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Original Research Article

Appropriateness of antibiotic prescribing for upper respiratory tract infection in a tertiary care teaching hospital: a cross sectional study

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ABSTRACT

Background: Overuse of antibiotics among the patients with upper respiratory tract infection (URTI) is a worldwide problem, leading to antimicrobial resistance. This study is aimed to evaluate the appropriateness of the antimicrobial prescribing for upper respiratory tract infections in a tertiary care teaching hospital.

Methods: This was a cross-sectional, observational study. Data was collected from outdoor adult patients who were clinically diagnosed to have URITs from General Medicine and Otorhinolaryngology Department of a tertiary care teaching hospital. The appropriateness of antibiotics used in URTI was assessed. The data was analyzed using descriptive statistics.

Results: Total 100 cases, clinically diagnosed to have URTI were included in the study. Among these, common cold (46%) and acute otitis media (23%) were the most frequent encounters. 75% of the prescriptions contained at least one antibiotic. In fact, antibiotics were the most commonly prescribed agents (21.2%) followed by antihistaminic (19.8%) and NSAIDs. 57% of the antibiotics were prescribed inappropriately, either in terms of inappropriate choice (37%) or over use (20%) of antibiotic.

Conclusions: Inappropriate prescription of antibiotics for otherwise self-limiting URTI cases is a common practice even in a tertiary care teaching hospital. Implementation of multifaceted approach is needed to curtail the same.

Keywords: Antibiotics, Antibiotic resistance, Outdoor cases, Upper respiratory tract infection

INTRODUCTION

URTIs comprise of a range of conditions such as acute rhinitis, rhinosinusitis, acute pharyngitis, tonsillopharyngitis, acute epiglottitis, acutelaryngitis and acute otitis media.¹ A substantial proportion of health care visits to primary care and other family medicine settings are due to suspected URITs. Most URITs are viral in origin, meaning they are unlikely to benefit from antibiotics and can often be effectively managed with supportive treatments.² Despite this knowledge, antibiotics are often inappropriately prescribed. Unfortunately, this tendency of unnecessary antibiotics prescription for URIT is prevalent worldwide.³ Although clinical guidelines on

judicious antibiotic use explicitly mentions that antibiotics should not be prescribed for viral infections and non-specific URIT; literature on antibiotic prescribing from across the globe including India indicates high rate of antibiotic prescriptions for respiratory infections.^{4,5} According to CDC, at least 30 percent of antibiotics prescribed in the United States are unnecessary and moreover, most of these unnecessary antibiotics are prescribed for respiratory conditions caused by viruses.⁶ Such overprescribing of antibiotics contributes to increase in the cost of treatment, increase chance of development of adverse drug reactions and drug interactions and most importantly resulting into development of antibiotic resistance.⁷

Antibiotic resistance is a global public health threat and its reduction is a priority. Initiatives are being taken with an aim to reduce antibiotic overuse and advice against using antibiotics for URTIs that are viral in origin. While the risk of inappropriate and overuse of antibiotics is established, however, maintaining balance between, the pressure of diagnostic uncertainty, time constraints, and patient expectations and preferences against the undesirable consequences of overprescribing is a task for the providers. Various interventions are being tried that address inappropriate antibiotic prescribing and the pressures of providing in-person care for patients with URTIs. These include delayed (postdated) antibiotic prescriptions and different interventions to guide the use of antibiotics, as well as multiple educational strategies.² Prescription pattern evaluation is a part of the process of improving patient care by reviewing the existing prescribing practices. It helps to assess the extent and pattern of inappropriate antibiotic use and extent of polypharmacy in a health care setting and provide a platform for implementation of necessary changes.⁸ The objective of the present study is to assess the prescribing practice for different URTI conditions and analyse the appropriateness of antimicrobial prescribing for such conditions using the available standard treatment guidelines.

METHODS

Study setting

This cross-sectional observational study was carried out at a tertiary care teaching hospital for the period of three months. Prior permissions of the respective head of the departments (medicine and otorhinolaryngology department) and ethical clearance was obtained before conducting the study. Initially, data collection was started in the month of March 2021 but due to the second wave of COVID-19 pandemic, the study was temporarily paused. Data collection was resumed from July 2021 to August 2021.

Data collection procedure

Total 100 patients, attending general medicine and otorhinolaryngology outdoor facilities of the hospital, who were clinically diagnosed to have URTI, were included in the study. After obtaining their informed consent, demographic and clinical details of such patients as well as the treatment provided to them were obtained from the case notes given to the patients after consultation. The relevant data was entered in to the data collection form.

Data analysis

The data was entered in to Microsoft excel spreadsheet and analyzed using descriptive statistics. Data was analyzed using WHO core drug prescribing indicators. Moreover, appropriateness of antimicrobial prescribing was analyzed using ICMR standard treatment guidelines 2019.¹

RESULTS

Out of 100 Prescriptions of Upper Respiratory Tract Infection (URTI), there was nearly equal distribution of prescriptions from each of Medicine and Otorhinolaryngology OPD. With 54% prescriptions belonged to patients attending Otorhinolaryngology OPD. 56% of prescriptions were of male patients. The mean age of patient in was 34 ± 11.11 (years \pm SD). The most common URTI diagnosed was common cold 46% followed by otitis media 23% and Pharyngitis 15% (Figure 1).

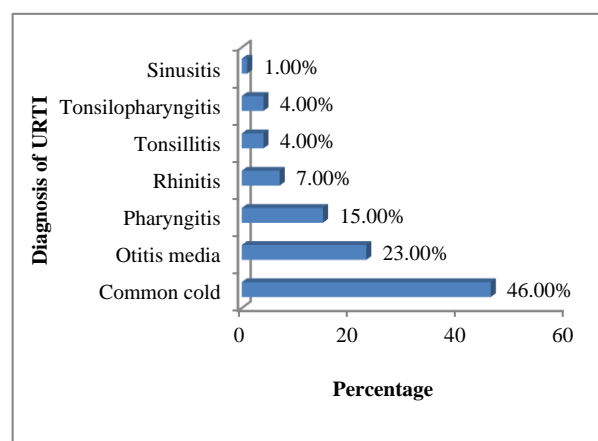


Figure 1: Clinical diagnosis different cases of URTI.

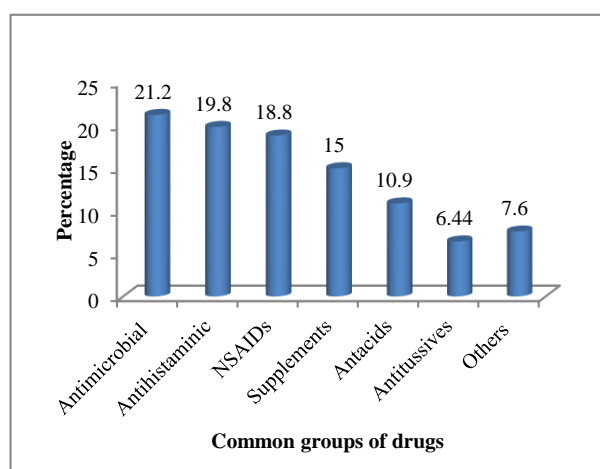


Figure 2: Group of the drugs prescribed for URTI patients (n=100).

Average number of the drugs prescribed per prescription was 4.19 ± 1.14 with a range of 2 to 6. 93.5% (329/419) drugs were prescribed by generic name. 31% prescriptions contained fixed drug combination (FDC), with a mean of 0.42 ± 0.68 per prescription. 89% of the prescriptions contained at least one non NLEM drug. The mean number of drugs per prescription from NLEM was 2.48 ± 1.25 . Antibacterials (21%) were the most commonly prescribed group of drugs followed by antihistaminic (19.8%) and NSAIDs (18.8%) (Figure 2). 75% patients with URTI were prescribed antibiotics with an average of 1 ± 0.85 antibiotic per prescription. Out of 89, 74(83.14%) were

given by oral route while 15 (16.86%) were given topically (Table 1). Azithromycin was the most commonly (44%) prescribed antibiotic, while, levocetirizine (54.2%) was found to be the most commonly prescribed antihistaminic. Among NSAIDs, paracetamol (93.6%) seemed to be the most preferred drug for URTI patients (Table 2).

Table 1: analysis of prescribing using WHO core drug use indicator.

Parameters	Observed value
Total number of prescriptions analyzed	100
Total number of drugs prescribed	419
Average number of drugs per encounter	4.19±1.14
Percentage of drugs prescribed with generic name	93.5
Percentage of drugs prescribed with fixed dose combinations	10
Percentage of drugs from NLEM (national list of essential medicine) list	59.18
Total number of prescriptions with antimicrobial	75

Table 2: Most commonly used agents in each group of drugs for the patients of URTI (n=100).

Group of drugs	Commonest drug	N (%)
Antimicrobial	Azithromycin	39 (43.8)
Antihistaminic	Levocetirizine	45 (54.2)
NSAIDs/Antipyretics	Paracetamol	74 (93.6)

Evaluation of appropriateness of prescribing

Based on the inclusion of information such as dose of drug, frequency of intake, formulation of drug and duration of medication, the prescriptions were classified as complete or incomplete. If all the above information about the drug is present in the prescription, the prescription was classified as complete and in case of absence of any one of the above-mentioned details the prescription was classified as incomplete. Accordingly, 73% of the prescriptions were incomplete. The incompleteness was in terms of omission of one or more of dose (97.2%), duration (12.3%) and or frequency of administration (8.22%) of the medications used. Evaluation of appropriateness of antimicrobials prescribed for URTI was carried out considering ICMR guidelines 2019 (Treatment Guidelines for Antimicrobial Use in Common Syndromes 2019).¹ All antimicrobial prescriptions were analyzed based on appropriateness of the indication (is the antibiotic needed for the particular case?), followed by appropriateness of their choice, dose, route, duration and frequency of administration. 57% of the antibiotic prescriptions were considered inappropriate. The major area of inappropriateness found was the choice

of antibiotic. 37% prescriptions had wrong selection of antibiotic and in 20% prescriptions the antibiotic was used unnecessarily.

DISCUSSION

Total 100 prescriptions of adult patients suffering from Upper Respiratory Tract Infection (URTI) from the outdoor facility of otorhinolaryngology and medicine department of a tertiary care teaching hospital of Gujarat state were collected for the study. All the prescriptions were analyzed using WHO core drug use indicators.⁹ And those containing an antibiotic were analyzed for the appropriateness of antimicrobial prescribing using ICMR guideline.¹ Average number of drugs prescribed per patient per encounter was 4.19±1.14, which is higher than the accepted standard of <2 drugs per encounter by WHO.⁹ The increase in the number of drugs prescribed per encounter may be due to the prescription of nutrient supplements to each patient, as majority of the patient inflow to the hospital is from the lower socioeconomic class, who are likely to have associated nutritional deficiencies. 93.5% drugs were prescribed by generic name, which is close to the WHO recommendation of 100% prescription under generic name.⁹ This also reflects the success of state government initiated drive to encourage drug prescribing by generic name. 73% prescriptions were found to be incomplete in one or more parameters taken into consideration. This error of omission may be attributed to increased patient load or lack of emphasis on prescription writing. 75% prescriptions for URTI contained at least one antibiotic, this is quite higher than the WHO standard of <30%.⁹ The usual causative agents of URTI are viruses. These illnesses are best treated with symptomatic therapy.¹ Antimicrobial therapy is not indicated for viral URTI. The patients should be warned about symptoms which indicate complications like breathing difficulty, persistent fever beyond 4-5 days or ear pain. 63.04% of patients who were diagnosed to have common cold, were prescribed an antibiotic with the most preferred agent was found to be azithromycin (93.1%). Common cold is a mild, self-limited URI with symptoms of runny nose, sore throat, cough, sneezing, and nasal congestion. It is a heterogeneous group of viral diseases, and therefore does not respond to antibiotics.¹⁰

One study reviewed randomized controlled trials (RCTs) from 1966 to 2009 that compared antibiotic therapy with placebo in persons who had symptoms of acute URI of less than seven days' duration, or acute purulent rhinitis of less than 10 days' duration.¹⁰ The authors found insufficient evidence to recommend antibiotics for the treatment of purulent or clear rhinitis in children or adults. ICMR guidelines, 2019 also mentions to institute symptomatic therapy to be constituted for the same.¹ 82.6% of acute otitis media, were prescribed antibiotics, most commonly prescribed agent being amoxicillin+clavulanic acid and cefixime. For non severe AOM, routine prescribing of antibiotic is not indicated, and the cases can be managed with watchful waiting for 48-72 hours and prescribing

antibiotic only if there is failure to improve. The choice of antimicrobial is appropriate on the basis of ICMR treatment guidelines.¹ 13 (86.66%) out of 15 patients diagnosed with pharyngitis were prescribed antimicrobials. Most of the patients received azithromycin. Pharyngitis is frequently caused by viruses. Antibiotic prescription is not recommended as per ICMR guidelines.¹ Group A beta-hemolytic streptococcal (GAS) infection is the only common indication for antibiotic therapy for sore throat cases and only 5–10% of adult sore throat cases are caused by GAS.^{11,12} A rapid antigen detection test (RADT) is necessary to establish a GAS pharyngitis diagnosis. However, throat cultures are not routinely recommended for adults. Those who meet two or more Centor criteria should receive a RADT. Beta-lactam antibiotic is the preferred first line therapy. For penicillin-allergic patients, clindamycin, or macrolides are recommended. GAS being resistance to azithromycin is increasingly common and so should not be prescribed.^{11,12} Almost all patients of rhinitis were prescribed an antibiotic, and azithromycin was the most commonly prescribed agent. 90-98% of rhinosinusitis cases are viral, and antibiotics are not guaranteed to help even if the causative agent is bacterial. Even if a bacterial infection is established, watchful waiting is encouraged for uncomplicated cases for which reliable follow-up is available. Amoxicillin or amoxicillin/clavulanate is the recommended first-line therapy. Macrolides such as azithromycin are not recommended due to high levels of *Streptococcus pneumoniae* antibiotic resistance (~40%).¹³ Though multiple guidelines clearly report evidence against routine prescription of antibiotics for URTI, it appears that prescribing antibiotic for URTI is a norm, and this prescribing behavior is hard to change. Moreover, though most URTIs are of self-limiting nature with overall low morbidity, there is a small risk of serious complication (e.g., meningitis with acute otitis media) with all these conditions, and this in part influences clinicians in their desire to prescribe antibiotics. Moreover, patients' perceived expectations and other non-clinical factors can also influence the decision to prescribe antibiotics. Reducing antibiotic prescriptions on a large scale will require a multidimensional approach. A community-level, randomized trial in Massachusetts showed that implementing a multichannel intervention that includes targeting physician behavior, small-group education, disseminating educational materials to the community, and providing prescribing feedback in various settings decreases antibiotic prescription rates.¹⁴ Moreover, the delayed prescription option seems sensible in practice because it does not feel like complete capitulation, it avoids confrontation and it acknowledges the patient's concerns. It has also been shown to reduce antibiotic consumption and future consulting while maintaining patient satisfaction.¹⁵

CONCLUSION

Inappropriate prescription of antibiotics for otherwise self-limiting URTI cases is a common practice even in a tertiary

care teaching hospital. Implementation of multifaceted approach is needed to curtail the same.

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