



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2019; 8(7): 169-174
© 2019 TPI
www.thepharmajournal.com
Received: 28-05-2019
Accepted: 30-06-2019

S Suwitha
Department of Pharmacy,
Annamalai University,
Chidambaram, Tamil Nadu,
India

P Suriya
Department of Pharmacy,
Annamalai University,
Chidambaram, Tamil Nadu,
India

M Senthilvelan
Department of Medicine, Rajah
Muthiah Medical College
Hospital, Chidambaram, Tamil
Nadu, India

K Baburaj
Department of Medicine,
Rajah Muthiah Medical College
Hospital, Chidambaram,
Tamil Nadu, India

A Elaiyaraja
Department of Medicine,
Rajah Muthiah Medical College
Hospital, Chidambaram,
Tamil Nadu, India

A study on prescribing pattern of antibiotics in lower respiratory tract infection among adults in tertiary care teaching hospital

S Suwitha, P Suriya, M Senthilvelan, K Baburaj and A Elaiyaraja

Abstract

Background: Antibiotics are medicines that are strong and effective for treating various bacterial infections. Among the most commonly prescribed drugs in adults are antibiotics. Antibiotic overuse and inappropriate use has resulted in antibiotic resistance and failure of treatment.

Objective: To assess the prescription pattern of antibiotics in lower respiratory tract infection in adults at RMMCH teaching hospital.

Methods: It was a Prospective observational study done in Department of Medicine, A tertiary care teaching hospital in Chidambaram, Tamil Nadu. The patient data was collected by using well designed patient data collection form and their prescription were recorded and analysed.

Results: Total 80 subjects were enrolled into the study among that 52 were male and 28 female. The patients are divided into 7 age trends. The study shows that maximum number of patients 23 (28.75%) were between age group of 50-59 yrs. Majority of patients included in the study had chronic obstructive pulmonary disease with acute exacerbation 18 (22.5%). Followed by Asthma with acute exacerbation 16 (20%), Bronchitis 15 (18.75%), old tuberculosis with sequelae 12 (15%), Bronchiectasis 11 (13.75%) and Pneumonia 8 (10%). All the patients were prescribed with antibiotics. 41 patients received single antibiotic, 36 patients received two antibiotics and 3 patients received three antibiotics.

Conclusion: Lower respiratory tract infection is the most common infectious disease. Chronic obstructive pulmonary disease with acute exacerbation comprises the greater portion in adults. Most commonly prescribed antibiotics were a single drug category cefotaxime 20. Followed by two drugs combination category was Ceftriaxone with Azithromycin 11. And three drugs combination category was Ampicillin + Amikacin + Levofloxacin 2.

Keywords: Antibiotics, prescribing pattern, lower respiratory tract infection, acute exacerbation

Introduction

Respiratory Tract Infections

Respiratory infections remain the major cause of morbidity from acute illness in worldwide and likely represent the most common reasons why patients seek medical attention. Depending on the physical characteristics, the respiratory system can be divided into two parts upper and lower respiratory tract. The upper respiratory tract consists of the nose, throat, and larynx, while the lower part of the respiratory tract involves the trachea, bronchi and lungs.

Upper respiratory tract infections include

Cold, Otitis media, Pharyngitis (sore throat), Laryngitis, Sinusitis, Influenza. Symptoms of Upper respiratory tract infections include cough, sore throat, runny nose, nasal congestion, headache, fever, facial pressure and sneezing.

Lower respiratory tract infections include

Bronchitis, Bronchiectasis, Chronic obstructive pulmonary disease, Pneumonia, Tuberculosis, Asthma. Symptoms of Upper respiratory tract infections include shortness of breath, weakness, fever, coughing and fatigue ^[1]. Respiratory syncytial virus (RSV) is the leading cause of infections with the lower respiratory infections ^[2].

Antibiotics

Definition and Characteristics: Antibiotics are in the strictest sense, antibacterial substances produced by different microorganism's species (bacteria, fungi, and actinomycetes) that suppress other microorganisms from growing. Common use often extends the term antibiotics

Correspondence

S Suwitha
Department of Pharmacy,
Annamalai University,
Chidambaram, Tamil Nadu,
India

to include synthetic antimicrobial agents, such as sulfonamides and quinolones. Antibiotics differ markedly in physical, chemical, and pharmacological properties, in antimicrobial spectra, and in mechanisms of action. Knowledge of molecular mechanisms of bacterial replication has greatly facilitated rational development of compounds that can interfere with their replication [3].

In lower respiratory tract infection, antibiotics are often thought to be the first line treatment; however, these are not indicated in viral infections. It is important to use an appropriate selection of antibiotic based on the infectious organism and to ensure that this therapy changes with the evolving nature of these infections and the emerging resistance to conventional therapies [4].

Most antibiotic classes, including the β -lactam antibiotics, tetracyclines, amino glycosides, and macrolides, were originally derived from natural sources, and are now being chemically modified to give the drug confer better properties. However, some important classes of antibiotics (including the sulfa antibiotics, the quinolones, and the oxazolidinones) are derived from synthetic chemical sources [5].

Prescribing pattern helps to evaluate the pattern of local consumption/resistance to optimize the therapeutic effect of medicines. Thus, the aim of our study was to assess the prescribing pattern of antibiotics in adults in LRTI in RMMCH TEACHING hospital.

OBJECTIVES

- To assess prescription pattern of antibiotics in LRTI in adults.
- To analyze the various common LRTI in adults.

Materials and Methodology

Study design

Prospective observational study.

Study place

The study was conducted in Medicine department, Rajah Muthiah Medical College and Hospital, Annamalai University, Annamalai Nagar, Tamil Nadu, which is a 1400 bedded multi-speciality tertiary care teaching hospital located in rural South India.

Study period

December 2018 to May 2019 (6 months).

Study recruitment procedure

All patients who visits the RMMCH for treating lower respiratory tract infection.

Source of data

Patient data related to study was obtained from patient case records.

Study Criteria

Inclusion criteria

- Subject age more than 13 years.
- Subject diagnosed with lower respiratory tract infection.

- All prescription containing antibiotics in in-patients with LRTI.

Exclusion criteria

- Pediatric patients.
- Adults from ICU.

Study procedure

A suitably designed data collection form was used to collect all the necessary data including patient’s gender, age medication history, and reason for admission, drugs and diagnosis.

Statistical method:

A simple percentage calculation was conducted to arrive conclusion of our study Microsoft word, Excel 2007 was used to generate tables, figures etc.

Results

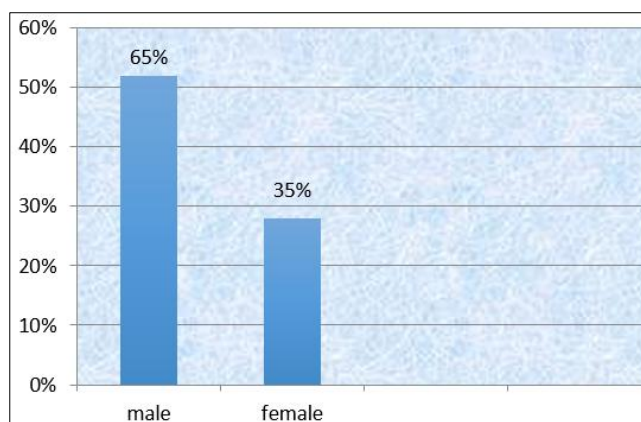


Fig 1: Gender Wise Distribution

In the present study out of 80 patients, 52 (65%) were male and 28 (35%) were female. (Fig 1).

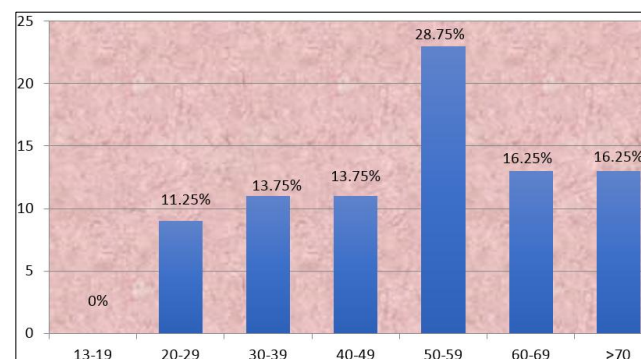


Fig 2: Age Wise Distribution

The study shows that maximum number of patients 23 (28.75%) were between age group of 50-59 yrs. Followed by (16.25%) were 60-69 yrs old and >70 yrs old, (13.75%) were 30-39 yrs and 40-49 yrs old, (11.25%) were 20-29 yrs old, and (0%) were 13-19 yrs old.

Table 1: different diagnosis of lower respiratory tract infections

Types of Irti	No. Of patients	Percentage
COPD With Acute Exacerbation	18	22.5%
Asthma With Acute Exacerbation	16	20%
Bronchitis	15	18.75%
Old Tuberculosis With Sequelae	12	15%
Bronchiectasis	11	13.75%
Pneumonia	8	10%

Majority of patients included in the study had chronic obstructive pulmonary disease with acute exacerbation 18 (22.5%). Followed by Asthma with acute exacerbation 16 (20%), Bronchitis 15 (18.75%), Old tuberculosis with sequelae 12 (15%), Bronchiectasis 11 (13.75%) and Pneumonia 8 (10%). (Tab. 1).

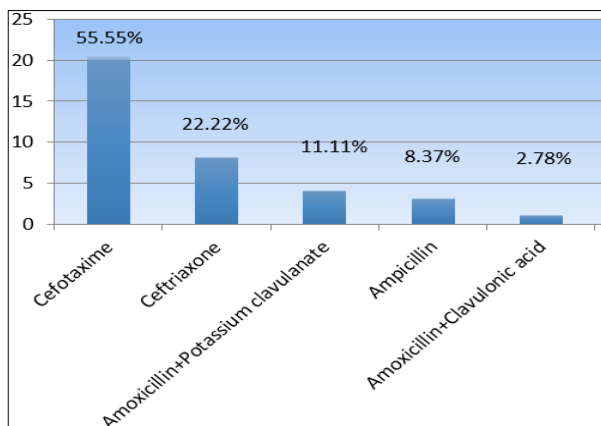


Fig 3: most frequently prescribed single antibiotic in lower respiratory tract infections

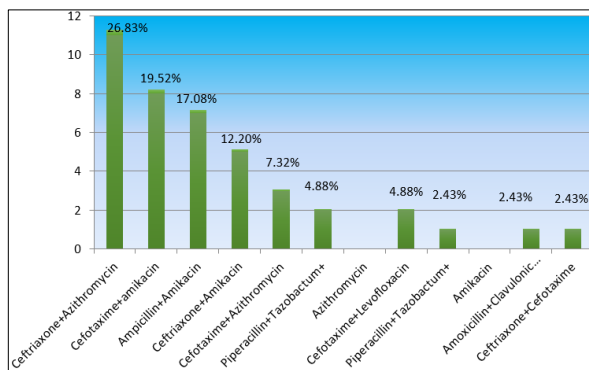


Fig 4: most frequently prescribed two antibiotics in lower respiratory tract infections

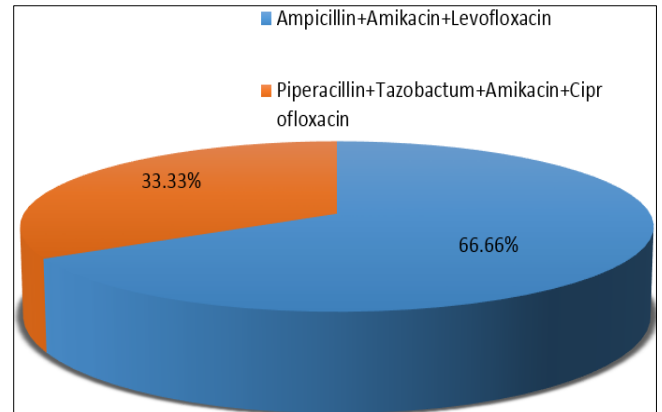


Fig 5: Most Frequently Prescribed Three Antibiotics in Lower Respiratory Tract Infections

80 samples included in this study, all the patients were prescribed with antibiotics. 36 patients received single antibiotic, 41 patients received two antibiotics and 3 patients received three antibiotics.

Cefotaxime 20 (55.55%), were the most commonly prescribed single antibiotic.

Followed by Ceftriaxone 8(22.22%), Amoxicillin+ Potassium clavulanate 4(11.11%), Ampicillin 3(8.37%) and Amoxicillin + Clavulanic acid 1 (2.78%). (Fig 3). Ceftriaxone with Azithromycin 11(26.83%), were the most commonly prescribed two antibiotics. Followed by Cefotaxime + Amikacin 8 (19.52%), Ampicillin+ Amikacin 7 (17.08%), Ceftriaxone + Amikacin 5(12.20%), Cefotaxime + Azithromycin 3(7.32%), Piperacillin+ Tazobactam+ Azithromycin and Cefotaxime + Levofloxacin 2(4.88%), Piperacillin + Tazobactam + Amikacin and Amoxicillin+ Clavulonic Acid + Azithromycin 1(2.43%). (Fig4). Ampicillin + Amikacin + levofloxacin 2(66.66%), were the most commonly prescribed three antibiotics. Followed by Piperacillin + Tazobactam + Amikacin + Ciprofloxacin 1 (33.33%). (Fig 5).

Table 2: prescription pattern in COPD with acute exacerbation

Drug therapy	Antibiotics	No. Of prescription	Percentage
One-drug	Cefotaxime	4	22.23%
	Amoxicillin+clavulonic acid	1	5.55%
Two-drug	Ampicillin+amikacin	5	27.78%
	Cefotaxime+azithromycin	2	11.12%
	Cefotaxime+amikacin	2	11.12%
	Ceftriaxone+azithromycin	1	5.55%
	Piperacillin+Tazobactum+Amikacin	1	5.55%
Three-drug	Ampicillin+Amikacin+Levofloxacin	1	5.55%
	Piperacillin+Tazobactum+Amikacin+Ciprofloxacin	1	5.55%

Table 3: Prescription Pattern IN Asthma with Acute Exacerbation

Drug therapy	Antibiotics	No. Of prescription	Percentage
One-drug	Ceftriaxone	5	31.25%
	Ampicillin	3	18.75%
	Cefotaxime	1	6.25%
Two-drug	Ampicillin+amikacin	2	12.5%
	Ceftriaxone+azithromycin	2	12.5%
	Piperacillin+Tazobactum+Azithromycin	2	12.5%
	Cefotaxime+amikacin	1	6.25%

Table 4: Prescription Pattern in Bronchitis

Drug therapy	Antibiotics	No. Of prescription	Percentage
One-drug	Cefotaxime	9	60%
	Ceftriaxone	1	6.7%
Two-drug	Cefotaxime+levofloxacin	2	13.2%
	Amoxicillin+clavulonic acid+azithromycin	1	6.7%
	Ceftriaxone+cefotaxime	1	6.7%
Three-drug	Ampicillin+amikacin+Levofloxacin	1	6.7%

Table 5: prescription pattern in old tuberculosis with sequelae

Drug therapy	Antibiotics	No. Of prescription	Percentage
One-drug	Cefotaxime	3	25
	Ceftriaxone	2	16.67
Two-drug	Cefotaxime+amikacin	4	33.33
	Ceftriaxone+azithromycin	2	16.67
	Cefotaxime+azithromycin	1	8.33

Table 6: Prescription Pattern in Bronchiectasis

Drug therapy	Antibiotics	No. Of prescription	Percentage
ONE-DRUG	Amoxicillin+Potassium Clavulanate	3	27.27%
TWO-DRUG	Ceftriaxone+Amikacin	5	45.45%
	Ceftriaxone+Azithromycin	2	18.18%
	Cefotaxime+Amikacin	1	9.1%

Table 7: Prescription Pattern in Pneumonia

Drug therapy	Antibiotics	No. Of prescription	Percentage
One-drug	Cefotaxime	3	37.5%
	Amoxicillin+potassium clavulanate	1	12.5%
Two-drug	Ceftriaxone+azithromycin	4	50%

Out of 18 patients with chronic obstructive pulmonary disease with acute exacerbation, 5 patients were received with single antibiotic, followed by 11 patients received with two antibiotics and 2 patients with three antibiotics. The majority of patients with chronic obstructive pulmonary disease received single antibiotic Cefotaxime 4(22.23%), Amoxicillin+ Clavulanic acid 1 (5.55%), followed by two antibiotics Ampicillin + Amikacin 5(27.78%), Cefotaxime + Azithromycin2 (11.12%), Cefotaxime + Amikacin 2(11.12%), Ceftriaxone+ Azithromycin 1(5.55%), Piperacillin + Tazobactam + Amikacin 1 (5.55%) and three antibiotics Ampicillin + Amikacin + levofloxacin 1(5.55%), Piperacillin + Tazobactam + Amikacin + Ciprofloxacin 1 (5.55%). (Tab 2).

Out of 16 patients with Asthma with acute exacerbation, 9 patients were received with single antibiotic, followed by 7 patients received with two antibiotics. The majority of patients with asthma received single antibiotic Ceftriaxone 5 (31.25%), Ampicillin 3 (18.75%), cefotaxime 1(6.25%) followed by two antibiotics Ampicillin + Amikacin 2(12.5%), Ceftriaxone + Azithromycin 2(12.5%), Piperacillin + Tazobactam + Azithromycin 2(12.5%) and Cefotaxime + Amikacin 1 (6.25%). (Tab 3).

Out of 15 patients with Bronchitis, 10 patients were received with single antibiotic, followed by 4 patients received with two antibiotics and 1 patient with three antibiotics. The majority of patients with Bronchitis received single antibiotic Cefotaxime 9(60%), Ceftriaxone 1(6.7%) followed by two antibiotics Cefotaxime + Levofloxacin 2(13.2%), Amoxicillin + Clavulonic Acid + Azithromycin 1(6.7%), Ceftriaxone + Cefotaxime 1(6.7%) and three antibiotics Ampicillin + Amikacin + levofloxacin 1(6.7%). (Tab 4).

Out of 12 patients with Old tuberculosis with sequelae, 5 patients were received with single antibiotic, followed by 7 patients received with two antibiotics. The majority of patients with Tuberculosis received single antibiotic Cefotaxime 3(25%), Ceftriaxone 2(16.67%), followed by two antibiotics Cefotaxime + Amikacin 4(33.33%), Ceftriaxone+ Azithromycin 2 (16.67%), and Cefotaxime+ Azithromycin 1(8.33%). (Tab 5).

Out of 11 patients with Bronchiolitis, 3 patients were received with single antibiotic, followed by 8 patients received with two antibiotics. The majority of patients with Bronchiolitis received single antibiotic Amoxicillin+ Potassium clavulanate 3 (27.27%) followed by two antibiotics Ceftriaxone+ Amikacin 5 (45.45%), Ceftriaxone+ Azithromycin 2

(18.18%), and Cefotaxime + Amikacin 1 (9.1%). (Tab 6).

Out of 8 patients with Pneumonia, 4 patients were received with single antibiotic, followed by 4 patients received with two antibiotics. The majority of patients with Pneumonia received single antibiotic Cefotaxime 3 (37.5%), Amoxicillin+ Potassium clavulanate 1(12.5%) followed by two antibiotics Ceftriaxone + Azithromycin 4(50%). (Tab 7).

Discussion

The widespread use of AMAs result in the development of pathogens that is resistant to antibiotics [6]. The study of prescribing antibiotic pattern is an effective way to reduce therapy costs, minimize poly-pharmacy practice and improve the use of antibiotics rationally [7].

In the current study, out of 80 patients, 52 (65%) were male and 28 (35%) were female. This result matched with a study done by Kelsey *et al.* [11], who showed that the prevalence was greater in males than in females. The patients are divided into 7 age trends. Out of which (0%) were 13-19 yrs old, (11.25%) were 20-29 yrs old, (13.75%) were 30-39 yrs and 40-49 yrs old, (28.75%) were 50-59 yrs old and (16.25%) were 60-69 yrs old and >70 yrs old. Most of the patients come under 50-59 yrs age accounting (28.75%) of the total. Majority of patients included in the study had chronic obstructive pulmonary disease with acute exacerbation 18 (22.5%). Followed by Asthma with acute exacerbation 16 (20%), Bronchitis 15 (18.75%), Old tuberculosis with sequelae 12 (15%), Bronchiectasis 11 (13.75%) and Pneumonia 8 (10%). All the patients were prescribed with antibiotics. 36 patients received single antibiotic, 41 patients received two antibiotics and 3 patients received three antibiotics. In this study, the most frequently prescribed single antibiotic were Cefotaxime 20 (55.55%). Followed by Ceftriaxone 8 (22.22%), Amoxicillin + Potassium clavulanate 4 (11.11%), Ampicillin 3 (8.37%) and Amoxicillin + Clavulanic acid 1 (2.78%).

Ceftriaxone with Azithromycin 11 (26.83%). This result match with that of the study done by Mazzaglia *et al.* [12]. The most frequently prescribed two antibiotics were Ceftriaxone with Azithromycin 11 (26.83%). Followed by Cefotaxime + Amikacin 8(19.52%), Ampicillin + Amikacin 7 (17.08%), Ceftriaxone + Amikacin 5 (12.20%), Cefotaxime + Azithromycin 3(7.32%), Piperacillin + Tazobactam + Azithromycin and Cefotaxime + Levofloxacin 2(4.88%), Piperacillin + Tazobactam + Amikacin and Amoxicillin + Clavulonic Acid + Azithromycin 1(2.43%). and the most frequently prescribed three antibiotics were Ampicillin + Amikacin + levofloxacin 2(66.66%). Followed by Piperacillin + Tazobactam + Amikacin + Ciprofloxacin 1(33.33%).

Out of 18 patients with chronic obstructive pulmonary disease with acute exacerbation, the most frequently prescribed single antibiotic for Cefotaxime 4(22.23%), Amoxicillin + Clavulanic acid 1(5.55%), followed by two antibiotics Ampicillin + Amikacin 5(27.78%), Cefotaxime + Azithromycin 2(11.12%), Cefotaxime + Amikacin 2(11.12%), Ceftriaxone + Azithromycin 1(5.55%), Piperacillin + Tazobactam + Amikacin 1(5.55%) and three antibiotics Ampicillin + Amikacin + levofloxacin 1(5.55%), Piperacillin + Tazobactam + Amikacin + Ciprofloxacin 1(5.55%). This result did not match with that of the study done by Mona M. Ahmed *et al.* [14].

Out of 16 patients with Asthma with acute exacerbation, the most frequently prescribed single antibiotic for Asthma with acute exacerbation Ceftriaxone 5(31.25%), Ampicillin 3

(18.75%), cefotaxime 1(6.25%) followed by two antibiotics Ampicillin + Amikacin 2(12.5%), Ceftriaxone + Azithromycin 2 (12.5%), Piperacillin + Tazobactam + Azithromycin 2(12.5%) and Cefotaxime + Amikacin 1(6.25%).

Out of 15 patients with Bronchitis, the most frequently prescribed single antibiotic for Cefotaxime 9 (60%), Ceftriaxone 1(6.7%) followed by two antibiotics Cefotaxime + Levofloxacin 2(13.2%), Amoxicillin + Clavulonic Acid + Azithromycin 1(6.7%), Ceftriaxone + Cefotaxime 1(6.7%) and three antibiotics Ampicillin + Amikacin + levofloxacin 1(6.7%).

Out of 12 patients with old tuberculosis with sequelae, the most frequently prescribed single antibiotic for Cefotaxime 3(25%), Ceftriaxone 2(16.67%), followed by two antibiotics Cefotaxime + Amikacin 4(33.33%), Ceftriaxone + Azithromycin 2(16.67%), and Cefotaxime + Azithromycin 1(8.33%).

Out of 11 patients with Bronchiectasis, the most frequently prescribed single antibiotic for Amoxicillin + Potassium clavulanate 3(27.27%) followed by two antibiotics Ceftriaxone + Amikacin 5(45.45%), Ceftriaxone + Azithromycin 2(18.18%), and Cefotaxime + Amikacin 1(9.1%). This matched with Standard Treatment Guidelines, [13].

Out of 8 patients with Pneumonia, the most frequently prescribed single antibiotic for Cefotaxime 3(37.5%), Amoxicillin + Potassium clavulanate 1(12.5%) followed by two antibiotics Ceftriaxone + Azithromycin 4(50%). This result did not match with Standard Treatment Guidelines, [13].

Antibiotics are the most commonly prescribed drugs in patients [8, 9]. Irrational use of antibiotics is an important public health issue that affects the community and the individual [10]. This can be prevented by formulating antimicrobial guideline, by conducting awareness program in national and public meetings and by conducting workshops on rational pharmacotherapy.

Conclusion

This study gives an overview use of antibiotic pattern for lower respiratory tract infections in Department of Medicine in RMMCH, Tamil Nadu.

We can conclude that:

Lower respiratory tract infections were more prevalent in males than in females. Maximum number of patients was between age group of 50-59 years old. Most common infectious diagnosis was chronic obstructive pulmonary disease with acute exacerbation. All the patients were prescribed with antibiotics. In lower respiratory tract infectious patients the most commonly prescribed antibiotics were a single drug category cefotaxime. Followed by two drugs combination category was Ceftriaxone with Azithromycin. And three drugs combination category was Ampicillin + Amikacin + levofloxacin.

Recommendation

There is an increasing need for regular, updated and revised local guidelines.

Reference

1. <http://www.medicalnewstoday.com/articles/324413.php>.
2. Tupakula Karthik Babu, Dr. Sai Vikas B, Vishwas ATL, Joga Sasidhar Dr, Vinnakota Saikrishna, Dr Sainath

- Gupta R, Study on antibiotic prescription pattern in lower respiratory tract infections in tertiary care teaching hospital, Eurobian journal of pharmaceutical and medical research. 2017; 4(1):301-307.
3. Goodman and Gilman's, the pharmacological basis of therapeutics, 11th edition.
 4. Mona M, Ahmed Ashraf A, ELMaraghy, Engy Andrawas W. Study of prescription patterns of antibiotics in treating lower respiratory tract infections at Sohag Chest Hospital, Egyptian Journal of Chest Diseases and Tuberculosis. 2016; 65:143-155.
 5. <https://www.researchgate.net/publication/260567634>
Beta lactamase Inhibitors from Indigenous Herbs and Spices, Research Journal of Pharmaceutical, Biological and Chemical Sciences, March, 2014.
 6. Nandimath MK, Ahuja S. Drug prescribing pattern in upper respiratory tract infection in children aged 1 – 14 years, International Journal of Pharma and Bio Sciences. 3(1):2012.
 7. Pavani M, Hasna AH, Ramesh S, Manna PK, Role of clinical pharmacist in promoting rational use of antimicrobials in the management of pediatric lower respiratory tract infections in a tertiary care teaching hospital, International journal of research in pharmacy and chemistry. 2012; 2(2):360-370.
 8. Holstiege and Garbe E. Systemic antibiotic use among children and adolescents in Germany: a population-based study, Eur J Pediatr. 2013; 172:787-795,
 9. Vernacchio LL, Kelly JP, Kaufman DW, Mitchell AA. Medication use among children <12 years of age in the United States: results from the Slone Survey, Pediatrics. 2009; 124:446-54.
 10. Tiwari P, Ahlawat R, Gupta G, Prescription practice in patients of upper respiratory tract infection at a pediatric outpatient clinic in Punjab, Indian Journal of Pharmacy Practice. 2014;7(2).
 11. Kelsey MC, Mitchell CA, Griffin M, Spencer RC, Emmerson AM, Prevalence of lower respiratory tract infections in hospitalized patients in the United Kingdom and Eire – results from the Second National Prevalence Survey, 2000.
 12. Mazzaglia G, Arcoraci V, Greco S, Cucinotta G, Cazzola M, Caputi AP. Prescribing habits of general practitioners in choosing an empirical antibiotic regimen for lower respiratory tract infections in adults in Sicily, Pharmacol. Res. 1999; 40(1):47-52.
 13. Sangeeta Sharma GR. Sethi, Standard treatment guidelines, a manual of medical therapeutics 5th edition.