ISSN: 2690-0688

Research Article

Journal of Humanities & Social Sciences

Challenges in Antibiotics Prescriptions in Paediatrics: A National Survey Among Lebanese Paediatricians

Amale Issa[1*], Nadine Saleh[2], Mira Hleyhel[2], Rouba Karen Zeidan[2], Sara Assaf [3] , Nathalie Lahoud[2]

[1] *Department of Family Medicine, Faculty of Medicine, Saint Joseph University, Beirut, Lebanon.*

[2] *Faculty of Public Health, Lebanese University, Fanar, Lebanon.*

[3] *Faculty of Pharmacy, Lebanese University, Hadath, Lebanon.*

[*]Corresponding Author
Amale ISSA, Department of Family Medicine, Faculty of Medicine, Saint Joseph University, Beirut 1004 2020, Lebanon.

Submitted: 17 Feb 2023; **Accepted**: 28 Feb 2023: **Published**: 28 Mar 2023

Citation: *Issa.*, A., Saleh, N., Hleyhel, M., Zeidan, R. K., Assaf, S., et al. (2023). Challenges in Antibiotics Prescriptions in Paediatrics: A National Survey Among Lebanese Paediatricians. *J Huma Soci Scie*, *6*(3), 84-93.

Abstract

Objectives: *The aim of this study, the first of its kind in Lebanon, was to evaluate attitudes and practices of Lebanese paediatricians towards antibiotics prescriptions with a special focus on upper respiratory tract infections to identify challenges facing physicians.*

Materials and Methods: *This was a cross-sectional study conducted among paediatricians registered in the Orders of Physicians. A 63-item questionnaire in English was sent by e-mail or by message to mobile phones of all paediatricians with subsequent reminders.*

Results: *One hundred seventeen physicians agreed to participate in the study. A high proportion of Lebanese paediatricians replied correctly on avoiding antibiotics in cases of cough (86.3%), upper respiratory tract infections (74.4%), tympanic membrane dysfunction (64.1%) and prevention of secondary infection (63%). Eighty percent of physicians prescribed antibiotics for pharyngitis without requesting a throat culture. Most physicians admitted that antibiotic use is considerable in their community and that antibiotic resistance is a threat on the national and international level. Forty percent of paediatricians agreed and strongly agreed that giving advice to parents reduces their antibiotic demand. The same percentage disagreed that they might prescribe antibiotics to gain parents' trust.*

Conclusion: *National campaigns are required to increase parents' educations and promote judicious antimicrobial use. Implementing national guidelines, ensuring continuing medical education for doctors and regulating over the counter sale of antibiotics are highly recommended*

Keywords: Antibiotic Prescriptions, Attitude, Practice, Paediatrician

Introduction

Antibiotics are the most prescribed drugs, especially in paediatrics [1]. A study done in the USA concerning drug prescription trends in children found that the most commonly used medication classes were antibiotics [2]. Upper respiratory tract infections (URIs) are among the most frequent infections for which antibiotics are prescribed in paediatrics [3]. Those infections are the leading cause for parents to consult primary care physicians [4]. Most URIs are caused by viruses, and hence they are self-limited and do not require antibiotic administration except in limited indications [5, 6]. It is well cited in the literature that inappropriate antibiotic prescriptions for URIs are common in ambulatory settings and as many as 10 million antibiotic prescriptions per year are directed toward respiratory conditions for which they are unlikely to provide a benefit [7].

According to the World Health Organization (WHO), antibiotic resistance is an important public health issue [8]. Several factors have been shown to promote the development of antimicrobial resistance; the most important is medical misuse of antibiotics defined by prescribing antibiotics when not indicated or for an inappropriate duration or the prescription of broad-spectrum antibiotics when more selective ones would have been sufficient [9, 10]. More than half of all community-based antibiotic prescriptions may have been unnecessary or inappropriate due to patient, physician and health system factors [11].

Physicians are facing many challenges during their daily practice regarding antibiotic prescriptions such as parental pressure, diag-

nostic uncertainty, drug promotion and over the counter (OTC) sale of antimicrobials [12-14]. Several studies have explored the knowledge, attitudes and practices of paediatricians concerning antibiotic prescriptions and evaluated the factors associated with those prescriptions [12, 15-18]. Many qualitative studies were conducted about this subject in inpatient and ambulatory paediatric settings [12, 19]. However, few quantitative studies were carried out in outpatient settings concerning antibiotic prescription in URI [20].

In Lebanon, a developing country in the Middle East, there are no national guidelines regarding antibiotics prescriptions for children with URIs. Furthermore, the Lebanese Ministry of Public Health (MOPH) considers antimicrobial resistance a serious threat according to a statement in 2015 [21]. Despite a law regulating antibiotic prescription in Beirut, a previous pilot study resulted in a rate of 42% of antibiotic dispensing without a medical prescription [22, 23]. In addition, a high proportion of Lebanese people assumed that antibiotics are used for treatment of common cold and sore throat symptoms (59%) or viral infections (53%) [24]. Parents thought that antibiotics were effective against viruses (19.2%) and both viruses and bacteria (42.6%). More than half of them didn't mind giving antibiotics to their child without a physician's prescription (58.4%), and blamed physicians for antibiotic misuse (52.5%) [25].

In this context, we conducted this study among the Lebanese paediatricians regarding their attitudes and practices regarding antibiotic prescription with a special focus on URI. To the extent of our knowledge, this is the very first national study about this subject in Lebanon.

Materials and Methods

Study Design and Sampling

A cross-sectional study was conducted in 2018 among paediatricians across the country who are registered in the Lebanese Order of Physicians (LOP) of Beirut and Tripoli. A minimum sample of n=146 was calculated based on a confidence level of 95%, a margin of error of 5%, a power of 80%, an anticipated proportion of 50% and N=1316 for the number of registered paediatricians in both orders by March 2018. E-mail addresses and phone numbers of paediatricians were provided by the Orders of Physicians. We didn't find any contact information for 103 physicians.

Study Questionnaire and Data Collection

The questionnaire included 63 questions adapted from a previous study [20]. It was divided into six sections asking about sources of knowledge, seven clinical scenarios, factors that may influence prescribing antibiotics, the attitude of physicians, interventions to promote prudent use of antibiotics and socio-demographic data.

A pilot study of 10 paediatricians was done before the survey. After the pilot study, we reformulated some questions for comprehension and we merged some repetitive questions from the third and fourth sections.

The survey was administered to all registered paediatricians in English through an Internet-based questionnaire conducted using Google Forms. It was sent by e-mail or by a message including the link to the online survey to mobile phone numbers in cases where no e-mail was provided. Reminders were sent 10 days apart to increase the response rate. Data collection was conducted from 1 May 2018 to 2 July 2018.

Statistical Analysis

The data analysis was done using Statistical Package for Social Sciences (SPSS) version 21. For the descriptive analysis, continuous variables were presented by means and standard deviations and categorical variables by frequencies and percentages.

Ethical Considerations

Participants read and approved informed consent before completing the questionnaire. Participation was voluntary and physicians were able to withdraw from the survey at any time. Confidentiality and anonymity were respected throughout the study. The ethical committee of Lebanese University waived the need for an ethical approval, taking into consideration the study's objectives and methods.

Results

Socio-Demographic Characteristics of Participants

Of the 1,213 physicians approached, 117 agreed to participate in this study, giving a response rate of ~10%. Socio-demographic characteristics are shown in Appendix A (Table A-1). Fifty-three percent of the physicians were female with a mean (±SD) age of 44.5(±12.2) years. Fifty nine percent have been practicing for more than 10 years; around 40% treated less than 50 patients per week and almost 60% had an academic position. Around one-fourth of physicians graduated as specialists in paediatrics from the American University of Beirut and 22.2% from universities abroad from Lebanon. More than half of paediatricians (54.7%) worked in an urban region only. Most participants worked in different governorates and different settings at the same time. Only nine physicians had not attended a continuing medical education event (CME) concerning antibiotics in the past three years.

Usefulness of Sources of Knowledge in the Treatment of URI

As shown in Table 1, Lebanese paediatricians considered guidelines, previous clinical experience and CME courses very important (68.4%, 71.8% and 55.6%, respectively) or important (29%, 26.5% and 39.3%, respectively) sources of information in the treatment of URI. Forty-four percent of physicians rated documentation and courses provided by the pharmaceutical industry useful.

Table 1: Usefulness of sources of knowledge in the treatment of upper respiratory tract infection:

Sources of knowledge	Very important n (%)	Important n (%)	Neutral n (%)	Not important n (%)	Not important at all n(%)
Clinical Practise Guidelines*	80 (68.4)	34 (29)	2 (1.7)	0 (0)	0 (0)
Documentation furnished by the pharmaceutical industry	15 (12.8)	52 (44.4)	36 (30.8)	10 (8.5)	4 (3.4)
Courses held by the pharmaceutical industry	14 (12)	51 (43.6)	35 (29.9)	11 (9.4)	6 (5.1)
Previous clinical experience	65 (55.6)	46 (39.3)	4 (3.4)	1 (0.9)	1 (0.9)
Continuing education courses	84 (71.8)	31 (26.5)	1 (0.9)	1 (0.9)	0 (0)
Others, e.g., contributions of specialists (microbiologists, infectious disease specialists, etc.)	57 (48.7)	51 (43.6)	9 (7.7)	0 (0)	0 (0)
Contributions of peers (of the same specialization)	27 (23.1)	62 (53)	28 (23.9)	0 (0)	0 (0)
Data collected via the Internet	12 (10.3)	53 (45.3)	38 (32.5)	12 (10.3)	2 (1.7)

* Missing data: 1 (0.9%)

Self-Reported Antibiotic Prescribing Practices of Paediatricians

Most paediatricians responded properly on giving antibiotics for pneumonia (97.4%) and sinusitis (79.5%) (cases 4 and 7). Avoiding antibiotic prescription was predominant in cases of tympanic membrane dysfunction, cough and URI (cases 1, 2 and 3) with the following percentages: 64.1%, 86.3% and 74.4%, respectively. Sixty-three percent of physicians never prescribed antibiotics for the prevention of secondary infection (case 5). In contrast, 80.3% prescribed antibiotics for pharyngitis without ordering a throat culture (case 6) (Table 2).

Table 2: Self-reported antibiotic prescribing practices of paediatricians

Clinical scenario	Correct answers n (%)	Wrong answers n (%)
Case 1: Tympanic membrane dysfunction	75 (64.1)	42 (35.9)
Case 2: Cough	101 (86.3)	16 (13.7)
Case 3: Upper respiratory tract infections	87 (74.4)	30 (25.6)
Case 4: Pneumonia	114 (97.4)	3 (2.6)
Case 5*: Prevention of secondary infection	73 (62.4)	42 (35.9)
Case 6: Pharyngitis	23 (19.7)	94 (80.3)
Case 7 †: Sinusitis	93 (79.5)	21 (17.9)

* Missing data: 2 (1.7%), † Missing data: 3 (2.6%)

Factors Influencing Antibiotic Prescriptions for URI

Factors that contributed to an increase in prescription patterns were preventing serious complications (65%), second visit for the same problem (50.4%), purulent discharge (37.6%), diagnostic (35%) or treatment uncertainty (26.5%). Treatment guidelines decreased antibiotics prescriptions by only 55.6%. Most of the physicians thought that the child's return to school, parents' requests and expectations, drug promotion, parents' satisfaction, fever, purulent nasal discharge and receiving an antibiotic for similar symptoms did not change their practice with frequencies ranging from 60% to 94% (Table 3).

Table 3: Factors influencing antibiotic prescriptions for upper respiratory tract infection

Variable	Increased antibiotics prescriptions n (%)	Decreased antibiotics prescriptions n (%)	No change n (%)
Productive cough with purulent sputum	44 (37.6)	4 (3.4)	69 (59.0)
Second visit for the same problem	59 (50.4)	2 (1.7)	56 (47.9)
Fever (> 38° C)	29 (24.8)	3 (2.6)	85 (72.6)
Purulent nasal discharge	32 (27.4)	9 (7.7)	76 (65.0)
Patient had received an antibiotic for similar symptoms in the past	29 (24.8)	11 (9.4)	77 (65.8)
Patient needed to return to school*	11 (9.4)	2 (1.7)	103 (88)
Parents' request/expectation	20 (17.1)	2 (1.7)	95 (81.2)
Diagnostic uncertainty	41 (35.0)	16 (13.7)	60 (51.3)
Parent satisfaction	10 (8.5)	5 (4.3)	102 (87.2)
Treatment uncertainty*	31 (26.5)	14 (12.0)	71 (60.7)
Treatment guidelines*	20 (17.1)	65 (55.6)	31 (26.5)
Drug promotion	4 (3.4)	3 (2.6)	110 (94.0)
To prevent serious complications	76 (65.0)	2 (1.7)	39 (33.3)

* Missing data: 1 (0.9%)

Attitudes of Paediatricians

Around 40% of the physicians stated they strongly agreed and agreed that advising parents reduces their expectations for antibiotics and that prior antibiotic use increases the personal risk of developing resistance (46.2%, 41.9%; 47.9%, 41.9%, respectively). Answers from paediatricians with respect to antibiotic use as being a notable factor in their community were agree (52.1%) and strongly agree (41.9%). Physicians strongly agreed and agreed that they prescribe antibiotics when there is a clear indication (66.7%, 29.1%, respectively). Sixty-two percent of physicians were confident that antibiotics were necessary when prescribed. Three-fourths of paediatricians agreed that rapid and effective diagnostic techniques are required for the diagnosis of URI (54.7% agreed and 21.4% strongly agreed). Most of the doctors agreed and strongly agreed (54.7%, 23.1%, respectively) that parents are convinced that antibiotics should be prescribed for cold and flu symptoms. Physicians believed that if parents felt their child needed antibiotics, they would manage to obtain antimicrobials from a pharmacy without a prescription (45.3% agreed and 25.6% strongly agreed). Opinions were divided among prescribing antibiotics when there is doubt in the bacterial aetiology: 35% of paediatricians approved, 30.8% disapproved and 26.5% were neutral. The use of wide spectrum antibiotics in cases of doubt in diagnosis or aetiology of URI was refuted by 45.3% and 17.9% who disagreed and strongly disagreed, respectively. As for prescribing antibiotics where it is impossible to conduct a systematic follow up, 43.6% of paediatricians were adherent and 31.6% disagreed. Forty percent of physicians disapproved when asked whether they would prescribe antibiotics to gain parents' trust. Paediatricians were against prescribing antibiotics if not indicated because of lack of time (65% strongly disagreed and 29.1% disagreed). Most of the physicians did not agree that it is difficult for them to withhold antibiotics for cold and flu symptoms because other clinicians prescribe antibiotics for these illnesses (47% strongly disagreed and 35% disagreed). Paediatricians highly supported and approved the use of amoxicillin + clavulanic acid more than amoxicillin alone for treating most URIs (44.4%, 24.8%; 43.6% and 13.7%, respectively). Antibiotic resistance is considered a worldwide problem by physicians, on both the national and the community level (53%, 53.8% and 48.7% strongly agreed and 41%, 38.5% and 41% agreed, respectively) (Appendix B: Table B-1).

Promoting Prudent Use of Antibiotics in Paediatrics

When asked about what would aid the prudent use of antibiotics in paediatrics on the national level, around 80% of physicians answered that antibiotics should be dispensed only with a medical prescription; parents' education and physicians' CME were also cited. Sixty-one percent thought that media campaigns promoting judicious use of antibiotics should be done.

Discussion

In comparison to Canadians doctors, Lebanese colleagues used antibiotics more appropriately in cases of tympanic membrane dysfunction and cough from sinusitis (first and last cases) (64.1% versus 43.5%, 79.5% versus 24.5%, respectively). Answers to cases of URI, pneumonia and pharyngitis (cases 3, 4 and 6) were almost identical. As for treating cough and prevention of secondary infections (cases 2 and 5), Lebanese paediatricians prescribed more inappropriate antibiotics in these cases (86.3% versus 94%, 62.4% versus 82%, respectively) [20]. These findings suggest that Lebanese paediatricians had an acceptable use of antibiotics but need more training to improve their practice, especially regarding

management of pharyngitis and antibiotic prophylaxis.

Several factors influence practitioners' decisions in prescribing antibiotics. Lebanese physicians are in favour of prescribing antibiotics due to the presence of purulent discharge and fever, but less than their Indian colleagues as shown in two previous studies (37.6% compared to 65–88.6% for discharge, 24.8% versus 40–72.5% for fever). This emphasizes that Lebanese doctors are following the indication of antibiotic use in an optimal way. Diagnostic or treatment uncertainty could increase antibiotic prescriptions for 35% and 26.5% of physicians, respectively, compared to 59% and 53.3% of Indian practitioners, respectively [18]. Our findings corroborate results from other studies showing that physicians prescribe antibiotics when they are not certain about the diagnosis [12]. Therefore, developing clinical tools or laboratory tests can aid physicians in making the correct diagnosis. Guidelines in Lebanon were found to decrease antibiotics prescriptions more than in India (55.6% compared to 40.6%) [18]. Thus, adherence to international guidelines is key in decreasing antibiotic misuse in Lebanon. However, in the absence of a national recommendation, it is useful to consider implementing such guidelines. Preventing serious complications increased antibiotics prescriptions in 65% of Lebanese physicians versus 79% of Indians [18]. Half of the Lebanese clinicians increased antimicrobial prescriptions after the second visit for the same problem, confirming that this factor is related to overprescribing [19]. Those two findings can be justified because physicians feel that they are on the safe side when they prescribe antibiotics. Most Lebanese practitioners believed that parents' requests and expectations, drug promotion and parent satisfaction did not change their practice more than Indian physicians (81.2%, 94% and 87.2% compared to 57.2%, 60.7% and 64.2%, respectively) [18]. Thankfully, pharmaceutical companies' promotional campaigns did not have an influence on Lebanese paediatricians at a greater rate when compared to their Indian colleagues (94% and 57%, respectively) [26]. These findings contradict the studies conducted by Lucas at al. and Rezal et al., who found that clinicians reported prescribing antibiotics due to pressure exercised by drug companies [12, 13].

Overall, the percentage of Lebanese paediatricians who increased their antibiotic prescriptions due to several factors was lower than their international colleagues, which is promising and confirms once again that our physicians have a good level of practice.

When it comes to paediatricians' opinions about antibiotics, most of them admitted that antibiotic use is a notable factor in their community beyond what was found by in Canada (94% compared to 77%); maybe this problem is more critical in developing countries [20]. Similarly, the majority stated that antibiotic resistance is a concern on the national and international level as stated by the MOPH and WHO [8, 21]. Lebanese doctors are aware of the burden of antibiotic resistance. Eighty-eight percent of Lebanese physicians are convinced that educating parents will control their demand for antibiotics compared to 93.5% of Canadian physicians [20]. Lebanese doctors believed more than their Canadian colleagues that prior antibiotic use increases the risk of developing resistance (89.9% compared to 71.8%) [20]. This confirms that physicians are aware of the principles of antibiotic resistance. In addition, about three-fourths of Lebanese practitioners acknowledged that parents believe that they should prescribe antibiotics for flu and cold symptoms, which points out the public misconceptions about antibiotics that need to be corrected. Seven paediatricians out of 10 recognized that if a parent feels that his child needs antibiotics, he will manage to obtain antimicrobials from a pharmacy without a prescription indicating OTC sale of antibiotics. Almost half of the paediatricians agreed that they would prescribe antibiotics if it were difficult to conduct a follow-up echoing overprescribing due to non-clinical factors. This is not an indication by itself for antibiotics, and parents should be educated on how to observe the child and recognize symptoms that need a follow-up consultation. Amoxicillin with clavulanic acid are the first choices for most URIs, even more than amoxicillin, while guidelines agree that amoxicillin is the first-line treatment [28]. This can be explained by the fact that Lebanese paediatricians opt for this drug assuming coverage of beta-lactamase bacteria. However, in the absence of local microbiological studies this attitude is not justified. Six out of ten physicians were against prescribing wide spectrum antibiotics in cases of doubt in diagnosis or aetiology of URI, and 88.5% disagreed that they might prescribe antibiotics so that parents continue to trust them. This emphasizes once again that Lebanese clinicians are cautious when prescribing antibiotics. Most paediatricians were opposed to prescribing antibiotics if not indicated because of time pressure. This differs from other studies where lack of time during consultation was an incentive to prescribe antibiotics and highlights judicious use of antibiotics in more than half of paediatricians [19].

Strengths and Limitations

Primarily the innovativeness of this study is a major strength. To the extent of our knowledge, this is the first study of its kind to be conducted on this subject in Lebanon and the Middle East region. Second, the study included physicians from different regions across the country, who graduated from different universities and were practicing in different settings and was not limited to one geographic area or to university hospitals. Moreover, administering the survey online allowed complete anonymity, which contributes to less information bias.

As for the study limitations, a selection bias may be present due to missing data in physicians' contact lists provided by the Order of Physicians. Secondly, the response rate was low making generalizability very difficult, and the minimal sample size needed was not reached. Unfortunately, not all Lebanese physicians are interested in participating in research. Finally, practices of physicians were evaluated based on self-reported practices for clinical scenarios instead of the actual practice; hence, there will be an information bias. This might lead to an underestimation of the prevalence of inappropriate attitudes and prescribing behaviours. In fact, prescribing a medication is a multifaceted behaviour and it is extremely difficult to measure in real practice unless we conduct

a patient-simulated study and the latter might have some ethical considerations to take into account.

Conclusion

This study identifies the practice patterns of paediatricians and their attitudes regarding antibiotic usage. Implementation of national guidelines regulating prescribing antibiotics in Lebanon is urgent as well as ensuring CME for doctors concerning antibiotic use. Law enforcement regarding restricting selling OTC antibiotics must be applied to decrease antibiotic self-medication. Media, especially social media, can also play a role in spreading awareness to the public about prudent antibiotic use.

Further studies focusing on paediatricians' antibiotics prescription practices or targeting other primary care physicians are highly praised.

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Appendix A

Table A-1: Socio-demographic data of paediatricians

Variable	n (%)
Age * (Mean±SD)	44.5 +/_ 12.2
Gender	
Male	55 (47)
Female	62 (53)
Marital status	
Married	91 (77.8)
Single	20 (17.1)
Widowed/divorced	5 (4.3)
Missing data	1 (0.9)
Children	
Yes	88 (75.2)
No	29 (24.8)
Years of practice	
< 5 years	27 (23.1)
5-10 years	21 (17.9)
> 10 years	69 (59)
University of graduation	31 (26.5)
AUB	25 (21.4)
USJ	15 (12.8)
Lebanese University	2 (1.7)
USEK	2 (1.7)
Balamand	1 (0.9)
BAU	2 (1.7)
LAU	2 (1.7)
Makassed	26 (22.2)
Abroad	11 (9.4)
Missing data	
Region of practice	
Urban	64 (54.7)
Rural	5 (4.3)
Urban and rural	46 (39.3)
Missing data	2 (1.7)

Table A-1: Socio-demographic data of pediatricians (continued)

Variable	n (%)
District of practice	
Beirut	57 (48.7)
Mount Lebanon	52 (44.4)
North and Akkar	21 (17.9)
South and Nabatieh	14 (12.8)
Bekaa and Hermel	4 (3.7)
Abroad Lebanon	3 (2.7)
Missing data	2 (1.7)
Practice settings	
Private clinic	105 (89.7)
Private hospital	92 (78.6)
Public clinic	17 (14.5)
Public hospital	12 (10.2)
Missing data	2 (1.7)
Academic position	
Yes	47 (40.2)
No	69 (59)
Missing data	1 (0.9)
Number of patients weekly	
< 50	51 (43.6)
50-100	43 (36.8)
100-150	16 (13.7)
> 150	6 (5.1)
Missing data	1 (0.9)
Attended CME	
Yes	108 (92.3)
No	9 (7.7)

* Missing data: 23 (19.6%)

Appendix B

Table B-1: Attitudes of paediatricians

	Strongly disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly agree n (%)
Giving parents advice reduces expectation for antibiotics.	3 (2.6)	5 (4.3)	6 (5.1)	49 (41.9)	54 (46.2)
Prior antibiotic use increases personal risk of developing resistance.	3 (2.6)	5 (4.3)	4 (3.4)	49 (41.9)	56 (47.9)
Antibiotic use is a notable factor in my community.	0 (0)	3 (2.6)	4 (3.4)	61 (52.1)	49 (41.9)
I prescribe antibiotics if there is a clear indication *.	0 (0)	1 (0.9)	3 (2.6)	34 (29.1)	78 (66.7)
In a primary-care context, one should wait for the microbiology results before treating an URI.	0 (0)	30 (25.6)	31 (26.5)	39 (33.3)	17 (14.5)
Rapid and effective diagnostic techniques are required for the diagnosis of URI.	2 (1.7)	9 (7.7)	17 (14.5)	64 (54.7)	25 (21.4)
I avoid prescribing antibiotics if I am concerned about side effects *.	2 (1.7)	18 (15.4)	25 (21.4)	57 (48.7)	14 (12.0)
I prefer not to prescribe antibiotics because of drug resistance *.	1 (0.9)	16 (13.7)	17 (14.5)	48 (41.0)	34 (29.1)

The choice of antibiotic, when indicated, depends on the acceptability of the child for the taste of the drug.	5 (4.3)	26 (22.2)	22 (18.8)	55 (47.0)	9 (7.7)
I provide parents a delayed antibiotic prescription in case the child deteriorates *.	14 (12.0)	27 (23.1)	23 (19.7)	4 (3.4)	48 (41.0)
Most parents think I should prescribe antibiotics for cough, cold and flu symptoms.	3 (2.6)	17 (14.5)	6 (5.1)	64 (54.7)	27 (23.1)
I am convinced that new antibiotics will be developed to solve the problem of resistance.	14 (12.0)	31 (26.5)	30 (25.6)	36 (30.8)	6 (5.1)
The use of antibiotics on animals is an important cause of the appearance of new resistance to pathogenic agents in humans.	6 (5.1)	11 (9.4)	36 (30.8)	44 (37.6)	20 (17.1)
In case of doubt (in diagnosis or aetiology of an URI), it is preferable to use a wide-spectrum antibiotic to ensure that the patient is cured	21 (17.9)	53 (45.3)	10 (8.5)	33 (28.2)	0 (0)
I prescribe an antibiotic in situations in which it is impossible for me to conduct a systematic follow-up of the patient.	3 (2.6)	37 (31.6)	23 (19.7)	51 (43.6)	3 (2.6)
I prescribe antibiotics so that parents continue to trust me.	48 (41.0)	52 (44.4)	9 (7.7)	4 (3.4)	4 (3.4)
In situations of doubt as to whether a disease might be of bacterial aetiology, it is preferable to prescribe an antibiotic for URI.	8 (6.8)	36 (30.8)	31 (26.5)	41 (35.0)	1 (0.9)
When I prescribe an antibiotic for a URI, I am confident that the antibiotic is necessary.	3 (2.6)	13 (11.1)	5 (4.3)	73 (62.4)	23 (19.7)
I prescribe antibiotics, even when I know that they are not indicated because I do not have the time to explain to the parents the reason why antibiotics are not necessary.	76 (65.0)	34 (29.1)	2 (1.7)	2 (1.7)	3 (2.6)
It is hard for me to withhold antibiotics for cough, cold and flu symptoms because other clinicians in my community prescribe antibiotics for these illnesses *.	55 (47.0)	41 (35.0)	8 (6.8)	9 (7.7)	3 (2.6)
In a primary-care context, amoxicillin is useful for treating most URI.	13 (11.1)	19 (16.2)	18 (15.4)	51 (43.6)	16 (13.7)
In a primary-care context, amoxicillin+clavulanic acid is useful for treating most URI*.	8 (6.8)	17 (14.5)	10 (8.5)	52 (44.4)	29 (24.8)
The choice of antibiotic, when indicated, depends on the cost of the medication *.	18 (15.4)	43 (36.8)	26 (22.2)	28 (23.9)	1 (0.9)
When prescribing antibiotics I prefer to choose brand-name drugs more than generics.	10 (8.5)	21 (17.9)	32 (27.4)	42 (35.9)	12 (10.3)
If a parent feels that his child needs antibiotics, he will manage to obtain them from a pharmacy without a prescription.	12 (10.3)	12 (10.3)	10 (8.5)	53 (45.3)	30 (25.6)
Antibiotic resistance is a problem in my community.	2 (1.7)	1 (0.9)	9 (7.7)	48 (41.0)	57 (48.7)
Antibiotic resistance is a problem on the national level.	1 (0.9)	0 (0)	8 (6.8)	45 (38.5)	63 (53.8)
Antibiotic resistance is a problem worldwide *.	1 (0.9)	2 (1.7)	3 (2.6)	48 (41.0)	62 (53.0)

The phenomenon of resistance to antibiotics is mainly a problem in hospital settings *.	9 (7.7)	34 (29.1)	15 (12.8)	35 (29.9)	23 (19.7)
Two of the main causes of the appearance of antibiotic resistance are patient self-medication and antibiotic misuse *.	1 (0.9)	1 (0.9)	2 (1.7)	37 (31.6)	75 (64.1)

* Missing data: 1 (0.9%)

URI: Upper respiratory tract infection