



**REDUCING PARENTAL EXPECTATIONS FOR ANTIBIOTICS IN CHILDREN  
UNDER TREATMENT FOR  
RESPIRATORY TRACT SYMPTOMS**

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**Abstract**

**Problem:** Overprescription of antibiotics for acute respiratory infections results in increased antimicrobial resistance, and adds a significant cost to the health care.

**Aim:** To see the effectiveness of a semi-structured evaluation tool with one-on-one patient education in reducing patient expectations of antibiotics for the treatment of acute respiratory infections.

**Methods:** A randomized double-blinded controlled trial in 33 children with acute respiratory symptoms and their parents.

**Results:** Antibiotic expectation rates of the study and control group for fever (15,1 % versus 64,3 %), cough (30,3 % versus 60 %), and sore throat (71,8 % versus 93,1 %)

differed significantly ( $p < 0,05$ ). Symptom-based ( $3,35 \pm 1,14$ ) and total behavior scores ( $4,38 \pm 1,70$ ) were significantly higher in the study group than the control group ( $p < 0,05$ ).

**Discussion:** Use of an evaluation tool combined with one-on-one patient education was found successful for changing antibiotic related behavior and reducing antibiotic expectations of parents for acute respiratory infections.

**Key words:** Antibiotics, patient education, respiratory infections.

**Abbreviation: ARIs:** Acute Respiratory Infections

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### **Introduction:**

Acute Respiratory Infections (ARIs) are quite common in primary care (1). Although they are mild, self-limiting infections, they are a primary reason for school and work absence (2). Lack of effective and widely approved tools or guidelines for the management of ARIs causes great differences across practices of physicians.

Antibiotics neither shorten the course of the illness nor prevent secondary bacterial infection (3). Although they are not indicated, antibiotics are widely used in outpatient practice to treat ARIs (4,5). The overuse has been suggested as a contributing factor in the rise of antimicrobial resistance (6) adding a significant cost to the care of these patients (7).

Parental expectations on drug prescription for mild and simple diseases are most likely dependent on their educational level, socio-economic background and cultural and religious background.

Patient education can be defined as a learning experience using a combination of methods such as teaching, counseling and behavior modification techniques, which influence patient's knowledge and health behavior. Health information provided by physicians is a type of patient education valued by patients.

In this study we examined the effectiveness of a semi-structured evaluation tool with one-on-one patient education for reducing parental expectations of antibiotics in the treatment of ARIs.

### **Methods:**

This study was conducted in two stages. In the first stage, children younger than 17 years admitted to Trakya University Family Practice Center with symptoms related to respiratory tract on every Mondays between January and April 2001 were evaluated with a semi-structured examination tool (Figure 1). The same physician practiced all children

on every Mondays through the study period for standardization. The attending physician educated the parents orally about ARIs and antibiotics. Evaluation and education time was limited with 15 minutes; education covering about 5 minutes. The parental education was prepared through American Academy of Family Physicians' recommendations for health information (8).

Two groups were established for the second stage: the study group, consisting of all parents who received the semi-structured education (33 cases) and a control group of parents (31 cases) chosen with electronically randomization from who received ordinary health service from the same center. The two groups were matched with regard to educational status, family income, and number of children. The second stage of the study was conducted  $9 \pm 1,45$  months (min:7; max:11) after the first encounters. A questionnaire was developed to assess the knowledge and the attitudes of the parents with regard to ARIs and antibiotics (Table 1). The questionnaire was applied by a telephone survey. A behavior index was calculated by giving one point to each correct answer in the questionnaire. Symptom-based, diagnosis-based, and total scores were calculated.

Statistical analysis was carried out using  $\chi^2$  and Student's t-test. Statistical significance was defined as  $p < 0,05$ .

### **Results:**

A total of 33 parents for the study group and 31 parents for control group were included in the study sample.

Of the study group, 33.3 % always, 42.4 % sometimes, 18.1% rarely, and 6,0 % never sought care of a physician for ARIs. The same percentages for the control group were 32.3 %, 61.3 %, 19.4 %, and 0 % respectively. There was no statistically significant difference between the two groups regarding health care utilization rates for ARIs ( $p > 0,05$ ).

Antibiotic prescription rates for ARIs were significantly lower in the study group than the control group ( $p=0.01$ ) (Table 2).

**Table 1: Questionnaire to assess the attitudes of the parents**

1. Mother's education	
2. Father's education	
3. Father's job	
4. Family income	
5. Number of children	
6. Do you seek help from a physician when your child has common cold or respiratory infection?  a. always      b. sometimes      c. rarely      d. never	
7. Does your physician prescribe your child antibiotics for common cold or respiratory infection?  a. always      b. sometimes      c. rarely      d. never	
8. If your child has common cold or respiratory infection, do you use antibiotics without consulting your physician?  a. always      b. sometimes      c. rarely      d. never	
9. In which of the following <b>symptoms</b> you think antibiotics are <b>always</b> necessary?  a. cough      b. earache      c. running nose      d. sore throat      e. fever	
10. In which of the following <b>diagnoses</b> you think antibiotics are <b>always</b> necessary?  a. bronchitis      b. middle ear infection      c. tonsillitis      d. sinusitis	

Antibiotic expectation rates for fever, cough, and sore throat were significantly lower in the study group than the control group ( $p < 0.05$ ). Rates for nasal discharge, and diagnoses (bronchitis, pharyngitis, otitis, and sinusitis) were also lower in the study group but there was no statistical significance ( $p > 0.05$ ) (Figure 2).

Symptom-based and total behavior scores were significantly higher in the study group ( $p < 0.01$ ). There was no statistical difference between the two groups regarding diagnosis-based behavior scores ( $p > 0.05$ ) (Table 3).

**Discussion:**

Informing patients about the natural history of symptoms is an effective strategy for reducing re-consultations, benefiting the patient and the physician; it is likely to reduce antibiotic prescriptions and future patient consultation habits (9). We informed parents of children with ARIs about their illness and the treatment. We did it actually and actively; because we believe providing printed education materials is not as successful as one-on-one education. There are two important reasons affecting the use of antibiotics for ARIs: One is patient expectation for antibiotics to treat ARIs, and the other is physicians' preference to prescribe antibiotics when in doubt about the cause of an infection (10). Interventions should be done primarily to change patient expectations for antibiotics and physicians' prescribing behavior.

**Figure 1: Evaluation tool**

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Date: \_\_\_\_\_ Gender: \_\_\_\_\_ Age: \_\_\_\_\_  
Parent education: \_\_\_\_\_ Parent occupation: \_\_\_\_\_

**Symptoms:**  
 fever  
 muscle pain  
 malaise  
 dyspnea  
 chills

red eye  
 nasal discharge  
 nausea  
 hoarseness  
others:.....

earache  
 cough  
 sore throat  
 vomiting

fatigue  
 headache  
 chest pain  
 dizziness

**Physical findings:**  
 rhinorea  
 ulceration  
 anosmia  
 hearing loss  
 bulging of tympanic membrane  
Others:.....

tonsillar hypertrophy  
 wheezing  
 adenopathy  
 rales

hyperemic oropharynx  
 conjunctivitis  
 otorrhea  
 rhonchi

**Tests:**  
CBC: \_\_\_\_\_  
Throat swab: \_\_\_\_\_  
X-ray: \_\_\_\_\_  
Others:.....

**Diagnosis:**  
 viral colds  
 tonsillitis  
Others:.....

AOM  
 sinusitis

pharyngitis  
 bronchitis

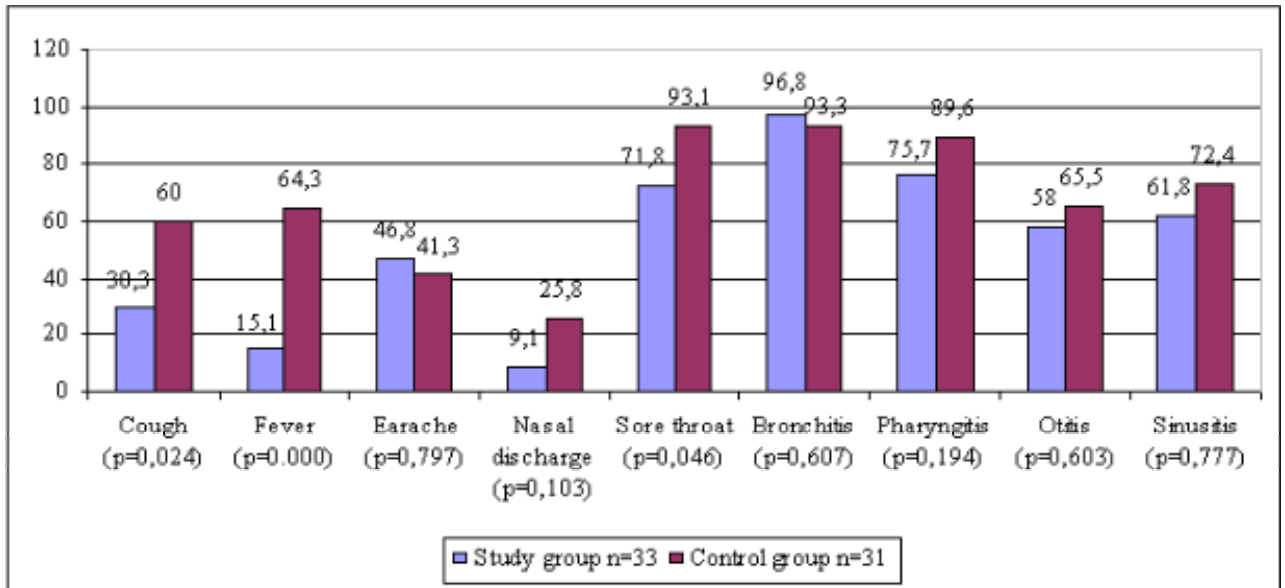
laryngitis  
 pneumonia

**Treatments:**  
Symptomatic \_\_\_\_\_  
Antibiotics (name, dose, duration):.....

**Return visits:**  
Problem: \_\_\_\_\_  
Subjective: \_\_\_\_\_  
Objective: \_\_\_\_\_  
Diagnosis: \_\_\_\_\_  
Treatment: ..... (name, dose, duration for antibiotics)

**Counseling:**.....  
.....  
.....

**Figure 2: Antibiotic expectation rates for ARIs**



**Table 2: Antibiotic prescription rates for ARIs**

%	Always	Sometimes	Rarely	Never
Study group	18,1	30,3	9,1	42,4
Control group	22,6	51,6	19,3	6,5

**Table 3: Symptom-based, diagnosis-based, and total behavior-scores**

	Study group n=33 Mean±SD	Control Group n=31 Mean±SD	p
Symptoms	3,35±1,14	2,08±1,00	0,000
Diagnosis	1,00±1,06	0,64±1,04	0,226
Total	4,38±1,70	2,75±1,67	0,001

Mainous found out that providing physicians with tools for educating patients should be more effective rather than focusing on educating physicians (7). In our study, an evaluation tool was used combined with patient education. The combination seems to have synergy. Gonzales found that combination of patient and clinician interventions could safely reduce antibiotic treatment of adults having acute bronchitis (11). In a similar study, 61% of the subjects expressed their belief that antibiotics are effective for a condition of 5 days duration with cough, sore throat, and clear nasal discharge (12). In this study subjects in both groups did not expect antibiotics to treat nasal discharge, but instead of it, they believed that fever should be treated with antibiotics.

It may be concluded from the findings that the given education was not as effective in maintaining the right behavior of the parents when they faced diagnoses related with ARIs. Parents lack the understanding of the normal presentation of an ARI and the effectiveness of antibiotics as a treatment. Past antibiotic usage may also contribute to inappropriate utilization and expectations for antibiotics. The scaring effect of terms used for respiratory diagnoses may have contributed to these results as well.

Small sample group and typical problems of a telephone survey were limitations of the study.

### **Conclusion:**

Patient and physician education plays the key role in interventions for rational use of antibiotics. Future research should focus on exploring ways of incorporating patient education into clinical practice. The results of this study have positive views for future interventions. We suggest using structured and semi-structured educations for the parents of children with ARIs. It is clear that an education as short as five minutes is effective in changing the behaviors and attitudes of parents, even in a long time manner.

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