

A Study on Lower Respiratory Tract Infection in a Tertiary Care Hospital, Bangalore, India

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Abstract

Objective: To find out the antibiotics which are prescribed and preventive measures for lower respiratory tract infections in a tertiary care hospital. **Methodology:** A prospective observational study was conducted in a quaternary care hospital for a period of six months. 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 lower respiratory tract infection in a tertiary care hospital prescribed. **Result:** This study is a hospital based prospective study carried out over a period of six months from September 2016 to February 2017 in a tertiary care hospital. A total of 150 patients were screened and included in the study, of which 82 patients were male (54.6%) and 68 patients were female (45.3%). We observed that majority of the patient population was in the age group of 0-10 years (21.3%). 28.6% (n=43) were received with oral route of administration and 71.3% (n=107) were given by parenteral route of administration. 68% (n=102) were having bronchitis. And 8.6% (n=13) with bronchiolitis and 23.3% (n=35) by pneumonia as lower respiratory tract infection. Majority of the study population were received with third generation cephalosporins that is ceftriaxone, 19.01% (n=106), followed by piperacillin 18.6% (n=108). **Conclusion:** We observed that Frequency of drug administration was studied to understand the dosage regimen patterns among antibiotics. 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.

Keywords: LRTI, Prescribing Pattern, Pharmacoeconomics, Antibiotics

INTRODUCTION

Lower respiratory tract infections (LRTIs) are frequent and include community acquired pneumonia (CAP), exacerbations of chronic bronchitis (ECB), acute bronchitis (AB), and viral lower respiratory tract infections (VRTI). The antibiotic prescription for LRTI remains controversial. Infections of LRTI are responsible for 4.4% of all hospital admissions and 6% of all general practitioner consultations. They likewise represent 3% to 5% of passing's in grown-ups, particularly Over the age of 60 years. Treatment for network obtained lower respiratory tract contaminations (LRTIs) is regularly exact. Improper utilization of anti-microbials, especially for RTIs, has added to the significant general medical issue of anti-toxin opposition in the network. Ill-advised anti-infection use incorporates too low portion, too long length, wrong selection of anti-infection agents, inappropriate blend of anti-infection agents and restorative or prophylactic use in unjustifiable/doubtful clinical circumstances [1].

As per the Global Burden of Disease 2015 examination (GBD 2015), ceaseless obstructive aspiratory ailment (COPD) and lower respiratory tract contaminations (LRTIs) speak to the third and fourth most basic reasons for death, individually, after ischemic coronary illness and cerebrovascular disease. [2] LRTI is an expansive phrasing which incorporates various ailments including intense bronchitis, pneumonia, and intense intensification of constant lung maladies, for example, COPD

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or bronchiectasis. Yearly frequency of pneumonia, one of the most significant LRTIs, is accounted for to be 24.8 per 10,000 grown-ups. The rates vary dependent on the age, with higher occurrence saw in patients somewhere in the range of 65 and 79 years old (63.0/10,000 grown-ups) and >80 years old (164.3/10,000 adults).^[3] Pneumococcal pneumonia is the most widely recognized reason for mortality because of lower respiratory diseases. As indicated by the GBD 2015 investigation, pneumococcal pneumonia is the most well-known reason for pneumonia answerable for more than 15 lakh (95% vulnerability interim of 9.58–21.84 lakh) counterfactual passings over the world in 2015. Children younger than 5 years are commonly affected, making it the highest contributor of death due to LRTIs in them.^[1]

Adverse drug reactions can be minimized by regular prescription auditing. Improvement in the quality of treatment can be done by adherence to standard treatment guidelines (STGs). The prescription pattern study infers to evaluate monitor and suggest modifications in the prescription to give better patient care^[4] Acute respiratory tract infections are the leading cause of mortality in infants and young children. Antimicrobial are the group of drugs which are commonly prescribed in most of the hospitals. ADRs, increase in cost of therapy and resistance, waste of resources are the major problems of irrational prescribing of antibiotics.^[5]

Antibiotics are the central to the recent health care system extended for treating major and serious infections to prophylaxis for infections after surgery, cancer patient protection and immuno-compromised patients, promotion of growth and prevention of disease.^[6] The direct use of antibiotics results in antibiotic resistance. The larger the volume of antimicrobial agents used; the larger will be the chances that antibiotics resistance. Antibiotics are essential to effectively treat many hospitalized patients. However, when antibiotics are prescribed incorrectly, they offer little benefit to patients and potentially expose them to risks for complications, including clostridium difficult infection (CDI) and antibiotic-resistant infections. Information is needed on the frequency of incorrect prescribing in hospitals and how improved prescribing will benefit patients. A national administrative database (Market Scan Hospital Drug Database) and CDC's Emerging Infections Program (EIP) data were analyzed to assess the potential for improvement of inpatient antibiotic prescribing. Pneumonia is a form of acute respiratory infection that affects the lungs. The lungs are made up of small sacs called alveoli, which fill with air when a healthy person breathes. When an individual has pneumonia, the alveoli are filled with pus and fluid, which makes breathing painful and limits oxygen intake.^[7]

The revised guidelines present two major changes to existing guidelines (A) there are now just two categories of pneumonia instead of three [pneumonia which is treated at home with oral amoxicillin and severe pneumonia which requires inject able antibiotics] and Boral amoxicillin

replaces oral clotrimazole as first line treatment, preferably in 250mg dispersible tablet form, twice daily for 5 days which can be reduced to three days.^[8] In this article we focus on the antibiotics which are prescribed and preventive measures for lower respiratory tract infections in a tertiary care hospital.

MATERIALS AND METHODS

The study will be conducted for a period of 6 months in tertiary care hospital. This is a prospective observational study, the patients who were satisfying the inclusion criteria will be enrolled into the study. The clinical pharmacist will review the patient case notes, medication chart, laboratory data and other prevalent data.

In this method, the inpatient case sheets and prescriptions will be screened for Analysis of prescriptions for various effects of LRTI on daily basis. All the prescribed medications along with other medications and relevant information will be noted in a customized data collection form to find out the LRTI and other. The study patients will be followed daily until their discharge. The Micromedex, Medscape, articles and relevant references books will be used as tools to review the collected data. The prescribed medication will be checked for their existence in the hospital and also the relevant dosing calculation. Check for any error in prescription such as doses, frequency and route of administration and analysis of prescription for any LRTI etc. Drug related problem (DRPs) will be identified and evaluated by referring Micromedex and standard text books and finding will be discussed with the physicians to reduce DRPs.

RESULT AND DISCUSSION

Antibiotic resistance is an emerging global problem reaching epidemic proportions in recent years. India became the global manufacturing spot for many pharmaceutical companies. increasing resistance towards the antibiotics and deduction in the introduction of new antibiotics is added to the global problem. It is an urgent requirement to prevent the emergence of resistant strains.

Developing country like India is contributing a much higher level of resistant strains by inappropriate use of antibiotics, so it is a vital requirement to evaluate the clinical use of antibiotics in the hospitals and health care centers and also improving the rational prescribing pattern.

A tertiary care hospital has higher burden of infectious diseases, so it was an appropriate area where the current study conducted. Previous studies mentioned that inappropriate use of antibiotics such as overuse, underuse and misuse are the major factors for developing antibiotics resistance. More than 30% of the total inpatients has been administered with at least one antibiotic. Antibiotics are the most commonly used medicine in hospitalized patients.

The majority of patients enrolled in the study were males that is 54.6% than females i.e. 45%. in the current study the mean

length of hospital stay was 4.92 days which is similar to the study conducted by khavane .k et al, and it might be due to the lower economic and financial status of the patients. [9]

The average age group of patients in the study group was 33 years. Other studies from developing countries were stated that elder patients were more likely to be prescribed with antibiotics.

Pneumonia is the major infectious diseases causing mortality and morbidity. In India, children among 5-14 years age group accounts for 20% of deaths. Pneumonia is a major the infectious disease, which causes hospitalization among pediatric infectious diseases accounted for 60% of deaths among children aged 5-14 years whereas the current study shows that bronchitis (lower respiratory tract infections) was the disease which was affected to majority of study population. table 1,2

Table 1: Distribution of Infectious Diseases with or Without Co-Morbidities

Diagnosis	Number	Percentage
Infectious Diseases Only	109	72.6%
Infectious Diseases with Co-Morbidities	41	27.3%
Total	150	100

Table 2: Infectious Diseases

Infectious Diseases	Number	Percentage
Bronchitis	102	68%
Bronchiolitis	13	8.6%
Pneumonia	35	23.3%
Total	150	100

Table 3: Antibiotics Administered

Name of Antibiotics	Number	Percentage
Ceftriaxone	108	19.01%
Cefazolin	18	3.1%
Amoxicillin Clavulanic Acid	21	3.6%
Metronidazole	17	2.9%
Azithromycin	25	4.4%
Cefixime	34	5.9%
Ciprofloxacin	45	7.9%
Doxycycline	48	8.4%
Amikacin	15	2.6%
Piperacillin	106	18.6%
Levofloxacin	53	9.3%
Cefotaxime	78	13.7%

Out of 150 patients who were administered with antibiotics, most of them were prescribed with single antibiotics. Antibiotics prescribed with combination therapy was penicillin's and beta lactamases inhibitors. Majority of the patients were administered with third generation cephalosporins that is ceftriaxone. Empirical therapy is based on clinical symptoms and its severity and also for the prophylaxis of hospital acquired infections like pneumonia.

Selection of antibiotics by the prescriber can be done by using antibiogram and its delay in receiving is the major reason for choosing empirical therapy. In the current study due to the lack of awareness and economic constraints among the population, none of them were obtained antibiogram of biological specimens. Broad spectrum antibiotics were prescribed to the study population as an initial therapy irrespective of the disease, which was continued in later too.

Majority of patients were students that is 24% followed by farmers that is 18.6%. majority of patients administered with ceftriaxone. The current study consists of 150 patients, of which 71.3% of patients were received with parenteral antibiotics and 28.6% with oral preparations which is different from the study conducted by S Chama et al in department of pulmonary medicine.

Table 4: 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

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. Table 4

Quality-adjusted life years (QALY) have become the dominant outcome of interest in Pharmacoeconomics evaluations, and many studies employ a cost-per-QALY analysis. Economic evaluations are carried out alongside randomized controlled trials and using methods of decision-analytic modelling. Pharmacoeconomics is a useful method of economic evaluation of various treatment options. As more expensive drugs are being developed and licensed it has become imperative especially in context of developing countries where resources are scarce to apply the principles of Pharmacoeconomics for various drugs and treatment options so that maximum improvement in quality of life can be achieved in minimum cost.

Table 5: Pharmacoeconomics of LRTI

Name	Dose	No of Each Sheet	Price (Inr)
Azithromycin	100-250-500	3-10	50
Clarithromycin	250-500-gel	10	250
Tetracyclines	250-500	10	8-299
Cefotaxime	250-INJEC	10- INJEC	21-77
Cefperazone	INJECT	INJEC	270
Cefperazone + Salbactam	INJECT	INJEC	190
Ceftriaxone	INJECT-250	INJEC-10	32-72
Ciprofloxacin	100-250-500-700	10	20-114
Levofloxacin	250-500-750	10	55
Moxifloxacin	HCL	HCL	382
Oflaxacin	200-300-500	10	39-55

Pharmacoeconomics is very much important as the cost affecting the patients is known and also it encourages generic prescription in order to reduce the cost burden. In our study the cost was assessed for various LRTI prescriptions. The cost burden of LRTI on patients is assessed where costs around 500 INR. Cefoperazone costed 270 INR/day, Azithromycin costed 50 INR/day, Clarithromycin costed 250 INR/day. Table 5

CONCLUSION

Antibiotic resistance is a global threat for the developing country like India. The health care professionals should be aware about the importance of combination therapy in the treatment of different infections and should know the development of resistance. Adverse drug reactions can be minimised by regular prescription auditing. Improvement in the quality of treatment can be done by adherence to standard treatment guidelines (STGs). Developing country like India is contributing a much higher level of resistant strains by inappropriate use of antibiotics, so it is a vital requirement to evaluate the clinical use of antibiotics in the hospitals. Over the past 50 years, it has become clear that it is not just the drug, but the way in which a drug is used that influences both its effectiveness and its potential for harm. It is an opportunity for pharmacists to use their professional training in more clinical ways.

It can be concluded that pharmacist can play a vital role in improving better patient care. Pharmacist can give counselling for the patient regarding medications. better prescribing patterns can be done by providing standard treatment guidelines to the prescribers and also by auditing the prescriptions. This study is a hospital based prospective study carried out over a period of six months from September 2016 to February 2017 in a tertiary care hospital, Bangalore. I have enrolled 150 patients, out of which 54.6% (n=82) were

males and 45.3%(n=68) were females. Among various age group in the study population, most of the population were found in the age group of 0-10 years i.e. 21.3%(n=32), followed by 31- 40 that is 11.3%(n=17). Among 150 patients 24 %(n=36) were students, followed by farmers that is 18.6%(n=28). the length of hospital stay was 49.3% (n=74) for 1-3 days,38.6%(n=58) for 4-6 days. Out of 150 patients 72.6% (n=109) were having only infectious diseases without co-morbidities and 27.3% (n=41) were with co-morbidities. Out of 150 patients 28.6% (n=43) were received with oral route of administration and 71.3% (n=107) were given by parenteral route of administration.68% (n=102) were having bronchitis. And 8.6% (n=13) with bronchiolitis and 23.3%(n=35) by pneumonia as lower respiratory tract infection. Majority of the study population were received with third generation cephalosporins that is ceftriaxone, 19.01% (n=106), followed by piperacillin 18.6%(n=108). The current study reveals that there is an opportunity for the pharmacist to use their professional training in more clinical ways.

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Lower respiratory tract infection (LRTI), while often used as a synonym for pneumonia, can also be applied to other types of infection including lung abscess and acute bronchitis. Symptoms include shortness of breath, weakness, fever, coughing and fatigue. There are a number of symptoms that are characteristic of lower respiratory tract infections. The two most common are bronchitis and edema.[3] Influenza affects both the upper and lower respiratory tracts. Antibiotics are the first line treatment for pneumonia; however, they are not effective or indicated for parasitic or viral infections.Â "Diagnosis of sputum culture positive organisms and their antimicrobial sensitivity profile in a tertiary care centre - Kanyakumari". *Journal of Evidence Based Medicine and Healthcare*. 4 (4): 168â€“171. However, the prevalence of Hospital Acquired Infection (HAI) in Indonesia was not available on a national level. Similarly, the information of HAI in low and middle income countries was very limited.Â Sanglah Hospital is a tertiary referral center and major healthcare hub for East Indonesia. The hospital is situated on the island province of Bali, an international tourist destination, which attracts more than 9 million tourists a year.Â Our study reports the identification and distribution of pathogens in a major tertiary hospital of Indonesia for an under-reported yet very densely populated area of Southeast Asia in the context of global literature and provides a foundation for future local and national studies. Reduction of catheter-associated urinary tract infections among patients in a neurological intensive care unit: a single institutionâ€™s success. *J Neurosurg* 2012;116:911â€“920.C CrossRef Google Scholar. 43. Rosenthal, VD, Ramachandran, B, Ducnas, L, et al. Findings of the International Nosocomial Infection Control Consortium (INICC), part I: effectiveness of a multidimensional infection control approach on catheter-associated urinary tract infection rates in pediatric intensive care units of 6 developing countries.Â Evaluation of a Novel Intervention to Reduce Unnecessary Urine Cultures in Intensive Care Units at a Tertiary Care Hospital in Maryland, 2011â€“2014. *Infection Control & Hospital Epidemiology*, Vol. 37, Issue. 5, p. 606.