

Clinical Research

## Appropriateness of Antibiotic Prescription for Upper Respiratory Tract Infections in Emergency Department in Bahrain

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Received: 02-28-2016

Accepted: 03-28-2016

Published: 04-13-2016

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### Abstract

#### Introduction

Upper respiratory tract infection (URTI) is a common clinical presentation to the medical field. Although it is usually viral and self-limited, antibiotics are still prescribed for a large proportion of patients. No studies have evaluated the appropriateness of prescribed antibiotics for URTI in adults in Bahrain.

#### Aim

The aim of this study is to evaluate the appropriateness of antibiotic prescription in adult patients diagnosed as URTI in a major emergency room in major secondary care hospital in the kingdom of Bahrain.

#### Methodology

The study was prospective observational study, conducted in Accident and Emergency department. Three-hundred forty-nine patients aging 14 years and above, who were diagnosed with URTI and discharged on antibiotics from emergency room during one month period were studied. Patient demographics, clinical presentation, and prescribed antibiotics were reviewed to assess the appropriateness of antibiotic prescription.

#### Results

Out of 417 prescriptions, 83% of antibiotics were not indicated, while 16% only were an appropriate antibiotic choice. Duration of antibiotic was appropriate in 18 out of 48 patient prescriptions only. Cefuroxime axetil was the most commonly prescribed antibiotics. Prescription of unnecessary antibiotics was higher among male. No correlation – however- was noted between age and antibiotics appropriateness.

#### Conclusion

Antibiotics are unjustifiably overused for URTI. Antibiotics stewardship strategies are required to be implemented to decrease this high rate in emergency rooms settings.

**Keywords:** Upper Respiratory Tract Infections; Appropriateness; Antibiotics; Emergency

## Introduction

Upper respiratory tract infection (URTI) is one of the common presentations of the medical field, where acute pharyngitis –for example- account for 1-2% of diagnosis in Accident and Emergency department. URTI is a general term used to describe infections of respiratory tract up to the bronchus. It includes the common cold, otitis media, pharyngitis, tonsillitis, and tracheobronchitis [1].

Viral etiology makes the bulk of the cases, with rhinovirus being the most commonly encountered virus, followed by Para influenza and corona viruses. Five to 10% of pharyngitis is attributed to Group A Beta-hemolytic streptococci (GAS) while less than 10% of acute bronchitis are attributed to bacterial etiology. URTIs are diagnosed based on clinical grounds. It is usually self-limited, requiring only supportive therapy and no antibiotics. Antibiotic indications include treating patients with acute pharyngitis suspected to have GAS, and acute sinusitis worsening over 5 to 7 days or failing to improve after 10 days [2]. Antibiotics are also prescribed in systemically unwell patients, those with serious illness or who presents with complications, in addition to those at risk of complications because of associated co-morbidities [1].

Despite that, antibiotics still prescribed inappropriately for a large number of patients with URTI, leading to unnecessary exposure to antibiotic adverse effects and bacterial resistance. A systemic review observed increase in bacterial resistance in patients prescribed antibiotics, twice comparing to the normal population, lasting for up to 12 months [3].

With the growing antibiotic resistance, a new concept 'Antibiotic Stewardship' has developed. It includes multiple strategies to optimize antibiotic prescription practice, aiming not only to decrease antimicrobial resistant strains but also to decrease serious adverse effects [4].

Many studies have evaluated the appropriateness of antibiotic prescription for patient attending general practice care, but to our knowledge, only a few studies assessed that in the acute setting, i.e. emergency department. In Bahrain, appropriateness of antibiotic prescription in URTIs has only been studied in children [5]. It has not been studied in adults in neither an emergency nor general practice settings.

## Aim

The aim of this study is to evaluate the appropriateness of antibiotic prescription in patients diagnosed with URTI in Emergency Department in the Kingdom of Bahrain.

## Methodology

The study was conducted in Salmaniya Medical Complex; the main secondary hospital in Bahrain. It is a one-month prospective observational study, where data were collected on a daily basis for patients attending the Accident and Emer-

gency Room during the month of July 2014.

All patients aging 14 years and above who were diagnosed to have URTI and discharged on antibiotics were analyzed. A total of three hundred forty-nine patients met the criteria and their records were reviewed by the researchers who filled their data in a form prepared by the research team.

The data included the demographics of the patients: age, gender, nationality, and pregnancy status. The clinical presentation was also noted; including the symptoms, absence or presence of fever, findings of general examination, chest examination, ENT, oral and dental examination. Additionally, data included the final diagnosis and the choice, frequency and duration of antibiotic prescription.

The accuracy of the diagnosis was not investigated; as the main aim of the study was to assess the appropriateness of antibiotic prescription in the context of URTI diagnosis and not to verify the accuracy of the diagnosis.

Diagnoses included; URTI not otherwise specified, tonsillitis, sinusitis, pharyngitis, bronchitis, otitis externa and otitis media

According to the aforementioned factors, two researchers evaluated the patient clinical presentation and classified the antibiotic prescription as appropriate, inappropriate due to antibiotic choice, frequency, or duration, or not indicated.

Data entry was done using Microsoft Excel 2013 while data analysis was using Microsoft Excel 2013 and Statistical Package for the Social Sciences version 16.0.

P value of <0.05 was considered significant.

## Results

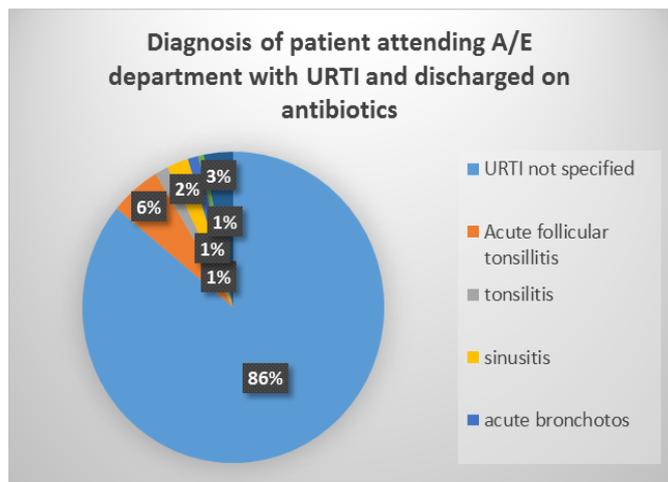
Three hundred forty-nine patients who aged 14 years and above, and discharged from Accident and Emergency Room with a diagnosis of URTI on antibiotics were studied. This included 276 Bahraini and 73 patients from other nationalities. Approximately 58% of the studied patients were of the male gender while around 42% were female. The majority of patients who presented with URTI were aging 14-30 years. (Table 1)

**Table 1.** Demographic data; age and gender, of the study population.

| Age group | Male | Female | Total |
|-----------|------|--------|-------|
| 14-30     | 108  | 59     | 167   |
| 31-40     | 45   | 48     | 93    |
| 41-50     | 25   | 21     | 46    |
| 51-60     | 14   | 11     | 25    |
| >= 61     | 11   | 7      | 18    |
| Total     | 203  | 146    | 349   |

The majority of patients – around 86% were diagnosed with URTI-not otherwise specified. Nineteen patients were

diagnosed with acute follicular tonsillitis while 11 patients were diagnosed with ear infection; including otitis media or external. The diagnoses are summarized in the chart below (Figure 1).



**Figure 1.** Diagnosis of patient attending A/E department with URTI and discharged on antibiotics.

A total of 417 antibiotics were prescribed, 68 of them was as an initial dose of IV antibiotics, which was followed by an oral course. Cefuroxime axetil was the most commonly prescribed antibiotic, followed by oral amoxicillin-clavulanate, accounting for 41% and 26% of the prescriptions respectively. Out of the 417 antibiotics, 346 (83%) were not indicated, while the choice was inappropriate in 5 prescriptions. Only 16% of prescription was appropriate in terms of choice of antibiotic (Figure 2). All patients who had an appropriate antibiotic choice was prescribed the right dosage. In only 18 out of 48 patient, the duration of antibiotic prescription was appropriate. The appropriateness of antibiotic choice was associated with gender, with males having more antibiotics that are not indicated (p-value: 0.007) (Table 2). However, there was no significant correlation between the age of patients and antibiotics appropriateness (P value: 0.286).

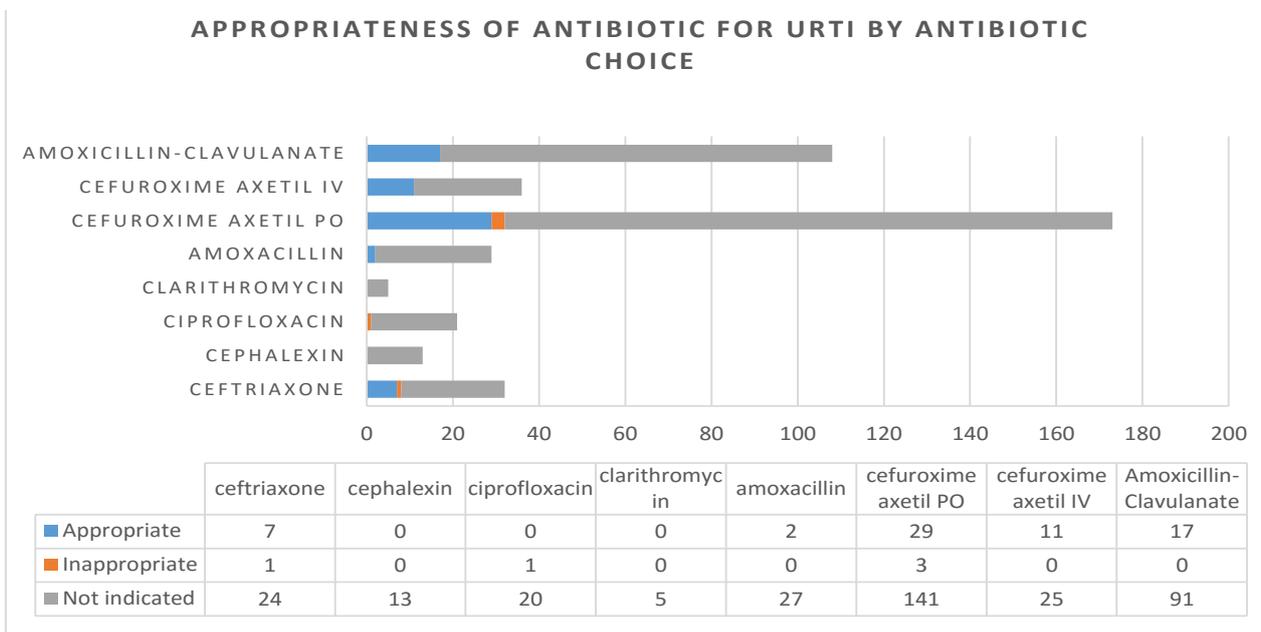
**Table 2.** Appropriateness of antibiotic choice by gender.

|                        |               | Gender          |        | Total  |        |
|------------------------|---------------|-----------------|--------|--------|--------|
|                        |               | 1               | 2      |        |        |
| Choice appropriateness | Appropriate   | Count           | 19     | 29     | 47     |
|                        |               | % within gender | 9.4%   | 19.9%  | 13.5%  |
|                        | Inappropriate | Count           | 3      | 1      | 4      |
|                        |               | % within gender | 1.5%   | .7%    | 1.1%   |
|                        | Not indicated | Count           | 181    | 116    | 298    |
|                        |               | % within gender | 89.2%  | 79.5%  | 85.4%  |
| Total                  |               | Count           | 203    | 146    | 349    |
|                        |               | % within gender | 100.0% | 100.0% | 100.0% |

**Discussion**

Our study demonstrated non-adherence to the international recommendation in the management of URTI. The majority of a patient who received antibiotic presented with uncomplicated URTI requiring no antibiotic treatment. A multi-centered study was done in similar settings and showed 72% of patient prescribed unjustifiably antibiotics for URTI, which is lower than our center rate [6]. The rate is also much higher comparing to studies conducted in general practice. In HAPPY AUDIT Project – for example – 45% were prescribed antibiotics unnecessarily [7]. Similarly, a study conducted in the public sector of hospitals in New Delhi showed 44.5% non-indicated antibiotic prescription for uncomplicated URTI [8].

The high percentage of unnecessary prescription might be attributed to the physician perception that antibiotics are expected treatment by the patient, and patient misconception about antibiotic effectiveness. Studies suggest that physician’s uncertainty about the diagnosis, and poor communications skills may also account for the antibiotics over prescription [9].



**Figure 2.** Diagram of the appropriateness of antibiotic for URTI by antibiotic choice.

Similar to other studies, we observed no association between the unnecessary prescription and age. However, in our study, we observed a correlation between patient gender and the unnecessary prescription, where the male had more prescriptions of non-required antibiotic, unlike other studies [7,10].

In terms of antibiotic choice, we had similar results to New Delhi study private practice, where cephalosporins were the most common choice [8]. Our second most common antibiotics – Amoxicillin-Clavulanate- have been observed to be the most common antibiotic prescribed in Croatia for tonsillopharyngitis [11]. Differently, in Malaysia Macrolide, accounted for 61% of all prescriptions [12].

We noticed also that the majority of patients who required antibiotics were prescribed for the inappropriate duration; less than the recommended duration. We have not encountered any study assessing the appropriateness of antibiotic duration to compare it to our study.

### Conclusion

Antibiotics are highly overused for patients attending emergency department with URTI. Antibiotic stewardship strategies implementation is mandatory to overcome this practice. It is important to increase awareness among physicians, as well as the general population about the limited antibiotic rule in URTI, especially with the presence of evidence about its correlation with the growing antibiotic resistance. Publishing clear local guidelines for indications of antibiotics in URTI might be a good step to achieve antibiotic appropriateness.

### Conflict of Interest

All the authors here by certify that there is no conflict of interest with any financial issues.

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