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ORIGINAL ARTICLE

An Examination of Parental Knowledge and Attitudes About The Rational Use of Antibiotics

Akılcı Antibiyotik Kullanımına Yönelik Ebeveyn Bilgi ve Tutumlarının İncelenmesi

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ABSTRACT

Aim: Our study aimed to assess the knowledge and attitudes of parents of pediatric patients admitted our pediatrics outpatient clinic about the rational use of antibiotics.
Materials and Methods: We had face-to-face interviews with parents of children. The Scales on Knowledge and Attitudes about the Rational Use of Antibiotics forms and questionnaires were filled out after the interviews.
Results: The mean level of knowledge of the parents about the rational use of antibiotics was found as 55.33±7.77; their attitude level was 66.37±10.02. It was seen that the more parents were educated, the more their knowledge and attitudes improved, but it was also observed that attitude levels fell and knowledge levels were not affected when the parents were older. Of the parents, 15.2% kept antibiotics on hand in the house, 7.2% wished to have antibiotics sold without prescription, and 5.5% gave their children antibiotics without a prescription. Additionally, the level of attitudes toward the rational use of antibiotics were 2.6-fold lower in males and 5.6-fold lower among parents who kept a stock of antibiotics at home.
Conclusion: The high levels of knowledge and attitudes of the participants regarding the rational use of antibiotics constitutes an important finding and is a promising outcome. It is clear that families, especially those parents with low education, fathers, and the elderly need to be more informed on this subject. Multiple-site studies with more participants and controls that can represent a range of different socioeconomic circumstances should continue to be regularly conducted.

Keywords: Parent, Rational Use of Antibiotics, Child

ÖZ

Amaç: Pediatrik yaş grubu antibiyotik kullanımın en sık olduğu dönemlerdendir. Çalışmamızda pediatri polikliniğine başvuran hastaların ebeveynlerinin akılcı antibiyotik kullanımı ile ilgili bilgi ve tutumlarının değerlendirilmesi amaçlanmıştır.
Gereç ve Yöntem: Kesitsel olan çalışmamızda Ankara Şehir Hastanesi Çocuk Sağlığı ve Hastalıkları Kliniğinde Kasım ve Aralık 2021 aylarında hastanemiz Genel Pediatri polikliniklerine başvurmuş olan 0-18 yaş çocukların ile yüz yüze görüşülerek ölçek ve anket formları doldurulmuştur.
Bulgular: Ebeveynlerin akılcı antibiyotik kullanımına yönelik ortalama bilgi düzeyleri 55.33±7.77, tutum düzeyleri 66.37±10.02 olarak bulundu. Eğitim düzeyi arttıkça bilgi düzeyi ve tutumun arttığı, yaş arttıkça ise bilgi düzeyi etkilenmeksizin tutumun azaldığı gösterildi. Ebeveynlerin %15.2'sinin evde yedek antibiyotik bulundurduğu, %7.2'sinin antibiyotiklerin reçetesiz satılmasını istediği, %5.5'inin çocuklarına reçetesiz antibiyotik verdiği saptandı. Ek olarak akılcı antibiyotik kullanımına yönelik tutumda erkek cinsiyette 2.6 kat ve evde yedek antibiyotik bulunduran ebeveynlerde 5.6 kat düşüklük saptandı.
Sonuç: Katılımcıların akılcı antibiyotik kullanımına yönelik ortalama bilgi ve tutum düzeylerinin yüksek olması önemli bir bulgu ve olumlu bir gelişmedir. Ancak %15.2 gibi bir katılımcının evde yedek antibiyotik bulunduruyor olması dikkat çekicidir. Ailelerin, özellikle düşük eğitim seviyesine sahip olanların, babaların ve yaşlıların bu konuda daha fazla bilgilendirilmeye ihtiyacı olduğu görülmektedir. Çok merkezli, değişik sosyoekonomik durumları temsil edebilecek, daha fazla katılımcının dâhil edildiği düzenli kontrol çalışmalarına devam edilmelidir.

Anahtar Sözcükler: Ebeveyn, Akılcı Antibiyotik Kullanımı, Çocuk

Background

The rational use of antibiotics is instrumental in countering bacterial resistance, in allowing the provision of healthcare at the highest quality and reducing health expenditure. The inappropriate use of antibiotics can cause, among other issues, a rise in antibiotic resistance, increase the costs of healthcare services, and lead to adverse effects (1,2). Studies carried out in recent years however, have shown that in many cases where antibiotic treatment is not required or narrow-spectrum antibiotic treatment would be appropriate, there is a steady increase in the issue of prescriptions for wide spectrum antibiotics (3–5). The World Health Organization (WHO) has developed a series of principles governing the rational use of antibiotics in order to prevent their inappropriate and widespread use. The organization has defined the rational use of antibiotics as "the effective use of those antibiotics that have the greatest therapeutic effect, produce the least adverse effects and the lowest level of resistance (6). In Turkey, the Rational Use of Antibiotics Program initiated by the Ministry of Health in 2003 brought forth the practice of requiring the approval of an infectious diseases specialist for antibiotics used at the hospitals, which targeted a reduction is the use of wide spectrum

antibiotics. Under the recommendation of the WHO regarding reducing the high rates of antibiotic use among ambulatory patients, Turkey adopted a program that was implemented over the period 2014-2017. The over-the-counter use of antibiotics was prohibited in 2015 and public service announcements and informative campaigns were launched to bring down the use of antibiotics. It was observed that these efforts led to a 25% drop in prescribed antibiotics, which had been representing 35% of all medications prescribed by doctors. Daily antibiotic usage dropped from 42.2 doses per day per 1000 patients in 2011 to 40.4 doses per day per 1000 patients in 2014, and then to 35.25 doses per day per 1000 patients in 2017 (7).

Childhood is the time when antibiotics are most frequently taken. Although the upper respiratory tract infections (URTI) commonly seen in pediatric cases are frequently caused by viruses, studies have shown that antibiotics are widely used in the treatment of URTI's.(8–10) One of the reasons antibiotics are overly used is in response to parental requests and their desire to make use of antibiotics based on their previous experiences. Besides this, another important health issue is that parents will start antibiotic treatment without the advice of a physician. There are variations in the way parents will have their child take antibiotics depending upon socioeconomic status, level of education, previous experiences with illness, and knowledge about antibiotics. This is why it is of importance that families are informed about this matter (11–14).

To ensure the rational use of antibiotics in Turkey, existing programs, regulations and efforts must be steadily enhanced in order to achieve effective control over this issue in the coming years. Regular and close monitoring of the antibiotic use of in- and outpatients at the hospitals and of the knowledge and attitudes of parents toward the rational use of antibiotics are important parameters that must be considered if the desired result is to be achieved in the context of the rational use of antibiotics. It was for this reason that our study aimed to assess the knowledge and attitudes of parents of pediatric patients presenting at our pediatrics outpatient clinic about the rational use of antibiotics.

Materials and Methods

Our study was conducted at the Ankara City Hospital's Pediatric Clinic during November and December 2021. The study group consisted of the parents of children aged 0-18 who had presented at our hospital's General Pediatrics outpatient clinic. Face-to-face discussions were held with the parents who volunteered to participate in the research and the relevant questionnaires were filled out. Only one parent was included for each patient in the study. The parents of those patients who needed to take antibiotics frequently for a chronic illness, those with immunodeficiency, patients monitored for a malignancy, those taking prophylactic antibiotics, those with a language problem that precluded easy communication, and those parents who did not agree to participate in the research were excluded.

The parents were asked to respond to a questionnaire containing 13 items on their sociodemographic features and to a scale containing 30 questions on knowledge and attitudes towards the rational use of antibiotics. The questionnaire queried the parents' demographic data, their socioeconomic status, whether they or their children had any chronic illness and what medications they took, the medications they gave their children, the use of unprescribed medications, and whether they were in the habit of keeping spare antibiotics on hand. The Scales on Knowledge and Attitudes about the Rational Use of Antibiotics were developed by Çelebi et al. Their Cronbach alpha coefficients were calculated as 0.87 and 0.89, respectively (15). The scale was shown to be valid and reliable. Possible scores on the knowledge about the rational use of antibiotics scale ranged from 14-70, while scale scores on attitudes toward the rational use of antibiotics ranged from 16-80. It was seen that the higher the scores, the better was the level of knowledge and the more positive were the attitudes.

The Statistical Package for the Social Sciences (SPSS), version 23.0, (IBM Corp., Armonk, NY) was used to analyze the data. Descriptive statistics (including frequencies and means) for all variables were calculated. The results were expressed in terms of mean ± standard deviation, median and range (smallest value–largest value), and number (%) depending on whether the data were parametric or not. The Kolmogorov–Smirnov test was used to examine whether the numerical variables showed normal distribution. Quantitative data were compared using the $\chi 2$ test. The Mann-Whitney U-test investigated differences between the two independent groups in terms of binary variables. The Kruskal-Wallis test was used for comparisons of more than one independent group. Spearman's correlation coefficient was used to determine whether there were significant relationships between binary variables. The level of statistical significance was established as $p<0.05$.

The study conformed with the principles of the Declaration of Helsinki and was approved by the Republic of Turkey Ministry of Health and the Institutional Review Board of the Children's Hospital of the Ankara City Hospital (Issue No:E2-21-1143).

Results

Of the 545 parents participating in the study, 52.1% (n=284) were women, 47.9% (n=261) were men. The mean age of the study group was 42.1±10.21 years. Descriptive features of the participants are displayed in Table 1. The scale indicated that the parents' mean level of knowledge about the rational use of antibiotics was 55.33±7.77 and that their attitudes were measured as at a level of 66.37±10.02. While the mothers' level of knowledge was 55.79±8.08 and their attitudes was measured as 68.33±9.71, the fathers'

level of knowledge was 54.81±8.08 and their attitudes was measured as 64.23±9.94. A significant difference was found between the parents' levels of knowledge about the rational use of antibiotics (p=0.031) and their attitude levels (p<0.001). A statistically significant positive correlation was found between the participants' levels of knowledge and attitudes (r = 0,53, p < 0.001); as the level of knowledge increased, it was seen that attitudes toward the rational use of antibiotics also showed a positive increase. At the same time, the analysis of the correlation showed that as educational level increased, so did the levels of knowledge (r = 0,093, p =0.03) and attitudes (r = 0,19, p < 0.001); the level of knowledge however did not change with increased age, but attitude levels declined (r = -0,145, p =0.001). No difference was seen between attitude and knowledge levels in terms of economic status and social security (p>0.05, each). Again, no difference was seen between attitude and knowledge levels in terms of the presence of a chronic disease in either parent or child or in terms of the regular use of medications (p>0.05, each). There was also no difference between attitude and knowledge levels in terms of number of children in the family or having more than one child (p>0.05, each).

It was observed that 15.2% of the parents kept spare antibiotics at home and that levels of knowledge (p=0.001) and attitudes (p<0.001) about the rational use of antibiotics in this group were significantly lower than in the other parents. It was additionally seen that 7.2% of the parents wanted antibiotics to be available without a prescription and that levels of knowledge (p=0.048) and attitudes (p<0.001) about the rational use of antibiotics in this group were significantly lower than in the other parents. It was also found that 5.5% of the parents gave their child unprescribed antibiotics and that levels of knowledge (p=0.004) and attitudes (p<0.001) about the rational use of antibiotics in this group were significantly lower than in the other parents.

While 28.1% of the participants did not give their child any medication without a prescription, it was found that the most common off-the-counter agents administered were antipyretics (35.8%), vitamins (18.3%) and pain relievers (17.4%). No difference was found between parents who administered prescribed medications and those who gave their children medications without a prescription in terms of their levels of knowledge and attitudes about the rational use of antibiotics (p>0.05). When parents were queried as to how they determined an antibiotic should be used, 0.4% said they followed the recommendations of a pharmacist, 9.2% said they administered antibiotics for 5-10 days, 13.2% revealed that they stopped the antibiotic when they saw improvement, 16% said they administered the antibiotic until the box was emptied. And 61.3% said they followed doctor's orders. The group of parents who said they stopped the antibiotic when they saw improvement and the group who said they administered the antibiotic for a period of 5-10 days displayed significantly lower levels of knowledge and attitudes about the rational use of antibiotics compared to the other groups of parents (p<0.001, each).

Logistic regression analysis was performed on the results from the knowledge and attitude scale; scores below the mean indicated insufficient, scores above the mean indicated sufficient knowledge and attitude levels. We found that the level of knowledge of parents who kept antibiotics in stock at home was 2.15-fold lower (OR = 2.157, 95% CI 1.33–3.50, p =0.013). Additionally, the level of attitudes toward the rational use of antibiotics was 2.6-fold lower (OR = 2.61, 95% CI 1.81–3.76, p<0.001) in males and 5.6-fold lower among parents who kept a stock of antibiotics at home (OR = 2.61, 95% CI 3.08–10.43, p<0.001).

Table 1. The participants' demographic, social and descriptive features (n:545)

	n (%)	
Parent		
Mother	284 (52.1%)	
Father	261 (47.9%)	
Age (Years)(Mean±SD)	42.1±10.21	
Mother	39.41±9.07	
Father	45.17±10.54	
Monthly income		
Less than expenditure	71 (13.0%)	
Equal to expenditure	328 (60.2%)	
More than expenditure	146 (26.8%)	
Parental education		
Primary school	50 (9.1%)	
High school	90 (16.5%)	
University	405 (74.3%)	
Keeping spare antibiotics at home	83 (15.2%)	
Wanting antibiotics to be available without a prescription	39 (7.2%)	
Giving their children unprescribed antibiotics	30 (5.5%)	
Level of knowledge about the rational use of antibiotics	55.33±7.77	
Mother	55.79±8.08	
Father	54.81±8.08	p=0.031
Level of attitude about the rational use of antibiotics	66.37±10.02	
Mother	68.33±9.71	
Father	64.23±9.94	p<0.001

Discussion

The rational use of antibiotics plays a vital role in preventing bacterial resistance, providing healthcare at the highest quality, and reducing healthcare costs. As in all parts of the world, efforts and work to ensure the rational use of antibiotics are steadily increasing in Turkey. Field studies must continue in order to assess the effectiveness of these efforts and programs must be implemented to protect whatever gains have been achieved in this context so that more progress can be made. Our study, which was carried out with a valid and reliable scale and encompassed a broad group of participants, contributes to the literature by holding a mirror to the current situation and to problems that must be resolved.

The knowledge parents have about the rational use of antibiotics is one of the most important factors that impact patterns of antibiotic intake. In a study by Pan et al., it was found that parents with a low level of knowledge about the use of antibiotics had high percentages of asking doctors for antibiotics and of indiscriminately using antibiotics (14). In the cohort study by You et al., the authors found that individuals with sufficient knowledge about the use of antibiotics exhibited appropriate attitudes and behavior with regard to this matter (16). In the systematic review by Arvelo et al., it was shown that parents' knowledge about the use of antibiotics was one of the most crucial parameters in the rational use of these drugs (4). In our study too, we found that as the level of knowledge increased, parents' attitudes toward the rational use of antibiotics improved. In the light of the data in the literature and based on our own findings, it can be said that one of the most important changeable risk factors with regard to the rational use of antibiotics is parental knowledge levels. Consequently, it is of vital importance that parents are appropriately informed at primary care or pediatric visits or on social platforms.

A study by Korkut et al. revealed that mothers were more aware of the issue of administering antibiotics (17). In their study, Wang et al. reported that mothers' perceptions and attitudes toward the use of antibiotics were better than fathers' (18). In our study as well, mothers' knowledge and attitude scores were higher compared to fathers. We believe that this might be due to the fact that mothers take more responsibility in providing care and fathers spend less time on this compared to mothers.

The literature reveals a significant correlation between parents' education and the rational use of antibiotics. It has been shown that parents with lesser education, those living in the rural areas and in less-developed countries have low knowledge and attitude scores (19–22). In our study, we observed that although a large part of the parents had a high school or university education, a correlation was still found between education and the rational use of antibiotics; we saw that as education levels increased, knowledge and attitude scores regarding the rational use of antibiotics increased. This suggests that parents with a higher level of education also have a higher level of health literacy, know better how to access the right information, and have more skills in researching health matters. Consequently, we believe in the importance of informing and educating low educated parents about the rational use of antibiotics in the clinical setting.

It was reported in a study by Rouusounidis et al. that parents' knowledge about the rational use of antibiotics increased the older they were and that this was related to the anxiety younger parents felt about their children running a temperature (23). Kuloğlu et al. however did not find a correlation between parental age and knowledge and attitudes about the rational use of antibiotics (24). In the study by Alrafiaah et al., the authors showed that as age increased, knowledge and attitude levels about the use of antibiotic decreased (25). Vinker et al. demonstrated in their study that the knowledge and attitudes about the rational use of antibiotics was at a higher level in older rather than younger parents (10). In our study, we noted that knowledge levels did not increase with age but that attitude scores decreased. It is our belief that the variable relationships between age and the rational use of antibiotics found in the literature stems from the fact that age is not an independent risk factor for the rational use of antibiotics but that variables such as education, the level of knowledge and health literacy have a direct impact on this issue.

One of the most significant indicators of the rational use of antibiotics is whether antibiotics are taken without a prescription, a practice that varies from country to country and also shows variation in Turkey. A study conducted in Malaysia revealed that the rate for this practice in that country is 5.5% while it is 10% in Greece, 6% in Cyprus and 18% in the United States (4,8,23,26). A 2013 study in Turkey showed that the rate of taking antibiotics without a prescription is 8.1%; a study conducted in 2019 indicated a rate of 4.5% (27,28). We found a slight rate of 5.5% in our study, which showed that parents' knowledge and attitude scores about the rational use of antibiotics was significantly low. However, it was seen that 7.2% of the parents wanted antibiotics to be available without a prescription and that levels of knowledge and attitudes about the rational use of antibiotics in this group were significantly lower than in other parents. We found at the same time that the medications to be most commonly administered without a prescription were antipyretics, vitamins and pain relievers. No difference was found between parents who administered prescribed medications and those who gave their children medications without a prescription in terms of their levels of knowledge and attitudes about the rational use of antibiotics. The finding that the use of antibiotics without a prescription was at a low level can be attributed to the national action plan initiated by the Ministry of Health in 2014 that prohibited the sale

of antibiotics without a prescription. At the same time however, despite the prohibition regarding the sale of antibiotics without a prescription, we find it striking that this is a practice that is still favored by some parents, albeit a small number, who somehow find a way of procuring and administering the drugs.

Indeed, some parents are in the habit of keeping antibiotics in stock at home in order to start their children off on them when they are ill and come down with a fever. A study conducted in Spain indicated that 37% of families kept spare antibiotics on hand (29). It was reported in a study carried out in China that about 63.1% of 11,000 participants kept spare antibiotics at home.(30). Varying rates such as 21.5%, 6.9% and 4.5% for this have been reported in some studies in Turkey (27,28,31). We observed in our study that 15.2% of the parents kept spare antibiotics at home and levels of knowledge and attitudes about the rational use of antibiotics in this group were significantly lower than in the other parents. The low rate of keeping antibiotics on hand, we believe, can be associated with the prohibition on selling antibiotics without a prescription. On the other hand, the higher rate of using antibiotics without a prescription, we think, can be attributed to the habit of keeping antibiotics on hand at home.

One of the indications of the rational use of antibiotics is how long an antibiotic is used. In our study, about 60% of the participants used antibiotics according to doctor's orders while 40% used them on the recommendation of a pharmacist, used them for 5-10 days, stopped the antibiotic when improvement was observed, or used them until the box was emptied. It is for this reason that it is of vital importance that clinicians educate parents about how long prescribed antibiotics should be used.

To conclude, it can be said that the high mean scores of knowledge and attitudes about the rational use of antibiotics in the participating group is a significant finding and a positive outcome of the study. It is however striking to observe that as much as 15.2% of the participants keep spare antibiotics in the house. It is clear that families, especially those parents with low education, fathers, and the elderly need to be more informed on this subject. Multiple-site studies with more participants and controls that can represent a range of different socioeconomic circumstances should continue to be regularly conducted.

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Conflicts of interest

All authors significantly contributed the work, have approved the final manuscript and takes full responsibility for the manuscript. The authors have indicated they have no conflicts of interest relevant to this article to disclose.

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