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TO STUDY THE DRUG UTILIZATION EVALUATION OF ANTIBIOTICS IN LOWER RESPIRATORY TRACT INFECTION IN TERITARY CARE TEACHING HOSPITAL

Dr. Santhosh Uttangi*[1], Prof. J. S. Venkatesh[2], Acsah Ann Reji[3], Aji Antony[3], Anjana S. S.[3] and Ansu Abraham[3]

[1]Assitant Professor, S C S College of Pharmacy, Harapanahalli.

[2]Professor, S C S College of Pharmacy, Harapanahalli.

[3]Pharm.D interns, S C S College of Pharmacy, Harapanahalli.

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***Corresponding Author**
Dr. Santhosh Uttangi
Assitant Professor, S C S College of Pharmacy, Harapanahalli.

ABSRACT

Most people will develop lower respiratory tract infection every year. LRTI tends to be more dangerous than URTI. Management of LRTI were preferred with antibiotics as there is an increasing incidence of antimicrobial resistance it is necessary to conduct drug utilization studies. Aim of this study was to identify and evaluate the antibiotics utilized in patient with lower respiratory tract infections at tertiary care teaching hospital. A total of 183 patients with LRTI (18 to above 65years) in government Chigateri District Hospital Davengere (tertiary care teaching hospital) were taken, the data was collected from the case sheets of patients and recorded in a data collection form. The collected data were analyzed in MS Excel and descriptive statistics were used for analyzing the result of the study. Among all antibiotics ceftriaxone were found to be 159(51%) followed by azithromycin 92(29.6%), piperacillin + tazobactum 39(12.58%), doxycycline 7(2.25%), ciprofloxacin 1(0.32%), ofloxacin 2(0.64%), meropenem2(0.64%), clindamycin2(0.64%. Whereas cefoperazone + salbactum, amoxicillin + claculanate, amikacin, cefpodoxime, ceftriaxone + salbactum and streptomycin were prescribed in limited cases. The present study was conducted to analyse rational prescribing of antibiotics in patients with LRTI and an overall pattern of antibiotics usage. Area of concern in the present study is polypharmacy and use of antibiotics in LRTI without following any guideline. From our study we conclude that drug utilization studies have the potential to make objective evaluation of irrationality and empiric antibiotic prescription.

KEYWORDS: Lower respiratory tract infection (LRTI), Drug utilization evaluation (DUE), Antibiotics, Inpatients, Rational use.

INTRODUCTION

Lower respiratory tract infections (LRTI) are the most common types of respiratory tract infections (RTI).[1] Lower respiratory tract infections refer to the inflammation of the trachea, bronchi, bronchioles, and lung tissue. Old people have an increased risk of developing LRTI's compared to young adults.[2] Lower respiratory tract infections account for over 50 million deaths each year globaly.[3] World Health Organization (WHO) global burden of disease study estimated that lower respiratory tract infections where 429.2 million episodes of illness Worldwide and accounts for 94.5 million disability adjusted life years (DALYS).[4]

LRTI is mostly induced by infection or invasion of outside pathogenic microorganism.[5] These bacteria namely streptococcus pneumoniae, Haemophilusinfluenzae, Klebsiella pneumoniae, mycoplasma pneumonia, staphylococcus aureus and chlamydia pneumonia are mainly responsible for infections.[1]

TYPES OF LRTI's INCLUDES

- Pneumonia.
- Bronchiolitis.
- Bronchitis.
- Pulmonary tuberculosis.
- Chronic obstructive pulmonary diseases.

Antibiotics are commonly regarded as the primary and most important treatment for Lower respiratory infections. Antibiotics are the oldest medications identified, and they target specific microbes such as fungi and bacteria. Although there are numerous classification methods for antibiotics based on the bacterial spectrum (wide vs narrow), mode of administration, or kind of activity (bactericidal vs bacteriostatic), the most practical one is based on the molecular structure.

Rational prescribing involves "SANE criteria" i.e. safety, affordability, need and efficacy of the drug. Improper antibiotic use includes too low dose, too short/long duration, wrong choice of antibiotics, improper combination of antibiotics and therapeutic or prophylactic use in unproven clinical situations.[6] Selection of antibiotics by the prescriber can be done by

using antibiogram.[7] Inappropriate Empirical Therapy (IET) is said to be associated with a potentially worse outcome such as 30 days readmission rates and mortality rate,[8] when antibiotics are prescribed incorrectly, they offer little benefit to patient and potentially expose them to risk for complication.[7]

Drug utilization evaluation (DUE) It has been defined by the American society of Health System Pharmacists (ASHP) as a "criteria-based, ongoing, planning and systemic process for monitoring and evaluating the prophylactic, therapeutic and empiric use of drugs to help, assure that they were provided appropriately, safely and effective.[9] our study is conducted to evaluate various problems in prescribing practice such as polypharmacy, overuse of antibiotics. DUE is designed to review the drugs which are prescribed to the patients, provide a right feedback to the clinician/other relevant healthcare professional, develop criteria and standards. Prospective drug utilization studies can directly impact the patient's treatment and their outcome.[1]

METHODOLOGY

Study Site: The study was conducted in the Chigateri District Hospital, Davangere (tertiary care teaching hospital)

Study Design: Prospective observational study (subjects are followed to observe future outcome)

Sample Size: The study was conducted in 183 patients.

STUDY CRITERIA

This was carried out by considering the following inclusion and exclusion criteria.

INCLUSION CRITERIA

- Patients of either gender
- Cases with comorbid conditions
- Patients admitted for more than 2 days
- Patients admitted in medicine and emergency department
- Newly detected and known cases of LRTI

EXCLUSION CRITERIA

- Patients who are treated from out-patient department
- Patients with insufficient data

- Patients with COVID -19

STUDY PROCEDURE

A prospective observational study was conducted among 183 patients who were been admitted to the medicine and emergency department of Chigateri District hospital Davangere within a period of six months. The Institutional Ethics Committee of SCS College of pharmacy has approved the study and consent have been obtained from all residents. For this study a specialized data collection form was designed which include the patients demographic data, medical and medication history, underlying comorbid conditions, personal and family history.

RESULTS

1: DISTRIBUTION OF PATIENTS BASED ON GENDER

Out of 183 patients involved in the study percentage of males was found to be more 56.83% (104) when compared to females 43.16% (79).

Table 1: Distribution of patients based on gender.

Gender	Numbers (n)	Percentage (%)
Male	104	56.83%
Female	79	43.17%

2: DISTRIBUTION OF PATIENTS BASED ON AGE

The total admitted patients were classified into 6 age groups: 18-30, 31-40, 41-50, 51-60, 61-70, above 70. Out of which majority of patients belongs to 61-70 age group (22.95%) followed by 41-50 age group (18.57%).

Table 2: Distribution of patient based on age.

Age group	No. of patients (n)	Percentage (%)
18- 30	24	13.11%
31-40	23	12.57%
41-50	34	18.58%
51-60	29	15.85%
61-70	42	22.95%
>70	31	16.94%

3: DISEASE PREVALENCE IN LRTI

In our study population the total number of cases are 183.Out of total 183 cases collected, the most common LRTI treated with antibiotics were found to be COPD 61(33.33%), followed by pulmonary tuberculosis47 (25.68%), Unspecified LRTI 41(22.40), Pneumonia 23(12.56%),

Bronchitis 8 (4.37%) and pleural effusion were 3 (1.63%).

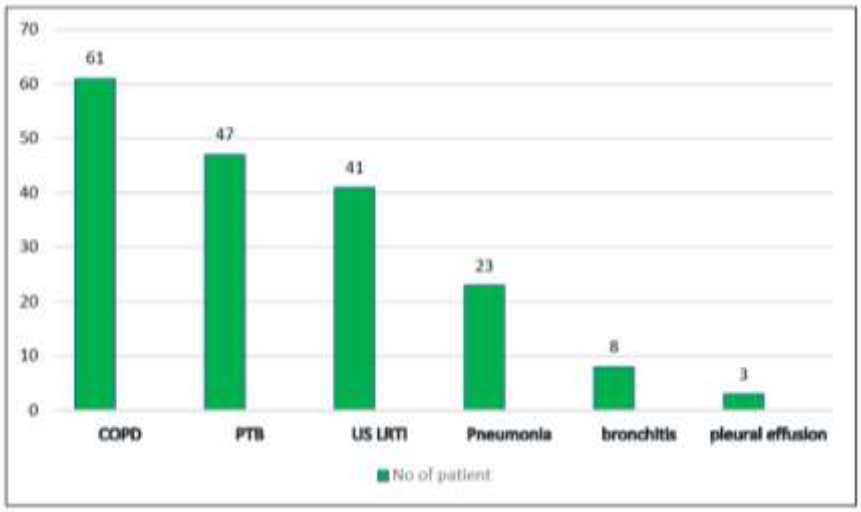

Figure 1: Disease prevalence in LRTI.

4: COMMONLY PRESCRIBED ANTIBIOTICS

Among all the antibiotics ceftriaxone 159 (51%) was found to be more predominant than others followed by azithromycin 92 (29.6%), pipzo39 (12.58%).

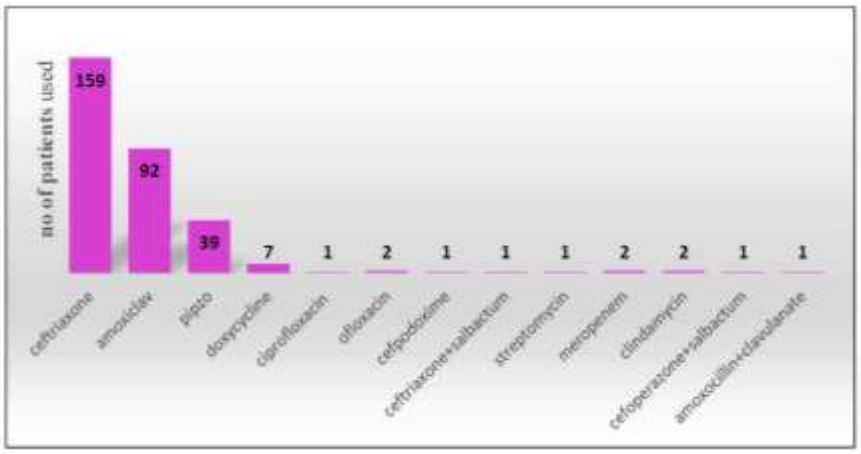

Figure 2: Commonly prescribed antibiotics.

5: CO-MORBID CONDITIONS WITH LRTI'S

During our study period the results revealed that hypertension 26 (14.20%) was the most commonly seen comorbidities along with LRTI's followed by Diabetes mellitus 24(13.11%).

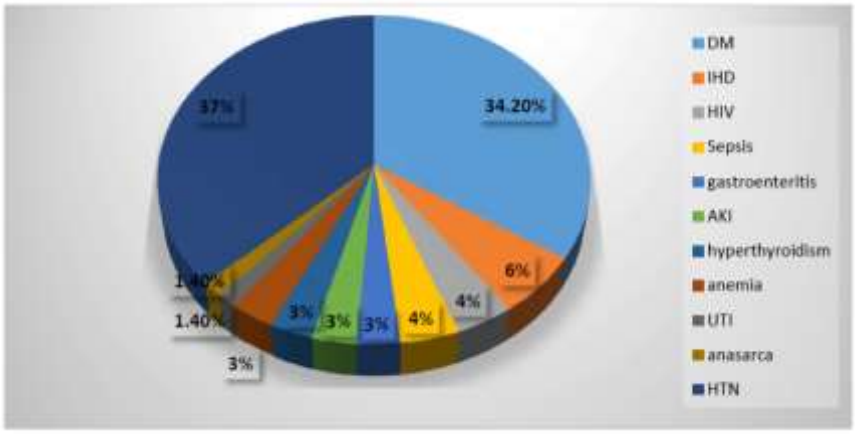

Figure 3: Percentage Distribution of Comorbidities.

6: TYPE OF ANTIBIOTIC THERAPY

During our study period we found that patients with LRTI received comparatively higher two antibiotic therapy 89(49.63%) compared to single antibiotic therapy and three antibiotic therapy.

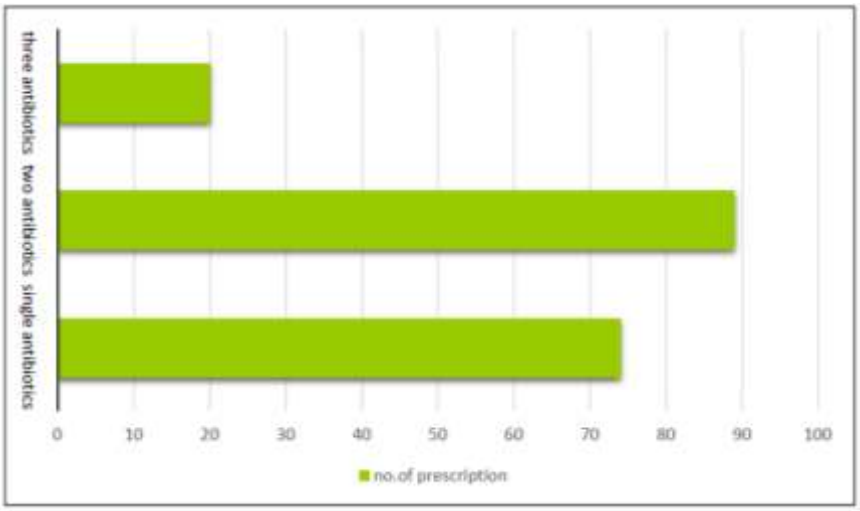

Figure 4: Type of antibiotic therapy.

7: ROUTE OF ANTIBIOTIC ADMINISTRATION

The patients included in the study 129(70%) received the antibiotics prescribed on admission via oral and parenteral route, while 51(28%) via parenteral route and only 3(2%) via oral route.

Table 3: Route of antibiotic administration.

Route of administration	No. of prescription	Percentage
Parenteral	51	28%
oral and parenteral	129	70%
Oral	3	2%

8: CLINICAL MANIFESTATION IN LRTI PATIENTS

Among the signs and symptoms of the lower respiratory tract infections cough 131(40%) was the most commonly seen clinical manifestation followed by shortness of breath (SOB) 83 (25%) and fever 54 (16.3%).

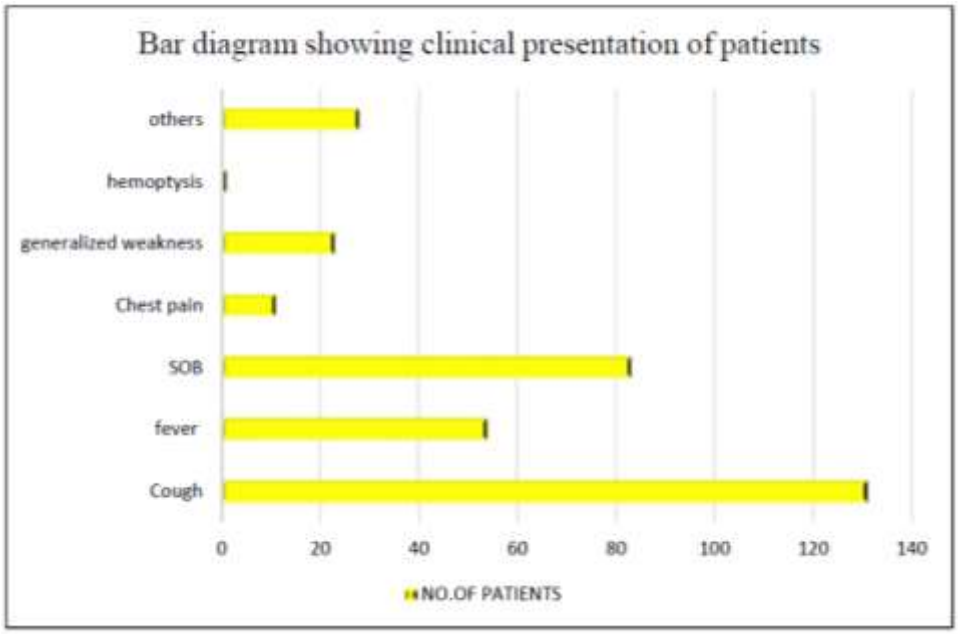

Figure 5: clinical presentation of LRTI patients.

9: LIFE STYLE OF STUDY POPULATION

Life style of the study population are listed in the below table. The results revealed that 14% of patients have the habit of smoking alone, 2% of patients were having habit of both smoking and alcohol, and 83% of study population were found to be having none of these habits.

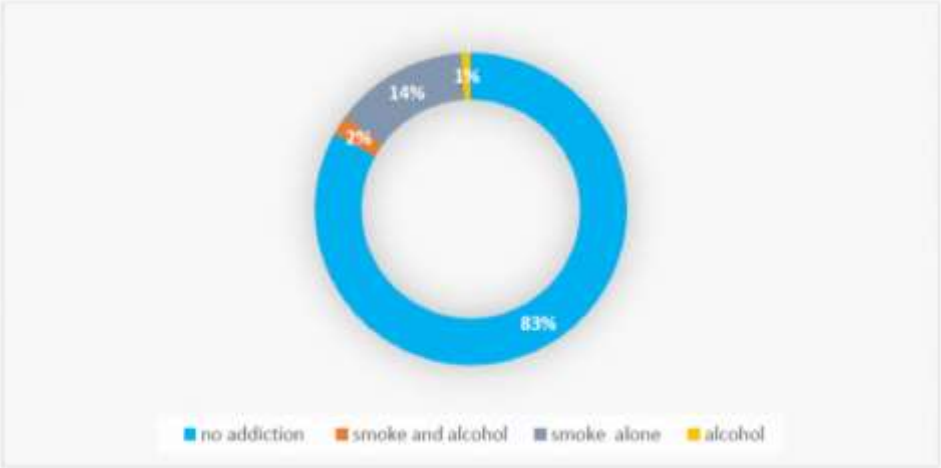

Figure 6: life style of study population.

10: CLASSIFICATION OF ANTIBIOTICS USED BY PATIENTS

Our study observed that beta lactams class 162 (62.14%) was prescribed more followed by macrolides 92 (35.2%) are particularly prescribed in the treatment of LRTI.

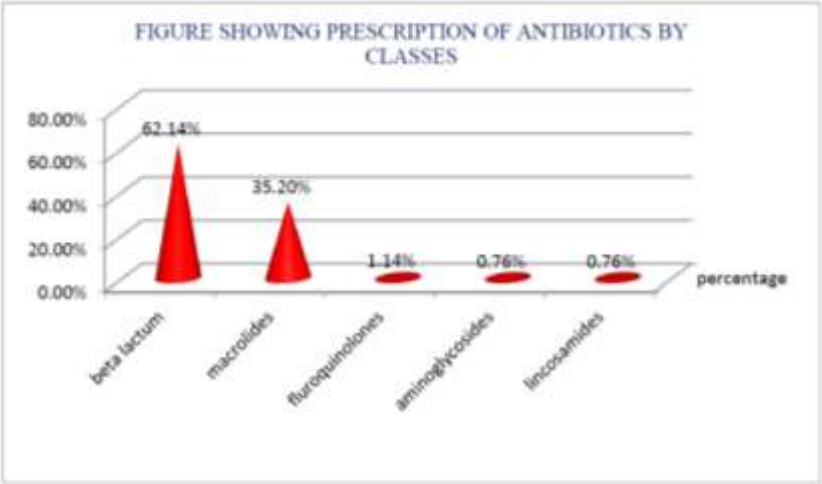

Figure 7: prescription of antibiotics by classes.

DISCUSSION

As LRTI accounts for a large percentage of consultation it become commonest of infections. However, the high level of availability and consumption of antibiotics for the management of the infectious disease, have led to higher incidence of resistance to antibiotics Maleki J.E *et al.*[10] The present prospective study indicated general trends of prescribing of antibiotics in inpatients who were in medical and emergency department of a tertiary care teaching hospital, davengere.

In the current study, A total of 183 patient's charts were reviewed, out of 183 cases males were 104(56.83%) members and females were 79(43.17%) members as shown in figure1. Higher percentage of the cases belonged to the age group of 61-70 are 42(22.95%), the result were in contrast to the study conducted in Andhra Pradesh by Kumar CS *et al.*[11] Among the various LRTI analyzed most of the patients were diagnosed with COPD 61(33.33%) was more prominent compared to other LRTIs which is in accordance to the study by Dahal. S *et al.*[12] The study also revealed that most commonly prescribed antibiotic in the management of LRTI was found to be Ceftriaxone 159(51%) followed by azithromycin 92(29.6%)which is similar to the study conducted by Kumar CS *et al.*[11]

The most frequent concomitant conditions of the study population were found to be

Hypertension 26(37%) followed by Diabetes mellitus 24(34.2%) and others are mentioned in table 5. This results were in contrast to the study conducted in New Delhi By shamim MD *et al.*[1] We observe that 74(40%) patients taken antibiotic monotherapy and the remaining patients were on multiple therapy receiving 2 or 3 antibiotics per prescription. Out of all prescriptions analyzed route of administration of antibiotics mostly used in patients were parenteral only 51(28%) than oral. Similar assessment were observed in study conducted in MJV medical college and research by Dahal S *et al.*[12]

Our study showed among the signs and symptoms of the LRTI's cough 131(40%) was the most commonly seen clinical manifestation followed by shortness of breath 83(23%) which is against to the study conducted by Kumar CS *et al.*[11] It was also observed that a total of 26(14%) of patients were current smokers; and only 2(1%) alcoholic and also 151(83%) were no addiction patients which is contrast to the study conducted by Shamim M.D *et al.*[1]

Most commonly prescribed categories of antibiotics were found to be beta lactam (62.14%) [penicillin 0.38% cephalosporin 21.73%] followed by macrolides (35.2%) which is in accordance with study conducted by Kumar CS *et al.*[11]

CONCLUSION

A prospective observational study on utilization of antibiotics in patients with LRTI was carried out with 183 patients. From the study it was observed that male were more prone to lower respiratory tract infections than females. Age group of 61-70 years were higher than other age groups. COPD was more prevalent among all LRTI followed by PTB. Hypertension was the most commonly seen associated illness with LRTI. In majority of patients frequently prescribed antibiotics was ceftriaxone followed by azithromycin. The most dominant type of antibiotic therapy observed in the entire prescription was two antibiotic therapy in which most of them were administrated via parenteral and oral route. Majority of antibiotics were prescribed from beta lactam class. From this study it is concluded that drug utilization studies can provide feedback to physician and promote rational prescribing of antibiotics. A study of DUE of antibiotics is a effective way to encourages physicians to choose a broader and safe opinion of antibiotics thereby minimizing polypharmacy.

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AUTHORS CONTRIBUTION

All authors have contributed equally.

CONFLICT OF INTEREST

NIL.

ETHICS DECLARATION

The Institutional Ethics Committee of SCS College of pharmacy has approved the protocol and consent have been obtained from all residents.

CONSENT FOR PUBLICATION

All authors have consented for the publication of their work.

COMPETING INTEREST

All authors declare that they have no competing interests.

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