group was 30.09. A modest improvement is noted in satisfaction scores when education was provided. Patients in the control group were 3.53 times more likely to have an unscheduled follow-up compared to the treatment group and patients who received education were 4.57 more likely to receive an antibiotic at their follow-up visit. This indicates that patients in the treatment group followed-up more appropriately and required an antibiotic for an evolved issue after the first visit.

Parental education in pediatric primary care appears to be a promising option for maintaining patient satisfaction and concurrently practicing antibiotic stewardship. Educated parents also followed-up less often and more appropriately when necessary, such as when acute otitis media or pneumonia develops. This key factor increases access to care, decreases unnecessary costs, and maintains safe and satisfying medical care.

Notable strengths for this study include a large sample size of 398 and the utilization of a standardized reliable handout from the CDC. Additionally, the study is much needed due to the heavy burden of antibiotic resistance, patient satisfaction, access to care, and the lack of related literature for pediatric primary care.

Limitations of this study include the utilization of a survey with limited use and validation, a somewhat homogenous sample that lacked racial and ethnic diversity, and previously high satisfaction levels. High satisfaction in the control group indicated that parents were satisfied prior to the intervention. A study conducted by Zolaly (2012), found that parents who were satisfied overall, were not always satisfied in regards to their involvement in their child's care. Considering this, some aspects of satisfaction may have been masked in the survey causing overall satisfaction scores to be difficult to modify. High satisfaction levels for both the control and intervention group are considered a limitation; however, it could also be hypothesized that high overall satisfaction makes even small changes in satisfaction more difficult to ascertain (Chesney, Lindeke, Johnson, Jukkala, & Lynch, 2005). Also, it should be noted that the study lacks generalizability considering that it only involved young children and parents in an outpatient setting, children from one pediatric practice in the southeastern United States, viral upper respiratory infections diagnoses, and only English speaking.

This project offers a unique contribution to the literature in that it studied a specific and simple intervention that can be utilized to keep patients happy with services provided while importantly, reducing antibiotic resistance and increasing access to health care. Further research is needed on how to assess patient satisfaction in more detail. Extensive research is also needed to influence providers to practice antibiotic stewardship for the conservation of effective antibiotics.

Conclusion

Antibiotic resistance weighs heavy on the health and future of society. Patient and parental satisfaction with antibiotic stewardship and education can relieve the burden of overprescribing antibiotics and unnecessary follow-up visits. The findings of this study may easily be put into action in pediatric clinics as a bridge to antibiotic stewardship while maintaining satisfaction of care. The new practices can impact parental outlooks, provider practices, antibiotic resistance, and patient follow-ups. Future large-scale research is needed to generalize the employment of these interventions. Large-scale research in different pediatric outpatient clinics with diverse populations would expand the treatment's applicability to more diverse pediatric populations in numerous pediatric outpatient settings. This low cost, quick and easy intervention has the potential to have positive impacts on health care for children and societal well-being.

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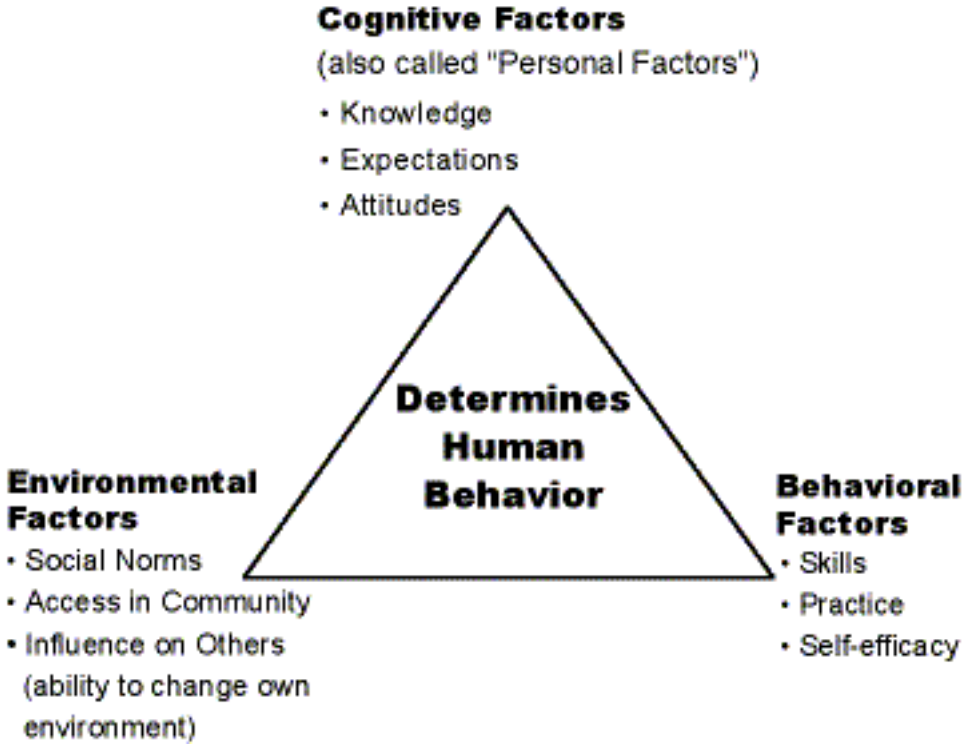
Figure 1. Social Cognitive Theory



(Social cognitive theory - Google Search, n.d)

Figure 2. Theory Application

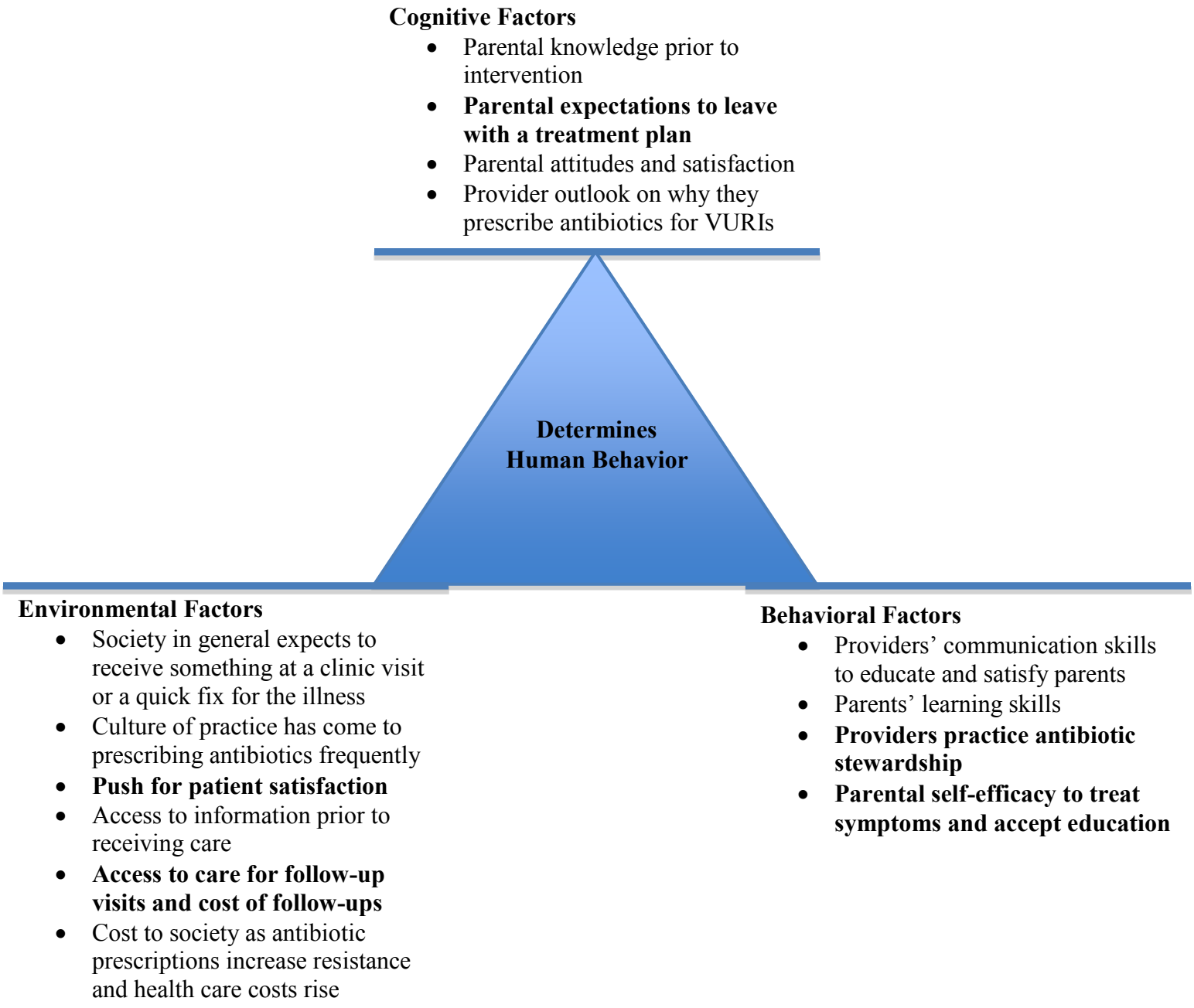


Table 1. Group Statistics

	N	Mean	Std. Deviation
Group 1	198	30.09	1.303
Group 2	200	29.47	1.625

Table 3. Sample descriptive statistics

Demographics	Sample	Control	Treatment	Sig.
N	398(100)	200(50.2)	198(49.75)	
Age	3.23(2.25)	3.20(2.28)	3.26(2.21)	F(1,396)=0.314; p=0.575
Gender				$\chi^2(1)=0.504$; p=0.478
Male	213(53.3)	103(61.3)	109(38.7)	
Female	186(46.7)	97(52.2)	89(47.8)	
Descriptives				
Follow-up	80(20.0)	59(73.8)	21(26.2)	
Prescription (Yes)	15(18.8)	7(11.9)	8(11.2)	

Table 4. Independent t test for satisfaction by group

	Control			Treatment						
	M	SD	n	M	SD	N	T	Df	P	95% CI
Satisfaction	29.47	1.625	200	30.09	1.30	198	4.24	379	<0.001	0.336, 0.916

Table 5. χ^2 test for follow-up and prescriptions written at follow-up

	Follow-up		OR	Sig.
	Yes	No		
Control	59	141	10443/2961 = 3.53	$\chi^2(1) = 22.12$; $p<0.001$
Treatment	21	177	2961/10443 = 0.28	
Follow-ups	Prescription		OR	Sig.
	Yes	No		
Treatment	8	13	416/91 = 4.57	$\chi^2(1) = 7.00$; $p= 0.019$
Control	7	52	91/416 = 0.22	

Appendix A. Ambulatory Patient Satisfaction Survey

Q1
Age

Q2
Gender

- Male
- Female

Q3
How would you rate the overall quality of care you/your child received at this visit?

- Poor
- Fair
- Good
- Very Good
- Excellent

Q4
Did you have confidence and trust in the healthcare provider treating you/your child?

- Yes, completely
- Yes, somewhat
- No

Q5
During your visit, do you believe you/your child received safe medical care?

- Yes, definitely
- Yes, somewhat
- No

Q6
How would you rate the courtesy of your/your child's healthcare provider?

- Poor
- Fair
- Good
- Very good
- Excellent

Q7
Did the healthcare provider give you/your child a chance to ask questions about care?

- ◯ Yes, completely
- ◯ Yes, somewhat
- ◯ No

Q8
When you asked questions, did you get answers you could understand?

- ◯ Yes, always
- ◯ Yes, sometimes
- ◯ No
- ◯ I did not ask questions

Q9
Did you get as much information about your/your child's condition and treatment as you wanted?

- ◯ Yes, definitely
- ◯ Yes, somewhat
- ◯ No

Q10
On a scale from 0 to 5, with 5 being the best experience possible, how would you rate your overall experience during your/your child's visit?

- ◯ 0
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5

Q11
Was there an unscheduled follow-up for this illness within the 7-10 days? If so, was it a phone call to the office, return to the office, ER visit, or urgent care visit?

- ◯ Yes
- ◯ No

Q12
Has the child received an antibiotic since the initial visit? If so, what was the reason?

- ◯ Yes
- ◯ No

Appendix B. CDC Educational Pamphlet

Viruses cause common illnesses that antibiotics CANNOT treat like:

- Colds
- Influenza (the flu)
- Runny noses
- Most coughs
- Most bronchitis
- Most sore throats
- Most sinus infections
- Some ear infections

Viral illnesses, like colds, usually go away without treatment in a week or two. Even many bacterial ear infections go away by themselves. When an antibiotic is not prescribed, ask your child's doctor or pharmacist what can be used to relieve symptoms.

Taking antibiotics for viral illnesses:

- Will NOT cure your child's illness
- Will NOT help your child feel better
- Will NOT keep others from catching your child's illness

Bacteria cause illnesses like strep throat that are often treated successfully with antibiotics.

Remember–there are potential risks when taking any prescription drug. Antibiotics should only be used when your child's doctor determines they are needed.

Antibiotic use can:

- Kill good bacteria in your child's body, which may lead to complications, such as diarrhea or yeast infection.
- Cause a serious allergic reaction that may require hospitalization.
- Result in an antibiotic-resistant infection. Resistant bacteria are stronger and harder to kill. They can stay in your child's body and can cause severe illnesses that cannot be cured with antibiotics. A cure for a resistant infection may require stronger treatment–and possibly a hospital stay.

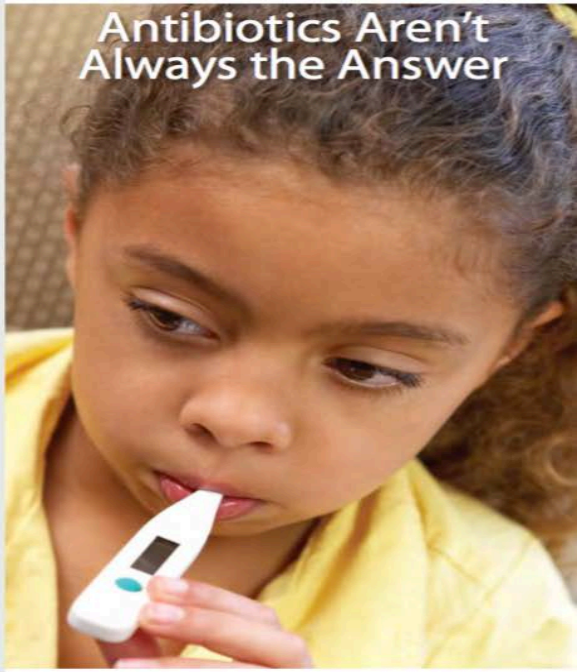
Talk with your child's doctor about the best way to care for your child during this illness.

Get Smart symptom relief tips & tools for your child at: www.cdc.gov/getsmart or call 1-800-CDC-INFO (232-4636)

GET SMART
Know When Antibiotics Work

CS232630-B

Antibiotics Aren't Always the Answer



Most cough and cold illnesses are caused by viruses. ANTIBIOTIC use can only cure bacterial illnesses–not viral illnesses.

CDC

Centers for Disease Control and Prevention
National Center for Immunization and Respiratory Diseases

SIX SIMPLE AND SMART FACTS ABOUT ANTIBIOTIC USE

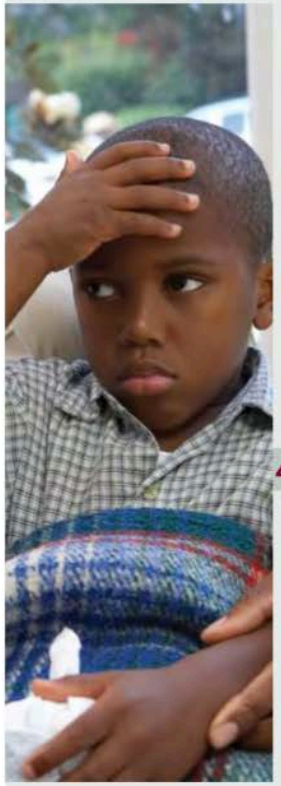
1. Antibiotics are life-saving drugs

Using antibiotics wisely is the best way to preserve their strength for future bacterial illnesses.

2. Antibiotics only treat bacterial infections

If your child has a viral infection like a cold, talk to a doctor or pharmacist about symptom relief. This may include over-the-counter medicine, a humidifier, or warm liquids.

3. Some ear infections DO NOT require an antibiotic

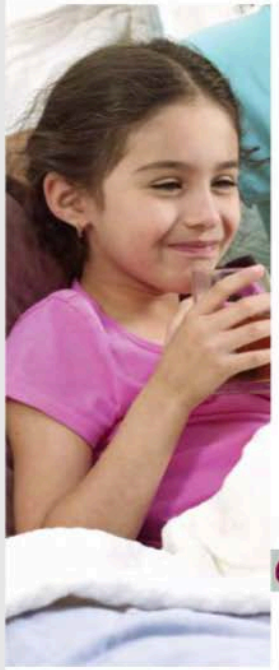


A doctor can determine what kind of ear infection your child has and if antibiotics will help. The doctor may follow expert guidelines to wait for a couple of days before prescribing antibiotics since your child may get better without them.

4. Most sore throats DO NOT require an antibiotic

Only 1 in 5 children seen by a doctor for a sore throat has strep throat, which should be treated with an antibiotic. Your child's doctor can only confirm strep throat by running a test.

5. Green colored mucus is NOT a sign that an antibiotic is needed



As the body's immune system fights off an infection, mucus can change color. This is normal and does not mean your child needs an antibiotic.

6. There are potential risks when taking any prescription drug

Antibiotic use can cause complications, ranging from an upset stomach to a serious allergic reaction. Your child's doctor will weigh the risks and benefits before prescribing an antibiotic.