Full Length Research Paper

Knowledge and behavior of the pediatricians on rational use of antibiotics

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This study was performed between June 17 - 20, 2009, in order to examine knowledge, behavior and the attitudes of pediatricians, who attended the 45th Turkish Congress of Pediatrics in Cappadocia, Turkey, about rational use of antibiotics and to investigate any affecting factors. This was a descriptive study that evaluated the pediatricians' theory about rational use of antibiotics. The survey sheet used in the study was developed by the researchers in light of information in the literature. The 77.3% of the participating physicians indicated that they did not resort to antibiotics when facing flu or common cold themselves. The rate that does not approve the antibiotic prophylaxis in upper or lower respiratory infections and the urinary system infections for an otherwise healthy individual is 65.6%. When prescribing antibiotics, 89.8% indicated that they would see the patient first, 78.1% indicated that they were prescribing according to patient's clinical condition, 71.1% reported that they paid attention to the indication appropriateness and 67.2% indicated that they would take culture samples for microbiological examination. With the increasing work experience, there is also increase in picking the answer that suggests "use of the third generation cephalosporins should be restricted to cases whose culture positivity had been proven" (p<0.05). Those with the answer "when prescribing antibiotics, I pay attention to the patient's clinical condition" are the highest among physicians who were employed by private sector (p<0.05). A further study is suggested at this point, aiming to find out underlying reasons. Considering that this topic, the rational use of antibiotics, is being used in various symposiums and scientific activities in recent years, this study suggests we should keep paying the same attention on this scientific matter. At least, carrying out in-service trainings is suggested. Also suggested could be conducting similar researches on the fields other than pediatrics.

Key words: Antibiotics, rational use, pediatricians.

INTRODUCTION

Antibiotics are among the most important discoveries of the past century (Karabay, 2009). World Health Organization has defined the use of rational medication as "providing medication to individuals easily, at the lowest prices and for the most suitable dosages and periods according to clinical findings and personal characteristics of individuals" (Baytemür, 2005; Özdemir, 2010).

The effective medication groups must be listed and among these medications the most suitable antibiotic must be selected from the point of its effectiveness, safety, suitability and cost effectiveness (Baytemür, 2005). However this flow of action does not work in all cases (Baytemür, 2005; Canli et al., 2009).

Antibiotics are in the list of most frequently used medication in most countries. Similarly in Turkey, antibiotics are placed on the top in terms of the average per capita medication with a ratio of 17 - 19% (Canli et al., 2009; Özdemir, 2010). The frequency of antibiotics usage in Turkey for in-patients is over 30%. This ratio increases over 50% for intensive care units (Özgüneş, 2005). In Turkey, antibiotic treatment is prescribed too frequently (Çelen et al., 2005; Şardan, 2005; Akan, 2006; Çanli et al., 2009). In a study it is stated that antibiotics are being prescribed to significant portion of the patients

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who apply to clinics (15 - 48%) and only 2 - 2.5% of those prescribed medication was based on culture results (Canli et al., 2009).

Despite the effort, numerous studies report that inappropriate use of antibiotics reached up to 60% (30 - 50% in average). The studies covering childhood era are limited (Bal, 2005).

A significant part of the antibiotic applications are empirical treatments. In our country this ratio is above 78% (Özgüneş, 2005). One third of the antibiotics are used today against the respiratory tract infections. 75% of the antibiotics prescribed at the Primary healthcare are against Acute Otitis Media (AOM); sinusitis, bronchitis, tonsillitis pharyngitis, and other upper respiratory tract infections (Canli et al., 2009) which are not specific. In the recent years it is revealed in studies that most of the acute respiratory tract infections are viral based, further it is reported that the antibiotics did not affect the duration / symptoms / intensity of the illness and they did not avoid the development of any secondary infections (Canli et al., 2009). Antibacterial resistance has increased in the last 20 years as a global issue. Increase in the sickness, death and health-care costs are of the social effects (Özdemir, 2010).

To this extent, this study was performed to examine the knowledge and behavior of the pediatricians about the rational antibiotics use and study its social and demographical aspects.

MATERIALS AND METHODS

This study was performed between 17 - 20 June, 2009, in order to examine knowledge, behavior and attitude of the pediatricians who had attended to the 45th Turkish Congress of Pediatrics in Cappadocia (38°39′30″N, 34°51′13″E), Turkey, as active physicians still prescribing and practically coming from various regions of the country, on the rational use of antibiotics, as well as to investigate affecting factors.

A survey form including 36 questions was used in data collection. It was prepared by use of relevant literature; it included 10 socio-demographics questions and the rest was aiming to find out the knowledge and implementations that the pediatricians had regarding rational use of antibiotics on their patients (Table 1) (Işık, 1990; Glover, 2000; Houghton, 2002; Perk, 2002; Baytemür, 2005; Ergönül, 2005; Şardan, 2005; Yilmaz and Arman, 2005; Canli et al., 2009; Devrim et al., 2009). The preliminary application of the survey was applied on 10 pediatricians. This evaluation was kept out of the scope of study. Only the survey forms which had been completely filled were taken into consideration. Ethical consent was obtained from the Ethical Board of Çukurova University for this research. The data were evaluated by using chi-square test and the statistic pack software, SPSS for Windows 15.0. Statistical consultancy service was benefited while evaluating the data.

FINDINGS

128 physicians attended the survey and 45 (35.2%) were males 83 (64.8%) were women. The average ages was a 38.59 ± 10.38 year (minimum: 25, maximun: 67). The

participants stated their social security as follows: State Retirement Fund 91 (71.1%); Social Security Organization for the Self-employed 10 (7.8%), Social Security Institution 24 (18.8%), and 3 (2.3%) for private health insurance.

3 of the participants were professor doctors, 6 were associate professors; 4 were assistant professor doctors, 5 of them were faculty members, 87 were specialist doctors, and 23 were research assistants. The Universities they had been graduated were Istanbul University (two medicine schools combined) 39 (30.4%), Ege University 13 (10.2%), Ankara University 12 (9.4%), Hacettepe University 9 (7.0%), Dokuz Eylül University 6 (4.7%), Çukurova University 6 (4.7%), Marmara University 5 (3.9%), Gazi University 5 (3.9%), Dicle University 5 (3.9%) and others 28 (21.9%).

They have indicated their work places as follows: 53 (39.8%) were working for the state, 39 (27.3%) were working for universities and 35 (25.8%) were working for private hospitals. Their declaration about their own economical condition produced results as follows: 2 (1.6%) very good, 67 (52.3%) good, 56 (43.8%) average and 3(2.3%) poor.

To the following are the answers given to a multiple choice question where the purpose of antibiotic prescripttion was asked: empirical 113 (88.3%), causal 105 (82.0%), microbiologic test results 18 (14.1%) and those who filled in "other" are 3 (2.3%).

They were asked what they had observed most significantly when prescribing antibiotics to their patients. The answers to the question in which they could mark one more than one option the answers were mostly like I should see the patient (89.8%), it should be according to the consultation from the infection control specialist if the antibiotics use will exceed three days (80.5%), depending on the clinical state of the patient (78.1%) I would prescribe. Additionally, the answers were like: I observe the medication from the point of its suitability to the indication (71.1%), I would get a microbiological examination from the suspected focus on the patient (67.2%) and I observe the efficacy of the medication (66.4%) (Table 2).

The answers from the participants in the research to the question if they would start antibiotics treatment when the patient is suspected to suffer nosocomial infections, were yes by 103 (80.5%) and no by 16 (12.5%), and 9 (7.0%) withdrew to answer. To the question if the use of the third generation cephalosporins should only be in the cases when the positivity of the culture is approved, 54 (42.2%) answered yes, 74 (57.8%) answered no. To the question which were the most demanded microbiological examination at the institution where they worked (the question which was arranged to be answered by marking more than one optional answers) the answers were as follows: 103 (80.5%) urine culture, 49 (38.3%) individual hemoculture; 27 (21.1%) individual throat culture, 1 (0.8%) individual immune florescent techniques, 1(0.8%) individual peripheral smear, urine, 1 (0.8%) individual

Table 1. Survey form aiming to find the knowledge and behavior of pediatricians regarding to rational use of antibiotics.

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1. Your gender   (   ) male   (   ) female
2. Your age (please specify)............................
3. Social Security coverage (   ) Yes   (   ) No
   (   ) State Retirement Fund   (   ) S.S. Org. for Artisans and the Self-employed   (   ) The S.S. Institution
   (   ) Private health insurance
4. Your occupation...
5. Please indicate for how long you have been working………………………...
6. Please indicate your graduate school...............................
7. Please indicate your area of expertise...
8. Specify your title (if any)……...
9. Your work place is
   (   ) University   (   ) State hospital   (   ) The SSI   (   ) Private sector   (   ) University and private office ( ) Primary Healthcare   (   ) Other (please specify)…………………………
10. How is your economic condition according to you?
   (   ) Very good   (   ) Good   (   ) Middle class   (   ) Poor   (   ) Very poor
11. Do you happen to consider that you might have been neglecting your own health even though you are in the health sector?
(   ) Yes   (   ) No   (   ) Sometimes
12. Do you use antibiotics yourself in the cases you have flue or common cold?
(   ) Yes   (   ) No   (   ) Sometimes
13. Do the drug presentations and promotions influence you?
(   ) Yes   (   ) No   (   ) Sometimes
14. What should be the reason for issuing antibiotic treatment?
  (   ) Empiric   (   ) Causal   (   ) Prophylactic   (   ) Microbiological test result
  (   ) Other (please specify)…………………………………………………
15. Do you start antibiotic treatment in cases where nosocomial infections are suspected?
(   ) Yes   (   ) No
16. Please mark those that you consider to be an important issue while prescribing antibiotics to your patients.
   (   ) I should definitely see the patient
   (   ) if patient stays in hospital
   (   ) other medication patient is currently using
   (   ) patient's allergic susceptibility
   (   ) patient's clinical condition
   (   ) microbiological examination of the suspected tissue (via direct preparation and cultivation)
   (   ) consulting to an infectious diseases specialist
   (   ) whether patient has a current / chronicle disease
   (   ) age of patient
   (   ) gender of patient
   (   ) characteristics of the policlinic patient was admitted
   (   ) indication suitability
   (   ) whether patient had been a long-observed / previously known one
   (   ) waiting for two days
   (   ) antibiotic dosage range
   (   ) suitability of antibiotic dosages
   (   ) I wait for two days by observing patient's liquid intake, suggesting to rest, taking natural substances and applying symptomatic treatment if necessary
   (   ) according to the information I had received from drug vendors
   (   ) by looking at up-to-date drug catalogues
   (   ) consulting a colleague
   (   ) cost of drug
   (   ) effectiveness of drug
   (   ) if use of antibiotics would exceed three days, then, according to consultation with an infection control specialist
   (   ) Other (please specify)………………………………………………………………………………..

Table 1. Cont.

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17. Is the statement "the use of third generation cephalosporins should be only applied to proven cases with culture positivity" correct?

    ( ) Yes   ( ) No

18. Please specify what microbiological examinations you are asked most frequently where you are working?

    ( ) Hemoculture   ( ) Immunofluorescence technique   ( ) Urine culture

    ( ) Other (please specify)………………………………………………………………………..

19. Do you agree with the statement "use of antibiotics should be made very carefully if there is hypotension, hypoxemia, or insufficient blood flow on kidneys"?

    ( ) I agree   ( ) I disagree

20. Do you agree with the statement "Once antibiotic medication is decided, the use of administration, its dosage and the period should be determined according to the condition of infant / newborn and to the characteristics of microorganism"?

    ( ) I agree   ( ) I disagree

21. Please state your opinion about the prophylactic antibiotic medication in surgical clinics.

    ( ) I agree   ( ) I disagree   ( ) Sometimes it can be necessary

22. The statement "antibiotic prophylaxis at upper respiratory tract infections, lower respiratory tract infections, and urinary tract infections for a healthy individual" is…

    ( ) Correct   ( ) Incorrect

    And the reason is………………………………………………………………………………………

23. The statement "Because of the limitations regarding to use of medication during febrile neutropenia, sepsis and urgent cases, as mentioned in the Guide of Controlled Use of Antibiotics, I do not get involved in the application" is

    ( ) Correct   ( ) Incorrect

    And the reason is………………………………………………………………………………………

24. "The most significant damage antibiotics cause in the body is that they mess with the digestive system by breaking apart the natural inside mechanisms." Is this statement correct?

    ( ) Yes, it is.   ( ) No, it isnot.

25. "The physician should be depending on scientific, objective, and unbiased sources, but completely independent from any other factors during a decision making process." Is this statement correct?

    ( ) Yes, it is.   ( ) No, it isnot.

    And the reason is………………………………………………………………………………………

26. "The antibiotics should be taken in different forms, such as oral, rectal, enteral, topical, etc. depending on the place and severity of the infection." Is this statement correct?

    ( ) Yes, it is.   ( ) No, it isnot.

27. Is the statement "The decisions regarding clinical antibiotic use should be supervised" correct?

    ( ) Yes, it is.   ( ) No, it isnot.

    And the reason is………………………………………………………………………………………

28. "The use of antibiotics for self-confidence rather than asepsis – antisepsis should be limited." Do you agree with this?

    ( ) I agree   ( ) I disagree   ( ) I partially agree.

    And the reason is………………………………………………………………………………………

29. "Implementation of the 'medical files' also for outpatients, and questioning of the over-antibiotic liberty of our physicians through scanning of the files are necessary." Do you agree with his statement?

    ( ) I agree   ( ) I disagree

    And the reason is………………………………………………………………………………………

30. "Antibiotic prescriptions should be monitored on the mainframe, and restrictions should be imposed upon the physician & clinic when necessary." How do you evaluate this statement?

    ( ) Correct   ( ) Incorrect

    And the reason is………………………………………………………………………………………

31. "It should be taught that some illnesses did not require systemic antibiotic treatment." Do you agree with this statement?

    ( ) I agree   ( ) I disagree   ( ) I partially agree.

    And the reason is………………………………………………………………………………………

32. Specify the three antibiotics you prescribed most frequently along with their intervals:

        1………………………………………………………………………………..

        2……………………………………………………………………………….

        3………………………………………………………………………………..

Table 1. Cont.

33. "Physicians, patients, and pharmacists should be trained in prevention of the resistance development in antibiotics."
   How do you evaluate this statement?
   (   ) Correct   (   ) Incorrect
   And the reason is……………………………………………………………………………………
34. Please shortly specify what are to be paid attention during the examination of antibiotics' blood level:
   …..
35. About which of the following topics the patients you have prescribed antibiotics on the foot should be given training?
   (   ) Generic and commercial name of the medication
   (   ) Its role in prevention or combat of the infection
   (   ) Dosage of medication
   (   ) Schematics for daily use in plain and simple language, using coherent terminology to tell how the drugs should be
taken: daily dosage, how many times a day, with or after the meals, should it be hourly, need to be awaken.
   (   ) Information about food and drink interactions
   (   ) Information and warnings about not taking double dose in case of forgetting one, taking the dose anyway if it happened
within the two hours originally planned and informing physician if more than one dose was forgotten.
   (   ) Consulting to physician about the termination of medication after each dose.
   (   ) Not terminating the medication without advise after starting to feel fine.
   (   ) Not sharing the treatment that was happened to work on him with the others.
   (   ) All of the above.
   (   ) Other (please specify)………………………………………………………………………..
36. Who do you think should give the training about the practical implications of antibiotic use to the patients?
   (   ) Pediatric nurse   (   ) Nurse   (   ) Assistant   (   ) Drug requester   (   ) Pharmacist
   (   ) Other (please specify)………………………………………………………………………..

secretion.

When the answers to the survey question in which the points to pay attention while looking at the blood levels of the antibiotics was asked with an open end question are evaluated the answers are as follows as it was answered by a few like 50 (39.1%) of the participants: 10 (7.8%) it must be taken before administering the medication, 8 (6.3%) at the time when blood is taken, 6 (4.7%) on the condition that the dosage is given appropriately in regular intervals, 5 (3.9%) MIC 90 value, 5 (3.9%)' duration of use, 3 (2.3%) exceeding dosage, 3 (2.3%) examination levels, 2 (0.8%) the used dosage, 2 (0.8%) after the antibiotics use is ceased, 1 (0.8%) reaching the effective blood level, 1 (0.8%) the chronic disease of the patient; 1 (0.8%) we do not look on that during practice, 1 (0.8%) to be sure if the medication is administered or not, 1 (0.8%) to reach the sufficient blood level tended to the factor and to maintain that.

Those who agreed that in case of hypotension, hypoxemia, reduced blood flow of kidney antibiotics use must be done with precision were 120 (93.8%) and those who did not agree were 8 (6.2%). To the question if they agree for the use of the prophylactic antibiotics at the surgery clinics 66 (51.6%) answered sometimes, 44 (34.4%) answered yes, 18 (14.0%) answered no. The ration of those who did not agree with the antibiotics prophylaxis in healthy individuals in case of upper respiratory tract infections (URI), lower respiratory tract infections and urinary system infections were 100

(78.1%), those who agreed were 28 (21.9%). To the sentence, regarding the use of antibiotics for "assurance" substituting asepsis-antisepsis 70 (54.7%) replied I agree; 29 (54.7%) replied I agree partially, 29 (22.7%) replied I do not agree.

Depending on the place and the intensity of the infection, use different types of antibiotics. Such as necessity to prescribe them from mouth, by injection, venous, as eye or ear drops, as skin cream etc. 113 (88.3%) replied saying they agree, 9 (7.0%) replied saying I agree partially, 6 (4.6%) replied saying they do not agree.

To the question asking if they believe that controlled antibiotics use guide makes any limitations in medication use in cases such as febrile neutropenia, sepsis and emergency cases, 77 (60.2%) replied by saying no, 51 (39.8%) replied by saying yes. To the question if the exceeding antibiotics freedom in our physicians with the polyclinic patients must be questioned by means of "medical file" application and by scanning the files frequently, 83 (64.8%) replied by saying yes, 45 (35.2%) replied by saying no. To the question if clinical antibiotics use must be audited 105 (82.0%) replied saying yes, 23 (18.0%) replied saying no. Those who agreed that the antibiotics prescriptions should be monitored in computer media and should be restricted both on the basis of the clinic and the physician were 83 (64.8%) and those who did not agree were 45 (35.2%).

To the expression "the physician, during the decision

Table 2. Distribution of the issues the pediatricians most carefully paid attention in prescribing antibiotics to their patients.

The points paid attention in prescribing antibiotics	n	%
Certainly must see the patient	115	89.8
Whether the patient stays in hospital	46	35.9
Other medication patient uses	56	43.8
The allergenicity	76	59.8
The clinical status of patient	100	78.1
Microbiological examination on the suspected tissue (direct preparate and m/b culture)	86	67.2
Opinion of the Infectious Diseases Specialist	22	17.2
Current illness of patient whether this is chronic or not	65	50.8
Age of the patient	79	61.7
Gender of the patient	20	15.6
Service characteristics for patients in hospital	39	30.5
Indication Appropriateness	91	71.1
A patient already familiar and observed before	27	21.1
Waiting for two days	26	20.3
Antibiotic dosage range	57	44.5
Suitability of the antibiotic dosage	65	50.8
Liquid intake, relaxation, natural medication and proposal of relieving the symptoms - if necessary; waiting for two days assessing the results	35	27.3
Information received from the pharmaceutical company	7	5.5
By looking at the updated drug index	21	16.4
Consulting to a colleague	6	4.7
The cost of medicine	33	25.8
The effectiveness of medicine	85	66.4
In cases where the use of antibiotic medication would exceed three days, the consultation of the infection control specialist	103	80.5

*The value of *n* varies since more than one option can be picked.

phase, must be scientific, objective, dependent on impartial sources but must still be independent form any other factors" 97 (75.8%) replied by saying I agree, 23 (18.0%) replied by saying I agree partially, and 8 (6.2%) replied by saying I do not agree.

The physicians were asked to give three examples along with the usage intervals of the antibiotics which they most frequently prescribe. Accordingly, 48 (37.5%) replied saying Amoxicillin Clavulanate, 22 (17.2%) replied by saying Amoxicillin 3X1, 13 (10.2%) replied by saying Augmentin BID 2X1.

The survey question asking on which subjects education must be given to the patients whom you decided that they should use antibiotics as out-patient (in which it is indicated that they may mark more than one optional answers) the most common answers were like: (92.2%) the daily usage of the medication, by using an easily understandable terminology the daily dosage, how may time it should be administered a day, should it be administered with or without food, should it be taken at certain hours, should the patient wake up while sleeping

etc (73.4%), the patient should not cease administering the medication when she/he feels fine and information should be obtain on food/medication interaction (71.9%) (Table 3).

To the question "who should give the education about antibiotics" the responses were distributed as follows: 41 (32.1%) the physician who prescribed the medication, 30 (23.4%) assistant physician, 28 (21.9%) pharmacist, 22 (17.2%) pediatric nurse, 12 (9.4%) nurse.

The difference among the pediatricians between providing education not to cease administering the medication when the patient fees fine depending on their field of work, about whom they decided use of antibiotics, is significant. Depending on their field of work those who say yes to this questions, for those working in private (33 persons, 26%), in state hospitals (30 persons, 23.6%) and at the university (20 persons, 17.2%) are more. (p = 0.02, p < 0.05).

Analysis of the pediatricians' response of "the use of third generation cephalosporins should be only applied to proven cases with culture positivity" with respect to their

Table 3. Distribution of the answers given for the question "in which fields the out-patients you had prescribed antibiotics should be trained / educated?"

The antibiotic related training topics for patients	n*	%
Its significance in preventing infections or fighting against infections	63	49.2
Medication dosage	90	70.3
Daily usage diagram of medication; with comprehensible terminology and in daily language, number of times / dosage amount / with or without meal / whether or not on timely basis / whether or not on awakened state the medication should be taken, etc.	118	92.2
Information regarding Foods / Drinks interaction	92	71.9
Teaching knowledge regarding to (in case a dose was forgotten) not taking double-dose next time, taking that dose if it's within the 2 hours planned, informing doctor in case of more than one dose had been forgotten.	72	56.3
Consulting the physician whether the treatment would continue after every dose taken	38	29.7
Not discontinuing the medication for feeling alright	94	73.4
Not sharing the medication that treated him/her with other people	62	48.4
All of the above	39	30.5
Side effects	2	1.6

*The value of *n* varies since more than one option can be picked.

Table 4. Analysis of the pediatricians' response "the use of third generation cephalosporins should be only applied to proven cases with culture positivity" with respect to their work experience.

Working years	Use of cephalosporins					
	Yes		No		Total	
	n	%*	n	%*	n	%**
0 - 5	5	20.0	20	80.0	25	19.5
6 - 11	9	25.7	26	74.3	35	27.3
12 - 17	12	50.0	12	50.0	24	18.8
18 - 23	13	56.5	10	43.5	23	18.0
24 - 29	6	85.7	1	14.3	7	5.5
30 and more	9	64.3	5	35.7	14	10.9
Toplam	54	42.2	74	57.8	128	100.0

*Row percentage, **Column percentage. X = 19.719   S. D = 5   p = 0.01 $p < 0.05$.

work experience can be seen at Table 4. In Table 5, there is the analysis of the pediatricians' response "antibiotic prescription is empirical" with respect to their age group. The difference between the analysis of results, in which pediatricians said they had paid attention to the clinical state of their patient while prescribing antibiotics and their work places was found to be statistically significant (Table 6).

DISCUSSION

When asked whether the medication presentation and the promotion effects or not; it is seen that 60 (46.9%) of the pediatricians replied by saying sometimes, 38 (27.7%) of them by saying yes and 30 (23.4%) of them by saying no. In our country, there are three principal factors that stand as obstacles before rational medication selection, usage and rational treatment. These are (1) insufficient medicine education; (2) medication presentations and promotions; (3) the absence of medication health policies nationwide and locally. Today the physicians are under partial and promotional information attack. Mostly the new and expensive medications step forward during commercials and promotions. This affects the prescription at various levels (Baytemür, 2005).

Table 5. Analysis of the pediatricians' response "antibiotic prescription is empirical" with respect to their age group.

| | Antibiotic prescription is empirical | | | | | |
| | Yes | | No | | Total | |
Age of pediatricians	n	%*	n	%*	n	%**
25 - 30 years	4	**23.5**	13	76.5	17	13.3
31 - 36 years	9	19.6	37	80.4	46	35.9
37 - 42 years	1	3.2	30	96.8	31	24.2
43 - 48 years	1	9.1	10	90.9	11	8.6
49 years and older	0	00.0	23	100.0	23	18.0
Total	15	11.7	113	88.3	128	100.0

*Row percentage, **Column percentage. X = 10.318, SD = 4, p = 0.035, p < 0.05.

Table 6. Analysis of pediatricians' paying attention to their patients' clinical conditions with respect to their work places.

| | Paying attention to clinical condition before prescribing antibiotics | | | | | |
| | Yes | | No | | Total | |
Working place	n	%*	n	%*	n	%**
University	22	62.9	13	37.1	35	27.3
State	39	76.5	12	23.5	51	39.8
Private	32	97.0	1	3.0	33	25.8
Others	7	77.8	2	7.1	9	7.0
Total	100	78.1	28	21.9	128	100.0

*Row percentage, **Column percentage. X=11.714, SD = 3, p = 0.008, p < 0.05.

In our study it is noted that if the antibiotics administration period exceeds three days they would prescribe as per the consultation with the infection control specialist (80.5%). In our country it is also a significant problem that the infection diseases work as units with beds and at many hospitals the necessary infrastructure for the consultation services, accumulations and the personnel education is lacking (Akan, 2006). In an antibiotics treatment it is more practical to evaluate the clinic efficacy but it may lead to incorrect interpretations. The priority purpose must be bacterial eradication. Bacterial eradication improves the clinical betterment, avoids resistance, and makes the costs more effective. In practice, it is difficult to detect the bacterial eradication in all patients. In such cases, depending on the existing pharma-kinetic /pharma-dynamic (PK/PD) indications we should use the correct antibiotics with the most suitable dosages and for the most suitable periods (Özdemir, 2010).

Those who said yes to the question if the use of the third generation cephalosporin should be in the cases of which the culture positivity is proven, 54 (42.2%) said yes, 74 (57.8%) said no. Çelen et al. (2005) detected that the third generation cephalosporin are the most comm.-only used antibiotics at their hospital (Çelen et al., 2005). In our country, from the antibiotics treatments applied at the hospitals it is reported that only 13.4% comply with the microbiological data (Özgüneş, 2005). In addition to the fact that the number of those among our employees claiming that the third generation cephalosporin used should only be for cases of which culture positivity is proven is small (42.2%) on the other hand it is significant form the point of indicating the importance paid to this issue.

It is documented that 40 - 70% of the children who are with respiratory tract infection are prescribed unnecessary and inappropriate antibiotics. The most significant indicators of the irrational antibiotics use: (1) Physician-patient interaction (2) the characteristics of the physician (3) the limited time (4) uncertain diagnosis (Özdemir, 2010).

In our study the ratio of those who do not approve the antibiotics prophylaxis in URI, lower respiratory tract infections and urinary system infections in healthy individuals is 100 (78.1%), the ratio of those who approve is 28 (21.9%). To the questions if they themselves use antibiotics in case they catch flue the majority replied that (77.3%) they do not. An analogy is not seen in the responses between those of the (73.1%) pediatricians which themselves not using antibiotics when they have flue, influenza etc, with those who do not approve the antibiotics prophylaxis in URI, lower respiratory tract infections, urinary system infections in healthy individuals (78.1%).

The factors that affect PK and PD are age, the disease behind, the medication interaction and tissue distribution. The age difference between the child patients and different developmental phase changes; are related to obvious changes in PK and PD of the antibiotics. The developmental changes in hepatic and renal functions influence the medication metabolism. Similarly, the body water content and the body surface are differences cause differences in the distribution volumes. Some of the chronic diseases affect the PK/PD of an agent (Özdemir, 2010). In our study, in cases such as hypotension, hypoxemia, reduced kidney blood flow, those who agree that the use of antibiotics must be observed are 120 (93.8%) of them and those who do not agree are 8 (6.2%) of them. This finding is extremely pleasing.

The prophylactic application ratio at our country was reported to be 44.2% (Özgüneş, 2005). In the study performed by Devrim et al. (2009); it as observed that inappropriate use of antibiotics is high especially in the use of the prophylactic antibiotics (58.8%). Particularly in the selection of the prophylactic antibiotics, rather than inappropriate placement of prophylaxis indication, it is seen that more often the selected antibiotics is inappropriate. In previous studies it was reported that the tendency of the physicians in prescribing the antibiotics with wider spectrums for a longer duration also has an effect (Devrim et al., 2009). Again, in the same study it is seen that the 58.8% of the anti-microbic treatments applied empirically are not prescribed with the appropriate indication (p = 0.004). In the treatments which are detected by means of microbiological techniques the ration of compliance to the indication was detected to be 100% (Devrim et al., 2009). To this extent the obtained research result may considered as complying to the literature.

To the question asking if they believe that Controlled Antibiotic Usage Guide provides limitation in medication use in cases such as neutropenia, sepsis and emergency cases, 77 (60.2%) replied saying no, 51 (39.8%) replied saying yes. Various methods have been applied until today in order to avoid the development of resistance. Use of standard guides, restriction and approval from specialist, alternate application, providing computer supports are the headings of the agenda (Özgüneş, 2005; Ergönül, 2005). Çelen et al. (2005), in their study, detected the effects of intervention to antibiotics use by calculating the antibiotics consumption index; they compared the relation of this limitation to hospital infection development and compared the costs after the limitation to those before. As a result it is seen that the effected education meetings and the infection diseases consultation has an effect on the rational antibiotics use. It is observed that obvious reduction is obtained in antibiotics use and economical gains are obtained and at the same time antibiotics limitations did not lead an increase the hospital infections (Çelen et al., 2005). In a study, it is informed that with the application of the guide

the inappropriate prophylaxis which was 69% was reduced to 18% upon the audit of the antibiotics committee (Özgüneş, 2005). To the question if it is necessary to question the exceeding antibiotics "freedom" among the physicians by means of the "medical file" application to the polyclinic patients and by scanning such files often; 83 (64.8%) replied yes, 45 (35.2%) replied by saying no.

To the expression "The physician, during the decision phase, must be scientific, objective, dependent on impartial sources but must still be independent form any other factors" 97 (75.8%) replied by saying I agree, 23 (18.0%) replied by saying I agree partially and 8 (6.2%) replied by saying I do not agree. This ratio was expected to be higher.

In our study, to the question with an open end asking what are the points to observe while looking at the blood levels of the antibiotics (open ended question) 50 (39.1%) gave an answer. From the obtained data the exactly suiting answer could not be found. The pediatricians may be suggested to organize on service education about the points to pay attention while looking at the blood levels of the antibiotics.

For the empiric antibiotic treatment to achieve success, the correct antibiotics should be used in correct dosages and for correct durations (Canli et al., 2009). In the successful treatment the patient's coherence to the treatment is important. Not being able to provide coherence contributes to insufficiency of the treatment and increase in resistance. The most important factors that have an effect on the coherence are: the dosage numbers per day; the length of the treatment duration and the taste of the medication (Özdemir, 2010). The most important the sue of the medication must be explained with precision to the relative of the patient and must be informed of the negativities is used otherwise (Özdemir, 2010; Canli et al., 2009). While prescribing medication to the children it is important to pay attention to the taste.

The ratio of those who express that the education about the antibiotics should be given by pediatrics nurse and nurse is 26.6%. Important tasks are assigned to the pediatrics nurses and the pharmacists regarding this issue. The pediatrics nurses auditing the medication use, evaluation by them if the importance of regular use of the medication is understood or not, to obtain the suitable feedback from the patent and the patient's family by the prescribing physician, adverse effects and what they should do under such circumstances etc., providing training and consultancy on all these are among their duties. This constitutes the semi-dependent role of the pediatric nurse (Çetinkaya and Tengir, 2006).

With the increasing work experience, there is also increase in picking the answer that suggests "use of the third generation cephalosporins should be restricted to cases whose culture positivity had been proven" (Table 4). For those up to 30 years old, the ratio of pediatricians

saying that "reasons for antibiotic prescription are empirical" is the highest, but this ratio decreases with the increasing age (Table 5). It is safe to presume that the experience of active pediatricians increase with the increasing age in years.

Those with the answer "when prescribing antibiotics, I pay attention to the patient's clinical condition" are the highest among physicians who were employed by private sector (Table 6). A further study is suggested at this point, aiming to find out underlying reasons.

Antibiotics should be used having a true diagnosis, with correct usage and choosing a proper antibiotic type. When possible, antibiotic treatment should be started after sending culture to microbiology. Empirical antibiotic use should be chosen in emergencies and severe cases (Ünüvar, 2010).

Antibiotics are the miracle of the science of living. Their rational use is a universal responsibility. From the expression stating most suitable treatment application of the cheapest and the correct treatment must be understood, not the use of the cheapest antibiotics. In addition to the box price, the costs due to the way of administration, monitoring, resistance, adverse effects and not responding to the treatment must be considered (Özdemir, 2010).

The joint application of the control methods and definite establishment of a multidisciplinary team are deemed necessary for success. From the coherence of the branches apart from infection diseases and microbiology, the importance of effective communication and collective decisions must not be disregarded. It must not be forgotten that only in addition to the limitation and auditing applications there comes along "leakages" due to reactions and habits (Özgüneş, 2005). Even though the results we have obtained here were in accordance with literature, thus, somewhat expected on our side, it should be kept in mind that the study was conducted on particular individuals at a national congress, the 45th Turkish Congress of Pediatrics, therefore, it might prove to be useful if more studies like this one are carried away on different groups for broader coverage on rational use of antibiotics.

Lastly, this very subject of rational use of antibiotics is being intensively used on various symposiums, congresses and scientific activities. It may be suggested that planning and carrying out systematical in-service training activities to pediatricians would be of our best interest.

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