Medical Science

pISSN 2321–7359; eISSN 2321–7367

Parent's awareness of antibiotic use for upper respiratory tract infection in children, in Ha'il region, Saudi Arabia

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To Cite:
Alshammari R, Aldhmadi A, Alreshidi A, Alsanea S, Almarshadi A, Alshammari A, Alrashidi R, Alkhateeb A, Alghaslan S. Parent's awareness of antibiotic use for upper respiratory tract infection in children, in Ha'il region, Saudi Arabia. Medical Science, 2022, 26, ms231e2255.
doi: https://doi.org/10.54905/disssi/v26i124/ms231e2255

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Peer-Review History
Received: 21 April 2022
Reviewed & Revised: 23/April/2022 to 12/June/2022
Accepted: 13 June 2022
Published: 18 June 2022

Peer-review Method
External peer-review was done through double-blind method.

URL: https://www.discoveryjournals.org/medicalscience

ABSTRACT

Background: Upper respiratory tract infections are the commonest cause of self-limiting respiratory disease. This study aims to assess the knowledge, awareness and practices regarding the use of antibiotics among parents in Ha'il region. *Materials and methods:* A randomized cross-sectional study conducted using a pre-validated pre-translated electronic questionnaire distributed through social media platforms. This study includes parents who are Ha'il region residents. *Results:* A total of 386 respondents were included and most respondents (82.9%) identified doctors as the main source of information about the use of antibiotics, followed by social media (30%), and friends and relatives (30%). *Conclusion:* Respondents were lacking in terms of knowledge and practices regarding the use of antibiotics and their consequences.

Keywords: Upper respiratory tract infections, Pediatrics, Antibiotics and URTI, Saudi Arabia.

1. INTRODUCTION

Upper respiratory tract infection (URTI) is an infection that causes swelling and irritation of the airways in the upper respiratory tract associated with cough and no sign of pneumonia. It is an acute disease most commonly during the cold winter months. It can be caused by bacteria and viruses, but mostly viral in origin, with *Rhinovirus* and *Adenovirus* being the most prevalent. URTIs are thought to be the most prevalent reason for children's visiting the outpatient clinics and emergency department (Nadeem *et al.*, 2010). It is cost-ineffective for both the healthcare system and the society, also considered as the leading cause for absenteeism from school (Cotton *et al.*, 2008). As a result, it is evaluated and followed up in an outpatient facility. Reassurance, education, and symptomatic care are all that is needed in most cases of URTI. Prescription of antibiotics for URTI is a typical ineffective

procedure because of its origin (Davey *et al.*, 2002; Alumran *et al.*, 2013; Bhanwra, 2013).

In primary health care facilities, antibiotics considered among the most widely prescribed medications for URTIs (Gaur *et al.*, 2005; Alanazi *et al.*, 2015). Many studies have proven that the use of over the counter (OTC) medications and the non-indicated prescription of antibiotics to treat URTIs is on the rise, which is leading to the development of antimicrobial resistance (Turnidge and Christiansen, 2005; Davies and Davies, 2010; Ventola, 2015). Both physicians and parents are to blame for the escalation of this severe dilemma (Paluck *et al.*, 2001). Even after the education by the healthcare provider, some parents still request the prescription of antibiotics for their child's URTI (Palmer and Bauchner, 1997; Mangione-Smith *et al.*, 1999). The indications and risks of using OTC antibiotics are not well understood by parents (Alrafiaah *et al.*, 2017).

Antibiotic resistance has thankfully been recognized as a serious public health problem, as the development of new antibiotics is no longer keeping up with the proliferation of increasingly resistant bacteria (Nash *et al.*, 2002). This led us to consider parents' understanding, attitudes, and practices about the use of antibiotics for URTIs in order to develop effective interventional instructional programs and raise concerns about antibiotic overuse.

2. MATERIALS AND METHODS

Participants and procedure

Using a cross-sectional design, an anonymous online questionnaire survey was used to assess parents' awareness of antibiotic use in URTIs in children, in Ha'il Region, Saudi Arabia. The calculation of the sample size was done using a Raosoft sample size online calculator. The needed sample size was estimated to be 380 participants. This study was conducted over a period of 2 months, extending from December 2021 to January 2022. Inclusion criteria included parents of children residing in Ha'il region. Informed consent of all participants obtained via the online survey and agreement to complete the anonymized online questionnaire was accepted as a willingness to enroll in the study.

Measures

The KAP survey assesses the population's knowledge (what they know), attitudes (how they feel), and behaviors (how they act). Our study used a pre-translated, pre-validated online questionnaire that was collected from a study in Al-Qassim, Saudi Arabia (Alsuhaibani *et al.*, 2019) with a 95% confidence level and a 5-percentage-point margin of error. Five questions asked about demographics, six questions about knowledge, four questions about attitude, and four questions about the practice were included in the structured questionnaire. The knowledge and attitude questions used a three-point Likert scale to represent emotions: disagree, uncertain, and agree, while the practice questions used a four-point Likert scale to express frequency: never, rarely, sometimes, and always.

Statistical analysis

The Statistical Package for Social Sciences was used to analyze the data (SPSS, version 23). Continuous variables were expressed as mean standard deviation, whereas categorical variables were expressed as percentages. For each domain, a mean score was calculated (knowledge, Attitude, and Practice). To determine the nature of data distribution, the Kolmogrov-Smirnov test was used. The difference was assessed using inferential statistics (Mann–Whitney U test and Kruskal Wallis H tests). For the Mann–Whitney U test and the Kruskal Wallis H test, a p-value of 0.05 was considered significant.

3. RESULTS

In our study, a total of 386 participants were included, most of the participants were females (56%). The vast majority of respondents' age ranged between 31 and 50 years with a percentage of 70.2%. Regarding education, 67.1% of the subjects had a bachelor's degree. However, 44.8% of the participants had a middle-income level ranging between 10,000 and 20,000 Saudi Riyal (SAR). About half of the participants had three to five children (51%). Table 1 shows the distribution of socio-demographic profiles of studied subjects.

Table 1 Socio-demographic profiles of study subjects

Demographic data		Number	Percentage %
Gender of the parents	Male	170	44.0%
	Female	216	56.0%

Age of the parents	20-30 years	65	16.8%
	31-40 years	136	35.2%
	41-50 years	135	35.0%
	>50 years	50	13.0%
Level of education	Elementary school	11	2.8%
	Secondary school	6	1.6%
	High school	66	17.1%
	Bachelor's degree	259	67.1%
	Postgraduate study	44	11.4%
Average financial income for the family	Less than 5,000	42	10.9%
	5,000-10,000	118	30.6%
	10,000-20,000	173	44.8%
	More than 20,000	53	13.7%
Number of children	1-2 children	120	31.1%
	3-5 children	197	51.0%
	>5 children	69	17.9%

Knowledge

Doctors were identified as the primary source of knowledge about the use of antibiotics by nearly all of the participants 82.9%, followed by social media, friends and relatives, TV, others, and newspapers (30%,30%, 7.8%, 6%, 3.4% respectively). The majority of the parents 61.7% (n=238) disagreed that every child with fever is recommended to take antibiotics whereas, 20.2% (n=78) agreed. Only 37.3% (n=144) of participants agreed that viral infections cause most of the URTIs. However, 43.2% (n=167) of parents believed that antibiotics will shorten the time it takes for recovery from flu symptoms. Moreover, the majority of the respondents 73.3% (n=283) knew that antibiotics have side effects. Fifty-two-point six percent of parents (n=274) agreed that improper and overuse of antibiotics could reduce antibiotic efficacy and leads to bacterial resistance. In addition, 43.5% (n=168) were uncertain regarding whether antibiotics can prevent any complications associated with URTIs, while 38.1% (n=147) agreed. The participants' answers to the questions about knowledge are demonstrated in Figure 1.

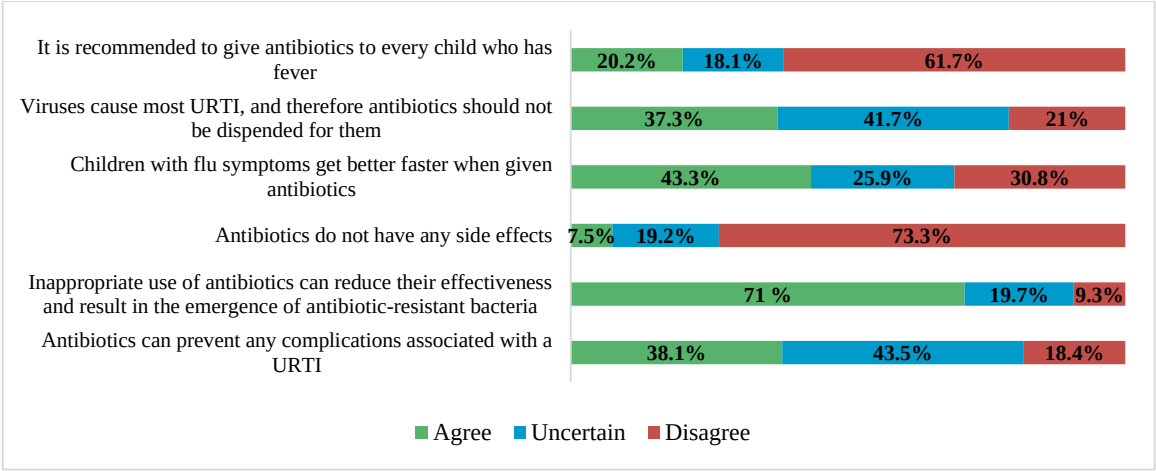

Figure 1 Parents' knowledge toward antibiotics uses in URTI.

Attitude and expectation

Most parents (76.9%) will wait 1-2 days to visit the pediatrician after their children develop URTI symptoms with a mean duration of 2.75± 0.87 days, while only 2.1% would not wait. The majority of parents 66.1% (n=255) expected that physicians will prescribe antipyretics and analgesics as a treatment for URTI in their children. However, 64.5% (n=249) of parents chose antibiotics as the possible treatment given by doctors to their children. Furthermore, 38.6% (n=149) chose antitussive and expectorants as expected treatment when they visit the pediatrician. Whereas 29% (n=112) expected the pediatrician to recommend body rest and warm fluids, 26.2% (n=101) antihistamines, and 22.5% (n=87) inhalers. Fever 61.7% (n=237) and sore throat 52.3% (n=201) were the most

expected symptoms by the parents that indicate antibiotics to be given to their children followed by cough 22% (n=85), lethargy and lack of appetite 21.5% (n=83), change in voice 17.9% (n=69) and runny nose 7.8% (n=30).

Only a few 20.2% (n=78) of participants would always give their children antibiotics without prescription because it has been prescribed to them previously for the same symptoms, while 19.9% (n=77) would follow the pharmacists' recommendations to use antibiotics, and 9.8% (n=38) stated that they don't have the ability or time to visit the paediatrician. However, 66.3% (n=256) would never give their children antibiotics according to relatives or co-workers' recommendations. About two-third 63% (n=243) of respondents believed that antibiotics were used in excess and in unnecessary cases, also 40.4% (n=156) agreed that most respiratory infections will be relieved without using antibiotics. Moreover, 46.9% (n=181) of parents would go to another pediatrician if the current pediatrician prescribes antibiotics at each visit. Figure 2 demonstrates the parents' attitude towards antibiotics use in URTI.

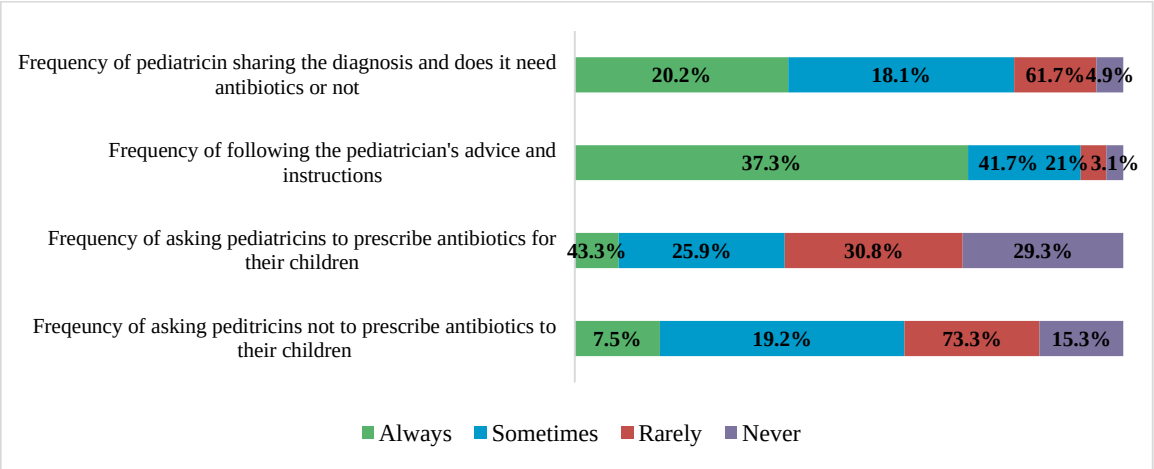

Figure 2 Parents' attitude towards antibiotics uses in URTI.

Practice

Approximately, 80% of parents were adequately informed by the pediatrician about the diagnosis of their children and whether they need to use antibiotics or not, near third 32.4% (n=125) of parents rarely asked the pediatrician to prescribe an antibiotic for their children. Whereas, 30.3% (n=117) would ask them to give their children antibiotics. In addition, 71.8% (n=277) of parents stated that they adhere to their pediatrician's instructions and advice about the dose and duration of use for antibiotics. Figure 3 shows the participants' response regarding their practice toward antibiotic use in URTI.

We compare mean KAP scores of each domain with various demographic variables using inferential statistics such as Mann-Whitney U and Kruskal Wallis H tests. The test results are listed in Table 2. A p value of < 0.05 was used to determine statistical significance. Result obtained for knowledge showed that there was no significant difference in knowledge score with any of demographic factors. Meanwhile, there were significant differences for both attitude (p=0.047) and practice (p=0.003) between males and females. Females showed better attitude and practice than males. However, parents with age ranged between 31 and 40 years showed a significant difference in practice (p=0.003). For income, participants with middle-income level 10,000 to 20,000 SAR showed better attitude (p=0.05). Lastly, a significantly higher difference was observed between mean practice score for parents who had 3-5 children than others (p=0.010). Other demographic variables did not show any statistically significant differences in scores.

Table 2 Association between mean KAP score and demographic variables

Variable	Mean Knowledge score (2.92 ± 0.047)		Mean Attitude score (2.12 ± 0.058)		Mean Practice score (2.94 ± 0.044)	
	Mean Rank	P-value	Mean Rank	P-value	Mean Rank	P-value
Gender**						
Male	182.08	0.072	180.98	0.047*	174.55	0.003*
Female	202.49		203.35		208.42	
Age group***						
20-30 years	199.81	0.549	199.18	0.121	175.25	0.003*
31-40 years	200.56		202.04		221.40	

41-50 years	182.51		175.71		180.79	
>50 years	195.75		210.91		175.66	
Education level***						
Elementary school	178.68	0.099	172.59	0.252	156.32	0.199
Secondary	182.58		178.58		231.33	
High school	176.24		169.54		170.44	
Bachelor's degree	191.91		197.58		200.63	
Post graduated study	233.94		212.67		190.25	
Financial income level***						
Less than 5,000 SAR	164.92	0.205	166.35	0.05*	164.86	0.195
5,000-10,000 SAR	187.11		182.83		187.68	
10,000-20,000 SAR	202.34		209.84		203.71	
More than 20,000 SAR	201.50		185.42		195.82	
Number of children***						
1-2 children	191.81	0.063	201.65	0.193	196.03	0.01*
3-5 children	203.66		195.90		204.34	
>5 children	167.41		172.48		158.14	

*The significance level is .05. ** Independent samples Mann-Whitney U Test.

*** Independent-Samples Kruskal-Wallis H Test.

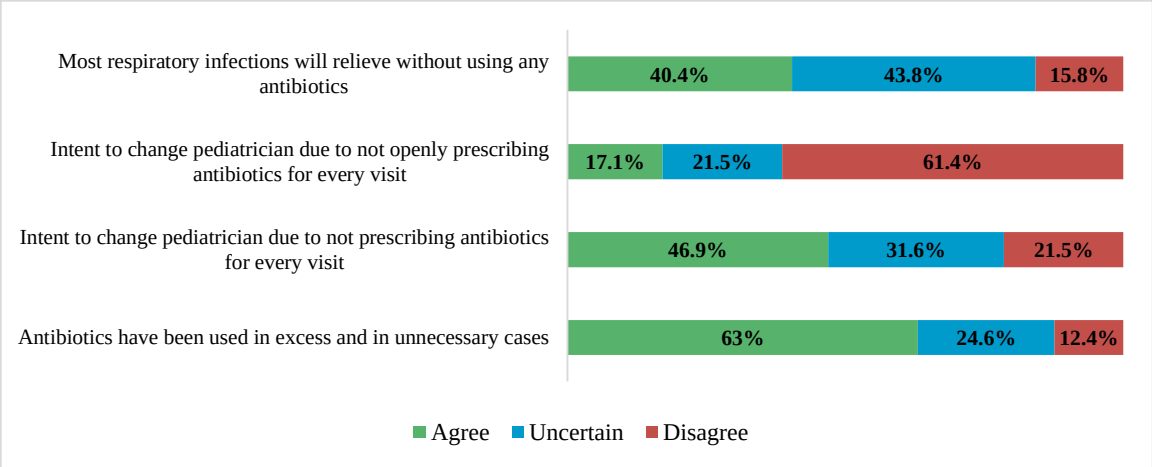

Figure 3 Parents' response regarding their practice toward antibiotic use in URTI.

4. DISCUSSION

The current study included 386 subjects of Ha'il residents, Saudi Arabia, most of them were educated mothers with 3-5 children. It was found that nearly all participants were well aware of the antibiotic's appropriate use and misuse and also their side effects. Half of them agreed that the overuse of antibiotics develops resistance to antibiotics. Apart from this, there were many that were uncertain about the dilemma. With respect to knowledge, 82% of parents choose doctors as their primary source of information. Accordingly, the majority of Al-Dossari's participants agreed with the statement. This highlights the degree of certainty, confidence, and trusts the parents place in their relationship with pediatricians. Moreover, one-third of them agreed upon using antibiotics based on the suggestion of their relatives and friends. These findings are supported by the most recent study conducted in 2021, where 23% use antimicrobial drugs when their family members, relatives, or friends advise them to do so (Al-Dossari, 2013).

In the current study, 73% were aware antibiotics have side effects. Contradictory results were found in a study conducted in Taif city of Saudi Arabia, where parents were unaware of the adverse effects of drugs and the emergence of drug resistance associated with the misuse of antibiotics (Elbur *et al.*, 2016). Contrary to the fact that our study covers most educated parents with bachelor's

degrees. More than half of parents expected to receive antibiotics from a pediatrician (Elbur *et al.*, 2016). Supported by our study, 60% of parents unequivocally admitted that they expect their doctor to prescribe antibiotics if their children have symptoms of URTI. This expectation is the result of inadequate knowledge and can be a powerful factor leading to parental need for antibiotics. In addition, these findings direct the role of physicians in raising awareness of the upsurge of antibiotic resistance. Nearly all participants agreed that respiratory infections are relieved without the use of antibiotics.

The residents of Ha'il, Saudi Arabia, were willing to wait for only one day before they visit a pediatrician after the development of URTI symptoms. The same question was asked to parents living in Makkah region. More than half (76.9%) stated they would visit a pediatrician within 1-2 days, and 2.1% would consult a pediatrician on the same day. It was found that 19.9% follow the recommendations of the pharmacist. But according to a recent study, 8% go for pharmacist recommendations (Faidah *et al.*, 2019). So, the percentage of parents seeking those antimicrobial drugs reported in this study was almost double the percentage of parents who had similar anticipation of antibiotics. About two-thirds (61.7%) of respondents agreed that fever is an expected symptom when a child encounters URTIs.

A similar study estimated that nearly all participants (80.5%) agreed on the statement and also considered earache as a worrisome symptom of URTIs. These findings may be largely due to parents' fear of a fever-related problem and their lack of knowledge about fever. A substantial percentage of respondents believed that antibiotics are used in excess and in unnecessary conditions. Another study concluded that parents understood the misuse of antibiotics reduces the effectiveness of antibiotics and increases resistance to antimicrobials (Alsuhaibani *et al.*, 2019). Over half of the participants move on to another pediatrician if the former prescribes antibiotics on each visit.

This study is in accordance with the study of Alwahhabi *et al.*, (2021) where parents also changed their pediatrician if he does not recommend antibiotics or prescribe the same antibiotics on each visit. Nearly all parents consult a pediatrician about whether to give antibiotics to their child or not. More than one quarter (30%) request their doctors to prescribe antibiotics. The findings are contradictory to the study of Alwahhabi *et al.*, (2021) where more than half of the participants ask their physician to prescribe antibiotics for their child. The fact is parent's self-prescribe antibiotics to their children because of free access to them. So, there is no need to ask a doctor to prescribe antibiotics. It was also documented that parents honestly admitted that they gave their child antimicrobials without any consultation with the pediatrician.

5. CONCLUSION

To summarize, it is suggested that respondents had limited understanding of antibiotics resistance and awareness on antibiotics misuse. Therefore, we recommend that conducting awareness programs for parents on the use of the antibiotics, which help reduce its use. Besides, it is also important to establish guidelines for Acute URTI-based clinical practice for physicians.

Acknowledgement

We thank the participants who were all contributed samples to the study and to our data collectors. We thank the participants who were all contributed samples to the study and to our data collectors Hassan Alshammari, Sultan Altamimi, and Abdulrahman Alsharari.

Ethical approval

The study was approved by the Research Ethics Committee at the University of Ha'il (Ethical approval code: H-2021-227).

Authors' contributions

Reem Alshammari: Study design, manuscript editing, manuscript review, approval of the version.

Abdulilah Aldhmadi: Study design, questionnaire design, data analysis, data interpretation, manuscript editing, manuscript review, approval of the version.

Ahmed Alreshidi: Literature review, study design, questionnaire design, manuscript editing, manuscript review, approval of the version.

Saleh Alsanea: Literature review, questionnaire design, manuscript preparation, manuscript editing, manuscript review, approval of the version.

Abdulaziz Alshammari: Questionnaire design, data interpretation, manuscript preparation, manuscript review, approval of the version.

Alreem Almarshadi: Questionnaire design, data analysis, data interpretation, manuscript editing, manuscript review, approval of the version.
Rinad Alrashidi: Questionnaire design, data analysis, data interpretation, manuscript preparation, manuscript review, final approval of the version.
Abdulrahman Alkhateeb: Manuscript preparation, manuscript review, final approval of the version.
Sulaiman Alghaslan: Manuscript preparation, manuscript review, final approval of the version.

Funding
This study has not received any external funding.

Conflicts of interest
The authors declare that there are no conflicts of interests.

Data and materials availability
All data associated with this study are present in the paper.

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