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**Research Article**

**NON-JUDICIOUS USE OF ANTIBIOTICS IN TREATING SORE THROAT IN ALBADAYA CITY PRIMARY HEALTH CARE CENTERS, QASSIM PROVINCE, KSA**

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**Abstract:**

*Upper respiratory tract infections (URTI) are the most common infectious illness in the general population. It accounts for 20-36% of outpatient clinic visits. Furthermore, 40-60% of URTI are caused by viruses, so in most of the cases there is no need to use antibiotics and treatment is mainly symptomatic and supportive. The non-judicious use of antibiotics has resulted in unwanted resistant strains of bacteria, a recognized etiology which led to that, among other things, is the misuse of antibiotics in treating URTI. In our study we assessed the rates of non-judicious use of antibiotics. Moreover, we will determine the most commonly prescribed antibiotics and we want to decrease the rates of misuse by sharing the results to ministry of health.*

**Methods:** A retrospective study that had been conducted after bioethical approval was taken in Albadaya city primary health care centers from 4th of March to 8th of March 2018 to which includes all patients who presented with sore throat. We excluded patients aged 3 years and below and patients with concomitant disease that needs antibiotic therapy. In addition our study had been based on Centor criteria which are a validated tool. The analysis was performed using (SPSS) version 21. Both descriptive and analytic inferential statistics had been conducted. P-value of  $\leq 0.05$  had been accepted as significance level for all statistical tests. **Results:** There were 392 patients who were involved in this study. Age range of the patients was from 4 to 70 years old. Most of the patients received both antibiotic and non-antibiotic drugs at the same time with 82.1%, 10.2% with non-antibiotic only, 6.6% with antibiotic only, 2 cases received two antibiotics and another 2 cases received two type of antibiotics plus non-antibiotic drug. Regarding risk of streptococcal infection score to determine the issuance of medication, 47.2% were in the group of 5% - 10% score, 26.3% were in the group of 1% - 2.5% score, 23.2% were in the group of 11% - 17% score and 03.3% were in the group of 28% - 35% score. Overall, the most common prescribed antibiotic was amoxicillin (39.1%) while the most common prescribed medication was paracetamol (46.2%). **Conclusion:** This study finds paracetamol and amoxicillin are the most common prescribed drugs on URTI patients and based on our further investigation the prevalence of non-judicious antibiotics issuance was relatively higher at 89.2% while 10.2% was considered as appropriate issuance of medication. This indicates the need to address the increasing of incorrect prescription of drugs.

**Keywords:** Non-judicious, antibiotics, URTI, prescription, sore throat.

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## INTRODUCTION:

Upper respiratory tract infections(URTI) are the most common infectious illness in the general population(1). It accounts for 20-36% of outpatient clinic visits (2). Furthermore, 40-60% of URTI are caused by viruses ,so in most of the cases there is no need to use antibiotics and treatment is mainly symptomatic and supportive(3).The non-judicious use of antibiotics has resulted in unwanted resistant strains of bacteria ,a recognized etiology which led to that ,among other things, is the misuse of antibiotics in treating upper respiratory tract infections(URTI) (4). The misuse is mainly attributed into three causes, First one is that clinicians do not strictly follow the recent guidelines and recommendations (5). The second cause is that the patients had pre-visits expectations of being prescribed antibiotics in which 50% of them do expect that they will receive antibiotics and 30% of physicians met their expectations. Finally , the undetermined diagnosis also plays a role in the misuse (6). For these reasons the appropriate use of antibiotics is crucial to slow the development of antibiotic resistance(7). A growing rates of resistance is not absolute and it can be controlled, A good example of this is Finland , in 1990 the country faced an increase resistance rate to erythromycin which led them to apply strict recommendations nationwide for the justifiable use of macrolide, those efforts resulted in reduction in using macrolide and eventually decreasing the rate of erythromycin resistance(8) .

There are many studies which have evaluated the rate of antibiotic misuse in patients diagnosed with URTI . one retrospective study done for patients with tonsillopharyngitis evaluated the use of antibiotics according to Centor Criteria. They included 689 patients , 44.7% of them got antibiotic prescription. Furthermore, 49.6% of the prescribed antibiotics were unnecessary. In addition , amoxicillin were the most commonly prescribed antibiotic followed by macrolides(9). A another study has been done on 184

pediatric patients with URTI . the antibiotics were given to 51% of them and mainly given to patinas who are <3 years. Also , the antibiotic prescriptions increased if there is fever , earache ,younger age and sore throat (9).

Another study done in Australia, have shown that the vast majority of antibiotics prescriptions are done by the general practitioners in the primary health care centers and the most common indication is URTIs(10). The over prescription is usually in case of pharyngitis(11).

## STATISTICAL ANALYSIS METHOD:

A retrospective study that had been conducted after bioethical approval was taken in Albadaya city primary health care centers from 4th of March to 8th of March 2018 to which includes all patients who presented with sore throat. We excluded patients aged 3 years and below and patients with concomitant disease that needs antibiotic therapy. In addition our study had been based on Centor criteria which are a validated tool. The analysis was performed using (SPSS) version 21. Both descriptive and analytic inferential statistics had been conducted. P-value of  $\leq 0.05$  had been accepted as significance level for all statistical tests.

The analysis was performed using Statistical Packages for Software Sciences (SPSS) version 21. Both descriptive and analytic inferential statistics had been conducted. P-value of  $\leq 0.05$  had been accepted as significance level for all statistical tests. Continuous variables had been expressed as mean  $\pm$  standard deviations or median with (interquartiles). Categorical variables had been presented as counts and proportions (%). The relationship between risk streptococcal infection and health characteristics of URTI patients has been conducted using chi square test.

## RESULTS:

**Table 1: Distribution of Center and age in years**

Study Variables	N (%) (n=392)
Center name	
• Center 1	78 (19.9%)
• Center 2	84 (21.4%)
• Center 3	68 (17.3%)
• Center 4	39 (09.9%)
• Center 5	52 (13.3%)
• Center 6	71 (18.1%)
Age in years (mean $\pm$ SD)	18.5 $\pm$ 12.6

There were 392 patients who were involved in this study. Of the 392 patients 78 (19.9%) were collected from center 1, 84 (21.4%) were collected from center 2, 68 (17.3%) were collected from center 3, 39 (09.9%) were collected from center 4, 52 (13.3%)

were collected from center 5 and 71 (18.1%) were collected from center 6. Age range of the patients was from 4 to 70 years old, mean age was 18.5 years (SD 12.6) (Table 1).

**Table 2: URTI related characteristics and medication prescription**

Characteristics	N (%) (n=392)
<b>Temperature (mean ± SD)</b>	<b>37.1 ± 1.3</b>
<b>Cough</b>	
<b>Positive</b>	<b>181 (46.2%)</b>
<b>Negative</b>	<b>211 (53.8%)</b>
<b>Tonsil</b>	
<b>Positive</b>	<b>03 (0.8%)</b>
<b>Negative</b>	<b>389 (99.2%)</b>
<b>Prescription Criteria</b>	
<b>Antibiotic only</b>	<b>26 (06.6%)</b>
<b>Non Antibiotic only</b>	<b>40 (10.2%)</b>
<b>Two Drugs (Antibiotic + non-Antibiotic)</b>	<b>322 (82.1%)</b>
<b>Two Drugs (Antibiotics)</b>	<b>02 (0.5%)</b>
<b>Three Drugs (Two Antibiotics + Non-Antibiotics)</b>	<b>02 (0.5%)</b>
<b>Risk of Streptococcal Infection (%)</b>	
<b>1% - 2.5%</b>	<b>103 (26.3%)</b>
<b>5% - 10%</b>	<b>185 (47.2%)</b>
<b>11% - 17%</b>	<b>91 (23.2%)</b>
<b>28% - 35%</b>	<b>13 (03.3%)</b>

The mean temperature of studied patients was 37.1 (SD 1.3). Patients with positive cough were 46.2% while patients with positive tonsil were only 3 cases out of 392 URTI patients. Most of the patients received both antibiotic and non-antibiotic drugs 82.1%, 10.2% with non-antibiotic only, 6.6% with antibiotic only, 2 cases received 2 antibiotics and another two cases received three kinds of drugs

including two type of antibiotics plus non-antibiotic drug. Regarding risk of streptococcal infection score to determine the issuance of medication, 47.2% were in the group of 5% - 10% score, 26.3% were in the group of 1% - 2.5% score, 23.2% were in the group of 11% - 17% score and 03.3% were in the group of 28% - 35% score (Table 2).

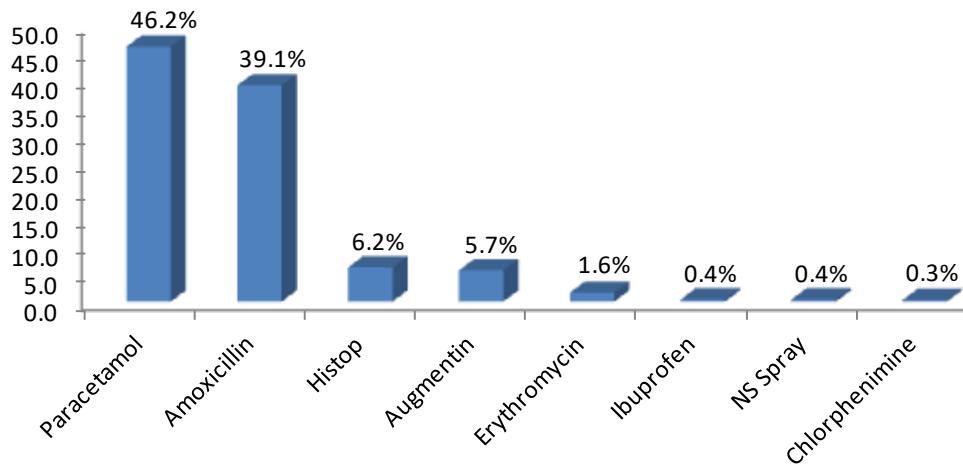
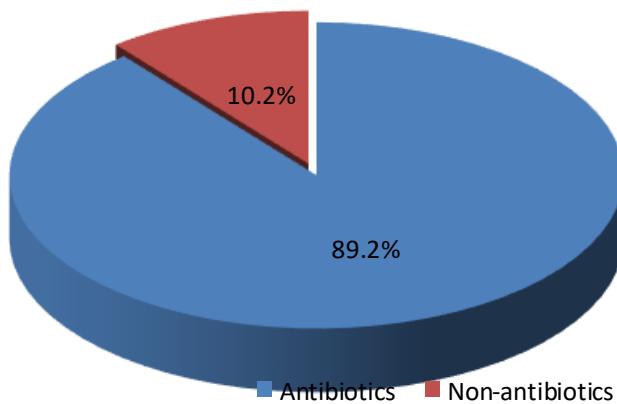
**Figure 1: Distribution of total prescribed antibiotics and medications**

Figure 1 shows the distribution of antibiotic prescription among patients with URTI. Based on the results, there were 46.2% prescriptions of paracetamol followed by amoxicillin 39.1%, next

was Histop which was in a distant from amoxicillin with 6.2%, Augmentin 5.7%, Erythromycin 1.6% and with few prescriptions for NS Spray, and Chlorphenimine.

**Figure 2: Prevalence of non-judicious issuance of medication**

**Figure 2: Elaborated the non-judicious issuance of medication where antibiotics were dominant with 89.2% compared to non-antibiotics with 10.2% which considered as good practice.**

**Table 3: Relationship between risk streptococcal infection and Health characteristics of URTI patients (n=392)**

Factor	Risk of Streptococcal Infection (%)				P-value §
	1% - 2.5%	5% - 10%	11% - 17%	28% - 35%	
	N (%) (n=103)	N (%) (n=185)	N (%) (n=91)	N (%) (n=13)	
Temperature (mean ± SD)	37.2 ± 0.4	37.1 ± 0.4	36.8 ± 2.3	38.3 ± 0.6	<0.001 **
Cough					
Positive	97 (94.2%)	82 (44.3%)	02 (02.2%)	0	<0.001 **
Negative	06 (05.8%)	103 (55.7%)	89 (97.8%)	13 (100%)	
Tonsils					
Positive	0	01 (0.5%)	0	02 (15.4%)	<0.001 **
Negative	103 (100%)	184 (99.5%)	91 (100%)	11 (84.6%)	
Frequency of drug taken					
Single drugs	18 (17.5%)	26 (14.1%)	20 (22.0%)	02 (15.4%)	0.425
2 – 3 drugs	85 (82.5%)	159 (85.9%)	71 (78.0%)	11 (84.6%)	

\* Discarded missing cases. §P-value has been calculated using chi square test and one way Anova. \*\*

Significant at p≤0.001 level.

We used chi square test at table 3 to measure the relationship between risk streptococcal infection and health characteristics URTI patients with p-values which indicates whether the relationship is statistically significant where p≤0.05 signifies the level of significance for all statistical tests. Based on the results, temperature shows significant relationship on the risk to streptococcal infection (p<0.001) where 28% - 35% score has the highest mean among the group. Cough also shows positive relationship among the risk to streptococcal infection group (p<0.001) with positive was high at 1% - 2.5% group on the other hand negative was high at 5% - 10% group. Tonsil also shows statistically significant (p<0.001) where negative was dominant in all streptococcal infection groups while frequency of drug taken shows negative association on streptococcal infection.

## DISCUSSION:

The main objective of this study is to measure the non-judicious use of antibiotics in sore throat patients in primary health care centers. The findings of this study shows, the most common prescribed antibiotic was Amoxicillin (39.1%) while the most common prescribed medication was paracetamol 46.2%. The prevalence of non-judicious issuance of antibiotic was 89.2% while 10.2% was considered as appropriate issuance of medication. Prescription of antibiotic in our study was consistent to various published papers. ((12)-(13), (14)) However, article published by Alkahtani showed Azithromycin as the

most common prescribed antibiotic with Amoxicillin were far behind(15). While Kho and associates reported Bacampicillin as the most commonly prescribed antibiotic in Malaysia(16). Moreover, several published articles reported non-judicious prescription of antibiotics. Al-Faris et al exhibited the least prescription of antibiotics (14.7%) but more on paracetamol (43%) while Linder and his colleagues reported the highest prescription of antibiotic (53%). ((17), (14)) The prescription of antibiotic in our study was slightly higher than the previous mentioned article although consideration of further research is needed to claim this context.

Most of the patients received both antibiotic and non-antibiotic (two) drugs 82.1%, 10.2% with non-antibiotic only, 6.6% with antibiotic only, 2 cases received two antibiotics and another 2 cases received two type of antibiotics plus non-antibiotic drug (three drugs). The prevalence for two prescription of drug in our study was higher compared to the article published by Alkahtani where he found out that 40.27% of the total patients prescribed with two drugs. 15 On the contrary, prescriptions for three drugs were superior in his study compared to our study finding where he reported 33.78% with three drugs prescription.

Regarding risk of streptococcal infection score to determine the issuance of drug, 47.2% were in the group of 5% - 10% score, 26.3% were in the group of 1% - 2.5% score, 23.2% were in the group of 11% -

17% score and 03.3% were in the group of 28% - 35% score. We viewed that this is the first paper in the Saudi Arabia to presents these determinants for issuance of drug where we focused on the patients with URTI. In this study, score range of 1% - 10% was classified as no antibiotic prescription while above those percentage was classified as antibiotic prescription. In general, our study results showed the prevalence of prescribed medication was higher at score range 1% - 10% with relatively less on the opposite. This signifies that prescribed medication might be incorrectly or overly issued for some URTI cases although further investigations are needed to correctly claim these findings due to the limited variables we included in this study.

Furthermore, we also measured the relationship between risk streptococcal infection and health characteristics of URTI patients. Based on the results, temperature shows significant relationship on the risk to streptococcal infection where 28% - 35% score has the highest mean among the group. Cough also shows positive relationship among the risk to streptococcal infection group with positive was high at 1% - 2.5% group on the other hand negative was high at 5% - 10% group. Tonsil also shows statistically significant where negative were dominant in all streptococcal infection groups. We also observed that we are the first paper to report this type of comparison. This comparison was significant in finding which factor is associated with the streptococcal infection score where higher ratings signifies the need to issue antibiotic while lower ratings were intended for medication prescription.

### CONCLUSION:

This study finds paracetamol and amoxicillin are the most common prescribed drugs on URTI patients and based on our further investigation the prevalence of non-judicious antibiotics issuance was relatively higher at 89.2%. This indicates the need to address the increasing of incorrect prescription of drugs. Further training and education of healthcare professionals toward rational drug utilization are necessary in order to decrease the non-judicious issuance of drugs and other medications.

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