Knowledge, Attitude and practice toward prescribing Antibiotics for Upper Respiratory Tract Infections among primary health care physicians in Cluster-1, Riyadh, Saudi Arabia

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Abstract

Background: Respiratory tract infections are among the most frequently encountered clinical conditions and upper respiratory tract infections (URTIs) are one of the most common reasons for consultations in primary health care centres. Antibiotics are often prescribed unnecessarily for URTIs around the globe. Identifying factors associated with the ubiquitous inappropriate prescribing of antibiotics for URTIs will help develop effective interventions and decrease antimicrobial resistance. The Aim of the study was to find out the resources of physicians' knowledge regarding upper respiratory tract infection management, and to identify the clinical factors that might affect antibiotics prescription by primary health care physicians.

Methodology: This is cross sectional observational quantitative study was carried out at Primary health care centres during the period from January to August 2021 in Cluster-1 Riyadh, Saudi Arabia. An online self-administered questionnaire was conducted on 197 physicians by using convenient sampling technique. The data was analysed using SPSS software version 23. The study was done on all physicians who have worked in primary health care in cluster 1 for one year or more, male and female, Saudi and non-Saudi, and including consultants, specialists, residents and general practitioners.

Results: In this study, we were able to collect 197 responses of our questionnaire with mean age of 31.6 years old (SD= 6.27). More than half of the participants were males (54.8 %) and 72.6 % of them were residents. Furthermore, 91.9 % of the participants reported following of criteria or guidelines for prescribing of antibiotics in treatment of UTRI. Among those physicians, 88.4 % of them reported depending on centor criteria. Furthermore, 70.6 % of the physicians reported a frequency of patient requests for antibiotic 1-4 times during the past months and 44.7 % of them would not accept the patients request while 28.9 % would refuse and educate the patients and 21.3 % would agree according to guidelines.

Conclusion: We found good to moderate level of knowledge among the physicians toward the use of antibiotics in treatment of URTI however, some improvement in the patient's knowledge should be considered.

Keywords: antibiotics, URTI, primary healthcare, Saudi Arabia

Introduction

Upper respiratory tract infection "URTI" is one of the most common and frequent encountered clinical conditions that causes patients to visit primary health care [1]. Upper respiratory tract infections (URTIs) can be defined as self-limited irritation and swelling of the upper airways associated with cough with no proof of pneumonia, lacking a separate condition to account for the patient symptoms, or with no history of COPD/emphysema/chronic bronchitis [2]. Upper respiratory tract infections involve nose, sinuses, pharynx, larynx, and the large airways [2]. Viruses have been shown to be the main etiological agents for respiratory tract infections. However, current evidence-based guidelines do not support antibiotic use in the majority of URTI cases, as URTIs are frequently caused by viral etiology, and are often self-limiting [3].

A recent systemic review done in 2018 reported that the most common clinician reported reason to visit is URTI [4].

Also, a study done in northern Saudi Arabia found that one third of prescriptions analyzed are for respiratory tract infections (ARIs) [5]. On the other hand, one of the studies showed that tonsillopharyngitis which is part of URTI is the reason for over 70% of unnecessary antibiotic prescriptions by primary care physicians [1]. In addition to that CDC guidelines revealed that 79% of antibiotic prescriptions were unnecessary [6]. In contrast many studies showed that inappropriate antibiotics use for URTIs may lead to develop antibiotics resistance [7]. Antimicrobial resistance part of major issue that facing medical failed [8].

The factors that affect prescribing antibiotics are health factors, patient factors and cultural norms, also higher socioeconomic status, older age, and longer duration of consultation correlate with prescribing antibiotics [3]. Physicians should first identify patients' expectations about antibiotics treatment before trying to give information about the self-limitedness of respiratory tract symptoms and ineffectiveness of antibiotics in order to improve shared decision making and rationalize antibiotics prescribing [6]. Looking to the impact of antibiotic resistance on public health and how it is going to be a great concern facing medical health especially in primary health care and family medicine , is why we thought to study the effect of Knowledge, Attitude and practice (KAP) toward prescribing antibiotics for URTI among Primary health care physicians in Cluster-1 in Riyadh, Saudi Arabia, especially as there are not enough studies that have been done in our region that assesses KAP towards antibiotics. This will help us to provide better healthcare for patients, and the information we will acquire on the way to achieve these goals will also help to address the causes that affect prescribing antibiotics among physicians.

In our study, we tried to assess the knowledge, attitude and practices towards antibiotic use in upper respiratory tract infections and the clinical factors that might affect antibiotics prescription by primary healthcare physician including centor criteria among patients seeking primary health care in Cluster-1 Riyadh, Saudi Arabia.

Methodology

Study design:
A cross sectional observational quantitative study was carried out at Primary health care centres during the period from January to August 2021 in Cluster-1 Riyadh, Saudi Arabia.

Sample size:
Sample size was calculated using sample size calculator of Raosoft ®. The tool uses the following equations for calculating sample size:

$$n = N*X / (X + N - 1),$$

and X is calculated using $X = Z_{\alpha/2}{}^2 \neg*p*(1-p) / MOE^2$

where n is sample size, N is population size, $Z_{\alpha/2}$ is the critical value of the Normal distribution at α/2, MOE is the margin of error and p is the sample proportion.

Our population size was 400 primary health care physicians in Cluster-1, in Riyadh which included consultants, specialist and residents. Confidence level of 95 %, margin of error is 5 %, $Z_{\alpha/2}$ will be 1.96 and property would be 5 %. According to these inputs, sample size was 197.

Subjects:
The study was conducted among primary health care physicians in Cluster-1, in Riyadh. Inclusion criteria included all physicians who work in primary health care in Cluster-1 for one year and more, male and female, Saudi and non-Saudi, including consultants, specialists, residents and general practitioners. The only exclusion criteria were the uncompleted questionnaire and those who refused to participate in the study.

Sampling technique:
The study was conducted among 197 physicians who were chosen after applying a convenient sampling technique.

Data collection method:
An online self-administered questionnaire was conducted on 197 physicians. The questionnaire consisted of 15 questions including information about demographic factors such as age, gender and experience. Moreover, the questionnaire included some questions about how physicians prescribe the antibiotic and if they are affected by patients' desire.

Data management and statistical considerations:
Data collection was done using online questionnaire, where Microsoft Excel was used for data entry and statistical analysis was conducted using SPSS software, IBM SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, N.Y., USA). Then frequency and percentage were used to describe categorical variable and mean and standard deviation were used for assessing continuous variables. For assessing correlation between variables, chi-squared test was used to describe the difference between clinical phenotypes in categorical variables while ANOVA test was used for continuous variables. A P-value of <0.05 was considered statistically significant.

Ethical consideration:
The study was conducted after gaining approval from King Saud Medical City Research Center's Institutional Review Board. All participants agreed to use an online consent form. They were informed about the purpose of the research, why they were chosen, all potential risks and benefits and that they could refuse to participate, or could withdraw from the study at any point in time. An Arabic/English informed consent form, which was attached to the proposal, was obtained from participants, who were involved in this study voluntarily after being given adequate information on the objectives and benefits of the project. At all times, privacy, and total avoidance of deception of the participants was maintained, and their data were confidential.

Results

In this study, we were able to collect 197 responses to our questionnaire with mean age of 31.6 years old (SD= 6.27). More than half of the participants were males (54.8 %) and 72.6 % of them were residents. Furthermore, 41.1 % of the participants reported having 3-5 years of practice and 50.3 % of them reported seeing 5-10 patients per day where 47.2 % reported seeing 26-50 % of the patients with URTI and 41.6 % seeing 0-25 % of total patients with URTI (Table 1).

Moreover, 47.7 % of the participants reported that most patients diagnosed with URTI were aged between 15-45 years old while 23.9 % were between 6-14 years old. Furthermore, 91.9 % of the participants reported following of criteria or guideline for prescribing of antibiotics in treatment of UTRI. Among those physicians, 88.4 % of them reported depending on Centor criteria (Table 2).

In Figure 1 and Figure 2, we showed the most common symptoms and signs that may affect physicians' decision to prescribe antibiotics for URTI. The most common symptoms include fever of 38.5 C (77.7 %) followed by deteriorating general condition (72.6 %), patients looking unwell (66 %) and resistant fever over 3 days (60.9 %). The most common signs included exudates in throat (100.0 %) followed by cervical lymphadenopathy (69.5 %), crepitation at lung auscultation (46.7 %) and inflamed eardrum (45.7 %).

Moreover, we found that 70.6 % of the participants would inform the patients to re-consult within two days if they not getting better or not prescribed antibiotics while 19.8 % of the physicians would be affected by patients asking for antibiotics . Furthermore, 70.6 % of the physicians reported a frequency of patients requesting antibiotics 1-4 times during the past months and 44.7 % of them would not accept the patients' requests while 28.9 % would refuse and educate the patients and 21.3 % would agree according to guidelines. Moreover, we found that 58.4 % of the participants reported that they faced complaints by the patients because of refusing to prescribe antibiotics for them. Almost two third of the sample suggested applying programs that aim to increase the awareness of population about the importance of avoiding antibiotics and restricting their prescription through national campaigns and health education while 29.5 % suggested ensuring following of physicians guidelines. Moreover, amoxicillin was the most common prescribed antibiotics (71.4 %) (Table 3).

Moreover, we found that there is a significant difference between male and female physicians and following of guidelines in prescribing of antibiotics (P=0.002) where males seem to follow the guidelines more than females however, there was no difference in following guidelines between different qualifications or experience. Moreover, we found that male physicians tend to refuse the prescription of antibiotics when it was asked by patients more than females, significantly (P=0.038) (Table 4).

Table 1: Demographic factors of the participants (N=197)

		Count	Column N %
Gender	Male	108	54.8%
	Female	89	45.2%
Qualification	Resident	143	72.6%
	Specialist	22	11.2%
	Consultant	28	14.2%
	General practitioner	4	2.0%
Years in practice	<1 year	4	2.0%
	1-2	51	25.9%
	3-5	81	41.1%
	> 5 years	61	31.0%
Total patients seen in general by physicians per day :	5-10 patients	99	50.3%
	11-20 patients	59	29.9%
	>20 patients	39	19.8%
Patients seen with URTI	0-25 %	82	41.6%
	26-50 %	93	47.2%
	51-75 %	16	8.1%
	76-100 %	6	3.0%

Table 2: Physicians' attitude and practices toward URTI

		Count	Column N %
Majority of patients' age with URTI	< 1 years old	10	5.1%
	1–5-year-old	45	22.8%
	6-14 years old	47	23.9%
	15-45 years old	94	47.7%
	46-65 years old	1	0.5%
Do you follow any Criteria/guidelines for prescribing Antibiotics?	Yes	181	91.9%
	No	16	8.1%
If Yes, Mention the criteria/guideline	Centor criteria	153	88.4%
	The Modified Centor score	3	1.7%
	Other	17	9.8%

Figure 1: Symptoms that may affect physicians decision to prescribe antibiotics for URTI

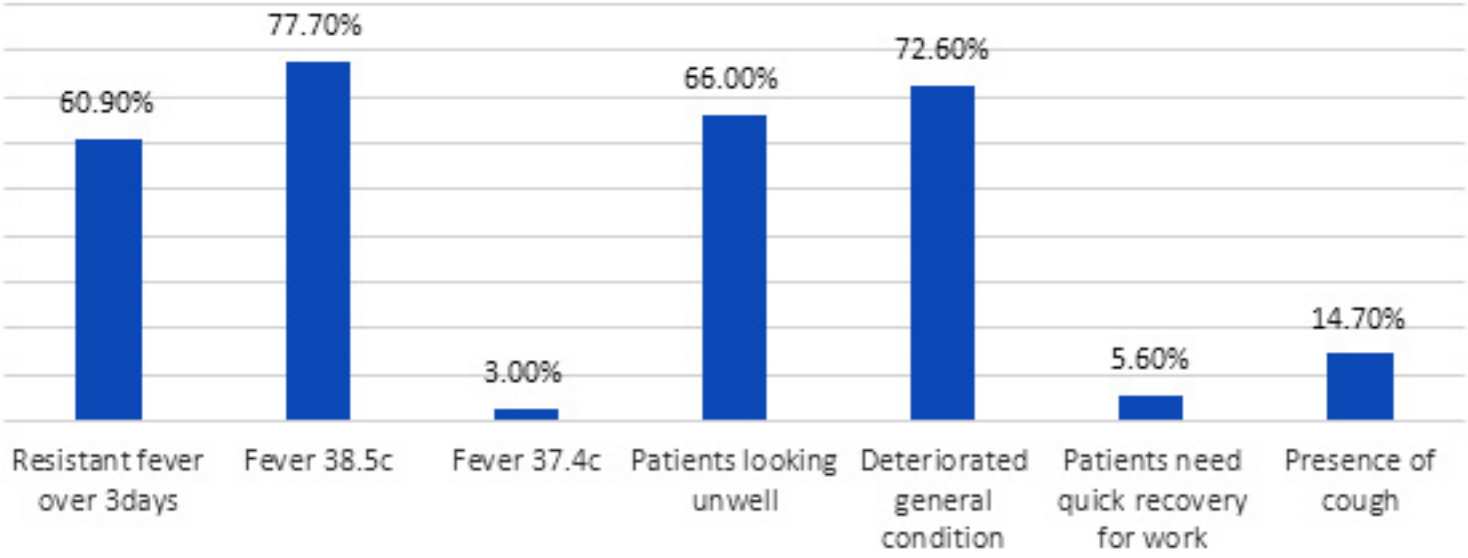

Figure 2: Signs that may affect physicians' decision to prescribe antibiotics for URTI

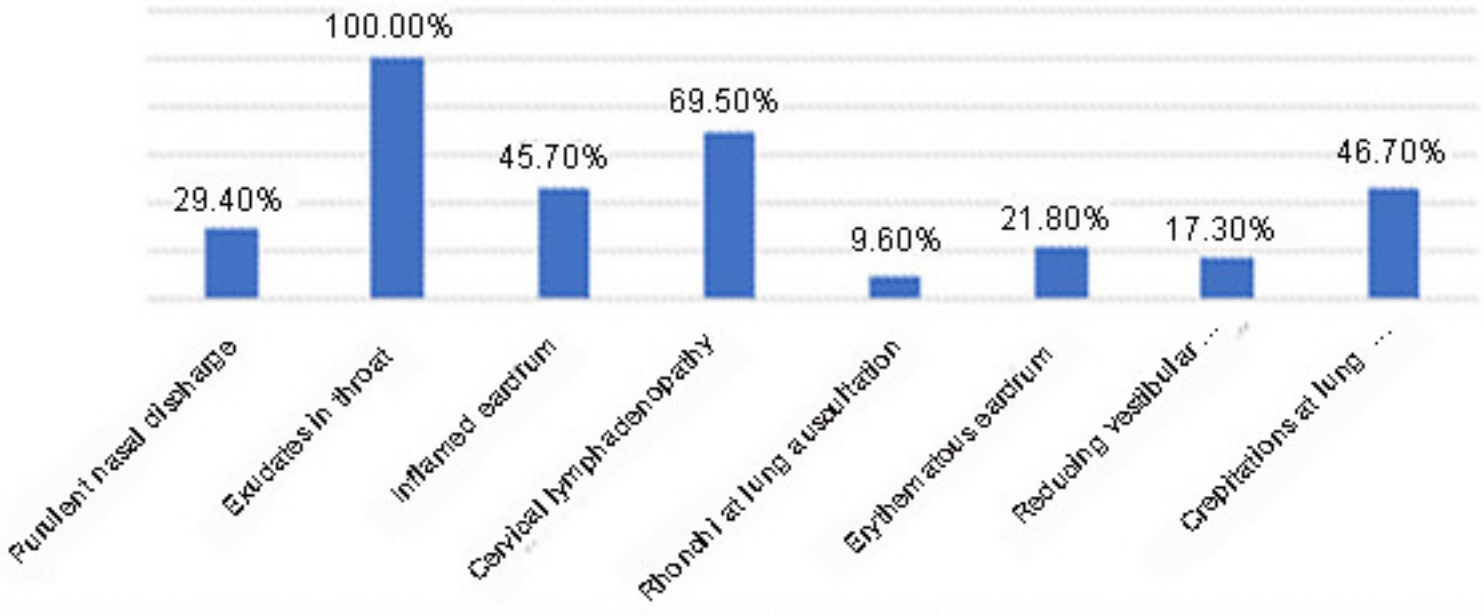

Table 3: Physicians' attitude and practices toward prescribing of antibiotics in URTI

		Count	Column N %
Factors affecting decision to prescribe antibiotics	Patient expects antibiotics according to you.	19	9.6%
	Patient was informed to re-consult within two days if not gettingbetter or not prescribed antibiotics.	139	70.6%
	Patient asks for antibiotics.	39	19.8%
Frequency of patient request of antibiotics for URTIs during past month. Time of request in the past month	No request	28	14.2%
	1-4 times	139	70.6%
	5-9 times	20	10.2%
	10 or more times	10	5.1%
Response of physicians to patient's request and advice for prescribing Antibiotics	Accept according to guidelines	42	21.3%
	Not accept	88	44.7%
	Refuse and educate the patients	57	28.9%
	Agree	10	5.1%
Did you face any complaint by the patients because of refusing to prescribe antibiotics?	Yes	115	58.4%
	No	82	41.6%
Your suggestion on the most single important program for reducing inappropriate oral antibiotics use for URTIs.	Follow guidelines of prescribing of antibiotics	44	29.5%
	Increasing the awareness of population throughout campaign, health education and Social media	105	70.5%
15- From your point of view are there any antibiotics you prefer to use for URTI?	Amoxicillin	110	71.4%
	Azithromycin	25	16.2%
	Penicillin	19	12.3%

		Gender		Qualification				Total patients seen in general by physicians per day:		
		Male	Female	Resident	Specialist	Consultant	General practitioner	5-10	11-20	>20
Do you follow any Criteria/guidelines for prescribing Antibiotics?	Yes	55.8%	44.2%	72.4%	11.0%	14.4%	2.2%	50.3%	29.8%	19.9%
	No	43.8%	56.3%	75.0%	12.5%	12.5%	0.0%	50.0%	31.3%	18.8%
	P-value	0.002*		0.934				0.990		
Response of physicians to patient's request and advice for prescribing Antibiotics	Accept according to guidelines	50.0%	50.0%	88.1%	7.1%	4.8%	0.0%	42.9%	35.7%	21.4%
	Not accept	65.9%	34.1%	72.7%	9.1%	14.8%	3.4%	47.7%	31.8%	20.5%
	Refuse and educate the patients	43.9%	56.1%	61.4%	19.3%	17.5%	1.8%	59.6%	22.8%	17.5%
	Agree	40.0%	60.0%	70.0%	0.0%	30.0%	0.0%	50.0%	30.0%	20.0%
	P-value	0.038*		0.103				0.766		

Table 4: The relation between demographic factors of the participants and their attitude toward use of antibiotics

Discussion

Consumption of antibiotics worldwide has increased dramatically over the past decade. In many countries, antimicrobials are legally available without a prescription, or the rules are not uniformly enforced. Studies show that in countries with low regulation, there is a high level of abuse [9]. According to one study, 77% of Greek pharmacists prescribe antibiotics without a prescription. Antibiotics were often given to patients with flu-like symptoms [10]. Evidence from various countries shows that self-medication is common and often inappropriate [11]; Antibiotics are usually bought without appropriate symptoms, in insufficient doses, or if not taken [12]. In these cases, antibiotics are of no use. Therefore, the evidence limits its recommended use in some cases where the aetiology may be bacterial [13,14].

Improper use of antimicrobials can occur due to complex interactions such as pharmacist knowledge and experience, diagnostic uncertainty, patient-drug interaction, and inadequate patient education from clinicians [15,16]. Additional factors influencing the ranking are patients' knowledge, beliefs and attitudes, antimicrobial use, self-medication, patient expectations, and patient experience with antimicrobial drugs. Appropriate use of antimicrobials for patients [17,18]. The most successful interventions in reducing inappropriate antimicrobial prescribing combine education for clinicians, patients, and the public [19]. The aim of this study was to assess the knowledge, attitude and practices towards antibiotic use in upper respiratory tract infections and the clinical factors that might affect antibiotics prescription by primary healthcare physicians including Centor criteria among patients seeking primary health care in Cluster-1 Riyadh, Saudi Arabia.

In this study, we found good level of knowledge among physicians considering prescribing of the antibiotics in cases of URTI depending on several factors and findings in this study. First, 91.9 % of the participants reported that they follow guidelines in prescribing antibiotics especially Centor scoring guidelines. This percentage is considered proper compared with previous studies that investigated the compliance of physicians to guidelines including the study of Karbach U et.al. [20], Alhuzaimi A et al., [21] and Ward M et.al. [22].

Secondly, we found that about half of the participants would refuse the patients' request of antibiotics and almost a third of them would further educate patients about how and when to use antibiotics. In a previous study, it was found that almost a third of patients with URTI would ask their physicians for antibiotics [23] and other studies [2,24] which are similar to our results in which physicians reported that 70 % of patients asked them to prescribe antibiotics. Moreover, in this study, we found that almost two-thirds of the physicians reported having complaints by patients when they refused to prescribe antibiotics.

In this study, most of the physicians suggested applying programs that aim to increase the awareness of population about the importance of avoiding antibiotics and restrict their prescription through national campaigns and health education. According to many previous studies, education and increasing the awareness of population about medical aspects would help in improving the health aspects of the population [25–27].

This study had some limitations including depending on self-reported questionnaire which may lead to some personal bias because some physicians may want to appear better which may be the reason that almost all of the participants reported following of guidelines. Moreover, some questions depended on previous history which may lead to recall bias.

In conclusion, we found a good to moderate level of knowledge among the physicians toward the use of antibiotics in treatment of URTI however, some improvement in the patient's knowledge should be considered.

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