

# EMPIRICAL USE OF ANTIBIOTICS FOR SORE THROAT – HOW RATIONAL IS IT?

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### ABSTRACT

**Objective:** To determine the frequency of Group A Streptococci culture positive cases among sore throat patients who were prescribed antibiotics.

**Study Design:** Cross-sectional study.

**Place and Duration of study:** This study was conducted at Shifa College of Medicine, Islamabad and outpatient departments of two tertiary care hospitals of Islamabad from August to November 2015.

**Materials and Methods:** Throat swab cultures were done in cases prescribed empirical antibiotics for sore throat. All data regarding the physicians and patients, presenting complaints, clinical findings and prescriptions was recorded on a structured questionnaire. Frequencies and percentages were calculated for each variable in the questionnaire.

**Results:** A total of 151 adult patients, who presented with sore throat were enrolled for the study. Inflammation of posterior pharyngeal wall/tonsils was observed in 132 (87%) patients, while exudate was seen in 40 (27%) cases. Tonsils were enlarged in 9 (6%) cases, follicular tonsillitis was observed in 3 (2%) and cervical lymphadenopathy was present in 2 (1.3%) patients. All patients were prescribed empirical antibiotics. Among them, 55 (36.4%) received levofloxacin, 29 (19.2%) azithromycin, 25 (16.6%) amoxicillin/clavulanate potassium or a combination of these with a cephalosporin (27.8%). Group A Streptococci were isolated from throat swabs of only 3 (2%) patients.

**Conclusion:** Empirical prescription of antibiotics for sore throat in most cases is unjustified and the practice should be discouraged.

**Keywords:** Pharyngitis, Antibiotics, Clinical practice patterns, Inappropriate prescribing.

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### INTRODUCTION

Acute sore throat is one of the commonest complaints in medical practice. Most of these cases are viral in aetiology and do not require antibiotics [1-3]. Among healthy individuals with acute pharyngitis, the only bacterial pathogen of concern, which requires antibiotic treatment is Group A Streptococcus because of its potential to cause rheumatic fever [4]. However, it is a common practice to prescribe antibiotics to all patients presenting with sore throat without identifying the aetiology by either throat swab culture or streptococcal antigen detection. Such practices lead to a waste of resources, expose patients to potentially harmful side effects of drugs and promote development of resistance in the bacteria [2,3]. Studies from around the world have highlighted this problem, ascribing it to concerns regarding acute rheumatic fever, unavailability of diagnostics facilities, pressure from patients or ignorance on the part of physicians [2,4-7]. The purpose of this study was to determine how

rational antibiotic prescription is in Islamabad by comparing prescriptions with throat swab culture results.

### MATERIALS AND METHODS

This cross-sectional study was conducted at Shifa College of Medicine, Islamabad, and outpatient departments of two tertiary care hospitals of Islamabad, from August to November 2015, after the approval of institutional review board & ethics committee. All patients presenting with sore throat, who were prescribed empirical antibiotics were included in the study. Enrolment was voluntary and anonymous. Patients who were taking or had taken antibiotics during the last 48 hours were excluded. Consecutive non-probability sampling technique was used to select study participants. WHO sample size calculator [8] was used to calculate a sample size of 151, keeping P=33% as reported frequency of antibiotic prescription in a study carried out in Holland in 2005 [9], margin of error = 7.5% and confidence level 95%.

All information regarding the physicians and patients, presenting complaints, clinical findings and prescriptions was recorded on a structured questionnaire after getting informed consent from

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study participants. Throat swabs for cultures were collected from all patients prescribed antibiotics for sore throat. Samples were immediately inoculated on Columbia agar (Oxoid, Basingstoke, UK) containing 5% sheep blood (blood agar), which were transported with due precautions in sealed plastic bags to the laboratory. Blood agar plates were incubated at 37°C for up to 48 hours. Isolates were identified by colony morphology, catalase test and Gram staining. Beta haemolytic streptococci were typed using latex agglutination test (PathoDxtra™ Strep Grouping Kit, ThermoFisher Scientific, USA). Antimicrobial susceptibility testing was done on Mueller-Hinton agar (Oxoid) by modified Kirby-Bauer disk diffusion technique and the results were interpreted according to Clinical and Laboratory Standards Institute criteria [10]. The antimicrobial disks used (Oxoid) were penicillin (10µg), clindamycin (2µg) and erythromycin (15µg). Sensitivity plates were incubated for 24 hours at 37°C.

All cultures positive for Group A Streptococci were intimated to the concerned physicians along with antibiotic susceptibility reports. All cases yielding the growth of normal throat flora were presumed to be viral or non-infectious in aetiology. Data was entered and analyzed using SPSS version 19. Descriptive statistics were calculated for both qualitative and quantitative variables

## RESULTS

Data was collected from outpatient departments of a public-sector tertiary care hospital

(n=75) and a private tertiary care hospital (n=76) of Islamabad by two investigators. All patients were adults ranging in age from 16 to 80 years (32 ± 11 years). Ninety-six (64%) patients were males. Presenting complaints and clinical findings are summarized in Table-1. All patients were prescribed empirical antibiotics (Table-2) for 2 to 7 days (mean 5 ± 1.7 days), while some were also prescribed non-steroidal anti-inflammatory drugs (n=111) and anti-histamines (n=49). Group A Streptococci were isolated from throat swabs of only 3 (2%) patients. They had presented with fever and sore throat. Follicular tonsillitis was observed in all three cases, while cervical lymphadenopathy was present in two of them.

## DISCUSSION

Our results highlight two disturbing trends in management of patients with sore throat. One is the empirical use of antibiotics without scientific justification and the other is the inappropriate choice of antibiotics. At least three different modalities are available with physicians to ascertain aetiology of sore throat. Ideally, throat swab cultures should be performed, which not only confirm the presence of Group-A Streptococci but also provide antimicrobial susceptibility report [4,11]. However, culture results take 48-72 hours and require follow-up visits, while culture facilities are not widely available in under-developed countries like Pakistan. Rapid antigen detection tests (RADTs) for streptococcal antigens on

**Table-1: Clinical features (n=151).**

Presenting complaints	Frequency	Percent
Sore throat	151	100%
Cough	131	87%
Fever	105	69.5%
Clinical findings		
Inflammation of posterior pharyngeal wall/tonsils	132	87.4%
Exudate on posterior pharyngeal wall/tonsils	40	26.5%
Enlarged tonsils	9	6%
Follicular tonsillitis	3	2%
Cervical lymphadenopathy	2	1.3%

**Table-2: Antibiotics prescribed (n=151).**

Antibiotic	Frequency	Percent
Levofloxacin	55	36.4%
Azithromycin	29	19.2%
Amoxicillin/clavulanate potassium	25	16.6%
Azithromycin plus cefatrizine	25	16.6%
Levofloxacin plus cefatrizine	12	7.9%
Levofloxacin plus azithromycin	3	2%
Amoxicillin/clavulanate potassium plus cefatrizine	2	1.3%
Total	151	100%

throat swabs are bedside procedures, which provide immediate results but they may not be freely available in Pakistan [6,11]. In the absence of these facilities, clinical criteria such as Centor score or its modification can be used to rule out streptococcal throat infection with reasonable confidence [6]. However, no effort was made by the physicians to ascertain the aetiology of pharyngitis before prescribing antibiotics, even though both hospitals have well-equipped clinical laboratories with culture facilities. They also did not apply Centor score, which would have ruled out streptococcal infection in most of the patients. The Mclsaac modification of Centor score assigns a low probability of streptococcal throat infection in the presence of cough and absence of cervical lymphadenopathy and tonsillar swelling/exudates [6,11,12]. Majority of our patients (87%) complained of cough, while only a few had enlarged tonsils (6%) or cervical lymphadenopathy (1.3%). Clinical findings alone should have precluded the use of antibiotics in most of these patients.

Injudicious use of antibiotics is a global problem, which is escalating healthcare costs, exposing patients to side effects of drugs and promoting antimicrobial drug resistance [2,3]. Studies from around the world have highlighted this problem with prescription rates varying from 35% to 80% [2,5,9,13,14]. The situation appears to be much worse in Pakistan, where lack of awareness among clinical practitioners and absence of accountability are more acute. Results similar to ours have been reported from Karachi with inappropriate use of antibiotics in 96% of patients [6] and from Rawalpindi with 92% patients receiving antibiotics in the absence of streptococcal infection [15].

The other significant finding in our study was the choice of antibiotic for empirical treatment of sore throat. Considering that the only pathogen of concern is Group A Streptococcus, which is universally sensitive to penicillin [11,16], none of our physicians chose penicillin. Instead, they prescribed levofloxacin, azithromycin, amoxicillin/clavulanate potassium or a combination of these with a cephalosporin (Table 2). Drug of choice for streptococcal sore throat is penicillin V due to its efficacy, safety and low cost. Amoxicillin and ampicillin are acceptable alternatives where penicillin V is not available. If the patient is allergic to penicillin, then a macrolide or a first-generation cephalosporin can be used [4,17]. There is no justification for using an expensive macrolide like azithromycin in the presence of cheaper alternatives or quinolones,

which have limited activity against streptococci [6,18], while the absence of beta lactamase production by Group A Streptococci precludes the use of amoxicillin/clavulanate potassium. Our findings are at a variance from the rest of the world, where physicians appear to be more judicious in their choice of antibiotics. Doctors in Western countries are more likely to prescribe penicillin for sore throat [2,4,9,14] than in Pakistan, where irrational choice of antibiotic for sore throat is more widespread. A study from Karachi has reported inappropriate choice of antibiotics in 70% of their patients [6], which although high, is not as alarming as our study, where none of the patients received appropriate antibiotics.

Different strategies have been proposed to overcome the problem of irrational use of antibiotics. Most important is the education of doctors along with institutional monitoring of clinical practices. Increased awareness and surveillance programmes in European countries have yielded encouraging results with appreciable decline in inappropriate prescription of antibiotics for sore throat [19]. In Pakistan, poorly developed health care system, financial constraints and lack of monitoring of clinical practices, pose a serious public health challenge. However, aggressive programmes to educate doctors, utilization of clinical decision rules like Centor score and wider availability of RADTs can help in reducing injudicious use of antibiotics for sore throat

## CONCLUSION

Empirical prescription of antibiotics for sore throat in most cases is unjustified and the practice must be discouraged.

## AUTHORS CONTRIBUTION

**Rifat Nadeem Ahmad:** Conception, design & drafting of the article

**Sajida Naseem:** Analysis & interpretation of data

**Mahwish Majid Bhatti:** Conception & design

**Haider Ghazanfar & Zainab Ali Khan:** Collection of data

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