

ASSESSMENT OF PRESCRIBING PATTERN OF BRONCHODILATORS FOR PATIENTS WITH RESPIRATORY TRACT INFECTION IN A TERTIARY CARE TEACHING HOSPITALJacob N. Thomas*¹, Harshith A. S.¹, Chandragiri Naveen Kumar Reddy¹ and A. Vikneswari²¹5th Year Pharm.D, Bharathi College of Pharmacy, Bharathinagara, Mandya, Karnataka, India.²Associate Professor, Dept. of Pharmacy Practice, Bharathi College of Pharmacy, Bharathinagara, Mandya, Karnataka, India.***Corresponding Author: A. Vikneswari**

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Article Received on 12/03/2018

Article Revised on 02/04/2018

Article Accepted on 23/04/2018

ABSTRACT

Background: Respiratory disorder such as Asthma, Chronic Obstructive Pulmonary Disease (COPD), and RTI may account for an estimated burden of about 100 million individuals in India. There are limited data on the burden of respiratory disease in India. There is a growing appreciation of the benefits of bronchodilation beyond lung function, such as exacerbations, patient-reported outcomes, exercise tolerance and exercise capacity, and daily activities. **Objectives:** This was a prospective observational study with the aim of analysing the drug prescribing patterns of bronchodilators for patients with RTI in a tertiary care hospital. **Methodology:** The study has been conducted on male and female patients who were satisfying the inclusion criteria. A suitably designed case record form was prepared and used to record all the necessary and relevant data from the medical records of patients. **Result:** A total of 173 patients were analyzed in our study. In that, 22 were LRTI patients, 18 were Pneumonia patients, 7 were Post TB sequel with LRTI, 1 was Pneumonia with TB patient, 1 was LRTI with Pneumonia with COPD and 1 was TB with Asthma patient. Remaining cases belongs to other respiratory disorder. Out of 173 cases 8% were below 30 years, 16% were between 31 to 50 years, 59% were between 51 to 70 years and 17% were above 70 years old. Out of 173 cases, 126 were males and 47 were females. We divided 173 patients based on their smoking habit. 79 patients (46%) were found to be smokers, 55 patients (35%) were non-smokers and 33 patients (19%) were ex-smokers. The most used pattern of bronchodilator therapy is combination therapy of Anticholinergic + Beta 2 sympathomimetic + Methylxanthine (57.80%) followed by Anticholinergic + Beta 2 sympathomimetic (27.74%), Beta 2 sympathomimetics(10.40%) and Beta 2 sympathomimetic + Methylxanthine (4.04%). Most used (97.68%) route of bronchodilator therapy is nebulization (alone or with other routes) followed by intravenous, oral route of administration. **Conclusion:** Pulmonary disorders such as Asthma, COPD, LRTI etc. are prominent causes of death in the world. The majority of patients have intermittent exacerbations of RTI due to the inadequate pattern of drug use.

KEYWORDS: Pulmonary disorder, RTI, Bronchodilator.**INTRODUCTION**

Respiratory tract infection (RTI) refers to any of a number of infectious diseases involving the respiratory tract. An infection of this type is normally further classified as an upper respiratory tract infection (URI or URTI) or a lower respiratory tract infection (LRI or LRTI). Lower respiratory infections, such as pneumonia, tend to be far more serious conditions than upper respiratory infections, such as the common cold. The upper respiratory tract includes the nose, sinuses, pharynx and larynx. Typical infections of the upper respiratory tract include tonsillitis, pharyngitis, laryngitis, sinusitis, otitis media, certain types of influenza, and the common cold.^[1] Symptoms of URTIs can include cough, sore throat, runny nose, nasal congestion, headache, low grade fever, facial pressure

and sneezing. The lower respiratory tract consists of the trachea (wind pipe), bronchial tubes, the bronchioles, and the lungs. Lower respiratory tract infections are generally more serious than upper respiratory infections. LRTIs are the leading cause of death among all infectious diseases.^[2] The two most common LRTIs are bronchitis and pneumonia.^[3] Influenza affects both the upper and lower respiratory tracts, but more dangerous strains such as the highly pernicious H₅N₁ tend to bind to receptors deep in the lungs.^[4]

Bronchodilators are central in the treatment of airways disorders. Bronchodilators work through their direct relaxation effect on airway smooth muscle cells. At present, three major classes of bronchodilators, anticholinergics, muscarinic receptor antagonists, and

xanthines are available and can be used individually or in combination.^[5] The current study was undertaken with the aim to analyze the prescribing pattern of bronchodilator in patients with RTI.

METHODOLOGY

This prospective study was conducted in general medicine department of MIMS, Mandya. All respiratory disorder patients' prescription detail was collected in a specially designed case record form (CRF) for the evaluation of drug prescribing pattern, and major concern was given to RTI patients. The parameters noted were: name of the drug, dosage form, route, frequency and duration of administration, generic/brand name and the number of drugs received by the individual patients during their hospital stay and on discharge.

Records of in-patients aged 18 years or more, both male & female patients, who have diagnosed as respiratory disorder were included in the study. Records of patients under intensive care, patients with tumor & pulmonary embolism were excluded. The study was initiated after getting ethical clearance from Institutional Ethics Committee, MIMS, Mandya. After acquiring the details, we have performed various analysis in the collected data. The analysis was based on patient age, gender, social history, drug prescribing pattern etc.

RESULTS AND DISCUSSION

A total of 173 patients were enrolled in the study based on study criteria. The required details from the patient case sheet were recorded in a suitably designed Case Report Form.

The patients were categorised on the basis of disorder. Out of 173 patients, 91 (52.60%) were COPD patients, 3 (1.79%) were Bronchiectasis patients, 22 (12.71%) were LRTI patients, 18 (10.40%) were Pneumonia patients, 29 (16.76%) were Bronchial Asthma patients, 7 (4.04%) were Post TB sequel with LRTI, 1 (0.57%) was Pneumonia with TB patient, 1 (0.57%) was LRTI with Pneumonia with COPD and 1 (0.57%) was TB with Asthma patient. That means 50 cases out of 173 comes under RTI.

Further the patients were categorised on the basis of age, gender, smoking history and RTI conditions with classes of bronchodilators and routes of their administration used in the treatment. The mean age and standard deviation of the study population was calculated.

Patient distribution based on age

The prescription data of 173 patients were analysed in the current study, out of which 8% were below 30 years, 16% were between 31 to 50 years, 59% were between 51 to 70 years and 17% were above 70 years old.

Table 1: Patient distribution based on age.

Sl. No:	Age groups (years)	Number of patients	Percentage
1	< 30	14	8%
2	31-50	28	16%
3	51-70	101	59%
4	> 70	30	17%

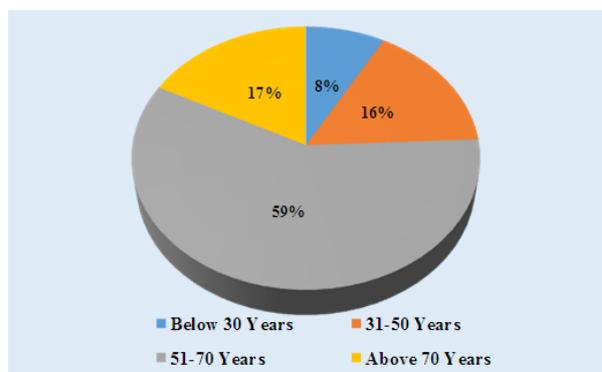


Figure 1: Age groups affected by Respiratory disorders.

Patient distribution based on gender and age

The prescription data of 173 patients were analysed in the current study, out of which 126 were males and 47 were females. The mean age of all patients was found to be 56.36 ± 17.498 years being 57.50 ± 16.305 and 53.26 ± 20.222 years in male and female respectively.

Table 2: Patient distribution based on gender.

Sl. No:	Gender	Number of patients	Mean Age \pm SD (Years)
1	Males	126	57.50 ± 16.305
2	Females	47	53.26 ± 20.222
3	Total	173	56.36 ± 17.498

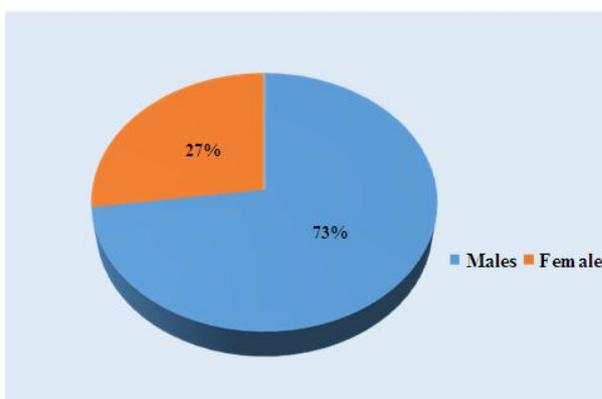


Figure 2: Gender wise distribution in Respiratory disorders.

Patient distribution based on smoking history

We divided 173 patients based on their smoking habit. 79 patients (46%) were found to be smokers, 55 patients (35%) were non-smokers and 33 patients (19%) were ex-smokers.

Table 3: Patient distribution based on smoking history.

Sl. No:	Smoking habit	Number of patients	Percentage
1	Non smokers	61	35%
2	Smokers	79	46%
3	Ex- Smokers	33	19%

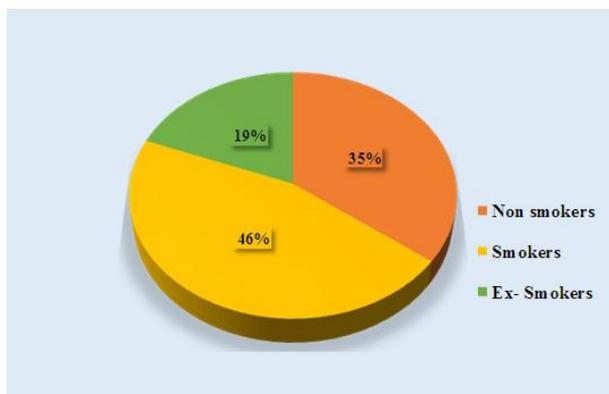


Figure 3: Patient distribution based on smoking history.

OBSERVED DRUG USE PATTERN IN RTI

Observed drug use pattern in LRTI

Out of 173 patients enrolled in the study based on study criteria, 22 patients were found to be suffering from LRTI.

Commonly prescribed bronchodilators by class in LRTI

Among 22 prescriptions, it has been seen that prescriptions contained mono and combination bronchodilator therapy. In which 4 of the prescriptions belong to mono bronchodilator therapy and 18 of the prescriptions belongs to combination bronchodilator therapy.

Among LRTI patients the class of bronchodilators observed, combination therapy of Anticholinergics + Beta 2 sympathomimetics were mostly prescribed (40.90%), followed by combination of Anticholinergics + Beta 2 sympathomimetics + Methylxanthines (31.81%), combination of Beta 2 sympathomimetics + Methylxanthines (9.09%) and mono bronchodilator therapy of Beta 2 sympathomimetics (18.18%) were prescribed along with corticosteroids, antibiotics and other relevant drugs according to symptoms.

Table 4: Commonly prescribed bronchodilators by class in LRTI patients.

Class of Bronchodilator	Number of patients	Percentage
Anticholinergics + Beta 2 sympathomimetics + Methylxanthines	7	31.81%
Anticholinergics + Beta 2 sympathomimetics	9	40.90%
Beta 2 sympathomimetics + Methylxanthines	2	9.09%
Beta 2 sympathomimetics	4	18.18%

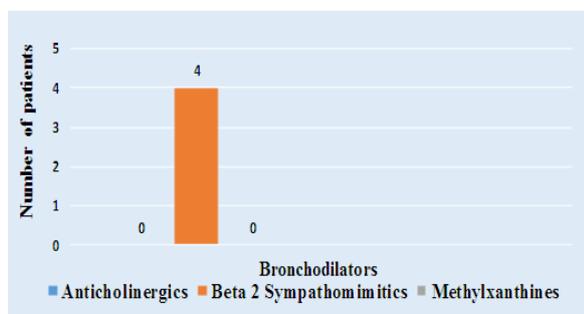


Figure 4: Bronchodilator therapy in LRTI (Mono drug therapy).

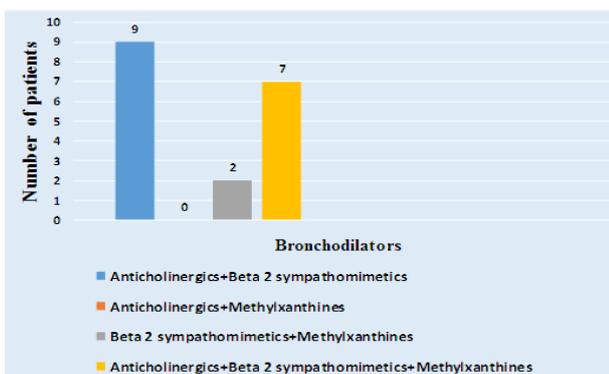


Figure 5: Bronchodilator therapy in LRTI (Combination drug therapy).

Commonly prescribed bronchodilators by route in LRTI

Among 22 prescriptions, it has been seen that prescriptions contained different routes of bronchodilator therapy. In which 3 of the prescriptions (13.63%) contained nebulization + intravenous route, 3 of the prescriptions (13.63%) contained oral + nebulization + intravenous route, 7 of the prescriptions (31.81%) contained oral + nebulization route, 2 of the prescriptions (9.09%) contained oral + intravenous route and 7 of the prescriptions (31.81%) contained nebulization route only. Among 22 prescriptions with LRTI 2 patients (9%) were prescribed rotacaps.

Table 5: Commonly prescribed bronchodilators by Route in LRTI patients.

Route of Bronchodilators	Number of patients	Percentage
Nebulization	7	31.81%
Oral + Nebulization	7	31.81%
Oral + Intravenous	2	9.09%
Nebulization + Intravenous	3	13.63%
Oral + Nebulization + Intravenous	3	13.63%

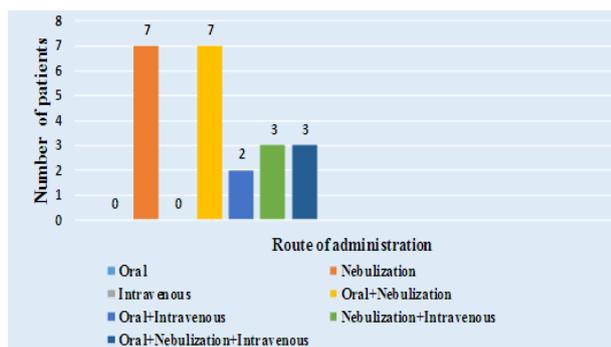


Figure 6: Commonly prescribed bronchodilators by Route in LRTI patients.

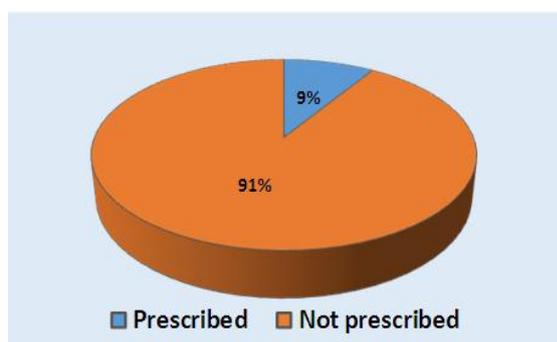


Figure 7: Commonly prescribed bronchodilators by Rotacaps in LRTI patients.

Table 6: Commonly prescribed bronchodilators by class in Pneumonia patients.

Class of Bronchodilator	Number of patients	Percentage
Anticholinergics + Beta 2 sympathomimetics + Methylxanthines	2	11.11%
Anticholinergics + Beta 2 sympathomimetics	8	44.44%
Beta 2 sympathomimetics	8	44.44%

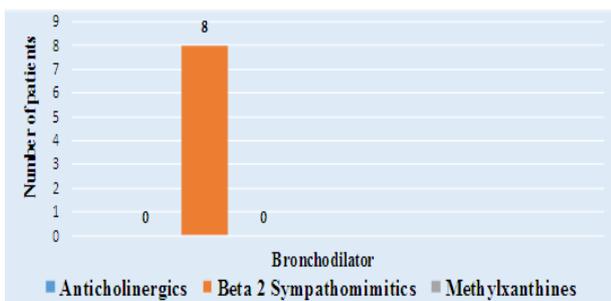


Figure 8: Bronchodilator therapy in Pneumonia (Mono drug therapy).

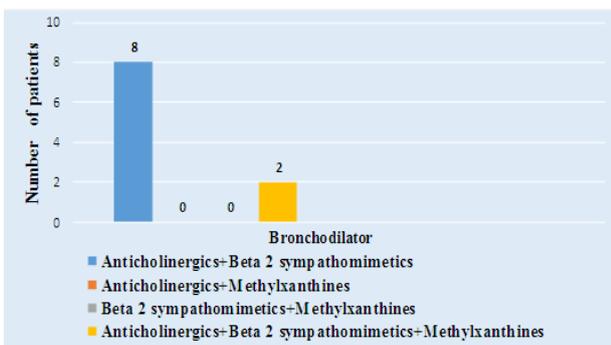


Figure 9: Bronchodilator therapy in Pneumonia (Combination drug therapy).

Observed drug use pattern in Pneumonia

Out of 173 patients enrolled in the study based on study criteria, 18 patients were found to be suffering from Pneumonia.

Commonly prescribed bronchodilators by class in Pneumonia

Among 18 prescriptions, it has been seen that prescriptions contained mono and combination bronchodilator therapy. In which 8 of the prescriptions belong to mono bronchodilator therapy and 10 of the prescriptions belongs to combination bronchodilator therapy.

Among pneumonia patients the class of bronchodilators observed, combination therapy of Anticholinergics + Beta 2 sympathomimetics + Methylxanthines were mostly prescribed (11.11%), followed by combination of Anticholinergics + Beta 2 sympathomimetics (44.44%), and mono bronchodilator therapy of Beta 2 sympathomimetics (44.44%) were prescribed along with corticosteroids, antibiotics and other relevant drugs according to symptoms.

Commonly prescribed bronchodilators by route in pneumonia patients

Among 18 prescriptions, it has been seen that prescriptions contained different routes of bronchodilator therapy. In which 4 of the prescriptions (22.22%) contained nebulization + intravenous route, 13 of the prescriptions (72.22%) contained oral + nebulization route, and 1 of the prescriptions (5.55%) contained nebulization route only.

Among 18 prescriptions with LRTI 2 patients (11.11%) were prescribed rotacaps.

Table 7: Commonly prescribed bronchodilators by route in Pneumonia patients.

Route of Bronchodilators	Number of patients	Percentage
Nebulization + intravenous	4	22.22%
Oral + nebulization	13	72.22%
Nebulization	1	5.55%

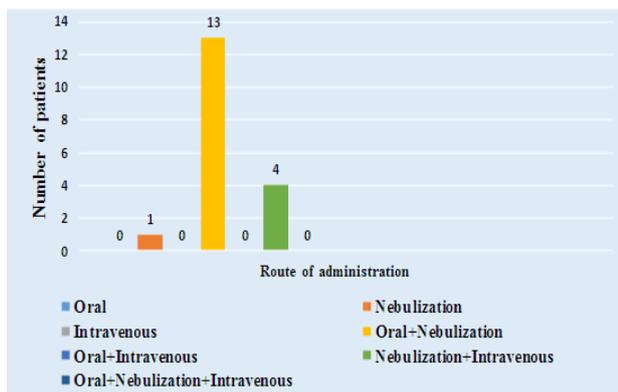


Figure 10: Commonly prescribed bronchodilators by Route in Pneumonia patients.

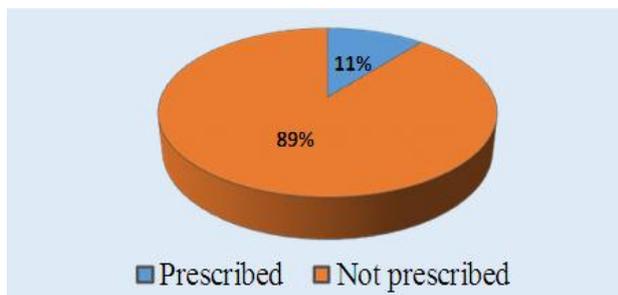


Figure 11: Commonly prescribed bronchodilators by Rotacaps in Pneumonia patients.

Table 8: Commonly prescribed bronchodilators by class in patients with Post TB sequela and LRTI.

Class of Bronchodilator	Number of patients	Percentage
Anticholinergics + Beta 2 sympathomimetics + Methylxanthines	3	42.85%
Anticholinergics + Beta 2 sympathomimetics	3	42.85%
Beta 2 sympathomimetics	1	14.28%

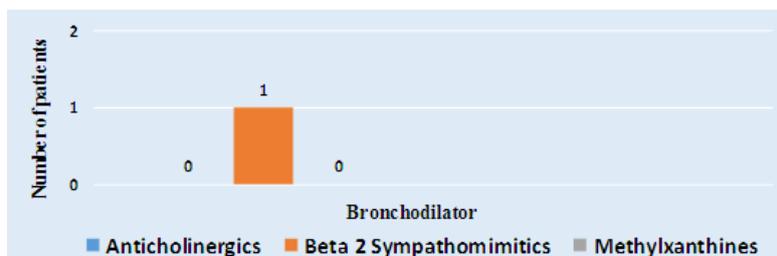


Figure 12: Bronchodilator therapy in Post TB sequela with LRTI (Mono drug therapy).

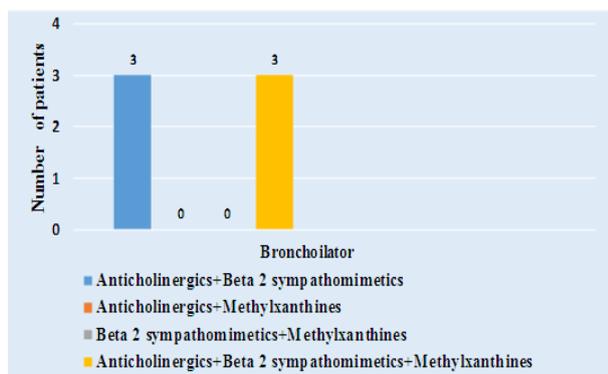


Figure 13: Bronchodilator therapy in Post TB sequela with LRTI (Combination drug therapy).

Observed drug use pattern in post TB sequela with LRTI

Out of 173 patients enrolled in the study based on study criteria, 7 patients were found to be suffering from Post TB sequela with LRTI. It has been seen that prescriptions contained mono and combination bronchodilator therapy. In which 1 of the prescriptions belong to mono bronchodilator therapy and 6 of the prescriptions belongs to combination bronchodilator therapy.

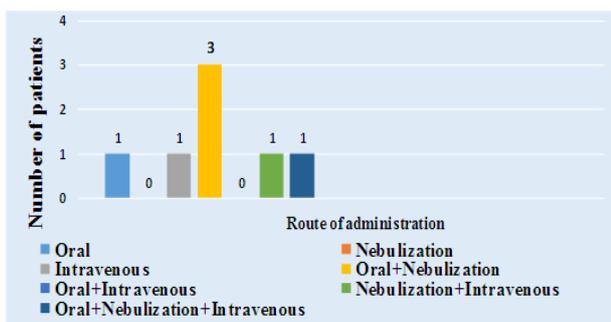
Among Post TB sequela with LRTI patients the class of bronchodilators observed, combination therapy of Anticholinergics + Beta 2 sympathomimetics + Methylxanthines were prescribed (42.85%), followed by combination of Anticholinergics + Beta 2 sympathomimetics (42.85%) and mono bronchodilator therapy of Beta 2 sympathomimetics (14.28%) were prescribed along with corticosteroids, antibiotics and other relevant drugs according to symptoms.

Commonly prescribed bronchodilators by route in Post TB sequela with LRTI

Among 7 prescriptions, it has been seen that prescriptions contained different routes of bronchodilator therapy. In which 1 of the prescriptions (14.28%) contained nebulization + intravenous route, 1 of the prescriptions (14.28%) contained oral + nebulization + intravenous route, 3 of the prescriptions (42.85%) contained oral + nebulization route, 1 of the prescriptions (14.28%) contained Intravenous route only and 1 of the prescriptions (14.28%) contained oral route only.

Table 9: Commonly prescribed bronchodilators by Route in Post TB sequela with LRTI patients.

Route of Bronchodilators	Number of patients	Percentage
Nebulization + intravenous	1	14.28%
Oral + nebulization + intravenous	1	14.28%
Oral + nebulization	3	42.85%
Intravenous	1	14.28%
Oral	1	14.28%

**Figure 14: Commonly prescribed bronchodilators by Route.****Observed drug use pattern in pneumonia with TB**

Out of 173 patients enrolled in the study based on study criteria, 1 patient was found to be suffering from Pneumonia with TB. For that patient, combination therapy of bronchodilators was prescribed, which contains anticholinergic, beta 2 sympathomimetic and methylxanthine. Beta 2 sympathomimetic was given by oral route, anticholinergic + beta 2 sympathomimetic by nebulisation and methylxanthine by intravenous route of administration along with corticosteroids, antibiotics and other relevant drugs according to symptoms.

Observed drug use pattern in LRTI with pneumonia with COPD

Out of 173 patients enrolled in the study based on study criteria, 1 patient was found to be suffering from LRTI with Pneumonia with COPD. For that patient Beta 2 sympathomimetics was used alone by both oral and nebulisation routes of administration along with corticosteroids, antibiotics and other relevant drugs according to symptoms.

Observed drug use pattern in TB with bronchial asthma

Out of 173 patients enrolled in the study based on study criteria, 1 patient was found to be suffering from TB with Bronchial Asthma. For that patient, combination therapy of bronchodilators was prescribed, which contains anticholinergic, beta 2 sympathomimetic and methylxanthine. Beta 2 sympathomimetic was given by oral route, anticholinergic + beta 2 sympathomimetic by nebulisation and methylxanthine by intravenous route of administration along with corticosteroids, antibiotics and other relevant drugs according to symptoms.

SUMMARY

A total of 173 patients were analyzed in our study. Out of that 126 were males and 47 were females. Studies of Prasad *et al.*,^[6] and Maqusood *et al.*,^[7] showed similar results (more male patients). Out of 173 patients, 22 were LRTI patients, 18 were Pneumonia patients, 7 were Post TB sequel with LRTI, 1 was Pneumonia with TB patient, 1 was LRTI with Pneumonia with COPD and 1 was TB with Asthma patient. The patients were categorised according to their age and gender. The maximum numbers of patients are found in range of 51-70 years and minimum numbers of patients are found in below 30 years category.

The patients were categorised on the basis of their smoking history. 46% of patients were found to be smokers, 35% of patients were non-smokers and 19% were ex-smokers. A study conducted by Maqusood *et al.*,^[7] showed similar result. According to the results, most of the patients suffered from pulmonary disorder were prescribed with multi bronchodilator therapy. Almost all the patients (97.68%) were prescribed with nebulization route of administration alone or with other routes. Maqusood *et al.*,^[7] and Laxminarayana Kamath *et al.*,^[8] showed similar results in their studies. We observed most of the patients suffered from LRTI were prescribed with multi bronchodilator therapy. Almost all the patients (97.68%) were prescribed with nebulization route of administration alone or with other routes.

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