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Knowledge and attitude towards antibiotics use among mothers attending pediatric clinics in king Saud medical city, Riyadh, Saudi Arabia 2021

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Abstract
Background: Upper respiratory tract infections (URTIs) are particularly common in children and are a major source of antibiotic misuse, which leads to antibiotic resistance development.
Aims: To assess the Knowledge and Attitude towards antibiotics use among mothers Attending pediatric clinics in King Saud medical city |(KSMC), Riyadh, Saudi Arabia.
Materials and Methods: This cross sectional study was conducted in pediatric clinics in KSMC, Riyadh, Saudi Arabia between March 2021 and August 2021. Desired population in this study was mothers of children aged ≤ 14 years Attending pediatric clinics in KSMC, Riyadh, they were selected via a convenient non-probability sampling technique. Data was collected using self-administered questionnaire and analysis was performed using (SPSS).
Results: A total of 422 mothers participated in this study. 77.3% of the parents had poor knowledge of the use of antibiotics in children for URTIs, even though the majority of the participants (93.4%) considered physicians as the primary source of information. Only 17.3% of the participants strongly agreed that most of the URTIs are of viral origin and only 12.3% of the participants correctly know that antibiotics have side effects and 39.8% strongly agreed that the inappropriate use of antibiotics reduces their efficacy and drives bacterial resistance. Fever and ear ache were the most common reasons for which parents visited the physician. Additionally, mothers have child with history of chronic disease considered as have good knowledge compared to mothers not have child with history of chronic disease, with significant association (P = 0.007).
Conclusion: The relationship between mothers and physicians is trusted, but Saudi mothers are insufficiently informed about antibiotics' use for URTIs, which results in inappropriate attitudes and practices. Educational interventions for both parents and physicians will reduce unnecessary antibiotic use and resistance.

Keywords: Knowledge, attitude, antibiotics, mothers, Saudi Arabia

Introduction
Upper respiratory tract infections are group of disorders caused by inflammations in the organs of upper respiratory tract including nasal cavity, throat region, larynx, pharynx and the bronchial pipe. These infections are caused by pathogenic microorganisms including viruses, bacteria, fungi and helminthes, however, viruses are the most common cause of these infections. Common viruses that are known to cause upper respiratory tract infections include rhinoviruses, influenza viruses, adenoviruses, respiratory syncytial viruses, coxsackieviruses and others. On the other hand, some bacterial strains are also known to cause upper respiratory tract infections in humans such as some species of Streptococcus family (*Streptococcus pyogenes* and *Streptococcus pneumonia*) and others including *Haemophilus influenzae*, *Corynebacterium diphtheriae*, *Bordetella pertussis* etc. [1, 2].
Exposure with these pathogens may lead to different types of infections that can be categorized depending upon the types of symptoms, infection time and infected organ. Some common types of upper respiratory tract infections include common cold, influenza, laryngitis, pharyngitis, bronchitis, sinusitis, epiglottitis, pneumonia, pertussis and rhinitis. These infections arise when the infectious microorganism is ingested through inhalation of droplets containing the pathogen. When ingested, first line defense of immune system including nasal hair lining, mucus and ciliated cells in lower airways try to trap the pathogen and move it back to pharynx.

However, the pathogen may evade immune system mechanisms and may propagate in the host to cause infection [3, 4].

Common symptoms observed in the patient with an upper respiratory tract infection include cough, nasal congestion, chest congestion, sore throat, runny nose, sneezing, fever body pains and malaise. These symptoms appear due to replication of infectious agent within host and associated release of immune modulatory molecules that cause inflammation in the affected area. In most of the infections, the symptoms start to relieve after 1-3 weeks of infection. These symptoms may get severe and may disturb patient's quality of life during the initial 2-4 days [1, 2, 5].

Upper respiratory infections are more frequently observed in children and elderly. In addition, the risk of these infections is increased in patients with compromised immune system such as patients receiving immune suppressive medicines, for example corticosteroids, and patients with certain disorders including acquired immune deficiency syndrome (AIDS) or cystic fibrosis. Also, individuals with abnormalities related to anatomy of facial structures, for example nasal polyposis, have increased risk of upper respiratory tract infection. Furthermore, smoking is also considered as a common risk factor for developing upper respiratory tract infection. These infections may also occur more frequently during winter season [3, 6].

In most of the cases, these infections are diagnosed clinically without requiring any testing. In complicated situations such as pneumonia and exacerbation of symptoms, nasal swabs and pharyngeal aspirates are collected to test for presence of bacterial strains. Antibiotics are prescribed if the underlying agent for infection is found to be a bacterial strain. On the other hand, viral infections are treated with symptomatic relief based approach. Nasal and chest congestion can be relieved by decongestant agents such as oxymetazoline and pseudoephedrine, while antagonist for H1 receptors can aid in reduction of sneezing and rhinitis associated symptoms. Moreover, 0.2 grams of vitamin C can effectively and consistently reduce symptoms pf upper respiratory tract infections when given daily. In complicated cases, antiviral drugs may be utilized to reduce symptoms severity and duration of infection. Vaccinations can also help in reducing the burden of upper respiratory tract infections. Antibiotics use for treatment of common cold and other upper respiratory tract infections have been discouraged because underlying agent of infection is mostly viral in nature [1, 7-9].

Literature review

Upper respiratory tract infections are frequently identified diagnosis in the outpatient units of hospitals and healthcare setups. In United States (US), almost 10 million people get infected with these disorders each year costing more than 22 billion US dollars per year. Most of the parents tend to treat their sick children with antibiotics. Moreover, antibiotics have been observed to be heavily prescribed by general physicians and practitioner. Thus, there is a need to increase general public awareness about safe use of antibiotics and associated risk of antibiotic resistance, especially in parents of young children. A study in US analyzed outcomes of interventions to increase knowledge of parents to avoid unnecessary use of antibiotics in children affected with respiratory tract infections. The study indicate that these interventions resulted in 13-40% reduction in consultation for antibiotics and improved parental awareness [10].

Besides, parents of young kids were assessed for their perception about antibiotics use for various infections in a study carried out in United Kingdom (UK). The outcomes suggested parents were aware about possibility of antibiotic resistance and they believed in low usage of antibiotics. Parents mentioned to follow the messages and knowledge gained from awareness campaigns and emphasized on need of future campaigns to deliver relevant and accessible knowledge about antibiotics safe use among families [11].

Moreover in Australia, a study revealed that primary physicians lacked awareness about magnitude of antibiotic resistance due to individual prescription based on patients' expectations [12].

In Greece, a study identified majority of parents using excessive antibiotics for treatment of upper respiratory tract infection in their children due to multiple factors including low education, low income, insufficient knowledge, inapt practices and careless attitude [35]. Contrastingly, another study from Cyprus, Greece indicated that parents tend to follow pediatricians' advice and do not use over the counter antibiotics. However, physicians stated that parents have expectations for antibiotic prescriptions when children are affected with upper respiratory tract infections [14]. In contrast, a study from Denmark reported that parents with higher educational level and socioeconomic state were more aware about the risk of antibiotic resistance and misuse of antibiotics in upper respiratory tract infections. Parents would not get disappointed when physicians do not prescribe antibiotics if they are properly given counselling and explanation [15].

Moreover, a study assessed the outcomes of upper respiratory tract infections in Pakistani children and concluded that antibiotics are not required in majority (93%) of the cases. Thus, parents and caregivers need to be guided to avoid unnecessary use of antibiotics in these infections [16]. Additionally, a retrospective study enrolling more than 500 children visiting emergency department of a Malaysian tertiary care hospital revealed that antibiotics were prescribed to more than one third of the children affected with upper respiratory tract infection. Hence, campaigns to improve awareness about safe use of antibiotics and dangers of antibiotics resistance must be launched in healthcare facilities and pediatric emergency rooms [17].

In Middle East countries, several studies have been carried out to assess misuse of antibiotics in upper respiratory infections among general public and parents of affected children. A study from Jordan indicated that misuse of antibiotics was more frequent in parents of children affected with upper respiratory tract infections when parents were aged, had lower socioeconomic status, had lower education level or had more children [18]. In addition, majority of Jordanian parents (64.6%) would opt to administer antibiotics without physician's prescription when their child is affected with upper respiratory tract infection [19]. Likewise, majority of Palestinian parents (73%) were found to choose antibiotics for treatment of upper respiratory tract infections in their children [20]. Therefore, these outcomes suggest that educational programs are required to educate parents in Middle East to avoid antibiotic resistance.

In Saudi Arabia, several studies have indicated the risk of antibiotic resistance due to parental careless attitude regarding unnecessary use of antibiotics for treatment of upper respiratory tract infections in children. A study

enrolling parents' data from Riyadh indicated that parents tend to self-prescribe and misuse antibiotics for treatment of these infections [21]. Similarly, another study enrolling 400 parents from Taif city showed that more than half of the participants would use antibiotics for upper respiratory tract infections in their children [22]. Likewise, a cross-sectional study revealed lack of awareness in Saudi parents about risk of antibiotic resistance due to antibiotic misuse for treatment of upper respiratory tract infections [23]. Another study enrolling data from Khobar, Dammam and Dhahran cities of Saudi Arabia indicated self-prescription and misuse of antibiotics by majority of parents (67%) for treating upper respiratory tract infections in children [24]. Recently, a cross-sectional study including data from 714 parents belonging to Riyadh, Taif, Jeddah, Makkah, Asir Dammam, Albaha and Al Ahsa, regions of Saudi Arabia revealed lack of awareness, incorrect practices and careless attitude towards the use of antibiotics for treatment of upper respiratory tract infections in children [25]. These studies highlight the need of educational programs and awareness campaigns to improve the attitude and practices regarding antibiotics use in Saudi parents, especially mothers, in order to avoid antibiotic resistance development in Saudi population.

Objectives

- Study the Knowledge and Attitude towards Antibiotics Use among Mothers Attending pediatric clinics in KSMC, Riyadh, Saudi Arabia.
- Study the Relationship between Level of Knowledge and Attitude and different socio-demographic factors.

Methodology

Study design: A cross sectional study was carried out.

Study Area: This study was conducted in pediatric clinics in KSMC, Riyadh, Saudi Arabia between March 2021 and August 2021.

Study Population: The study population was recruited from mothers of children aged ≤14 years Attending pediatric clinics in KSMC, Riyadh, who accept to share in the study.

Inclusion Criteria: Mothers of children aged ≤14 years attending pediatric clinics in KSMC, Riyadh, who accept to share in the study.

Exclusion Criteria: Mothers of children aged > 14 years, Mother who are not attending pediatric clinics in KSMC, and Mothers who do not accept to share in the study.

Sample size: The sample size was calculated using EPI info program. Based on 95% confidence interval, 5% margin of error and total population of Riyadh, Saudi Arabia. The estimated sample size was 384 and was adjusted to 422 to compensate for 10% non-response rate.

Data collection tools: The study was conducted using a self-administered questionnaire was used to achieve the aim of the study. A self-administered questionnaire is developed in Arabic after reviewing related studies [Chan and Tang (2006); Panagakou *et al*., (2009); Panagakou *et al*., (2011); Rousounidis *et al*., (2011). Most of the developed questions are tailored to suit the local Saudi situation in Riyadh and assure its applicability to be used in the Saudi setting.

The first section of the questionnaire was about the demographic characteristics of the mothers (Nationality, sex, age, fathers' education, mothers' education, residence). The main questionnaire was divided into three main parts.

Part one of the questionnaire elicited the mothers' knowledge about antibiotics through questions on indications, side effects, use, when to initiate or stop antibiotic medication, etc., with three possible answers for each item (i.e., disagree, agree or uncertain).

Part two of the questionnaire studied attitudes of mothers toward antimicrobial agents' use and the role of doctors. Data were elicited using a 5 point Likert scale (1 = strongly agree; 5 = strongly disagree) through questions pertaining to mothers' expectations from antibiotic prescription, the effect of pricing on their selection of antibiotics and effect of misuse.

Finally, Part three analyzed the caregivers' practices by extracting data on how frequently were antibiotics purchased only after obtaining a prescription from a doctor, how often they altered the dose given based on self-perception of the drug's safety and efficacy, how often they follow their doctor's instructions and advice.

Pilot study: The questionnaire was pretested in a pilot study over a sample of 30 participants whose their results were not included in the study. Some modifications were done accordingly to insure clarity and easy understanding of the questions.

Sampling Technique: A convenient non-probability sampling technique was employed to collect the data from the participants.

Data analysis: Data was coded, entered, and analyzed using the Statistical Package for Social Science (SPSS) version 23. Qualitative data was expressed in the form of number and percentage (No. & %). Chi-square (χ^2) test was used to examine qualitative data between two groups.

Ethical considerations: Respective approval of the study was obtained from the Institutional Review Board (IRB) at KSMC Hospitals. An informed consent was obtained from the participants in the questionnaire to indicate the purpose of the study. The participants have the right to withdraw from the study at any time without any obligation towards the study investigator. The participant's secrecy was assured by assigning each participant with a code number for the purpose of analysis only. No incentive or rewards was given to participants. The participants were assured that their names and data was not declared or used in public and no harm of any mean was intended to the participating mothers. All the information gathered from the respondents was kept confidential, and their names were not appeared on the questionnaires.

Results

Characteristics of the participants

A total of 422 mothers completed the questionnaires. Out of them, the mean age of them is 36.2 ± 7.1 years (range from 20 to 53). About the father's educational status, 62.6% completed their university or postgraduate studies, 32.9% were completing their high school studies and 4.5% had primary or secondary education. About the mother's educational status, 68% completed their university or postgraduate studies, 25.4% were completing their high

school studies and 6.6% had primary or secondary education. Most of the participants have an intermediate (44.3%) or high income (45.7%).

Most of the participating mother have a child or two children less than 6 years old (73%) and about the average age of children less than 6 years old, it was found to be 3.7 ± 1.3, 2.2 ± 1.3, 2.0 ± 1.5, and 1.0 ± 0.0 for the first child, second child, third child and fourth child respectively.

Also most of the participating mother have a child or two children from 6 to 14 years old (57.8%) and about the average age of children, it was found to be 10.7 ± 2.6, 8.7 ± 2.1, 7.6 ± 1.4, 7 ± 1.6, and 7 ± 0.0 for the First child, second child, third child, fourth child and fifth child respectively. About 16.1% of the participants had a child with history of chronic diseases involving the respiratory system (such as asthma). Detailed socio-demographic and diabetic characteristics for the participants are presented in (Table 1).

Table 1: Socio-demographic characteristics of the study participants (n=422)

Variable	Category	Frequency (%)
Father's educational status	Primary or secondary school	19 (4.5)
	High school	139 (32.9)
	University – Postgraduate studies	264 (62.6)
Mother's educational status	Primary or secondary school	28 (6.6)
	High school	107 (25.4)
	University – Postgraduate studies	287 (68)
Monthly income (SAR)	Low (< 5,000)	42 (10)
	Intermediate (5,000 – 10,000)	187 (44.3)
	High (> 10,000)	193 (45.7)
No. of children less than 6 years old	0	98 (23.2)
	1-2	308 (73)
	3-4	16 (3.8)
	≥ 5	0 (0)
No. of children from 6 to 14 years old	0	130 (30.8)
	1-2	244 (57.8)
	3-4	46 (10.9)
	≥ 5	2 (0.5)
Child history of chronic diseases involving the respiratory system (such as asthma)	Yes	68 (16.1)
	No	354 (83.9)

Mothers' knowledge regarding using antibiotic in children for URTIs: Out of a total score of 17 points, the mean score of participants was 5.7 ±3.2 (range from 0 to 16). 96 (22.7%) of the participants correctly answered 50% or more of the questions related to the knowledge about using antibiotic in children for URTIs; accordingly, 22.7% of the participants are considered as having good knowledge while 326 (77.3%) having poor knowledge.

About 188 (44.5%) of the participating mothers considered antibiotics are the first and best medication to treat URTI in children while 142 (33.6%) did not, and 92 (21.8%) did not know or had no idea. About the sources of information about judicious antibiotic use, physician was most selected source (93.4%) followed by pharmacist (40.3%) (Figure 1).

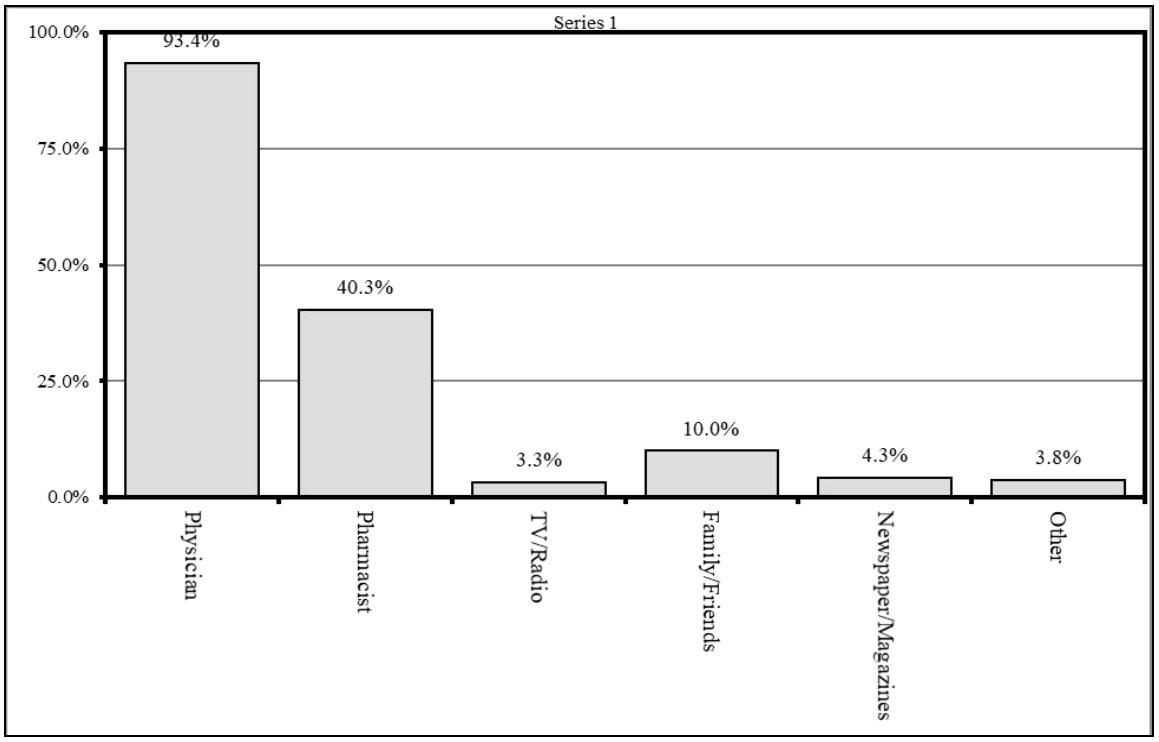

Fig 1: Sources of information about judicious antibiotic use (n=422)

Most of the participants (37.4%) disagreed that antibiotic should be given to all children who develop a fever while 46.2% agreed that children with flu like symptoms get better faster when antibiotics are given. Only 17.3% of the participants strongly agreed that most of the URTIs are of viral origin, antibiotics should not be given because they are self-limited.

Only 12.3% of the participants correctly know that antibiotics have side effects and 39.8% strongly agreed that the inappropriate use of antibiotics reduces their efficacy and drives bacterial resistance. Most of the participants (42.9%) agreed that antibiotic use can prevent complications from URTIs and 58.5% had no opinion if scientists can produce new antibiotics that can kill the resistant bacteria (Table 2).

Table 2: Mothers' knowledge regarding using antibiotic in children for URTIs (n=422)

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
Antibiotic should be given to all children who develop a fever	46 (10.9%)	86 (20.4%)	40 (9.5%)	158 (37.4%)	92 (21.8%)
Children with flu like symptoms get better faster when antibiotics are given	58 (13.7%)	195 (46.2%)	50 (11.8%)	79 (18.7%)	40 (9.5%)
Most of the URTIs are of viral origin, antibiotics should not be given because they are self-limited	73 (17.3%)	147 (34.8%)	123 (29.1%)	49 (11.6%)	30 (7.1%)
Antibiotics do not have any side effects	30 (7.1%)	22 (5.2%)	68 (16.1%)	165 (39.1%)	137 (32.5%)
Inappropriate use of antibiotics reduces their efficacy and drives bacterial resistance	168 (39.8%)	120 (28.4%)	76 (18%)	20 (4.7%)	38 (9%)
Antibiotic use can prevent complications from URTIs	59 (14%)	181 (42.9%)	139 (32.9%)	31 (7.3%)	12 (2.8%)
Scientists can produce new antibiotics that can kill the resistant bacteria	38 (9%)	129 (30.6%)	247 (58.5%)	4 (0.9%)	4 (0.9%)

Mothers' Practice toward using antibiotic in children for URTIs

Mothers were asked about the number of days that would they let pass in order to visit a General practitioner or PHC physician if their children presents with URTI symptoms, the average number of days was found to be 2.5 ±1.3 days (range from 0 to 7 days). About the symptoms that would make them visit a General practitioner or PHC physician for their children, the most reported symptom was fever (84.4%) followed by ear pain (64.5%) and sore throat (56.4%) (Figure 2).

Regarding the kind of therapies would participants expect from their General practitioner or PHC physician to suggest for their children when they suffer from an URI, pain and fever medications was the most selected one (74.9%) followed by antibiotics (53.1%) (Figure 3).

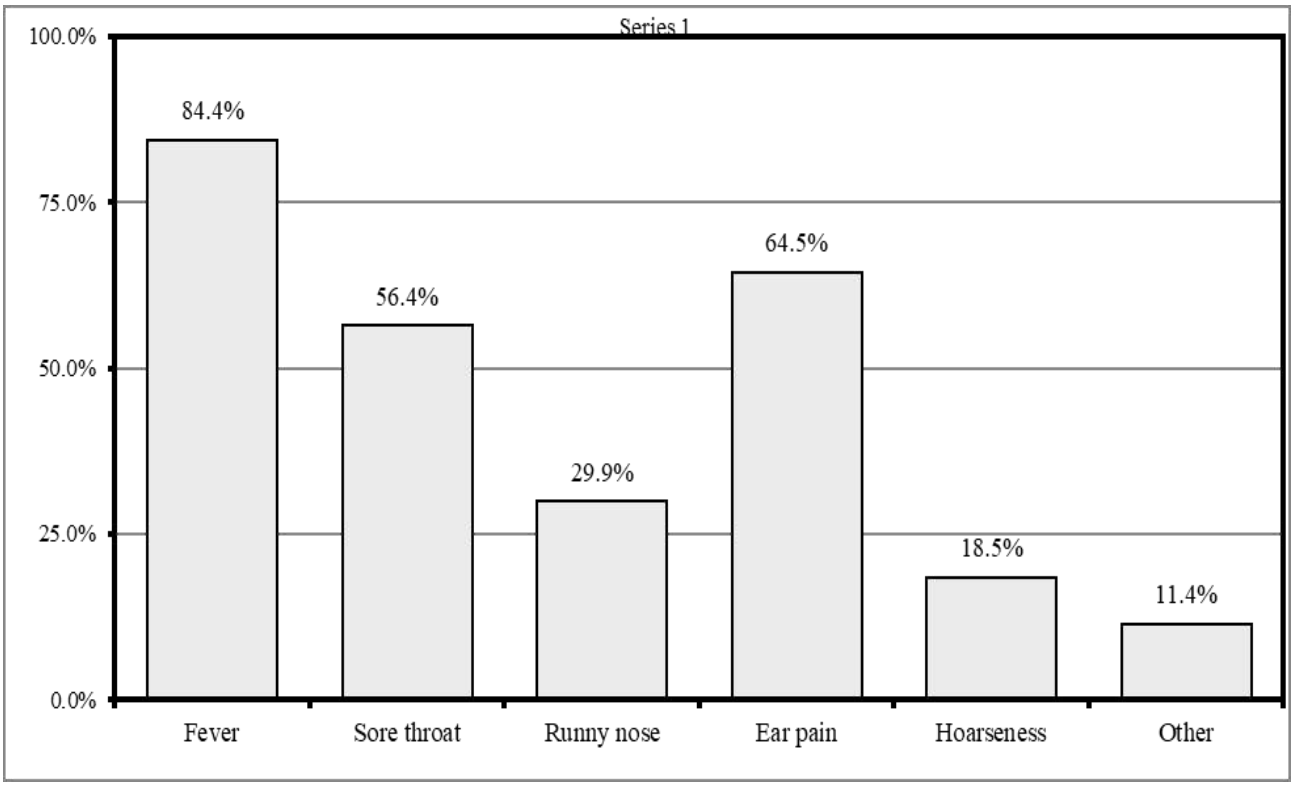

Fig 2: Symptoms that make participants visit a General practitioner or PHC physician for their children (n=422)

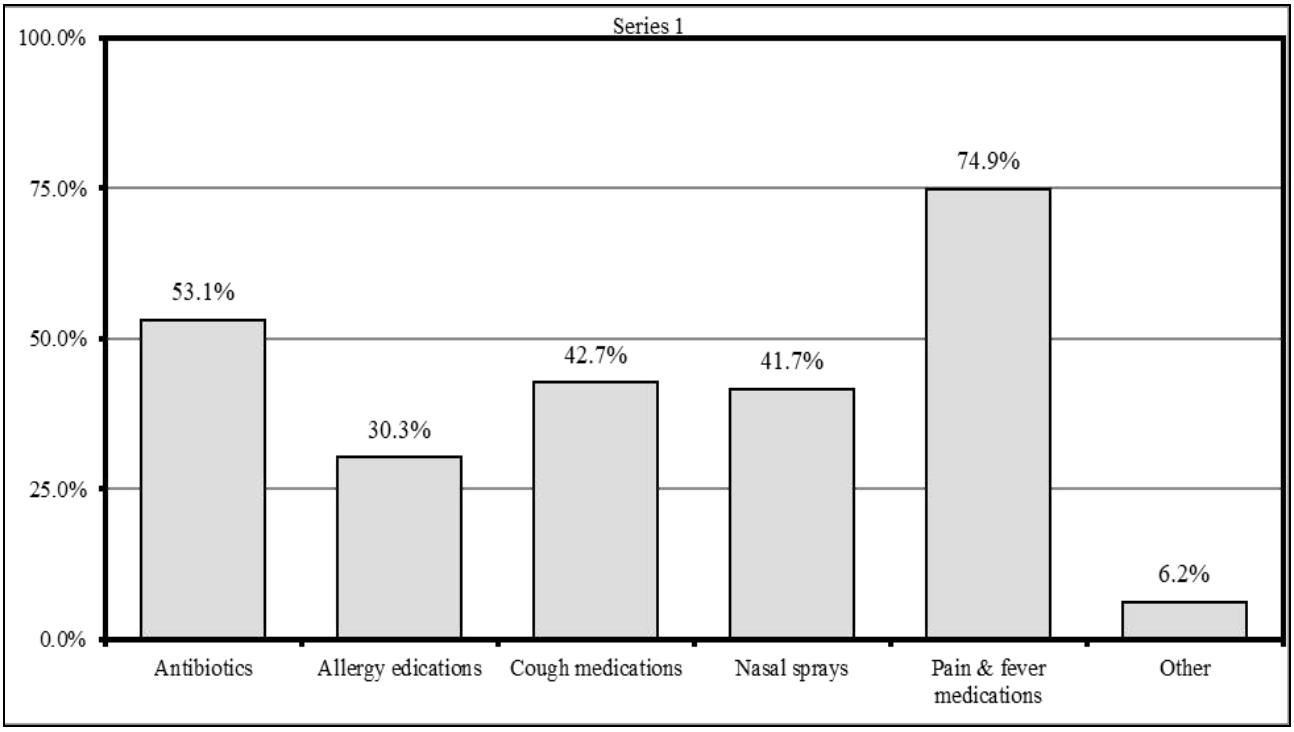

Fig 3: Therapy expectations of the participants from their General practitioner or PHC physician to suggest for their children when suffer from URIs (n=422)

Participants were asked how often they would like their General practitioner or phc physician to describe antibiotics for their children when they suffer from URT related conditions, most of the participants would never like antibiotics prescription for their children when they suffer from common cold, runny nose, cough or vomiting, which represent 38.2%, 57.1%, 35.3% and 31.5% of the participants respectively and most of them (22.5%) would sometimes like antibiotics prescription for sore throat while most of the participants always would like antibiotics prescription for fever (29.6%) and ear ache (29.1%) (Table 3).

Table 3: How often would you like your General practitioner or PHC physician to describe antibiotics for your child when he/she suffers from the following conditions?

	Always 95-100%	**Most of the times 70-95%**	**Often 30-70%**	**Sometimes 5-30%**	**Never 0-5%**
Common cold	38 (9%)	61 (14.5%)	49 (11.6%)	113 (26.8%)	161 (38.2%)
Runny nose	18 (4.3%)	39 (9.2%)	61 (14.5%)	63 (14.9%)	241 (57.1%)
Sore throat	91 (21.6%)	68 (16.1%)	90 (21.3%)	95 (22.5%)	78 (18.5%)
Cough	24 (5.7%)	53 (12.6%)	87 (20.6%)	109 (25.8%)	149 (35.3%)
Vomiting	76 (18%)	42 (10%)	87 (20.6%)	84 (19.9%)	133 (31.5%)
Fever	125 (29.6%)	79 (18.7%)	79 (18.7%)	58 (13.7%)	81 (19.2%)
Ear ache	123 (29.1%)	78 (18.5%)	95 (22.5%)	72 (17.1%)	54 (12.8%)

Regarding the hazards of using antibiotics, decrease immunity was reported by 77.7% of the participants followed by bacterial resistance (51.2%) then kidney damage (49.3%), stomach damage (44.1%) and liver damage (42.7%) (Figure 4).

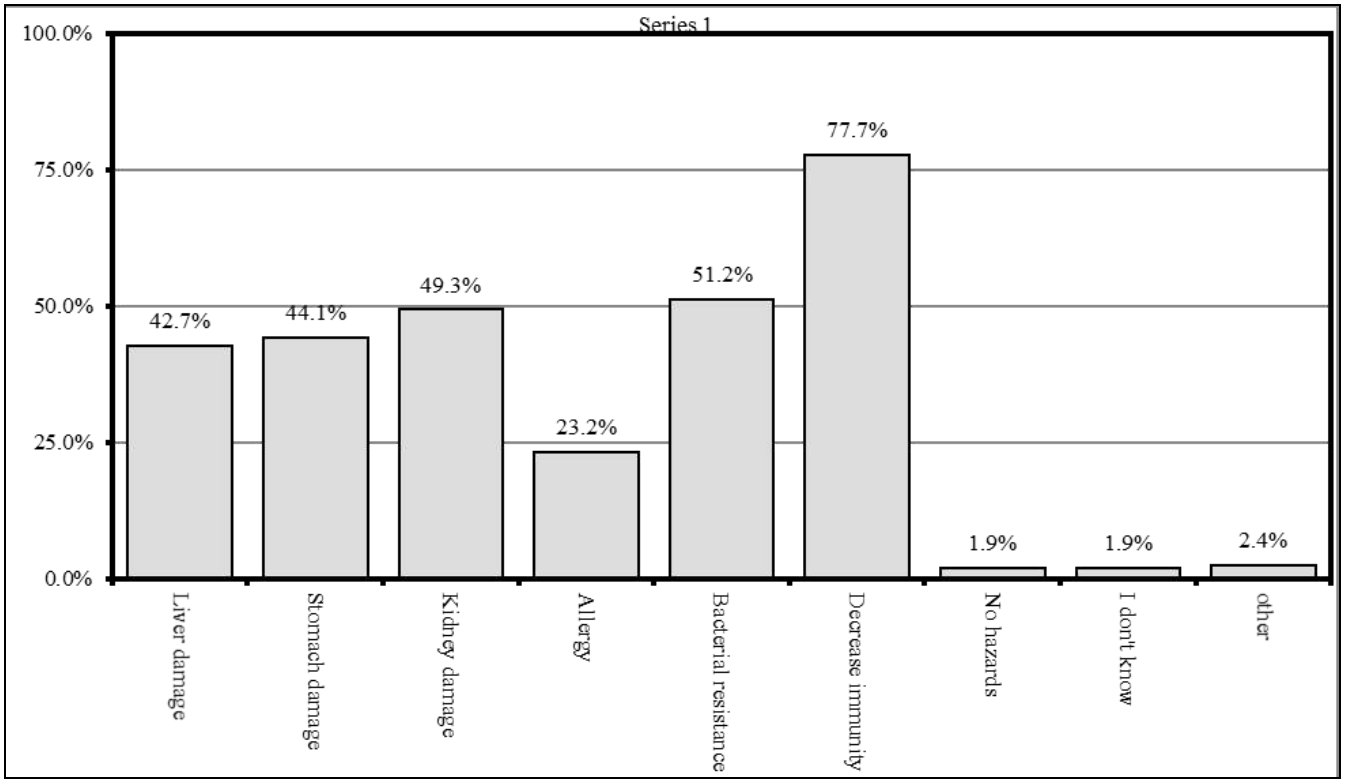

Fig 4: Hazards of using antibiotics (n=422)

The most reported reason that would make participants gave their children antibiotics without the General practitioner or PHC physician advice was that their doctor had prescribed the same antibiotic in the past, for the same symptoms (46.4%) followed by that they did not have enough time or enough money (36%), because a pharmacist recommended the antibiotic (35.1%), they thought that their children's condition was not serious enough (25.6%), Because a friend/family relative recommended the antibiotic (7.1%) while 18% of the participants said that they did not give their children antibiotics without the General practitioner or PHC physician advice.

The majority of the participants (54%) always asked their pediatrician whether or not the prescription of antibiotics is necessary and 32.2% refuse a prescription of antibiotics most of the times. About 46% of the participants never ask directly their doctor to prescribe antibiotics. The majority of the participants (73.5%) always completely follow all the doctor's instructions and advice and 63.3% never think that their doctor prescribes antibiotic only because they asked him/her to (Table 4).

Table 4: Mothers' Practice toward using antibiotic in children for URTIs (n=422)

	Always 95-100%	**Most of the times 70-95%**	**Often 30-70%**	**Someti-mes 5-30%**	**Never 0-5%**
How often do you ask your pediatrician whether or not the prescription of antibiotics is necessary?	228 (54%)	80 (19%)	50 (11.8%)	44 (10.4%)	20 (4.7%)
How often do you refuse a prescription of antibiotics?	90 (21.3%)	136 (32.2%)	80 (19%)	48 (11.4%)	68 (16.1%)
How often do you ask directly your doctor to prescribe antibiotics?	32 (7.6%)	40 (9.5%)	58 (13.7%)	98 (23.2%)	194 (46%)
How often do you completely follow all the doctor's instructions and advice?	310 (73.5%)	78 (18.5%)	26 (6.2%)	8 (1.9%)	0 (0%)
How often do you think that your doctor prescribes antibiotic only because you asked him to?	26 (6.2%)	32 (7.6%)	44 (10.4%)	53 (12.6%)	267 (63.3%)

Mothers' attitude toward antibiotic prescription and use in children with URTIs

About the mothers' attitude toward antibiotic prescription and use in children with URTIs, most of them (28.4%) believe that antibiotics are used too much and unnecessarily and 32.5% agreed that most of URTIs resolve without antibiotic administration because they are self-limited. About 74.4% of the participants strongly agreed that parents and doctors should be informed about judicious antibiotic use.

85.3% of the participants would not change their doctor because of not prescribing antibiotics to their children and 60.7% would not change their doctor because he/she keeps prescribing antibiotics, 87.4% did not reuse any leftover antibiotics whenever their children present with similar symptoms of a URTIs (Table 5).

Table 5: Mothers' attitude toward antibiotic prescription and use in children with URTIs (n=422)

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
Do you believe that antibiotics are used too much and unnecessarily?	96 (22.7%)	120 (28.4%)	76 (18%)	86 (20.4%)	44 (10.4%)
Do you think that most of URTIs resolve without antibiotic administration because they are self-limited?	106 (25.1%)	137 (32.5%)	109 (25.8%)	50 (11.8%)	20 (4.7%)
Do you think that parents and doctors should be informed about judicious antibiotic use?	314 (74.4%)	74 (17.5%)	32 (7.6%)	2 (0.5%)	0 (0%)
				Yes	**No**
Would you change your doctor because of not prescribing antibiotics to your child?				62 (14.7%)	360 (85.3%)
Would you change your doctor because whenever you visit him/her, he/she keeps prescribing antibiotics?				166 (39.3%)	256 (60.7%)
Would you reuse any leftover antibiotics whenever your child presents with similar symptoms of a URTIs?				53 (12.6%)	369 (87.4%)

Factors associated with Mothers' knowledge regarding using antibiotic in children for URTIs

We conducted chi-square test to explore the relationship between the mothers' knowledge regarding using antibiotic in children for URTIs and different socio-demographic factors. A statistically significant association ($p< 0.05$) was found with child history of chronic diseases (P = 0.007). Mothers having child with history of chronic disease considered as having good knowledge compared to mothers not have child with history of chronic disease. Other factors did not affect the knowledge regarding using antibiotic in children for URTIs. More information is provided in (Table 6).

Table 6: Factors associated with Mothers' knowledge regarding using antibiotic in children for URTIs

Variable	Level of knowledge		P value
	Good	Poor	
	Mean (SD)	Mean (SD)	
Mother age (Years)	35.6 (7.4)	36.3 (7.0)	0.390
	N (%)	**N (%)**	
Father's educational status			
Primary or secondary school	4 (21.1)	15 (78.9)	0.637
High school	28 (20.1)	111 (79.9)	
University – Postgraduate studies	64 (24.2)	200 (75.8)	
Mother's educational status			
Primary or secondary school	4 (14.3)	24 (85.7)	0.091
High school	18 (16.8)	89 (83.2)	
University – Postgraduate studies	74 (25.8)	213 (74.2)	
Monthly income (SAR)			
Low (< 5,000)	5 (11.9)	37 (88.1)	0.123
Intermediate (5,000 – 10,000)	49 (26.2)	138 (73.8)	
High (> 10,000)	42 (21.8)	151 (78.2)	
No. of children less than 6 years old			
0	16 (16.3)	82 (83.7)	0.110
1-2	78 (25.3)	230 (74.7)	
3-4	2 (12.5)	14 (87.5)	
No. of children from 6 to 14 years old			
0	32 (24.6)	98 (75.4)	0.700
1-2	52 (21.3)	192 (78.7)	
3-4	12 (26.1)	34 (73.9)	
≥ 5	0 (0)	2 (100)	
Child history of chronic diseases			
Yes	24 (35.3)	44 (64.7)	0.007
No	72 (20.3)	282 (79.7)	

Discussion

This is cross sectional study of knowledge and attitude towards antibiotics use among Mothers Attending pediatric clinics in KSMC, Riyadh, Saudi Arabia between March 2021 and August 2021. Generally, respondents indicated a high level of confidence in local physicians and healthcare providers. Most participants reported that their primary source of antibiotic information is their doctor. These findings were consistent with the results obtained by researchers in several countries [26, 27]. However, a Chinese study indicated television to be the main source of information about antibiotics [29]. Also, parents generally believed that doctors were in the position to prescribe antibiotics, and few changed physicians due to a lack of prescriptions for antibiotics. A high level of trust in healthcare practitioners facilitates the application of educational initiatives to increase public awareness of judicious antibiotic use.

Although the current study found that Saudi mothers exhibited a poor level of knowledge regarding antibiotic use for URTIs in children (77.3%), such as previous studies is Malaysia [26], UAE [30] and Palestine [33]. Lack of

understanding of medications such as antibiotics can dramatically increase the chance of misuse and poor compliance. As a result, it is critical that the health sector take steps to educate this population. Much of this burden will rest on the attending physician, who is obligated to provide parents with extensive information about the antibiotic prescribed to their child, including indications, instructions for use, and possible side effects. Pharmacists may also play a role in reminding patients about proper medication administration. Regardless, during the consultation and follow-up process, all healthcare providers should strive to maintain proper channels of communication and education.

Only 17.3 percent of participants strongly agreed that the majority of URTIs are viral in origin, that antibiotics should not be given because they are self-limiting, and that this reflected a lower level of knowledge than other studies in Oman [27] and Ethiopia [28]. Furthermore, while only 12.3 percent of participants correctly recognized that antibiotics have side effects and 39.8 percent strongly agreed that inappropriate antibiotic use reduces efficacy and promotes bacterial resistance, roughly half believed that antibiotics prevented URTI complications and that scientists would be able to develop new antibiotics.

Our findings indicated that fever and ear pain were the most common symptoms leading to pediatric clinics or PHC visits, where mothers expected to receive an antibiotic, which is consistent with the findings of another study in Saudi Arabia [32] and another study in Palestine [33].

Furthermore, the majority of participants would not reuse any leftover antibiotics whenever their child presented with similar symptoms, owing to a lack of time or money, and some participants would use antibiotics based on pharmacist recommendations. Unfortunately, this is a common practice in our community, as antibiotics can be obtained without a prescription from community pharmacies [32]. Concerning the risks of using antibiotics, 77.7 percent of participants reported decreased immunity, followed by bacterial resistance (51.2 percent).

Saudi Mothers will seek medical attention for their children within 2.5 ≠1.3 days of the onset of symptoms, indicating a low threshold for consultation. According to the findings of the Makah study, the duration was 1 to 2 days [34]. If pediatricians or PHC doctor interpret this attitude as a request for antibiotics, a cycle of expectation for subsequent illness is created, in which the parent and child return expecting another prescription, believing that the antibiotic, rather than the natural course of the disease, resolved their child's symptoms.

This cycle raises a number of concerns, including unnecessary antibiotic use, the spread of resistant bacterial pathogens in the community, and, most importantly, high health-care costs. Furthermore, a statistically significant association with a child's history of chronic diseases was discovered (P = 0.007). Mothers who have a child with a history of chronic disease are thought to have better knowledge than mothers who do not have a child with a history of chronic disease.

There were some limitations to this research. These drawbacks were linked to the convenience sample, which may not be representative of the entire Saudi community. Furthermore, the data were collected from mothers who attended pediatric clinics, which limits the results' applicability to other types of health-care services. Another limitation is that parents were asked several questions about their previous experience and antibiotic use, which could lead to recall bias.

Conclusion

Overall, Saudi parents have a high level of trust in their doctors and healthcare professionals when it comes to antibiotic prescriptions for their children, according to this study. They did, however, show that they lacked appropriate understanding about the usage of antibiotics in children with URTIs. In addition, parents believed that overuse of antibiotics diminish their efficacy and leads to resistance. Also we found that history of chronic disease is associated significantly with mothers having good knowledge compared to mothers do not, (P = 0.007). Unfortunately, a significant majority of parents disagreed that URTIs are mostly viral in nature. Finally, educational programs and health campaigns are urgently needed in Saudi Arabia to improve awareness and support sensible antibiotic usage.

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