RESEARCH ARTICLE

Evaluation of Knowledge, Attitude, and Practice of Parents on the use of Antibiotics for Acute Upper Respiratory Tract Infections in Children Admitted to Motahari Hospital of Urmia in 2017–2018

Amir Nasimfar[1], Ebrahim Sadeghi[1], Ali AmuzMehr[2]

[1]Department of Pediatric, Urmia University of Medical Sciences, Urmia, IR Iran, [2]Medical Student, Urmia University of Medical Sciences, Urmia, Iran

Abstract

Background and Objective: As majority of upper respiratory tract infections (URTIs) have a viral origin, antibiotic prescription for URTIs has become a common practice in pediatric medicine. The prescription of an inappropriate and unnecessary antibiotic is the main cause of the development and increase of antibiotic resistance. The factors involved in high level of using antibiotics include knowledge and attitude on the use of antibiotics, patient satisfaction with treatment, and the relationship between physician and patient, and patient experience in the use of antibiotics. Thus, the objective of this research was to evaluate the knowledge, attitude, and practice (KAP) of parents with regard to the use of antibiotics for URTIs in children admitted to Infectious Diseases Clinic of Shahid Motahari Hospital in Urmia in 2017–2018. **Methodology:** The current research is an analytical cross-sectional study. The research population included parents who have children aged 1–8 years and admitted to the infectious diseases clinic of the Motahari Hospital in Urmia from all parts of the province. In this research, KAP of patients was evaluated with regard to the use of antibiotics for acute URTIs in children based on age, education level, and living place. SPSS software version 21 was used to analyze the data. **Results:** Of 400 parents examined, 58.8% were female and 41.2% were male. In addition, 75% of the parents were living in cities, 23.3% of them had academic level of education, and 12% were illiterate. A significant relationship was found between the level of education, the living place, and the KAP of parents with regard to the use of antibiotics for URTIs. There was also a significant relationship between age and attitude and practice of parents, but age was not significantly correlated with parent knowledge. Parents admitted to the hospital stated that the most reason for the arbitrarily use of antibiotics was its prescription by physician in the same condition. During 3 months before admitting to the hospital, 54.2% of the parents used the antibiotic arbitrarily for URTIs children. **Conclusion:** Low level of knowledge and attitude of parents about URTIs and high levels of arbitrarily use of antibiotic in this study make it necessary to provide educational programs for parents with regard to infections common among the children and, their treatment more supervision over pharmacies and retraining courses for physicians.

Key words: Antibiotic use, children, parent knowledge, upper respiratory tract infections

INTRODUCTION

Nowadays, mortality and diseases associated with respiratory tract are very important in global health, and statistics show that over 100 million people live with chronic respiratory conditions in the world[1] and acute respiratory infections are one of the common reasons to admit to physician.[2] Upper respiratory tract infections (URTIs) in children with a prevalence of 500 million cases per year not only account for more than 10% of the total outpatient and emergency units admissions but also they are one of the most important challenges of health system in the world.[3] These infections are considered as

Address for correspondence:
Ebrahim Sadeghi, Department of Pediatric, Urmia University of Medical Sciences, Urmia, IR Iran.
E-mail: sadeghi.e@umsu.ac.ir

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the main cause of children's absenteeism at school as well as parents' absenteeism at workplace. It also imposes high economic costs on parents and the medical care system.[4] Antibiotics are some of the most important drugs used to treat viral respiratory tract infections, assuming that they reduce the severity of the symptoms, while they do not really affect the course of the disease.[5] This is very important issue given uncontrolled use of antibiotics and unnecessary use of drugs for acute URTIs, which have viral origins in most cases, antibiotic resistance and side effects of drugs.[6]

Several studies have reported the relationship between the uncontrolled use of antibiotics and increased resistance to them.[7] Countries having the highest rate of antibiotic use have reported highest antibiotic resistance.[8] While health-care physicians are aware of the fact that most of the URTIs have viral origin,[9] prescription of antibiotic for URTIs has become a common practice in pediatric clinics.[10,11] In general, about 20% to 50% of antibiotics are inappropriate in medical instructions.[12,13] Prescription of inappropriate and unnecessary antibiotics, which often have no effect on the patient, is the main cause of the development and increase of antibiotic resistance.[14,15] One of the main factors involved in this increase and unnecessary antibiotic prescription in children is the attitude of parents and physicians' practice. Parent beliefs and expectations can be one of the most important factors involved in the prescription of the antibiotics. Parent concerns on their children acute disease also cause frequent admissions to URTIs, leading to the prescription of unnecessary antibiotics.[16,17] Based on numerous reports, the factors leading to high antibiotic use include the level of knowledge, misconceptions and beliefs about the use of antibiotics, patient satisfaction with treatment, the relationship between physician and patient, and patient experience in the previous use of antibiotics.[18] Enhancing the general knowledge and proper attitude toward antibiotics can be an important factor in the rational use of antibiotics and consequently in minimizing the spread of antibiotic resistance.[18]

The pressure imposed on physicians to meet patients' demands is one of the important causes of prescribing the antibiotic for URTIs.[19,20] Thus, parents' knowledge, attitude, and practice (KAP) have great importance in using antibiotics for URTIs.[18,21] There is no comprehensive study on the level of antibiotic use for respiratory infections in Iran, but reports of Ministry of Health and Medicine suggest that antibiotics are prescribed in more than 50% of cases, which is considered high percentage compared to global statistics. As no similar study has been conducted in West Azerbaijan Province on the KAP of parents with regard to the use of antibiotics for acute respiratory tract infections in children, the results of this research can be applied in educational programs to prevent uncontrolled and unnecessary prescription of antibiotics.

METHODOLOGY

The current research is an analytical cross-sectional study. The research population included parents who have children aged 1–8 years and admitted to infectious diseases clinic of Motahari Hospital in Urmia from all parts of the province. The objective of this research was to evaluate the parents' KAP with regard to the use of antibiotics for acute URTIs in children based on age, level of education, and living place. In this research, the KAP questionnaire used in similar studies[21,22] was used.

Face validity was used in assessing the validity of the questionnaire. Accordingly, two pediatricians were used to review the questions. In assessing the reliability, 20 questionnaires were completed in a pilot way, and Cronbach's alpha was calculated. Cronbach's alpha of the questionnaire was calculated 71%. The final version of the questionnaire included five parts of A,B,C,D, and E. Part A included demographic questions including age, gender, number of children, living place, parents level of education. and child chronic disease (questions 1–6). Part B included questions on parents' knowledge on antibiotics and URTIs. This part includes nine sentences about the definition, role, and risks of using antibiotic and its efficiency, and a score of knowledge was determined based on the true or false answer. Based on the number of true answers, 0–3 true answers represent a low level of knowledge, 4–6 true answers represent a moderate level of knowledge, and 7–9 true answers represent a good level of knowledge (questions 7 to 15). Part C also included 9 questions about parents' attitudes and beliefs about antibiotics and URTIs, which were scored based on true answer, so that if they provided 0–3 true answers for the questions, attitude was at weak level, if they provided true answer for 4–6 questions, it was at the moderate level, and if they provided to 7–9 true answers to questions, the attitude was at good level (questions 16 to 24). Part D included 9 questions on parents' knowledge and attitude about their use of antibiotics for URTIs. Based on true answers given, the parents were divided into three groups: Weak, moderate, and good (questions 25–33). Part E included 4 questions about the frequency of admission to physician for the URTIS of children, the frequency of antibiotic prescription by the physician, the frequency of arbitrarily use of antibiotic during 3 months, and the cause of arbitrarily use of antibiotic (Questions 34–37). In providing the descriptive characteristics of the population, descriptive statistics (mean and standard deviation [SD]), frequency tables and graphs were used, and to examine the relationship between demographic variables and KAP score, Chi-square test (if Fisher's exact test is required) was used. SPSS version 21 (IBM) software was used to analyze the data.

RESULTS

In this research, the distribution of the frequency of demographic characteristics was examined in the parents

of children. Out of the 400 parents of the children examined, 58.8% were female and 41.2% were male. Most of the studied subjects belonged to families with one two children (41.8% and 36.3%, respectively). In addition, 75% of them were urban and 25% of them were rural, and 88% of the parents of children were literate and only 12% of them were illiterate. The mean and SD of the parents' age was 32.87 ± 8.23 years (minimum and maximum were 18 and 59 years, respectively). Moreover, 81% of the children reported that they had no history of chronic disease [Table 1].

The score of KAP of parents on the use of antibiotics for acute URTIs was assessed in children, of which 46% of the parents of children had a moderate knowledge about the use of antibiotics for acute URTIs (highest frequency). The parents' attitude was moderate in this regard. However, 63% of parents had reported good practice in this regard [Table 2].

The parents' KAP score on the use of antibiotics for acute upper respiratory tract infection in children based on age distribution was also examined. The mean age distribution of the parents of children in the knowledge dimension in the weak, moderate, and good scores was almost the same, and the mean age difference of parents was not statistically significant based on the knowledge score ($P = 0.8$). The mean age of parents in the attitude dimension, which was at the weak and moderate level, was higher than that of parents who obtained good score, and the observed difference was statistically significant ($P = 0.02$).

Table 1: Frequency distribution of demographic characteristics in parents of children studied

Studied variable	Studied group	F (%)
Number of children	1	167 (41.8)
	2	145 (36.2)
	3	48 (12)
	4	28 (7)
	5	8 (2)
	6	4 (1)
Living place	City	300 (75)
	Village	100 (25)
Gender	Female	235 (58.8)
	Male	165 (41.2)
Education	Illiterate	48 (12)
	Under high school	176 (44)
	High school	83 (20.8)
	Academic	93 (23.2)
Chronic disease in children	Yes	76 (19)
	No	324 (81)

In the practice dimension, the mean age of parents with a weak score was higher than that of parents with a good and moderate score. The mean age score of parents with good score in practice dimension was lower than that of parents with the weak and moderate score and the observed difference was statistically significant ($P = 0.002$) [Table 3].

The parents' KAP score on the use of antibiotics for acute URTIs in children was examined based on the education level of parents. Of 48 children with illiterate parents, 58.3% had a low level of knowledge (the highest frequency). Of 176

Table 2: The parents' knowledge, attitude, and practice score on the use of antibiotics for acute upper respiratory tract infection in children

Questionnaire dimensions	Statistic
	F (%)
Knowledge	
Weak	72 (18)
Moderate	184 (46)
Good	144 (36)
Attitude	
Weak	156 (39)
Moderate	192 (48)
Good	52 (13)
Practice	
Weak	56 (14)
Moderate	92 (23)
Good	252 (63)

Table 3: The knowledge, attitude, and practice score of parents with regard to the use of antibiotics for acute upper respiratory tract infection in children based on age distribution

Questionnaire dimensions	Statistic			*P**
	Mean±SD	Minimum	Maximum	
Knowledge				
Weak	32.38±8.3	21	50	0.8
Moderate	33±8.3	19	53	
Good	32.94±8.2	18	59	
Attitude				
Weak	33.07±8.4	20	53	0.02
Moderate	33.46±8.27	19	59	
Good	30.1±7.16	18	41	
Practice				
Weak	36.43±8.21	25	50	0.002
Moderate	33.2±8.8	19	48	
Good	31.97±7.82	18	59	

*Kruskal–Wallis test. SD: Standard deviation

children with education under high school level of education in their parents, 52.3% had a moderate level of knowledge and 82.8% of the parents with academic level of education had a good knowledge on the use of antibiotics for acute URTIs in their children. The relationship between the score obtained in the knowledge dimension on the use of antibiotics for acute URTIs in children and parents' level of education was statistically significant ($P < 0.001$).

Attitude score of 91.7% of parents with illiterate level of education about using antibiotic was weak, 52.3% of parents with education level lower than high school had weak attitude, and 45.5% of parents had moderate attitude score. The attitude score of 57% of parents with academic education level was at the moderate level, and 43% obtained good attitude score. The relationship between the score obtained in the dimension of attitude of using antibiotic for acute URTIs in children and parents' level of education was statistically significant ($P < 0.001$). In the practice dimension, the score of 58.3% of parents with illiterate level of education was at good level, the score of 54.5% of parents with a high level of education was good, 81.9% of parents with a high school level of education was at moderate level, and 64.5% of parents with academic level of education obtained good score on the use of antibiotics (highest frequency). The relationship between the score obtained in the practice dimension and the use of antibiotics for acute URTIs in children with parent education was statistically significant ($P < 0.001$) [Table 4].

The KAP score of parents on the use of antibiotics for acute URTIs in children was also examined based on their living place. The parents of children examined, 100 people were living in the village and 300 people were living in the city. In the knowledge dimension, the good score in the rural children's parents had lower frequency than the weak and medium scores. In parents of urban children, weak score had lower frequency than moderate and good score, and weak score in parents of urban children had lower frequency than that of rural children. The relationship between the score obtained in the dimension of knowledge of the use of antibiotics for acute URTIs in children and living place was statistically significant ($P < 0.001$). In the parents of rural children, the frequency of weak attitude score had higher frequency that of good and moderate score. In parents of urban children, the moderate attitude score had the highest frequency. The frequency of weak attitude score was higher in rural parents than that of urban parents. The frequency of good attitude score in urban children parents was 4 times higher than that of rural children. The relationship between the score obtained in the dimension of attitude of using antibiotic for acute URTIs in children and living place was statistically significant ($P < 0.001$).

The highest score of practice obtained in parents of rural and urban children was good score, and the frequency of weak practice score in parents of rural children was higher than that of parents of urban children. None of the parents of rural children obtained moderate practice score. However, 30.7% of the parents of urban children parents did not obtain moderate practice score. The relationship between the score obtained in the practice dimension and antibiotic use for acute URTIs in children and living place

Table 4: The knowledge, attitude, and practice score of parents on the use of antibiotics for acute upper respiratory tract infections in children based on parents' level of education

Questionnaire dimensions	Statistic				*P*
	Illiterate	Under high school	High school	Academic	
Knowledge					
Weak	28 (58.3)	40 (22.7)	0	4 (4.3)	<0.001
Moderate	12 (25)	92 (52.3)	68 (81.9)	12 (12.9)	
Good	8 (16.7)	44 (25)	15 (18.1)	77 (82.8)	
Total	48	176	83	93	
Attitude					
Weak	44 (91.7)	92 (52.3)	20 (24.1)	0	<0.001
Moderate	4 (8.3)	80 (45.5)	55 (66.3)	53 (57)	
Good	0	4 (2.3)	8 (9.6)	40 (43)	
Total	48	176	83	93	
Practice					
Weak	16 (33.3)	31 (18.2)	0	8 (8.6)	<0.001
Moderate	4 (8.3)	48 (27.3)	15 (18.1)	25 (26.9)	
Good	28 (58.3)	96 (54.5)	68 (81.9)	60 (64.5)	
Total	48	176	83	93	

was statistically significant ($P < 0.001$). Distribution of the frequency of admission to physician, antibiotic prescription by the physician, and arbitrarily use of antibiotic were also examined 3 months before admission to hospital, and 53% of the parents stated that they admitted to physician at least once in the past 3 months due to URTI, and 45.7% of the parents stated that antibiotics were prescribed by a physician for their URTI and 54.2% of parents stated that they arbitrarily used antibiotic at least once during the 3 months before admission to the hospital due to URTI in their children [Table 5].

DISCUSSION

The excessive use of antibiotics is a major cause of resistance development. It is due to the availability of antibiotics and the lack of knowledge on the use of antibiotics.[23] One of the most common antibiotics used uncontrollably is URTI disease.[24,25] Given the fact that the majority of URTIs have a viral origin, and the prescription of antibiotics to URTIS has become a common practice in pediatric medicine. The prescription of inappropriate and unnecessary antibiotic is the most important cause of developing and increasing antibiotic resistance.[14] The factors leading to high antibiotic use include the level of KAP of parents on the use of antibiotics, the pressure imposed on physicians to meet their demands, and patients' satisfaction and experience in previous use of antibiotic.[19,26] The current research was conducted to evaluate the level of KAP of parents on the use of antibiotics for URTIs based on their age, education level, and living place. It was conducted on parents of 400 children aged 1–8 years and admitted to Infectious Diseases Clinic of Motahari Hospital. Of 400 parents examined, 58.8% were female and 41.2% were male. In addition, 75% of the parents were living in cities and 25% of them were living in village, in which 23.3% of them had academic level of education and 12% were illiterate. The mean age of them was 32.87 ± 8.23 years. In our study, the level of KAP of parents on the use of antibiotics for URTIS showed a significant relationship with the level of education and the living place. There was also a significant relationship between age and attitude and practice of parents, but age was not significantly correlated with parent knowledge ($P = 0.8$).

Table 5: The knowledge, attitude, and practice score of parents on the use of antibiotics for acute upper respiratory tract infections in children based on their living place

Questionnaire dimensions	Statistic		*P*
	Village	City	
Knowledge			
Weak	31 (36)	36 (12)	<0.001
Moderate	36 (36)	148 (49.3)	
Good	28 (28)	116 (38.7)	
Total	100	300	
Attitude			
Weak	68 (68)	88 (29.3)	<0.001
Moderate	28 (28)	164 (54.7)	
Good	4 (4)	48 (16)	
Total	100	300	
Practice			
Weak	16 (16)	40 (13.3)	<0.001
Moderate	0	92 (30.7)	
Good	84 (84)	168 (56)	
Total	100	300	

In the research conducted by Szymczak *et al.,* to evaluate the parents' practice against acute respiratory tract infections, the parents of 109 children were examined and they concluded that parents feel more relaxation when they are using antibiotics to treat their children's disease. While they know that excessive use of antibiotics might cause resistance, they use antibiotic due to the lack of alternative solution.[27] In our research, 54.2% of the parents reported that they used antibiotic arbitrarily for their children's URTIs. In a research conducted by Panagakou *et al.* in Greece in 2011 to evaluate the knowledge of parents and use antibiotics in children for URTIs, only 10% of parents reported that they used antibiotic arbitrarily without consulting with physician.[21] It showed significant differences with our study. It might be attributed to the prescription of antibiotics in the same condition by the physician and its recommendation by pharmacists and the lack of adequate supervision over the distribution of drug without prescription of physicians in pharmacies. In our research, 60% of parents believed that URTIs have viral origin, 59% believed that unnecessary use of it would increase antibiotic resistance, and 42% believed that antibiotic should be prescribed when URTIs are developed. However, in the study conducted by Panagakou *et al*., 80% of parents believed that URTIs have mainly viral origin and 88% believed that unnecessary use of it would increase antibiotic resistance and 35% believed that antibiotics should be prescribed when URTIs are developed. The cause of this difference might relate to lower level of knowledge and education of target population in our study.[21] The final goal of this research is to describe the KAP characteristics of parents to identify potential risk factors leading to unnecessary use of antibiotics for URTIS in children.

CONCLUSION

Given the research results, the knowledge and attitude of major part of studied population were at the weak and moderate level, but they had relatively better practice. Therefore, these results require the use of comprehensive and attractive educational programs for parents to learn on the

common infections of children and the way of their dealing with children, especially in health care centers. This can play a vital role in enhancing the knowledge, attitudes, and practice of the parents. Moreover, the high arbitrarily use of antibiotics requires the careful supervision of pharmacies to prevent the sale of drugs without physician's prescription as well as holding retraining courses for physicians for not prescribing antibiotics for URTIs.

Recommendations

It is recommended that the study is to be conducted with more sample and a functional approach, for example, a study in which training courses are held is recommended. It is also recommended that its effect on the knowledge, attitude, and practice of the target group to be measured.

REFERENCES

1. Ferkol T, Schraufnagel D. The global burden of respiratory disease. Ann Am Thorac Soc 2014;11:404-6.
2. US National Center for Health Statistics. National Ambulatory Medical Care Survey: 2013 State and National Summary Tables; 2013. Available from: https://www.cdc.gov/nchs/data/ahcd/namcs_summary/2013_namcs_web_tables.pdf. [Last accessed on 207 Mar 21].
3. Linder JA. Improving care for acute respiratory infections: Better systems, not better microbiology. Clin Infect Dis 2007;45:1189-91.
4. West JV. Acute upper airway infections. Br Med Bull 2002;61:215-30.
5. Al-Shawi MM, Darwish MA, Abdel Wahab MM, Al-Shamlan NA. Misconceptions of parents about antibiotic use in upper respiratory tract infections: A survey in primary schools of the Eastern province, KSA. J Family Community Med 2018;25:5-12.
6. Glezen P, Denny FW. Epidemiology of acute lower respiratory disease in children. N Engl J Med 1973;288:498-505.
7. Wu J, Taylor D, Ovchinikova L, Heaney A, Morgan T, Dartnell J, *et al.* Relationship between antimicrobial-resistance programs and antibiotic dispensing for upper respiratory tract infection: An analysis of Australian data between 2004 and 2015. J Int Med Res 2018;46:1326-38.
8. Ferech M, Coenen S, Malhotra-Kumar S, Dvorakova K, Hendrickx E, Suetens C, *et al.* European surveillance of antimicrobial consumption (ESAC): Outpatient antibiotic use in Europe. J Antimicrob Chemother 2006;58:401-7.
9. Harnden A, Perera R, Brueggemann AB, Mayon-White R, Crook DW, Thomson A, *et al.* Respiratory infections for which general practitioners consider prescribing an antibiotic: A prospective study. Arch Dis Child 2007;92:594-7.
10. Goossens H, Ferech M, Vander Stichele R, Elseviers M; ESAC Project Group. Outpatient antibiotic use in Europe and association with resistance: A cross-national database study. Lancet 2005;365:579-87.
11. McCaig LF, Besser RE, Hughes JM. Trends in antimicrobial prescribing rates for children and adolescents. JAMA 2002;287:3096-102.
12. Guven GS, Uzun O. Principles of good use of antibiotics in hospitals. J Hosp Infect 2003;53:91-6.
13. Cizman M. The use and resistance to antibiotics in the community. Int J Antimicrob Agents 2003;21:297-307.
14. Babela R, Jarcuska P, Uraz V, Krčméry V, Jadud B, Stevlik J, *et al.* Decision and cost analysis of empirical antibiotic therapy of acute sinusitis in the era of increasing antimicrobial resistance: Do we have an additional tool for antibiotic policy decisions? Neuro Endocrinol Lett 2017;38:9-26.
15. Yagupsky P. Selection of antibiotic-resistant pathogens in the community. Pediatr Infect Dis J 2006;25:974-6.
16. Paluck E, Katzenstein D, Frankish CJ, Herbert CP, Milner R, Speert D, *et al.* Prescribing practices and attitudes toward giving children antibiotics. Can Fam Physician 2001;47:521-7.
17. Pechère JC. Patients' interviews and misuse of antibiotics. Clin Infect Dis 2001;33 Suppl 3:S170-3.
18. Wei X, Zhang Z, Walley JD, Hicks JP, Zeng J, Deng S, *et al.* Effect of a training and educational intervention for physicians and caregivers on antibiotic prescribing for upper respiratory tract infections in children at primary care facilities in rural China: A cluster-randomised controlled trial. Lancet Glob Health 2017;5:e1258-67.
19. Chan GC, Tang SF. Parental knowledge, attitudes and antibiotic use for acute upper respiratory tract infection in children attending a primary healthcare clinic in Malaysia. Singapore Med J 2006;47:266-70.
20. Belongia EA, Naimi TS, Gale CM, Besser RE. Antibiotic use and upper respiratory infections: A survey of knowledge, attitudes, and experience in Wisconsin and Minnesota. Prev Med 2002;34:346-52.
21. Panagakou SG, Spyridis N, Papaevangelou V, Theodoridou KM, Goutziana GP, Theodoridou MN, *et al.* Antibiotic use for upper respiratory tract infections in children: A cross-sectional survey of knowledge, attitudes, and practices (KAP) of parents in Greece. BMC Pediatr 2011;11:60.
22. Zyoud SH, Abu Taha A, Araj KF, Abahri IA, Sawalha AF, Sweileh WM, *et al.* Parental knowledge, attitudes and practices regarding antibiotic use for acute upper respiratory tract infections in children: A cross-sectional study in Palestine. BMC Pediatr 2015;15:176.
23. Al-Tawfiq JA, Alawami AH. A multifaceted approach to decrease inappropriate antibiotic use in a pediatric outpatient clinic. Ann Thorac Med 2017;12:51-4.
24. Marc C, Vrignaud B, Levieux K, Robine A, Gras-Le Guen C, Launay E, *et al.* Inappropriate prescription of antibiotics in pediatric practice: Analysis of the

prescriptions in primary care. J Child Health Care 2016. pii: 1367493516643421.
25. Ivanovska V, Hek K, Mantel Teeuwisse AK, Leufkens HG, Nielen MM, van Dijk L, *et al.* Antibiotic prescribing for children in primary care and adherence to treatment guidelines. J Antimicrob Chemother 2016;71:1707-14.
26. Awad AI, Aboud EA. Knowledge, attitude and practice towards antibiotic use among the public in Kuwait. PLoS One 2015;10:e0117910.
27. Szymczak JE, Klieger SB, Miller M, Fiks AG, Gerber JS. What parents think about the risks and benefits of antibiotics for their child's acute respiratory tract infection. J Pediatric Infect Dis Soc 2017; doi: 10.1093/jpids/pix073.

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