



ASSESSMENT OF DRUG UTILIZATION PATTERN IN RESPIRATORY TRACT INFECTIONS OF RURAL TERTIARY CARE HOSPITAL

Ramanath K. V.*¹ and Nabeelsha M. C.²

¹Dept. of Pharmacy Practice, SAC College of Pharmacy, Adichunchangiri University BG
Nagar Nagamangala (T), Manyda (D), Karnataka.

²M. Pharm 2year Student, SAC College of Pharmacy, Adichunchangiri University BG Nagar
Nagamangala (T), Manyda (D), Karnataka.

Article Received on
31 Jan. 2019,

Revised on 21 Feb. 2019,
Accepted on 14 March 2019

DOI: 10.20959/wjpps20194-13358

*Corresponding Author

Dr. Ramanath K.V.

Dept. of Pharmacy Practice,
SAC College of Pharmacy,
Adichunchangiri University
BG Nagar Nagamangala
(T), Manyda (D), Karnataka.

ABSTRACT

Introduction: Respiratory tract infections are very common and can be characterized by any infection of the upper (URTIs) or lower respiratory tract (LRTI). Hence the study of drug usage in URTI and LRTI will help in understanding the types of drugs used. **Objective:** To study the drug utilization pattern in respiratory tract infection. **Methodology:** A prospective and observational study was carried out in Adichunchangiri hospital and Research centre, over a period of 9 months. A well designed data collection form was used to record/collect all the necessary data. The obtained data was subjected to statistical analysis. **Results:** This study showed that RTIs occur more in 60-71 years male patients. It was found that the most costly antibiotic was used in LRTI with Hypertension and Diabetes Mellitus

(2459.75±1275.55) followed by pneumonia (1715.50±621.88). The most costly respiratory drug was used in Treatment of Asthma with Diabetes Mellitus with Ischemic Heart disease (995.00±245.76) followed by LRTI with Diabetes Mellitus. In RTIs, the most common prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids, followed by mucolytics. The most prescribed category of respiratory drugs are Ipratropium bromide + salbutamol, hydrocortisone and budesonide. In patients with RTIs, the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid, followed by Ceftriaxone. The most commonly prescribed other drug is proton pump inhibitors and diuretics. **Conclusion:** Prescribing pattern and usage of antibiotics are more compared to other drugs,

Amoxicillin with Clavulanic acid are most commonly prescribed antibiotics in various RTIs, and also prescribing pattern in the brand name are higher than the generic name.

KEYWORDS: RTI: Respiratory tract infection, URTI: Upper respiratory tract infection, LRTI: Lower respiratory tract infection, DUR: drug utilization review.

INTRODUCTION

Drug utilization studies are a potential tool in the evaluation of healthcare systems. DUE helps in understanding the role of drugs in society. Respiratory diseases are the important morbidity and mortality diseases among the Indian population and there is a lack of studies in rural populations.^[1]

The prescribing and drug utilization pattern deals with monitoring, evaluating and suggesting modifications in the prescribing pattern for safe, effective and cost effective. Irrational prescribing and drug utilizing pattern has been widely reported from both developed as well as developing countries. Inappropriate use of antibiotics is a great public health issue because of antibiotic resistance. The bacterial resistance leads to increase burden of chronic disease management and also increasing the number of side effects and the cost of services. This threat of injudicious use of antibiotics can be optimized by implementing appropriate use of the antibiotics.^[2,3]

The World Health Organization (WHO) defines that drug utilization is “the marketing, distribution, prescription and use of drugs in a society and its consequences. The development of drug utilization research made it the drug prescribing and drug usage in a scientific and formal manner. Developing countries are having limited funds available for health care and drugs and it becomes very difficult to prescribe drugs rationally. DU Studies helps in changing the unnecessary and irrational prescribing which increases the burden of cost of therapy also causes loss of working hours. DUE are definitely required for a developing country like India to promote the rational drug usage. Even though patients have much/good knowledge on health care systems but still the drug utilization is not happening properly.^[4,5]

Respiratory tract infection can be characterized by any infection of the upper or lower respiratory tract. Upper respiratory tract infections (URTIs) comprise common cold, laryngitis, pharyngitis/tonsillitis, acute rhinitis, acute rhino sinusitis and acute otitis media.

The most common signs & symptoms observed in URTI are coughing, sneezing, congestion, runny nose, low-grade fever, anorexia and myalgia. Most of URTI are viral, few only due to bacteria. The majority of URTIs are of viral origin, due to rhinovirus, parainfluenza virus, corona virus, adenovirus, Coxsackie virus, and influenza virus. However, pharyngitis and the common cold have the greatest probability of being of viral origin. Only 10% of URTIs are due to bacterial etiology, with the three most common organisms being *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*. The development of antimicrobial resistance has occurred mainly among *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis* in pediatric patients. Accurate judgment of origin of infection assists prescriber to prescribe rationally.^[6,7]

The management of URTI of viral origin involves the symptomatic relief only. For relief of fever, nasal congestion and coughing in viral URTI, a large variety of preparations are such as antihistamines, antipyretics or anti-inflammatory agents, cough suppressants expectorants and decongestants are being used.^[7]

Lower respiratory tract infections (LRTI) are also an important problem to society. The main LRTIs are acute bronchitis, bronchiolitis, tracheitis and pneumonia. LRTI is one of the major reasons for antibiotic treatment because it leads to changes in antibiotic resistance patterns and becomes a threat to its effective treatment, which is increasing in the community.^[5]

Overuse of antimicrobials is a global phenomenon. In India, the prevalence of use of antimicrobials varies from 24% to 67%. According to a recent study in an acute respiratory infections, 75% of the antibiotic prescriptions were most frequently noticed and seeks a medical attention.^[8]

Commonly antimicrobials prescribed for various infections like pharyngitis, acute suppurative otitis media (ASOM), chronic suppurative otitis media (CSOM), tonsillitis and laryngitis. The prescribing behavior of clinicians depends upon information from various sources like academic literature, professional colleagues, government regulations and commercial publicities.^[8]

The International Network for the Rational Use of Drugs (INRUD) was established in 1989 which taken a step to promote the rational use of drugs in developing countries. Various indicators were developed by INRUD in collaboration with WHO provided indices to allow

for assessment of drug usage practices. Still, there is a need/paucity of the data on both antibiotic use and its determinants from all the regions of the world showing that, these type of study's are required to be carried out.^[9]

According to Centre for Disease Control (CDC) guidelines, the quality of medical care requires prescribing to be judicious, appropriate, safe, effective and economic. Good prescribing is a complex balance between various conflicting factors. Hence to achieve clinical benefit with minimum risk at cost effective price and respecting the patient's choice.^[10]

Hence, the present study was planned to carry out in these patient category of rural Adichunchanagari Hospital and Research Centre. With the.

OBJECTIVE

1. To study the pattern of respiratory diseases admitted & respiratory drugs, other categories of the drug used. 2. To study the pattern of antibiotics use and its cost. 3. To assess the drug-drug interactions in the prescription

Site of the study

The study was conducted at Adichunchanagiri Hospital and Research Center, B.G. Nagara. Ethical committee clearance was obtained by the Institutional Ethical Committee of Adichunchanagiri Institute of Medical Science (AIMS) before the initiation of this study. (NO: AIMS/IEC/1380/2017-18).

Study procedure

A prospective and observational study was carried out in the tertiary care teaching hospital of Adichunchanagiri hospital and Research centre, over a period of 9 months. A suitably designed data collection form was used to record all the necessary data including patient demographic details, patient medication history, and reason for admission, any allergic reaction, medication details and lab investigations and consent was taken. The obtained data was subjected to statistical analysis.

RESULTS

The mean age of the patients was 65.16 ± 11.93 . The more respiratory issues were observed at the age of 61-70 years (35.45%) followed by 51-60 years (24.55%) and least were observed at 20-30 years (0.9%) of age. Interestingly in our study 31.82% females and 68.18% males

were observed with RTI. 90.91% patients BMI were normal & only 9.09% were in the obese category. The mean BMI of the enrolled patients was 22.81 ± 1.97 . The social habits of the patients showed only 3.63% were alcoholic and 96.36% were non smokers in past or present. Interestingly our results showed that only 22.73% were smokers and 77.27 were non smokers. Our results showed that 49.1% were with COPD, 9.1% were with asthma, 8.2% were with LRTI, 7.3% were with asthma and COPD, Pneumonia cases were 5.5% and least were bronchitis, LRTI, COPD TB combination etc.

RESULTS

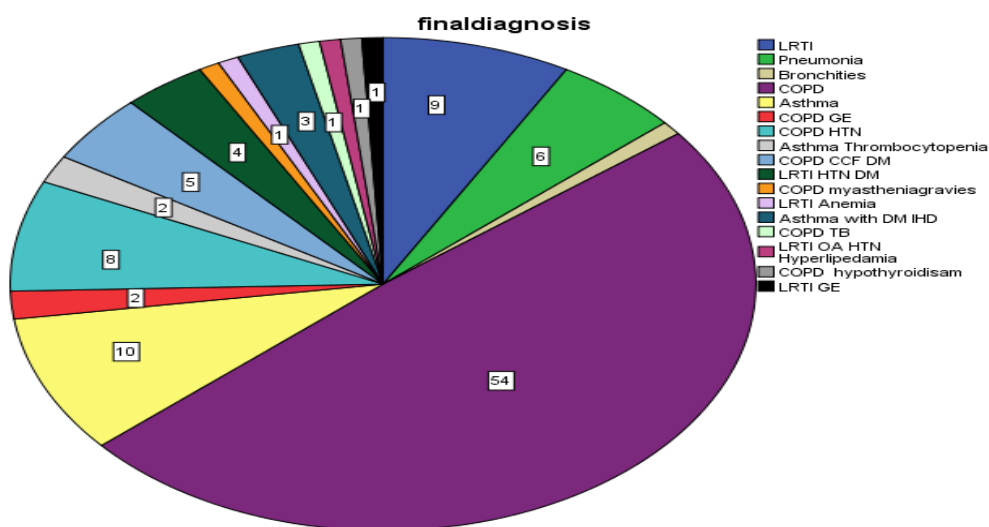


Figure 1: Distribution of RTI of the patients.

The 38.18% patients stayed in the hospital for a minimum of 5 days for their disease management followed by three days. The mean length of hospital stay was 4.6 ± 1.4 days.

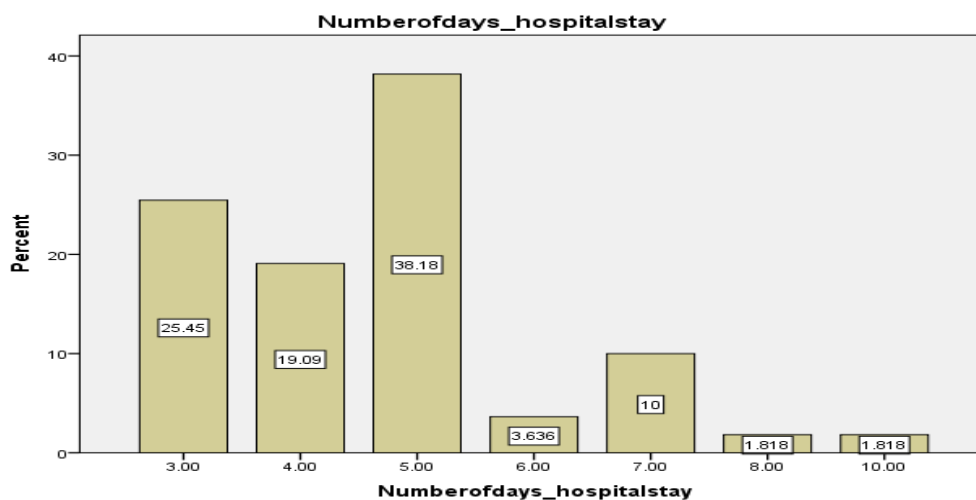


Figure 2: Distribution of patients based on Number of day's stayed in the hospital.

This study showed that 68.2% were improved and (8.2%) were referred to higher centers and (23.6%) were discharged against medical advice.

Table 1: Distribution of the cost incurred in the respiratory tract infections.

Final diagnosis	Generic name (Mean±SD)	Antibiotic cost (Mean±SD)	Respiratory drugs total cost (Mean±SD)	Total cost of the disease (Mean±SD) Management
LRTI	9	1155.77±784.32	573.77±284.20	2571±1980.23
Pneumonia	6	1715.50±621.88	416.33±195.85	2368.00±809.14
Bronchitis	1	312.00	73.00	409.00
COPD	54	1188.85±1144.05	570.47±299.45	2387.07±1370.43
Asthma	10	1467.40±1497.60	467.20±276.53	2403.30±2300.98
COPD GE	2	1530.00±240.41	597.50±24.74	2859.50±4.94
COPD HTN	8	688.00±528.34	604.87±273.42	1613.87±612.57
Asthma Thrombocytopenia	2	657.00±513.35	773.00±151.32	2114.50±9.19
COPD CCF DM	5	965.00±767.19	538.20±355.82	1586.60±1139.89
LRTI HTN DM	4	2459.75±1275.55	793.75±433.26	3942.25±1587.12
COPD Myasthenia gravis	1	490.0000	548.0000	1056.0000
LRTI Anemia	1	2380.0000	1779.0000	5335.0000
Asthma with DM IHD	3	326.66±282.90	995.00±245.76	1570.00±294.61
COPD TB	1	670.0000	515.0000	2150.0000
LRTI OA HTN Hyperlipidemia	1	100.0000	88.0000	268.0000
COPD Hyperthyroidism	1	1700.0000	708.0000	2933.0000
LRTI GE	1	1790.0000	675.0000	3061.0000

Interestingly it was found that the most costly antibiotic was used in LRTI with Hypertension and Diabetes Mellitus (2459.75±1275.55) followed by pneumonia (1715.50±621.88). This study found that the most costly respiratory drugs was used in Treatment of Asthma with Diabetes Mellitus with Ischemic Heart disease (995.00±245.76) followed by LRTI with Diabetes Mellitus.

Most costly treatment was done in treating LRTI with Diabetes Mellitus (3942.25±1587.12) followed by LRTI with Gastroenteritis (3061.000).

Table 2: Distribution of category of respiratory drugs used in the RTIs.

Final diagnosis	Category drugs	N	%
LRTI	ANTICHOLINERGICS, CORTICOSTEROIDS	4	44.4
	ANTICHOLINERGICS, CORTICOSTEROIDS, OXYGEN	2	22.2
	ANTICHOLINERGICS, CORTICOSTEROID, MUCOLYTICS, OXYGEN	1	11.1
	CORTICOSTEROIDS, MUCOLYTICS	1	11.1
	NO	1	11.1
	Total	9	100.0
Pneumonia	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	2	33.3
	ANTICHOLINERGICS, CORTICOSTEROIDS	2	33.3
	MUCOLYTICS	1	16.7
	OXYGEN, CORTICOSTEROIDS, ANTICHOLINERGICS, LEUKOTRINE RECEPTOR ANTAGONIST	1	16.7
	Total	6	100.0
Bronchitis	MUCOLYTICS	1	100.0
COPD	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	14	25.92
	ANTICHOLINERGICS, CORTICOSTEROIDS	24	44.44
	ANTICHOLINERGICS, CORTICOSTEROIDS, OXYGEN	1	1.9
	ANTICHOLINERGICS, CORTICOSTEROIDS, METHYL XANTHINES	1	1.9
	ANTICHOLINERGICS, CORTICOSTEROIDS, OXYGEN	5	9.25
	ANTICHOLINERGICS, MUCOLYTICS	2	3.7
	ANTICHOLINERGICS, MUCOLYTICS, CORTICOSTEROIDS, OXYGEN	1	1.9
	CORTICOSTEROIDS	2	3.7
	MUCOLYTICS	1	1.9
	MUCOLYTICS, ANTICHOLINERGICS, CORTICOSTEROIDS, METHYL XANTHINES, CORTICOSTEROIDS	1	1.9
	NO	2	3.7
	Total	54	100.0
Asthma	ANTICHOLINERGICS, CORTICOSTEROIDS	5	50.0
	ANTICHOLINERGICS, CORTICOSTEROIDS, LEUKOTRINE RECEPTOR ANTAGONIST	1	10.0
	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	2	20.0
	ANTICHOLINERGICS, CORTICOSTEROIDS, LEUKOTRINE RECEPTOR ANTAGONIST	1	10.0
	NO	1	10.0
	Total	10	100.0
COPD GE	ANTICHOLINERGICS, CORTICOSTEROIDS	2	100.0
	Total	2	100.0
COPD HTN	ANTICHOLINERGICS, CORTICOSTEROIDS	3	37.5
	ANTICHOLINERGICS, CORTICOSTEROIDS, METHYL XANTHINES	1	12.5
	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	2	25.0
	ANTICHOLINERGICS, CORTICOSTEROIDS, OXYGEN	1	12.5
	MUCOLYTICS, ANTICHOLINERGICS	1	12.5
	Total	8	100.0
Asthma Thrombocytopenia	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	1	50.0
	ANTICHOLINERGICS, CORTICOSTEROIDS	1	50.0

	Total	2	100.0
COPD CCF DM	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	3	60.0
	ANTICHOLINERGICS, CORTICOSTEROIDS	1	20.0
	NO	1	20.0
	Total	5	100.0
LRTI HTN DM	ANTICHOLINERGICS, CORTICOSTEROIDS	2	50.0
	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	1	25.0
	OXYGEN	1	25.0
	Total	4	100.0
COPD myasthenia Gravis	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	1	100.0
LRTI Anemia	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	1	100.0
Asthma with DM IHD	ANTICHOLINERGICS, CORTICOSTEROIDS, OXYGEN	1	33.3
	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	1	33.3
	ANTICHOLINERGICS, METHYL XANTHINES, OXYGEN	1	33.3
	Total	3	100.0
COPD TB	ANTICHOLINERGICS, CORTICOSTEROIDS	1	100.0
LRTI OA HTN Hyperlipidemia	MUCOLYTICS	1	100.0
COPD hypothyroidism	ANTICHOLINERGICS, CORTICOSTEROIDS, MUCOLYTICS	1	100.0
LRTI GE	ANTICHOLINERGICS, CORTICOSTEROIDS	1	100.0

This table shows that in LRTI, the most common prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (44.4%). In Pneumonia the most common prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (33.3%). Bronchitis, the most common prescribed classes of respiratory drugs are mucolytics (100%). COPD, the most common prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (44.44%), followed by mucolytics (25.92%). Asthma, the most common prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids and mucolytics (20%). Patients with COPD with Gastroenteritis the most prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (100%). Patients with COPD with Hypertension the most prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (37.5%), followed by Mucolytics (25%). Patients with Asthma with Thrombocytopenia the most prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (100%) followed by Mucolytics (100%). Patients with COPD with Diabetes Mellitus and Congestive Cardiac Failure the most prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (60%). Patients with LRTI with Hypertension and Diabetes Mellitus the most prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (50%). Patients with COPD with Myasthenia Gravis the most prescribed classes of respiratory drugs are Anticholinergics, Corticosteroids and Mucolytics (100%).

Patients with LRTI with Anemia the most prescribed classes of respiratory drugs are Anticholinergics, Corticosteroids and Mucolytics (100%). Patients with Asthma with Diabetes Mellitus with Ischemic Heart Disease the most prescribed classes of respiratory drugs are Anticholinergics, Corticosteroids, oxygen and mucolytics (100%). Patients with COPD with Tuberculosis the most prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (100%). Patients with LRTI with Osteoarthritis, Hypertension, Hyperlipidemia the most prescribed classes of respiratory drugs are Mucolytics (100%). Patients with COPD with Hypothyroidism the most prescribed classes of respiratory drugs are Anticholinergics, Corticosteroids and Mucolytics (100%). Patients with LRTI with Gastroenteritis the most prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (100%).

Table 3: Distribution of category of respiratory drugs used in the respiratory tract infections.

Final diagnosis	Generic name of the drug	N	%
LRTI	BUDESNOIDE,TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	11.1
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE	3	33.3
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE,OXYGEN	1	11.1
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL, OXYGEN	1	11.1
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESONIDE, HYDROCORTISONE	1	11.1
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESONIDE, OXYGEN	1	11.1
	NO	1	11.1
	Total	9	100.0
Pneumonia	IPRATROPIUM BROMIDE+ SALBUTAMOL,BUDESNOIDE	2	33.3
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESNOIDE, AMBROXOL+GUAIFENESIN+LEVOSALBUTAMOL	1	16.7
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE,HYDROCORTISONE, AMBROXOL	1	16.7
	OXYGEN,PREDINSOLONE,SALBUTAMOL+THEOPHYLLINE, ACEBROPHYLLINE+MONTELUKAST	1	16.7
	TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	16.7
	Total	6	100.0
Bronchitis	AMBROXOL+GUAIFENSIN+LEVOSALBUTAMOL	1	100.0
COPD	BUDESNOIDE,HYDROCORTISONE	1	1.9
	BUDESONIDE	1	1.9
	HYDROCORTISONE,BUDESNOIDE, OXYGEN,IPRATROPIUM BROMIDE+SALBUTAMOL	1	1.9
	IPRATROPIUM BROMIDE,BUDESONIDE	1	1.9
	IPRATROPIUM BROMIDE,PREDNISOLONE,OXYGEN	1	1.9
	IPRATROPIUM BROMIDE,PREDNISOLONE,TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	1.9
	IPRATROPIUM BROMIDE+SALBUTAMOL, BROMHEXINE+GUAPHENSIN+MENTHOL+TERBUTALINE	1	1.9
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE	17	31.4
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, HYDROCORTISONE	5	9.2

	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE,HYDROCORTISONE,DOXOFYLLINE	1	1.9
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE,HYDROCORTISONE, PREDINSOLONE	1	1.9
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESNOIDE,OXYGEN	3	5.6
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESNOIDE,TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	11	20.37
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESONIDE, AMBROXIL+GUAFENSIN,HYDROCORTISONE	1	1.9
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESONIDE,HYDROCORTISONE, TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	1.9
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESONIDE,OXYGEN	1	1.9
	IPRATROPIUM BROMIDE+SALBUTAMOL,TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL,BUDESONIDE,OXYGEN	1	1.9
	IPRATROPIUM BROMIDE+SALBUTAMOL.TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	1.9
	NO	2	3.7
	TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	1.9
	TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL,IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESONIDE,ETOFYLLINE+THEOPHYLLINE,BUDESONIDE	1	1.9
	Total	54	100.0
Asthma	IPRATROPIUM BROMIDE,BUDESONIDE	1	10.0
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESNOIDE	3	30.0
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESNOIDE,MONTELUKAST	2	20.0
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESONIDE,HYDROCORTISONE	1	10.0
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESONIDE,HYDROCORTISONE,TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	10.0
	IPRATROPIUM BROMIDE+SALBUTAMOL,BUDESONIDE,TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	10.0
	NO	1	10.0

	Total	10	100.0
COPD GE	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, HYDROCORTISONE	1	50.0
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESONIDE	1	50.0
	Total	2	100.0
COPD HTN	AMBROXOL+GUAIFENESIN+LEVOSALBUTAMOL, IPRATROPIUM BROMIDE	1	12.5
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, OXYGEN	1	12.5
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESONIDE, ETIOPHYLLINE+THEOPHYLLINE	1	12.5
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESONIDE, HYDROCORTISONE	2	25.0
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESONIDE, TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	2	25.0
	IPRATROPIUM BROMIDE+SALBUTAMOL, HYDROCORTISONE	1	12.5
	Total	8	100.0
Asthma Thrombocytopenia	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, HYDROCORTISONE	1	50.0
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESONIDE, TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL, HYDROCORTISONE	1	50.0
	Total	2	100.0
COPD CCF DM	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	3	60.0
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, THEOPHYLLINE+ETIOPHYLLINE	1	20.0
	NO	1	20.0
	Total	5	100.0
LRTI HTN DM	HYDROCORTISONE, IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, AMBROXOL+GUAIFENESIN+LEVOSALBUTAMOL	1	25.0
	HYDROCORTISONE, IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESONIDE	1	25.0
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESONIDE	1	25.0
	OXYGEN	1	25.0
	Total	4	100.0
COPD myasthenia Gravis	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESONIDE, TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	100.0
LRTI Anemia	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, HYDROCORTISONE, TERBUTALINE SULPHATE +	1	100.0

	BROMHEXINE + GUAPHENSIN + MENTHOL		
Asthma with DM IHD	HYDROCORTISONE, TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL, IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, AMBROXOL	1	33.3
	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, OXYGEN	1	33.3
	IPRATROPIUM BROMIDE+SALBUTAMOL, DOXOPHYLLIN, OXYGEN	1	33.3
	Total	3	100.0
COPD TB	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE	1	100.0
LRTI OA HTN Hyperlipidemia	TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	100.0
COPD hypothyroidism	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, TERBUTALINE SULPHATE + BROMHEXINE + GUAPHENSIN + MENTHOL	1	100.0
LRTI GE	IPRATROPIUM BROMIDE+SALBUTAMOL, BUDESNOIDE, HYDROCORTISONE	1	100.0

This table shows that in LRTI, the most common prescribed category of respiratory drugs are ipratropium bromide + salbutamol and budesonide (33.3%). Pneumonia the most common prescribed category of respiratory drugs are ipratropium bromide + salbutamol and budesonide (33.3%). Bronchitis, the most common prescribed category of respiratory drugs are ambroxol + guaiphensin + levosalbutamol (100%). COPD, the most common prescribed category of respiratory drugs are ipratropium bromide + salbutamol and budesonide (31.4%) followed by ipratropium bromide + salbutamol, budesonide, terbutaline sulphate + bromhexine + guaphensin + menthol (20.37%). Asthma, the most common prescribed category of respiratory drugs are ipratropium bromide+ salbutamol and budesonide (30%). Patients with COPD with hypertension the most prescribed category of respiratory drugs are ipratropium bromide+ salbutamol, hydrocortisone and budesonide (25%). Patients with COPD with diabetes mellitus and congestive cardiac failure the most prescribed category of respiratory drugs are ipratropium bromide + salbutamol, budesonide, terbutaline sulphate + bromhexine + guaphensin + menthol (60%). Patients with LRTI with hypertension and diabetes mellitus the most prescribed category of respiratory drugs are ipratropium bromide+ salbutamol and budesonide (75%). Patients with asthma with diabetes mellitus with ischemic heart disease the most prescribed category of respiratory drugs are ipratropium bromide + salbutamol (100%). Patients with COPD with tuberculosis the most prescribed category of respiratory drugs are (100%). Patients with LRTI with osteoarthritis, hypertension, Hyperlipidemia the most prescribed category of respiratory drugs is terbutaline sulphate + bromhexine + guaphensin + menthol (100%). Patients with COPD with hypothyroidism the most prescribed category of respiratory drugs are ipratropium bromide + salbutamol, budesonide, terbutaline sulphate + bromhexine + guaphensin + menthol. Patients with LRTI with gastroenteritis the most prescribed category of respiratory drugs are ipratropium bromide + salbutamol, budesonide, hydrocortisone (100%).

Table 4: Distribution of category of antibiotic drugs used in the respiratory tract infections.

Final diagnosis	Generic name	N	%
LRTI	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	5	55.6
	AMOXICILLIN + CLAVULANIC ACID(1000+200MG), AZITHROMYCIN(500MG)	1	11.1
	AMOXICILLIN + CLAVULANIC ACID(1000+200MG), CEFTRIAZONE(1GM)	1	11.1
	CEFOTAXIM(1GM)	1	11.1
	CEFTRIAZONE(1GM)	1	11.1
	Total	9	100.0
Pneumonia	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	3	50.0
	AMOXICILLIN + CLAVULANIC ACID(1000+200MG), AZITHROMYCIN(500MG)	1	16.7
	AMOXICILLIN + CLAVULANIC ACID(1000+200MG), AZITHROMYCIN(500MG), PIPERACILLIN + TAZOBACTAM(4000+500MG)	1	16.7
	AMOXICILLIN + CLAVULANIC ACID(1000+200MG), CEFTRIAZONE(1GM)	1	16.7
	Total	6	100.0
Bronchitis	AMOXICILLIN+CLAVULANIC ACID(1000+200MG)	1	100.0
COPD	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	18	33.3
	AMOXICILLIN + CLAVULANIC ACID(1000+200MG), AZITHROMYCIN(500MG)	7	13.0
	AMOXYCILLIN(500MG)	1	1.9
	AZITHROMYCIN(500MG), AMOXICILLIN(500MG)	1	1.9
	CEFOTAXIM(1GM)	1	1.9
	CEFOTAXIM(1GM), GENTAMYCIN(40MG)	1	1.9
	CEFOTAXIM(1GM), LEVOFLOXACIN(500MG)	1	1.9
	CEFTRIAZONE(1GM)	11	20.4
	CEFTRIAZONE(1GM), AZITHROMYCIN(500MG)	2	3.7
	CEFTRIAZONE(1GM), CLINDAMYCIN(600MG)	1	1.9
	CEFTRIAZONE (1GM), DOXYCYCLINE(100MG)	1	1.9
	CIPROFLOXACIN(500MG)	1	1.9
	NO	4	7.4
	PIPERACILLIN + TAZOBACTAM(4000+500MG), AZITHROMYCIN(500MG)	2	3.7
	PIPERACILLIN+TAZOBACTAM(4000+500MG)	1	1.9
	PIPERACILLIN+TAZOBACTAM(4000+500MG), LEVOFLOXACIN(500MG)	1	1.9
	Total	54	100.0
	Asthma	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	4
AMOXICILLIN + CLAVULANIC ACID(1000+200MG), CEFTRIAZONE(1GM)		1	10.0
CEFOTAXIM(1GM)		1	10.0
CEFTRIAZONE(1GM)		1	10.0
CEFTRIAZONE(1GM), PIPERACILLIN+TAZOBACTAM(4000+500MG)		1	10.0
NO		1	10.0

	PIPERACILLIN+TAZOBACTUM(4000+500MG)	1	10.0
	Total	10	100.0
COPD GE	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	2	100.0
COPD HTN	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	3	37.5
	AZITHROMYCIN(500MG)	1	12.5
	CEFOTAXIM(1GM)	1	12.5
	CEFTRIAZONE(1GM)	3	37.5
	Total	8	100.0
Asthma Thrombocytopenia	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	1	50.0
	CEFTRIAZONE(1GM)	1	50.0
	Total	2	100.0
COPD CCF DM	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	2	40.0
	AZITHROMYCIN(500MG), LEVOFLOXACIN(500MG), PIPERACILLIN+TAZOBACTUM(4000+500MG)	1	20.0
	CEFIXIME(200MG)	1	20.0
	CEFTRIAZONE (1GM), AZITHROMYCIN(500MG)	1	20.0
	Total	5	100.0
LRTI HTN DM	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	1	25.0
	AMOXICILLIN + CLAVULANIC ACID (1000+200MG), AZITHROMYCIN(500MG)	1	25.0
	CIPROFLOXACIN,AZITHROMYCIN(500MG),LEVOFLOXACIN(500MG), PIPERACILLIN+TAZOBACTUM(4000+500MG)	1	25.0
	PIPERACILLIN+TAZOBACTAM(4000+500MG)	1	25.0
	Total	4	100.0
COPD with myasthenia gravis	CEFTRIAZONE(1GM)	1	100.0
LRTI with Anemia	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	1	100.0
Asthma with DM IHD	CEFTRIAZONE(1GM)	2	66.7
	NO	1	33.3
	Total	3	100.0
COPD with TB	AZITHROMYCIN(500MG), CEFTRIAZONE(1GM)	1	100.0
LRTI with OA with HTN with Hyperlipidemia	AMOXICILLIN(500MG)	1	100.0
COPD hypothyroidism	AMOXICILLIN + CLAVULANIC ACID(1000+200MG)	1	100.0
LRTI GE	AMOXICILLIN + CLAVULANIC ACID(1000+200MG), AZITHROMYCIN(500MG)	1	100.0

This table shows that, when 110 patient's data were analyzed, LRTI patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (55.6%). Pneumonia patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (50%). Bronchitis patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (100%). COPD patients the most prescribed antibiotic was a combination of Amoxicillin and

Clavulanic acid (1000+200MG) (33.3%), followed by Ceftriaxone (1GM) (20.4%) patients. Asthma patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (40%). Patients with COPD with Gastroenteritis the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (100%). Patients with COPD with Hypertension the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (50%) and Ceftriaxone (1GM) (50%). Patients with Asthma with Thrombocytopenia the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (50%) and Ceftriaxone (1GM) (50%). Patients with COPD with Diabetes Mellitus and Congestive Cardiac Failure the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (20%). Patients with LRTI with Hypertension and Diabetes Mellitus the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid(1000+200MG) (50%) and Azithromycin (500MG) (50%). Patients with COPD with Myasthenia Gravis the most prescribed antibiotic was Ceftriaxone (1GM) (100%). Patients with LRTI with Anemia the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (100%). The Patients with Asthma with Diabetes Mellitus with Ischemic Heart Disease the most prescribed antibiotic was Ceftriaxone (1GM) (66.6%). Patients with COPD with Tuberculosis the most prescribed antibiotic was Azithromycin (500MG) (100%) and Ceftriaxone (1GM) (100%). Patients with LRTI with Osteoarthritis, Hypertension, Hyperlipidemia the most prescribed antibiotic was Amoxicillin (100%). Patients with COPD with Hypertension the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (100%). Patients with LRTI with Gastroenteritis the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (100%).

Table 5a: Distribution of various drugs used in respiratory diseases.

Final diagnosis	No, Of cases	NSAIDs	Hypoglycaemics	Cost hypoglycemics	PPI	Cost of PPI	H2 blockers	Anti platelets	Cost Anti platelets	Cost glycoside
LRTI	9	2(22.22%)	0	2(22.22%)	5(55.55%)	2(22.22%)	1(11.11%)	0	0	0
Pneumonia	6	3(50%)	0	0	5(83.33%)	0	0	0	0	0
Bronchitis	1	0	0	0	0	0	1(100%)	0	0	0
COPD	54	8(14.81%)	2(3.7%)	2(3.7%)	40(74.07%)	3(5.55%)	7(12.96%)	5(9.25%)	0	0
Asthma	10	3(30%)	0	0	6(60%)	1(10%)	0	1(10%)	0	0
COPD GE	2	0	0	0	2(100%)	0	0	0	0	0
COPD HTN	8	1(12.5%)	0	0	7(87.5%)	0	0	0	0	0
Asthma Thrombocytopenia	2	0	0	0	2(100%)	0	0	0	0	0
COPD CCF DM	5	1(20%)	0	0	1(20%)	0	3(60%)	0	0	0
LRTI HTN DM	4	1(25%)	0	0	3(75%)	0	0	0	1(25%)	0
COPD Myasthenia gravis	1	0	0	0	0	0	1(100%)	0	0	0
LRTI Anemia	1	0	0	0	1(100%)	0	0	0	0	0
Asthma with DM IHD	3	1(33.33%)	0	0	1(33.33%)	0	0	1(33.33%)	0	1(33.33%)
COPD TB	1	1(100%)	0	0	2(200%)	0	0	0	0	0
LRTI OA HTN Hyperlipidemia	1	0	0	0	0	0	1(100%)	0	0	0
COPD hyperthyroidism	1	0	0	0	1(100%)	0	0	0	0	0
LRTI GE	1	0	0	0	1(100%)	0	0	0	0	0

Table 5b: Distribution of the various drugs used in respiratory diseases.

Final diagnosis	HMGCOA	Anti arrhythmic	Anti HTN	ARBS	ACEI	CC blockers	BETA Blockers	Alpha Blockers	Diuretics
LRTI	0	0	3(33.33%)	1(11.11%)	0	2(22.22%)	1(11.11%)	0	4(44.44%)
Pneumonia	0	0	0	1(16.66%)	0	0	0	0	0
Bronchitis	0	0	0	0	0	0	0	0	0
COPD	3(5.55%)	0	7(12.96%)	1(1.85%)	0	5(9.25%)	0	0	17(31.48%)
Asthma	1(10%)	1(10%)	1(10%)	1(10%)	0	1(10%)	0	0	1(10%)
COPD GE	0	0	1(50%)	0	0	0	0	0	2(100%)
COPD HTN	0	0	1(12.5%)	0	0	0	0	0	5(62.5%)
Asthma Thrombocytopenia	0	0	1(50%)	0	0	1(50%)	0	0	1(50%)
COPD CCF DM	0	0	0	0	0	1(20%)	0	0	1(20%)
LRTI HTN DM	0	0	0	0	0	0	0	0	1(25%)
COPD Myasthenia gravis	0	0	0	0	0	0	0	0	0
LRTI Anemia	0	0	0	0	0	0	0	0	0
Asthma with DM IHD	0	0	0	1(33.33%)	0	0	0	0	2(66.66%)
COPD TB	0	0	0	0	0	0	0	0	0
LRTI OA HTN Hyperlipidemia	0	0	0	0	0	1(100%)	0	0	0
COPD hyperthyroidism	0	0	0	0	0	0	0	0	0
LRTI GE	0	0	0	0	0	0	0	0	0

Table 5c: Distribution of the various drugs used in respiratory diseases.

Final diagnosis	Antacid combination	Anti amoebic	O2	Protein supplement	Multi vitamin	L combinations	Mucolytics
LRTI	1(11.11%)	0	3(33.33%)	0	0	0	0
Pneumonia	0	0	1(16.66%)	0	1(16.66%)	1(16.66%)	1(16.66%)
Bronchitis	0	0	0	0	1(100%)	0	0
COPD	1(1.85%)	2(3.70%)	6(11.11)	1(1.85%)	4(7.40%)	0	0
Asthma	0	2(20%)	0	1(10%)	1(10%)	0	0
COPD GE	0	0	0	0	0	0	0
COPD HTN	0	0	1(12.5%)	0	0	0	0
Asthma Thrombocytopenia	0	0	0	0	0	0	0
COPD CCF DM	0	1(20%)	0	0	1(20%)	0	0
LRTI HTN DM	0	1(25%)	1(25%)	0	0	0	0
COPD Myasthenia gravis	0	0	0	0	0	0	0
LRTI Anemia	0	0	0	0	0	0	0
Asthma with DM IHD	0	0	2(66.66%)	0	0	0	1(33.33%)
COPD TB	0	0	0	0	0	0	0
LRTI OA HTN Hyperlipidemia	0	0	0	0	1(100%)	0	0
COPD hyperthyroidism	0	0	0	0	0	0	0
LRTI GE	0	0	0	0	0	0	0

This table shows that in LRTI, the most commonly prescribed drug was proton pump inhibitors (55.55%). Pneumonia the most commonly prescribed drug was proton pump inhibitors (83.33%). Bronchitis, the most commonly prescribed drugs are H2 blockers. In COPD, the most commonly prescribed drug was proton pump inhibitors (74.04%). Asthma, the most commonly prescribed drug was proton pump inhibitors (60%). Patients with COPD with Gastroenteritis the most commonly prescribed drug was proton pump inhibitors (100%) and diuretics (100%). Patients with COPD with Hypertension the most commonly prescribed drug was proton pump inhibitors (87.5%). Patients with Asthma with Thrombocytopenia the most commonly prescribed drug was proton pump inhibitors (100%). Patients with COPD with Diabetes Mellitus and Congestive Cardiac Failure the most commonly prescribed drugs was H2 blockers (60%). Patients with LRTI with Hypertension and Diabetes Mellitus the most commonly prescribed drug was proton pump inhibitors (75%). Patients with COPD with Myasthenia Gravis the most commonly prescribed drug was H2 blockers (100%). Patients with LRTI with Anemia the most commonly prescribed drug was proton pump inhibitors (100%). Patients with Asthma with Diabetes Mellitus with Ischemic Heart Disease the most commonly prescribed drug was diuretics (66.66%). Patients with COPD with Tuberculosis the most commonly prescribed drug was proton pump inhibitors (100%). Patients with LRTI with Osteoarthritis, Hypertension, Hyperlipidemia the most commonly prescribed drug was calcium channel blockers (100%). Patients with COPD with Hypothyroidism the most commonly prescribed drugs was proton pump inhibitors (100%). Patients with LRTI with Gastroenteritis the most commonly prescribed drug was proton pump inhibitors (100%).

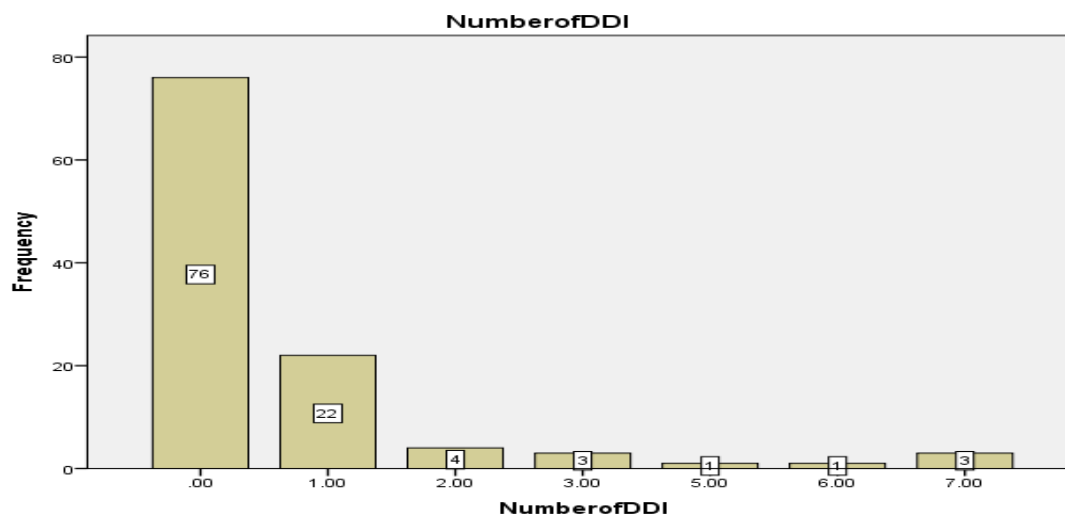


Figure 8: Distribution of the Total Number of DDI.

The results showed that, in 76 cases had no drug interactions, followed by 22 cases having 1 drug interaction.

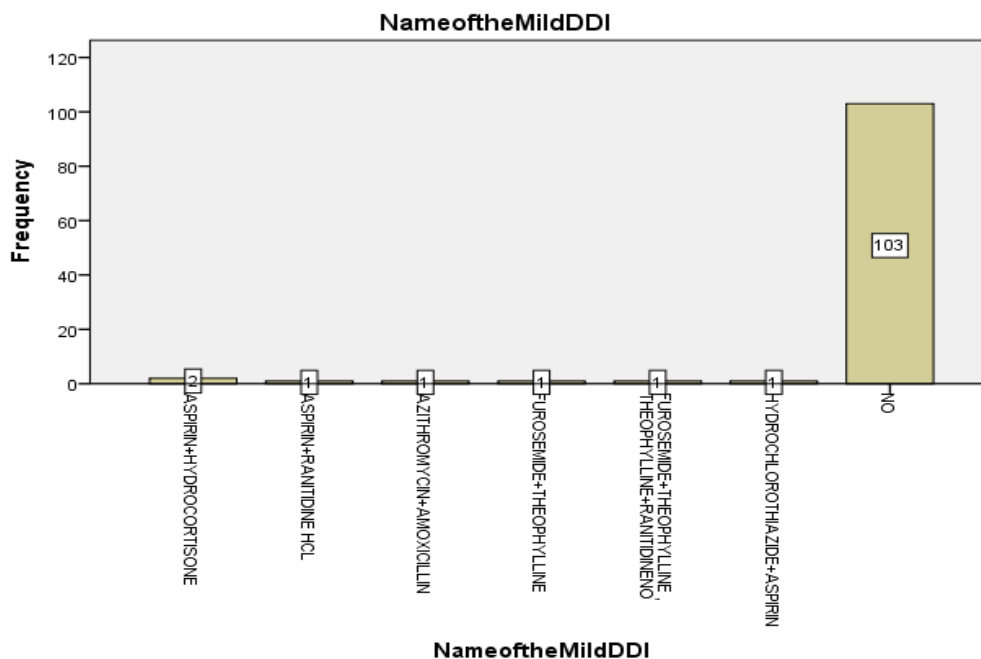


Figure 9: Distribution of the Mild DDI.

This figure showed that, in 103 cases no mild drug interactions. In 2 cases aspirin + Hydrocortisone mild drug interactions were found.

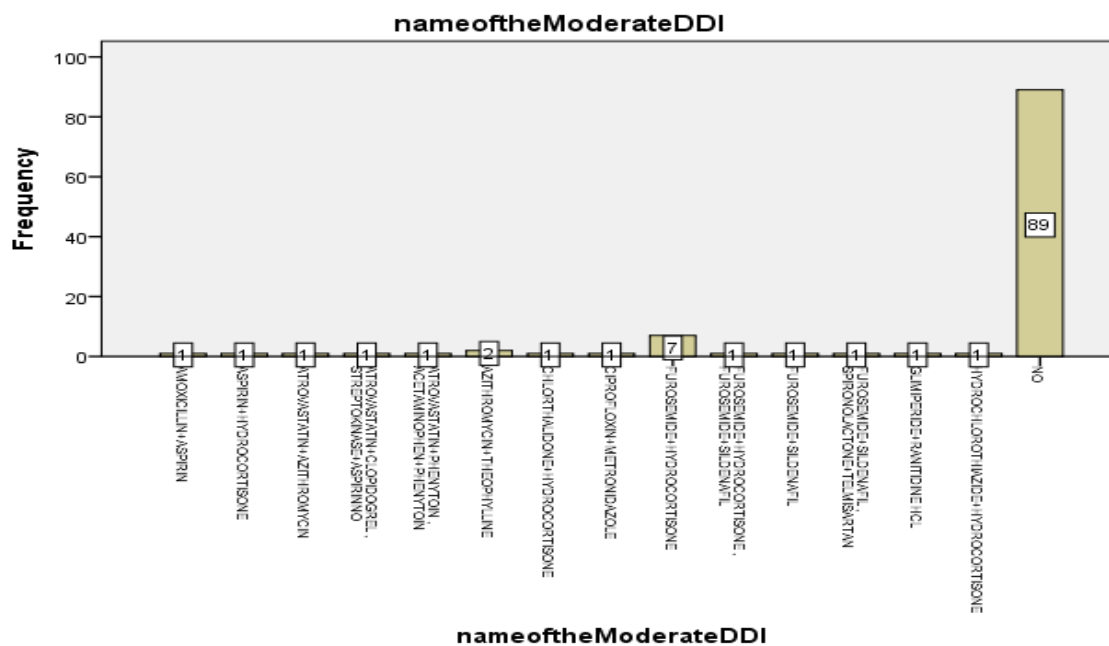


Figure 10: Distribution of the Moderate DDI.

This figure showed that, in 89 cases had no moderate drug interactions. In 7 cases furosemide + hydrocortisone moderate drug interactions were found.

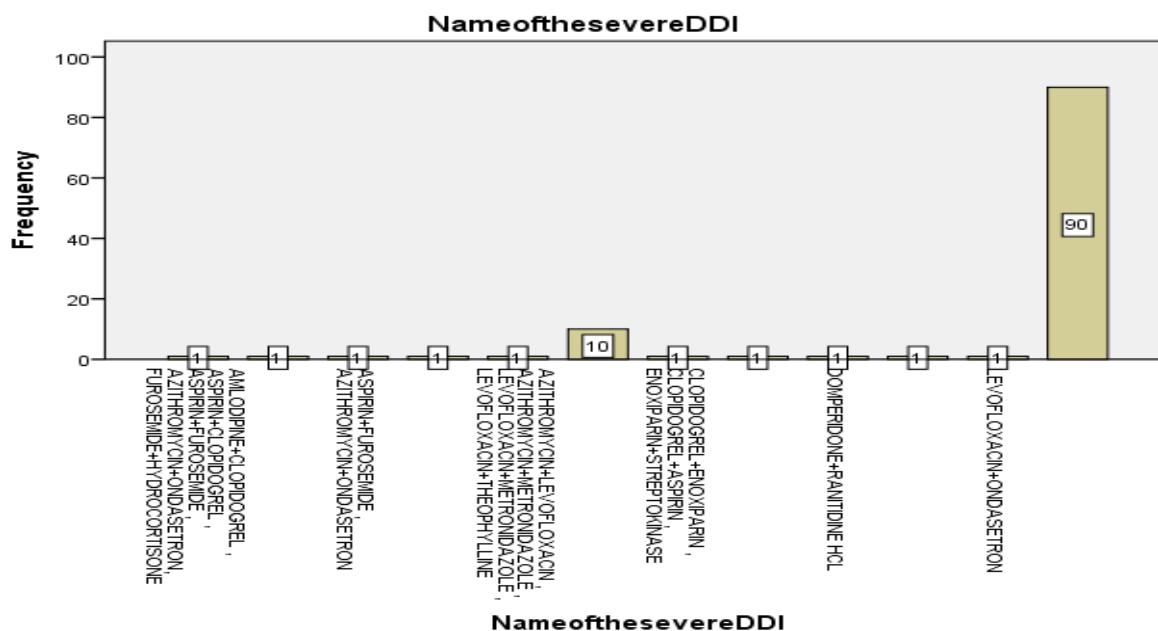


Figure 11: Distribution of the Severe DDI.

This figure showed that, in 100 cases had no severe drug interactions were found. Only 10 cases had severe drug interactions observed in this study.

DISCUSSION

In our study only 1(one) patient was prescribed with Ipratropium bromide +budesonide inhaler. This patient was counseled about how to use the inhaler by the pharmacist, even though the health care team counseled about how to use.

This study provides data on the drug utilization pattern of respiratory tract infections in the medical department inpatients of AH&RC. A total number of 110 were diagnosed with respiratory tract infections and were included in this study.

Distribution of patients based on Age

In our study more respiratory issues were observed at the age of 61-70 years (35.45%) followed by 51-60 years (24.55%) and least were observed at 20-30 years (0.9%) of age., which is close to the study conducted by Ramanath KV et al that showed that more respiratory tract infections were observed in the age group 61-70 years(31.7%) followed by 51-60 years(22.8%) and least was observed in 31-40 years(0.7%).^[1]

Distribution of patients based on sex

In our study more respiratory issues were observed in females (31.82%) and males (68.18%), which is close to the study conducted by Divya Kancherla et al which showed that more respiratory tract issues were observed in males 35(52.20%) and 32(47.70%) in females.^[2]

Distribution of Social habits of the patients

Interestingly our results showed only 3.63 % were alcoholic and 96.36 % were non smokers 22.73% were smokers and 77.27 were non smokers which is close to the study conducted by Battu Rakesh et al, which showed that 53.9% were alcoholic,28.43% were non alcoholic and 17.68% were ex-alcoholics and 48.03% were smokers, 11.76% were non smokers and 40.19% were ex-smokers.^[11]

Distribution of RTI of the patients

Our results showed that 49.1% patients were suffering with COPD, 9.1% were with asthma, 8.2 % were with LRTI, 7.3% were with asthma and COPD, Pneumonia cases were 5.5% and least were bronchitis, LRTI, which is close to the study conducted by Mirza A. Beg et al, which showed that 38.46% patients were diagnosed with COPD, 30.76% were with pulmonary tuberculosis, 16.41% were with bronchial asthma, 8.20% were with pneumonia.^[12]

Distribution of patients based on Number of day's stayed in the hospital

This study showed that mean length of hospital stay was 4.6 ± 1.4 days which is close to the study conducted by Sharonjeet Kau et al, which showed that the average duration of stay of patients was 12.3 days.^[13]

Distribution of clinical outcomes of respiratory tract infections

This study showed that 68.2% were improved and (8.2%) were referred to higher centers and (23.6%) were discharged against medical advice, which is close to the study conducted by Sharonjeet Kaur et al, which showed that outcome was favorable in 84.7% of the patients.^[13]

Distribution of the cost incurred in the respiratory tract infections

Our results showed that the most costly antibiotic was used in LRTI with Hypertension and Diabetes Mellitus (2459.75 ± 1275.55) followed by pneumonia (1715.50 ± 621.88). It was also found that the most costly respiratory drugs was used in Treatment of Asthma with Diabetes

Mellitus with Ischemic Heart disease (995.00±245.76) followed by LRTI with Diabetes Mellitus. It was also found that the most costly treatment was done in treating LRTI with Diabetes Mellitus (3942.25±1587.12) followed by LRTI with Gastroenteritis (3061.000) which is close to the study conducted by Ramanath KV et al, which showed that the mean of average cost of antibiotics per patient was 928.88±2615.267 and the average cost of total medicine per patient was 1819.32.^[1]

Distribution of category of respiratory drugs used in the RTIs

This study showed that in COPD and Asthma the most common prescribed classes of respiratory drugs are Anticholinergics and Corticosteroids (44.44%, 20%), followed by mucolytics (25.92%, 20%), which is close to the study conducted by Battu Rakesh et al, which showed the class of drugs prescribed mostly were Anti cholinergics (78.43%) and Short acting beta-2 agonists (92.15%).^[11]

Distribution of category of antibiotic drugs used in the respiratory tract infections

This study showed that in Pneumonia patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (50%). In bronchitis patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (100%). In Asthma patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (40%), which is similar to the study conducted by Tupukala Karthik Babu et al, which showed that in Pneumonia patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid(1000+200MG) (28%), followed by Cefotaxime and Amikasin (25%). In bronchitis patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid(1000+200MG) (50%), followed by Amoxicillin and clavulanic acid and Amikasin (50%). In Asthma patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (50%), followed by Amoxicillin and Clavulanic acid, Azithromycin and Amikasin.^[14]

This study showed that in LRTI patients the most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG) (55.6%), which is close to the study conducted by Divya Kancheral et al, which showed that the mostly prescribed antibiotics in LRTI was Ceftriaxone(34%), followed by Azithromycin and Levofloxacin (20%).^[2]

Distribution of the Total Number of DDI

The results showed that, in 34 cases(69.09%) having drug interaction which is similar to the study conducted by Pavani Malladi et al, which showed that 8 cases (9.3%) of patients, drug interactions were found.^[15]

In our study only one patient was prescribed with inhaler may be because of the cost parameter in this rural population and knowledge.

CONCLUSION

This study showed that RTIs occurs more in 60-71years old Male patients and most costly antibiotic was used in LRTI with Hypertension and Diabetes Mellitus (2459.75±1275.55) followed by pneumonia (1715.50±621.88). The most costly respiratory drugs was used in Treatment of Asthma with Diabetes Mellitus with Ischemic Heart disease (995.00±245.76) followed by LRTI with Diabetes Mellitus. The most common prescribed classes of respiratory drugs are Anticholinergics (Ipratropium bromide+ salbutamol) and Corticosteroids(hydrocortisone), budesonide followed by mucolytics. The most prescribed antibiotic was a combination of Amoxicillin and Clavulanic acid (1000+200MG), followed by Ceftriaxone (1GM). Other than Antibiotics and respiratory drugs are proton pump inhibitors and diuretics. The results showed that, in 76 cases (69.09%) no drug interactions, in which 21 (19.09%) cases showed Moderate drug interactions. Hence this study concluded that assessment of this type of research will help to understand the trends of drugs and also helps to understand the rational usage of drugs. This study also showed that even tough rationality was observed, but still there is a need of an improvement.

Limitations

- The study was conducted in short period i.e. 9 months, even this study can be extended.
- This study was conducted in only for in-patients not included in an out-patient due to lack of information in out-patients.
- The patients with more than four co morbid diseases were not included in the study.
- Pediatric patients were not involved in the study.

Future directions

- Similar study can be carried out in other department of the study site.

- To Improve the type of specific antibiotic treatment on culture sensitivity test, study is important because wide spread antimicrobial use may increase healthcare costs, increase adverse drug events, and encourage the emergence of antimicrobial resistant organisms.
- Antibiotic resistance pattern studies can be done.
- The DUE study can be conducted for longer period.

CONFLICT OF INTEREST: None.

SOURCE OF FUNDING: Nil.

ACKNOWLEDGEMENT: The authors are thankful to Adichunchangiri shikshnika trust for providing this opportunity to carry out this research work. The authors also thankful to department of general medicine HOD, the entire team and SAC College of pharmacy for cooperating for carry out this study.

REFERENCES

1. Ramanath Kv, Alvin Joe Thomas, Liju Joy, Vipitha Thomas. Assessment Of Drug Utilization Pattern In Asthma, Chronic Obstructive Pulmonary Disease And Pneumonia: In A Rural Tertiary Care Teaching Hospital. *Research Journal Of Pharmaceutical, Biological And Chemical Sciences*, 2016; 7(5): 748-756.
2. Divya Kancherla, Satya Sai M V, Gayathri Devi H Jandseema Sharma. A Study On Prescribing Pattern Of Antibiotics In Respiratory Tract Infections In A Tertiary Care Center. *International Journal Of Recent Scientific Research*, June, 2015; 6(6): 4558-4563.
3. Shaima Rana, Hina shabeer, Rida Abid, Saleha Sadeeqa. Evaluation of inappropriate prescribing trends of antibiotics in upper respiratory tract infections, among outpatients. *International Journal of Current Innovation Research*, November, 2017; 3(11): 504-507.
4. Harish Govind Naik, Chitra C Khanwelkar, Ashwini Kolur, Rohit Desai, Sunil Gidamudi. Drug Utilization Study On Antibiotics Use In Lower Respiratory Tract Infection. *National Journal Of Medical Research*, Oct– Dec, 2013; 3(4): 324-327.
5. Pramil Tiwari, Rajiv Ahlawat, Gaurav Gupta. Prescription Practice In Patients Of Upper Respiratory Tract Infection At A Pediatric Outpatient Clinic In Punjab. *Indian Journal Of Pharmacy Practice*, Apr–Jun, 2014; 7(2): 26-32.
6. 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. *Pharmacy Practice*, Jan-Mar, 2009; 7(1): 29-33.

7. Farhan Ahmad Khan, Sheikh Nizamuddin, Mohammad Tariq Salman. Patterns of prescription of antimicrobial agents in the department of otorhinolaryngology in a tertiary care teaching hospital. *International Research Journal of Pharmacy and Pharmacology*, August, 2011; 1(5): 79-85.
8. Ajit B. Lokare, Jaiprakash B. Ramanand. Drug Utilization Pattern In Upper Respiratory Tract Infection In Outpatient Department Of Government Medical College And C.P.R. Hospital, Kolhapur. *Indian Journal Of Basic And Applied Medical Research*, June, 2016; 5(3): 95–100.
9. K.Ramachandra, Narendranath Sanji, H.S. Somashekar, Abhishek Acharya, Keerthi Sagar J, Susheela Somappa Halemani. Trends in prescribing antimicrobials in an ENT outpatient department of a tertiary care hospital for upper respiratory tract infections. *International Journal of Pharmacology and Clinical Sciences*, April, 2012; 1(1): 15-18.
10. Prasad R Pandit, Vijay Kokanii, Kiran A Bhawe. Prescribing pattern of antimicrobials used for treatment of acute respiratory tract infections in children. *International Journal of Recent Trends in Science And Technology*, 2016; 18(1): 171-175.
11. Battu Rakesh, Jaladi Himaja. Assessment of Prescribing Pattern of Drugs in the Management of Obstructive Lung Diseases and Respiratory Tract Infections. *International Journal of Pharmaceutics & Pharmacology*, 2017; 1(4): 1-17.
12. Mirza A Beg, Shakti B. Dutta, Shalu Bawa, Amanjot Kaur, Subhash Vishal, Upendra Kumar. Prescribing trends in respiratory tract infections in a tertiary care teaching hospital. *International Journal of Research in Medical Sciences*, June, 2017; 5(6): 2588-2591.
13. Sharonjeet Kaur, Kanchan Gupta, Harmesh Singh Bains, Sandeep Kaushal. Prescribing Pattern & Cost-Identification Analysis of Antimicrobial Use in Respiratory Tract Infections, January-March, 2013; 15(1): 19-23.
14. Tupakula Karthik Babu, Dr. B. Sai Vikas, Vishwas A.T.L, Dr. Joga Sasidhar, Vinnakota Saikrishna, Dr. R. Sainath Gupta. Study on antibiotic prescription pattern in lower respiratory tract infections in paediatrics in tertiary care teaching hospital. *European Journal of Pharmaceutical and Medical Research*, 2017; 4(1): 301-307.
15. Pavani Malladi, 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.