

## Prescribing Pattern of Antibiotics in Respiratory Tract Infections, Bgs Global Hospitals, Bangalore, India

Nitasha Adavoodi Jolfaei\*, M. Apoorva Dev

Received: 04 December 2017 / Received in revised form: 11 May 2018, Accepted: 15 May 2018, Published online: 05 September 2018  
© Biochemical Technology Society 2014-2018  
© Sevas Educational Society 2008

### Abstract

**Objectives:** To study the prescribing pattern of antibiotics for respiratory tract infections. **Methodology:** A planned observational examination was directed in a quaternary care hospital for a period half year. All the necessary data was collected and recorded in a data collection and assessment form. Patient case notes, treatment charts/prescriptions, laboratory reports and interviews from the patients, patient representatives and healthcare professionals were the sources of data. The collected data was analyzed for the pattern of antibiotics prescribed. **Results:** A total of 126 patients were screened and included in the study, of which 66 patients were male (52.4 %) and 60 patients were female (47.6 %). We observed that majority of the patient population was in the age group of 20 – 39 years (29.4 %) followed by patients in the age group of 60 – 79 (28.6 %). Among the 126 patients included in the study, 105 patients were diagnosed to be suffering from LRTI (83.3 %) and 21 patients were found to be suffering from URTI (16.7 %). Among all diseases, it was found that the most common diagnosis was unknown LRTI (26.2 %) followed by bronchopneumonia (20.6 %) and COPD (17.3 %). cephalosporin (31.44 %) were the most commonly used class of antibiotics followed by penicillin (28.86 %) and macrolides (27.83 %). It was found the cephalosporin (43.6 %) were the most commonly used class followed by Penicillin (41.0 %). Among narrow spectrum antibiotics, Clarithromycin (79.6 %) was the most commonly used antibiotic followed by azithromycin (20.4 %). Among individual drugs, combination of amoxicillin and clavulanic acid (50 cases) was the most commonly prescribed antibiotic followed by Clarithromycin (43 cases) and Ceftriaxone (30 cases). **Conclusion:** We observed that Frequency of drug administration was studied to understand the dosage regimen patterns among antibiotics. Irrational (Misuse/overuse) of Antibiotics is an important public health issue that affects the community and the individual. The present study had provided useful findings which can be used as evidence for the prescribing pattern and the use of the antimicrobial drug. The results of this survey revealed that there is the need for an antibiotic formulary or clinical guidelines. The Hospitals Drugs and Therapeutics committee can play an important role in this regard and also perform drug utilization studies and prescription reviews to improve drug use in general and management. The study strongly highlighted the need of patient education and counselling on use of antibiotics and concomitant drugs.

**Key words:** Respiratory Tract Infections, Prescribing Pattern, Irrational Use, Antibiotics

### Introduction

Respiratory tract infections (RTIs) are exceptionally basic in the community and are the real explanations behind visiting to the primary care physician (Khan, Rani and Subramanyam, 2009). Different bacteria and virus can cause RTIs. The most widely recognized pathogens engaged with URTIs are rhinovirus, coronavirus, parainfluenza virus, respiratory syncytial virus, influenza virus and adenovirus families. Streptococcus pyogenes are all the more frequently connected with bacterial pharyngotonsillitis, Hemophilus influenza with acute epiglottitis, Moraxella catarrhalis with center ear diseases, and Staphylococcus aureus with intense sinusitis. The pathogens engaged with LRTIs are adenovirus, rhinovirus, corona virus, influenza virus, Bordetella pertussis, Mycoplasma pneumonia and Chlamydia pneumonia which are related with intense acute bronchitis, bronchiolitis and pneumonia (Khan, Rani and Subramanyam, 2009; Roger and Cate, 2008).

Upper respiratory tract infection (URTI) has been perceived as a standout amongst the most widely recognized restorative issues in the everyday lives of individuals around the world. A strong confirmation for the prevention of URTI is somewhat lacking, and subsequently, the patients take preventive measures based on their own involvement or inclinations. Be that as it may, a URTI is alluded to as a viral infection causing inflammation and infection in the nose and throat. URTIs are contagious which stay for couple of hours to 2-3 days of introduction. Also, the symptoms have been known to last from 7-10 days, but reports have shown that the symptoms may last even longer. URTI has been viewed as a nonspecific term that is utilized to depict acute infections involving the nose, paranasal sinuses, pharynx, larynx, trachea, and bronchi. Although, there have been a range of related conditions that may have similar or

---

Nitasha Adavoodi Jolfaei\* and M. Apoorva Dev

Doctors of pharmacy, Department of pharmacy practice, P.E.S College of pharmacy, Bengaluru, India

\*Email: Ashmir.555 @ gmail.com

overlapping clinical presentations within each category of illness, and hence, judgment is required in determining the affected respiratory mucosal part. Different signs and side effects of URTIs have been reported which incorporate stuffy and runny nose, sneezing, coughing, sore throat, fever, vomiting, irritability, loss of appetite, and watery eyes. Be that as it may, URTI infections have been proposed to be mild and self-limiting, but they have been accounted for lead to life threatening complications. Further, the reason of URTIs have been ascribed to viral, but studies have likewise recommended the reason to be bacterial (Sharma, Chopra and Kour, 2009).

Lower respiratory tract infections (LRTIs) are frequent and incorporate community acquired pneumonia (CAP), exacerbations of chronic bronchitis (ECB), acute bronchitis (AB), and viral lower respiratory tract infections (VRTI). The antibiotic prescription for LRTI stays dubious. Infections of LRTI are in charge of 4.4% of all clinic affirmations and 6% of all broad professional counsels. They likewise represent 3% to 5% of deaths in adults, particularly Over the age of 60 years. Treatment for community obtained lower respiratory tract infections (LRTIs) is regularly experimental. Inappropriate utilization of antibiotics, especially for RTIs, has added to the significant general medical issue of antibiotic resistance in the community. Improper antibiotic use incorporates too low dose, too long duration, wrong selection of antibiotics, improper combination of antibiotics and therapeutic or prophylactic use in unwarranted/unproven clinical circumstances (Pavani Malladi et al., 2012).

RTIs are the purpose behind 60% of all antibiotic prescribing in general practice, and this comprises a huge expense to the NHS. Yearly endorsing expenses for intense hack alone exceed £15 million. There is proof from randomized placebo-controlled trials (RCTs) that antibiotics have restricted viability in treating an expansive extent of RTIs in adults and children. These incorporate acute otitis media (AOM), acute cough/acute bronchitis, acute sore throat/acute pharyngitis/acute tonsillitis, acute rhino sinusitis and the regular cold. These conditions are to a great extent self-limiting and confusions are probably going to be uncommon if antibiotics are withheld. here various antibiotic executive's procedures can be utilized for patients with RTIs who present in essential consideration and other first face-to-face contact healthcare settings (for example emergency departments and walk-in centers): no antibiotic prescribing; postponed (or deferred) antibiotic prescribing (in which an antibiotic medicine is composed for use sometime in the not too distant future should indications compound); and immediate antibiotic recommending (Mungroo et al., 2009). The choice concurred between healthcare professional and patient relies upon both the human services NICE clinical guideline– respiratory tract infections – antibiotic prescribing expert's evaluation of the risk of complications if antibiotics are retained and the patient's assumptions about an antibiotic prescription. Perceived advantages of delayed prescribing as a strategy over no recommending are that it offers a " safety net" for the little extent of patients who build up a difficulty, and that a patient expecting antibiotics might be bound to concur with this course of action instead of with no prescribing (Hossain et al., 2011).

## Materials and Methods

The study was conducted in BGS global hospitals, Kengeri, Bangalore. It is a 300 bedded multi-specialty Quaternary care hospital. A hospital based prospective cross-sectional study was conducted in the department of pulmonology for a period of 6 months. where 126 in patients who were on the treatment with antibiotics for respiratory tract infections were involved in the study.

Data regarding the following details was collected during the study and documented in a designed patient preform.

- Socio-demographic details: age, sex, education, habits, occupation.
- Details of diagnosis made, laboratory data and antibiotics given- trade or/and generic name, dose, dosing frequency, route of administration, duration of treatment. The data collected was analyzed for type of RTIs diagnosed, ATC classification of antibiotics and pattern of antibiotics prescribed.
- The data was collected by interacting with the patients about their symptoms and reduction in the symptoms to know the efficacy of antibiotic treatment.

## Result and Discussion

Respiratory infections are amongst the widest spread and serious infections, accounting for 50 million deaths globally each year. RTIs are also most common reason for physician visits and prescription of antibiotics. Hence the rational use of antibiotics should be considered. A prospective study was undertaken to study the prescribing pattern of antibiotics in respiratory tract infections for a period of 6 months. The total number of patients who satisfied the inclusion criteria and participated in the study was 126.

### *Distribution of Patients based on the Demographics:*

In our study, depicts the gender distribution, where male patient was 66 (52.4%) followed by female were 60 (47.5%) out of 126 patients. Majority of the patients were in the age group of 20-39 yrs. were 37 (29.4 %), 60-79 yrs. were 36 (28.6%) ,40-59 yrs. were 26 (20.6%), 0- 12 yrs. were 17 (13.5%), 80-100 yrs. were 7 (5.5 %) and 13-19 yrs. were 3 (2.4 %). Considering the educational level of patients, it

was observed that majority of the female patients 18 (30 %) whereas male was 23 (34.84 %) has primary education. 17 (28.3%) female and male 15 (22.72%) had education up to PUC. Females had higher school education were 11(18.3%) and male were 10(15.5%). Females have education of degree level was 9(15%) whereas males were 6 (9%) followed by no education status females were 5 (8.3%) and males were 12 (18.8%). Occupation distribution of patients in the study group depicted and majority of the male patients were students 26(39%) whereas females were house wife 30 (50%). where male labors were 11(16.6%) and females were 15(25%). Males 9(13.6 %) were farmers and followed by business 8(12.12%) and other occupations of male were 12 (18.18%). In female's students were 9(15%) and others were 5 (8.3 %) and who was into business were 1 female (1.6%). 82 (65.7%) of patients were with no habits, 20 (34.92 %) were smokers, 16 (12.69 %) were alcoholic and 8 (6.34 %) were having the habit of smoking and alcohol. In our study only the male patients with habits were found. No single patient in the females had the habits of smoking or alcohol consumption.

#### *Distribution of Patients Based On the Diagnosis of the Disease:*

Table no. 1 and its corresponding graphs show the category of diagnosis URTIs were diagnosed in 21 patients among whom 15 (18.07%) were male patients and 6 (13.95%) were female patients, LRTIs were found in 68 (81.92%) of males and 37 (86.04%) of females.

Table 1: Diagnosis distribution of patients

Diagnosis	URTIs		LRTIs		Total
	No.	%	No.	%	
Male	15	18.07	68	81.92	83
Female	6	13.95	37	86.04	43

The data was analyzed for the different types of RTIs. Where table .no 2 represent URTIs classification. Majority of cases in URT's 10 (47.6%) was seen in 7 (10.6%) male and in females were 3 (5%), tonsillitis male was 2 (1.5%) and females were 1(1.5%), sinusitis in males were 3(4.5%) and in females were 5 (8.3%) followed by pharyngitis females were 1 (1.6%) no male were to diagnosed as pharyngitis.

Table 2: URTI classification in detail

Diagnosis	Number of cases	Percentage (%)
Pharyngitis	1	4.8
Sinusitis	8	38.1
Tonsillitis	2	9.5
URTI	10	47.6

Table no. 3 depicts Majority of cases in LRT's in male 21(31.8%) and females were 9(15%), In pneumonia male and female were 13 (20%), COPD male were 15 (22.7%) and female were 7(11.6%), in bronchitis male were 1(1.5%) and female were 8(13.3%), whereas in asthma male were 3(4.5%) and female were 5(8.3%) followed by Pulmonary edema and tuberculosis male were 2(3%) and female were (11.5%) respectively.

Table 3: LRTI classification in detail.

Diagnosis	Number of cases	Percentage (%)
Asthma	8	7.6
Bronchitis	9	8.6
Bronchospasm	1	0.9
COPD	22	20.9
LRTI	33	31.4
Pneumonia	26	24.8
Pulmonary Edema	3	2.8
Tuberculosis	3	2.9

Classification of antibiotics in general antibiotics are categorized in table no.9 where as in Table no.10 depicts which is representing broad spectrum antibiotics, Majority of the antibiotics prescribed belongs to the cephalosporin class 43.6%, next were penicillin and bête lactams 41%, Aminoglycosides were 3.6%, followed by fluoroquinolones and carbopenems were 2.1% were least prescribed. Among the

macrolides, Clarithromycin 79.6 followed by Azithromycin were 20.4% depicted in table no.11 which are narrow spectrum antibiotics. Table no. 4 depicts classification of cephalosporin, where highest numbers of cephalosporin were ceftriaxone 49.2%, a study conducted by Sharma R, Chopra VS, et al. (2009) also had similar findings of more prescription with cephalosporin. ceferazone and salbactam combination were 39.3 %, cefoperazone were 9.8 % followed by cefotaxime 1.63%. similar study conducted by S Z Hossain et al., (2011) on Treatment Pattern of Acute Respiratory Tract Infections in General Practice with 3rd generation was seen. Table no. 4 depicts classification of quinolones, where levofloxacin and moxifloxacin were 33.3%, next was ofloxacin 25% followed by ciprofloxacin 8.4%. Classifications of penicillin depicted in table no.4 which were given in combinations majority were amoxicillin and clavulanic acid were 89.3 % followed by piperacillin and tazobactam combination 10.7%. A similar study conducted by Mungrue K et al., (2009) a retrospective observational study on drugs in upper respiratory tract infections in Paediatric patients had similar findings. Similar study was seen in study conducted by Paul Little, Louise Watson, et.al. (2002) conducted to survey the connection between penicillin endorsing (the most normally utilized gathering of antibiotics for RTIs) and hospital affirmation with complexities. Other class of antibiotics which is depicted in table no. 4 where aminoglycosides were 45.4% followed by carbopenems and tetracycline were 27.3%. Majority of patients were given with the frequency of dose of antibiotics per day, once a day a 46.8% followed by twice a day 38.9 % and thrice 14.3% %. This was depicted, where single therapy was 46.1%, double therapy was 38.8% followed by triple therapy was 14.2% and more than triple therapy was only one case.

Table 4: classification in detail of Antibiotics

Classification of Broad Spectrum Antibiotics		
Category	Number of cases	Percentage (%)
Aminoglycosides	5	3.6
Carbopenems	3	2.1
Cephalosporin	61	43.6
Fluroquinolones	12	8.6
Penicillins + $\beta$ Lactams	56	41
Tetracyclines	3	2.1
Classification of Narrow Spectrum Antibiotics		
Drug Name	Number of cases	Percentage (%)
Azithromycin	11	20.4
Clarithromycin	43	79.6
Classification of Cephalosporin's		
Cefotaxime	1	1.63
Cefperazone	6	9.8
Cefperazone + Salbactam	24	39.3
Ceftriaxone	30	49.2
Classification of Quinolones		
Ciprofloxacin	1	8.4
Levofloxacin	4	33.3
Moxifloxacin	4	33.3
Ofloxacin	3	25
Classification of penicillin's		
Amoxicillin + Clavulanicacid	50	89.3
Piperacillin + Tazobactam	6	10.7

According to the study which illustrates the days of treatment, majority of patients were prescribed antibiotics for a period of 5 days 51.5 % closely followed by 7 days 31.7 %, 10.3 % for 3days and 6.3 % for 2 days. The supportive therapy given to the patients was shown in the table no.5 along with the graphs. It showed that anti asthmatics were prescribed for 98 (77.7 %) of patients, antipyretics for 76 (60.3%), antiulcer drugs for 120 (95.2 %), corticosteroids for 102 (80.9%), cough syrup for 110 (87.3%).Antiulcer drug was prescribed for almost all the patients. As well the cost of the treatment was also made a note where, Drug expenditure on disease is an important thing to consider. The over-prescribed drugs are neither consistent with the guidelines nor are they cost-effective. Prescribing antibiotics

is not benign and should be thoughtfully considered and moreover, they contribute vastly to the costs of government healthcare system directly and indirectly. Table

Table 5: Prescribing pattern of Supportive therapy

Therapy	Number of cases	Percentage (%)
Antipyretics	76	60.31
Anti-asthmatics	98	77.77
Corticosteroids	102	80.95
Multivitamin	48	38.09
Cough syrup	110	87.3
Anti-ulcer	120	95.2

## Conclusion

The present study was focused on prescribing pattern of antibiotics in respiratory tract infection. Prospective study is preferred since more control is possible over collection of data and a more valid answer to any query is likely to get. The research findings were done for number of antibiotics prescribed in RTI's. Prescribing antibiotics is not benign and should be thoughtfully considered and moreover, they contribute vastly to the healthcare system directly and indirectly. Doctors will in general use more up to date, increasingly costly agents, as opposed to cost effective, proven, and entrenched antimicrobial agents. The over-prescribed drugs are neither consistent with the guidelines nor are they cost-effective. It is important to make a move to improve endorsing propensities so as to decrease the superfluous utilization of antibiotics thus enhance rational antibiotic use. The consequences of this review uncovered that there is the need for an antibiotic formulary or clinical guidelines. Pharmacist can play a great role in Drugs and Therapeutics committee and also perform drug utilization studies and prescription reviews to improve drug use in general and management. Periodic survey of antibiotic usage at the hospital is necessary as part of the nosocomial infection surveillance and control program is recommended. Prospective study is preferred since more control is possible over collection of data and a more valid answer to any query is likely. A guideline tailored to local needs should be created for prescription of antibiotics and implemented to save unnecessary use, avoid antibiotic-related problems (avoid chance of adverse effect/reactions, medication error) and expenditure. In present study, the overall results were obtained as below. The majority of patient out of 126, were 66 males (52.4%), in the age group of 20-39 years (29.4 %). Most of URTIs were diagnosed in male (18.07%) whereas LRTIs were found mostly in female (86.04%). Majority of cases in URTI's were sinusitis (38.1%) and in LRTIs were multi infections of LRT (31.4%). Most prescribed antibiotics with broad spectrum activity were found to be cephalosporin 31.4%, 43.6% respectively, whereas in narrow spectrum activity, clarithromycin (79.6%) were leading. Major prescribed antibiotics which were used for RTIs treatment were ceftriaxone (49.2%) from cephalosporin group, both moxifloxacin and levofloxacin (33.3%) among quinolone derivatives, amoxicillin and clavulanic acid (89.3%) in penicillin group and aminoglycoside (45.4%). But among all antibiotics the ceftriaxone was most prescribed drug (above percentage were determined for each class only). Most of the antibiotics were administered once in a day (OD-46.8%), as single therapy (only one antibiotics - 46.1%) and maximum for 5 days' therapy (51.6%) The most prescribed supportive drug was found to be anti-ulcer (95.2%).

## References

- Khan IA, Rani S, Subramanyam G. Efficacy and safety of Azithromycin with various cephalosporins used in the treatment of lower respiratory tract infection. *Ind J Pharm Pract.* 2009;1(2):53-61.
- Little P, Watson L, Morgan S, Williamson I. Antibiotic prescribing and admissions with major suppurative complications of respiratory tract infections: a data linkage study. *Br J Gen Pract.* 2002; 52:187-93.
- Mungrue K, Brown T, Hayes I, Ramroop S, Thurston P, Pinto Pereira L. Drugs in upper respiratory tract infections in paediatric patients in North Trinidad. *www.pharmacypractice.org.* 2009 Jan-Mar; 7(1):29-33. 48.
- Pavani Malladi, Hasna AH, Ramesh S and Manna PK. Role of Clinical Pharmacist in Promoting Rational Use of Antimicrobials in The Management of Paediatric Lower Respiratory Tract Infections in a Tertiary Care Teaching Hospital. *International Journal of Research in Pharmacy and Chemistry.* 2012; 2(2):360-70.
- Roger W, Cate W. *Clinical Pharmacy and Therapeutics.* 4th edition. United Kingdom: Churchill living stone; 2008:496-505.
- S Z Hossain, R F Khan, U K Barua, M J Sobhan. Treatment Pattern of Acute Respiratory Tract Infections in General Practice with 3rd generation Oral Cefixime in Bangladesh. *Bangladesh Medical Journal.* 2011 Jan; 40:39-42.
- Sharma R, Chopra VS, Kour G. Use of antibiotics for respiratory illness in rural India. *J Clin and Diagn Research.* 2009; 3:1157-61.