Original Research Article

Drug Utilization Pattern for Respiratory Diseases at a Tertiary Care Hospital: Cross- Sectional Observational Study

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Abstract

Background: A prescription-based survey about drug utilization pattern is considered to be one of the effective methods to assess and evaluate the prescribing attitude of physicians with the aim to improve rational drug use. The incidence of respiratory diseases is increasing and in almost all the respiratory diseases treatment with more than one class of drug and more than one route of administration is necessitated as many patients seek immediate symptomatic relief. All these factors affect the drug prescribing habit of physicians in the pulmonary medicine department. With this view, this study was conducted with the objectives of studying the type of pulmonary diseases and drug prescribing pattern by prescription analysis.

Materials and Methods: 200 outpatients and inpatients irrespective of the diagnosis attending the pulmonary medicine department of Trichy SRM Medical College Hospital & Research centre. Relevant demographic data and data regarding diagnosis and treatment was collected after informed written consent.

Results: The common diagnosis were acute exacerbation of chronic obstructive pulmonary disease (40.5%), followed by lower respiratory tract infections (LRTIs) (28%), acute exacerbation of bronchial asthma (16%) and Pulmonary Tuberculosis (7%). The common drugs prescribed were β-agonists in inhalation form (73%) followed by methyl xanthine (used in 70% of prescriptions) and antibiotics (64.5%). Among antibiotics, co-amoxiclav was the most commonly used (48.1% of antibiotics) followed by macrolides in 28.7%.

Conclusion: In spite of rational drug use in the current study, following standard institution-based antibiotic prescribing guidelines and other standard guidelines will help in standardizing treatment plans and prescriptions. It is recommended that the microbiological spectrum of respiratory infections be determined so as to define antibiotic treatment protocol specific for the institution.

Keywords: Drug Utilization Pattern, Pulmonary Medicine, Drug use in COPD, Bronchial asthma.

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Introduction

A prescription-based survey about drug utilization pattern is considered to be one of the effective methods to assess and evaluate the prescribing attitude of physicians and prescription based drug utilization studies are more meaningful to observe the prescribing attitude of physicians with the aim to provide drugs rationally.

Drug utilization research is defined by the World Health Organization (WHO) as "The marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences" [1]. Drug utilization research studies provide evidence for guiding policy decisions at various health institutions [2]. The incidence of respiratory diseases are increasing globally with the parallel increase in world population, pollution, urbanization, overcrowding, global warming and climate change besides the increasing habit of smoking.

The incidence of lower respiratory tract infections (LRTIs) are high and include community acquired pneumonia, exacerbations of chronic bronchitis, acute bronchitis, and viral lower respiratory tract infections [3-5]. Besides the prevalence of pulmonary tuberculosis and multi-drug resistant

pulmonary TB is also increasing. Furthermore, the incidence and prevalence of chronic obstructive pulmonary disease (COPD) characterized by irreversible airflow obstruction is also on the rise.

COPD is the fourth leading cause of death worldwide and is estimated to be the third leading cause of death by 2020 [6]. COPD is often underdiagnosed and repeatedly misdiagnosed which is a cause of concern. The treatment of acute exacerbation of COPD is multi-modal and it includes treatment with oxygen (in hypoxemic patients), inhaled β-agonists, inhaled anticholinergics, antibiotics and systemic corticosteroids. Methylxanthine therapy also is considered in patients who do not respond to other bronchodilators.

Not only in COPD, in almost all the respiratory diseases necessitated treatment with more than one class of drug and in a more than one route of administration. Also many patients seek immediate symptomatic relief. All these factors affect the drug prescribing habit of physicians in the pulmonary medicine department.

Though many drug utilization studies are done in India, only a handful through insight into drug prescribing practices in respiratory diseases. Hence, with this background, this study was conducted with the objectives of studying the type of pulmonary diseases, drug prescribing pattern by prescription analysis among the patients attending the pulmonary medicine department of a tertiary care hospital.

Materials and Methods

This cross-sectional observational study was conducted for a duration of eight weeks among the out-patients attending the pulmonary medicine department in Trichy SRM Medical College Hospital & Research centre (SRM Groups) located in Irungalur, Tiruchirappalli. The protocol of the study was approved by the Institutional Ethical committee of Trichy SRM Medical College Hospital & Research centre. 200 patients of both sex, aged between 20 to 60 years and both in-patients and out-patients irrespective of the diagnosis were included in the study. Informed written consent was taken from all the patients after explaining the purpose of the study.

Demographic data such as age and gender was collected besides data regarding the diagnosis of the patient, details of drugs used, dose, form, route, and outcome of the patients were collected. From the collected data, prescribing pattern was analysed for studying type and class of drugs prescribed, their route of administration and percentage of prescriptions with an antibiotics. All the data were entered to Microsoft Excel 2010 and then the spreadsheets were used for statistical analysis in the SPSS version 17.0. Continuous variables were described as mean with standard deviation and data regarding categorical variables were expressed in frequency and percentage.

Results

A total of 200 patients who visited the pulmonary medicine department during the study period were analysed. The mean (± S.D) age of the study subjects was 49.2 (± 10.1) years ranging from 20 years to 60 years. About 112 subjects (56%) were males and 88 subjects were females (44%) (Table 1).

Table 1: Demographic parameters of study subjects (n=200)

Parameter	Current study
Age in years (± S.D)	49.2 (± 10.1) years
Minimum age	20 years
Maximum age	60 years
Males	112 (56%)
Females	88 (44%)

More than one-third of the subjects (35.5%) were in the 51 to 60 years age group and nearly one-third of the subjects (31.5%) were in the 41 to 50 years age group. Only 12% were in the 20 to 30 years age group while 21% were in 31 to 40 years age group (Table 2 and Fig 1).

Table 2: Age distribution of study subjects (n=200)

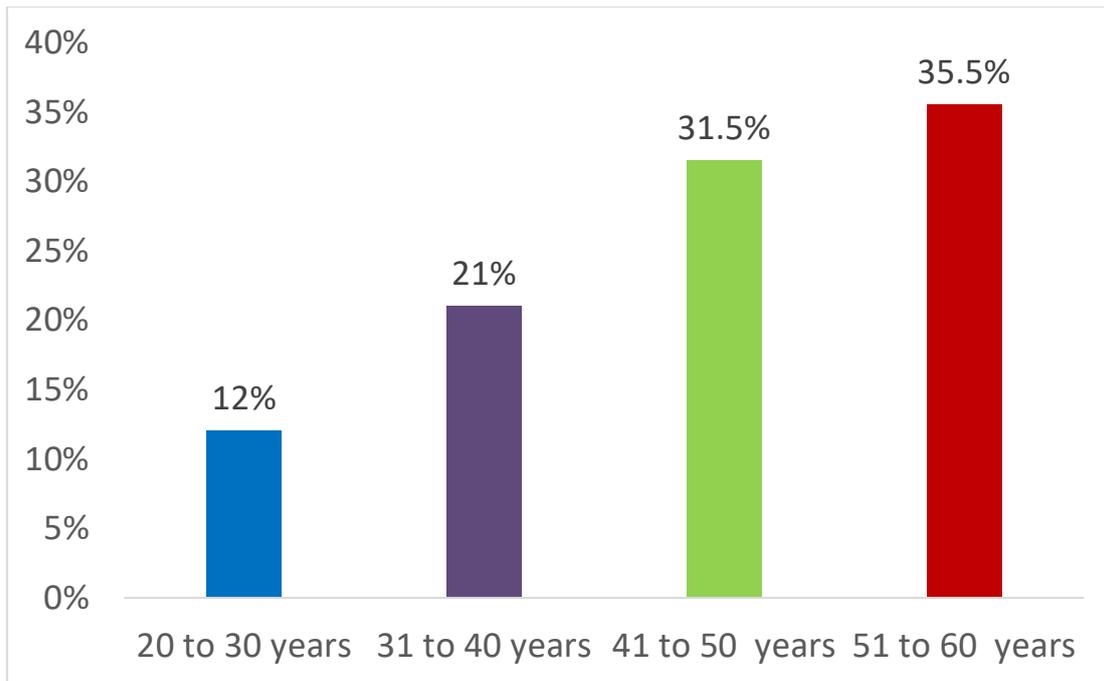| Age group	N	%
20 to 30 years	24	12%
31 to 40 years	42	21%
41 to 50 years	63	31.5%
51 to 60 years	71	35.5%
Total	200	100%

Figure 1: Age distribution of study subjects (n=200)

Table 3: Distribution of study subjects according to diagnosis (n=200)

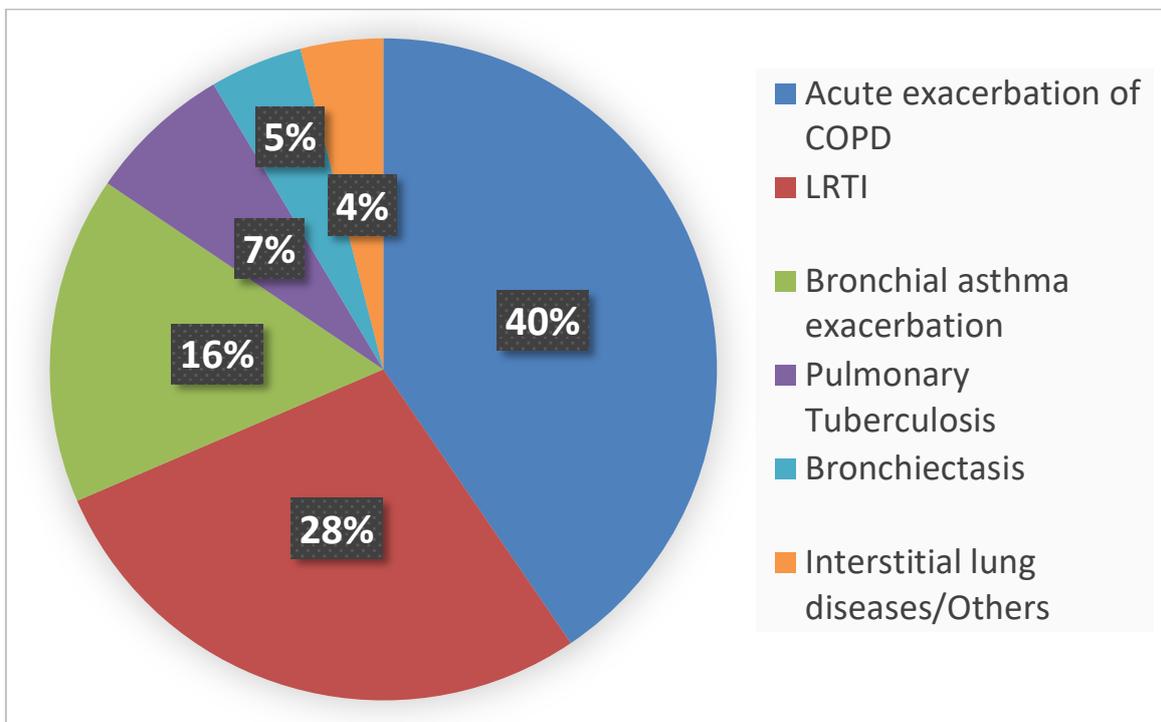| Diagnosis	N	%
Acute exacerbation of COPD	81	40.5 %
LRTI	56	28%
Bronchial asthma exacerbation	32	16%
Pulmonary Tuberculosis	14	7%
Bronchiectasis	9	4.5%
Interstitial lung diseases	8	4%
Total	200	100%

Figure 2: Pie chart on distribution of diagnosis (n=200)

The common diagnosis were acute exacerbation of chronic obstructive pulmonary disease (40.5%), followed by lower respiratory tract infections (LRTIs) (28%), acute exacerbation of bronchial asthma (16%) and Pulmonary Tuberculosis (7%) (Table 3 & Fig 2).

Table 4: Drug prescription pattern (n=200)

Drug group	Drugs used	Number of prescriptions	Percentage
β-agonist (inhalation)	Salbutamol, Formoterol	146	73 %
β-agonist (oral)	Salbutamol	119	59.5 %
Anticholinergic (inhalation)	Ipratropium	124	62 %
Methyl xanthines (oral and I.V)	Theophylline, deriphylline (hydroxyethyl theophylline) Doxophylline, Acebrophylline	140	70 %
Steroid (parenteral)	Hydrocortisone, prednisolone	51	25.5 %
Steroid (inhaler)	Budesonide	63	31.5 %
Antibiotics (see Table 5)		129	64.5 %
ATT		14	7 %
Mucolytics (ambroxol)		120	60 %

The common drugs prescribed were β-agonists in inhalation form (73%) followed by Methylxanthines (used in 70% of prescriptions) and antibiotics (64.5%   as mentioned in Table 4 and co-amoxiclav was the most commonly used (48.1% of antibiotics) followed by macrolides in 28.7% as mentioned in Table 5.

Table 5: Antibiotics prescription pattern (n=129)

Drug group	Drugs used	Number of prescriptions	Percentage
β-Lactams	Amoxicillin	20	15.5
	Co-amoxiclav	62	48.1
	Cephalosporins	30	23.3
Macrolides	Azithromycin, Erythromycin	37	28.7
Quinolones	Levofloxacin	11	8.5
Others	Clarithromycin	6	4.7
Number of antibiotics			
1		92	71.3 %
2		37	28.7 %

Discussion

In the current study, the drug utilization pattern in the pulmonary medicine department at a tertiary care hospital was studied using prescription analysis and a total of 200 patients were analysed. Males were 56% in comparison to 44% of females. The male preponderance as observed in the current study was also reported in other studies such as Beg MA et al [7], Kumar S et al [8], and Veettil et al [9].

Also, in the present study more than two-third of the patients were above 40 years and below 60 years and is the most commonly affected age group of patients. This is similar to the finding of 43.8% patients above 45 years as observed by Beg MA et al [7]. But, Veettil et al [9] observed that the mean age was around 66 years in their study subjects affected with COPD.

The most common diagnosis was acute exacerbation of chronic obstructive pulmonary disease (40.5%), followed by lower respiratory tract infections (LRTIs) (28%), acute exacerbation of bronchial asthma (16%) and Pulmonary Tuberculosis (7%). Bronchiectasis and Interstitial

lung diseases were present in 4.5% and 4%, respectively. According to Beg MA et al [8], 38.46% of patients were diagnosed with chronic obstructive pulmonary disease (COPD) and 16.4% were suffering from acute exacerbation of bronchial asthma which is similar to current study findings of 40.5% and 16%, respectively. Beg MA et al [8] noted that the prevalence of pulmonary tuberculosis was 30.76% which is much higher than 7% as observed in the present study and LRTI was observed in 8.2% in comparison to 28% in the current study. The study results are also comparable to that of Gupta CN et al [10] as they observed that 40 % of patients had COPD, bronchial asthma in 27.5% of cases, and pneumonia in 10% cases.

Among the drugs used in the current study, β-agonists such as Salbutamol and Formoterol in inhalation form (73%) were the most commonly prescribed agents as they provide immediate symptomatic relief to all patients with broncho-constriction. This was followed by Methylxanthines, used in 70% of prescriptions as it provides long-lasting broncho-dilatation in patients

with COPD as they improve lung capacity and diaphragmatic contractility.

Antibiotics were used in 64.5% excluding ATT use for TB patients in 7% (Table 4). Among antibiotics, co-amoxiclav was the most commonly used (48.1% of antibiotics) followed by Macrolides in 28.7% and oral cephalosporins in 23.3%. More than one antibiotic was used in 28.7% of subjects. The use of these antibiotics can be justified by the fact that gram positive cocci, H.influenza and gram negative bacilli are common respiratory infections. Antibiotics by effectively controlling infection, also reduces the duration of illness and reduces the disease burden and flare-ups.

Inhaled steroids such as budesonide was used in 31.5% usually in combination with inhaled β-agonist to reduce the airway inflammation in both COPD and bronchial asthma as it has little systemic side-effects. Also parenteral corticosteroids such as Hydrocortisone and prednisolone was used in 25.5% of which many were in-patients to achieve higher degree of reduction in airway inflammation. Mucolytic agents such as ambroxol was used in 60% of the patients as they help in liquefying the thickened sputum and improving the airway clearance.

According to Beg MA et al [8], 56.56% were prescribed antibiotics, 13.8 % were prescribed bronchodilators and 12.93% were given corticosteroids. But Veettil et al [9] studied the drug usage in COPD subjects and observed that β-agonist (inhaler) was used in 97.5% while β-agonist (oral) was used in 55.8%, Methylxanthines was taken by all COPD patients (100%) and parenteral steroids were used in 72.5%. All these findings are comparable to that of the present study findings.

Though the drug prescription being rational, it is ideal for the prescribers to have standard antibiotic prescribing guidelines and follow standard guidelines such as GOLD criteria for COPD management by making them available at the study site.

Conclusion

The drug prescribing practices in the current study are justified according to the physician's preference in prevailing disease conditions, drug availability, and drug-costs. In spite of such rational use, following standard antibiotic prescribing guidelines and other standard guidelines will help in standardizing treatment plans and prescriptions. It

is also recommended that the microbiological spectrum of LRTI/COPD and bronchial asthma exacerbation be determined by various investigational studies, so as to define antibiotic treatment protocol specific for the institution.

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