ORIGINAL ARTICLE

A Cross-Sectional Study on Prescribing Patterns on Patients Suffering from Respiratory Disorders in a Teaching Hospital of South India

Aleemuddin NM[1], Farahbahmed [2], Mohammed Shakeel Mohammed Bashir[3], Aamir Ali[4], Salma Khatoon[5], Md Mohib Hussain[6], Afshan Khatoon[7]

[1] *Associate Professor of Pulmonology, Deccan college of Medical Sciences*
[2] *Assistant Professor of Physiology, Deccan college of Medical Sciences*
[3] *Associate Professor of Pharmacology, RIMS Adilabad*
[4] *Assistant Professor of Pharmacy, Deccan School of Pharmacy*
[5] *Tutor in Pulmonology, Deccan college of Medical Sciences*
[6] *Postgraduate in Anaesthesia, Deccan college of Medical Sciences*
[7] *Tutor in Pulmonology Deccan college of Medical Science*

http://dx.doi.org/10.18049/jcmad/213

Abstract

Objectives: *Drug utilization evaluation can be used for the description of drug use pattern; early signals of irrational use of drugs; interventions to improve drug use; quality control cycle; continuous quality improvement. Hence the present study was planned to know the prescription pattern of patients suffering from respiratory disorders in a teaching hospital of south India.* ***Material and Methods:*** *A total of 152 cases from tuberculosis and chest department of Deccan College of Medical Sciences, Hyderabad, India suffering from respiratory disorders were studied for demographic details and prescription pattern.* ***Results:*** *Mean age was 55.5 years. Commonest diagnosis was chronic obstructive pulmonary disease (COPD) - 57.2%. 21.7% patients had co-morbidity mainly diabetes and cardiovascular disorders. A total of 2246 drugs prescribed with an average of 14.78. Almost 75% formulations were oral and parental. Combination of Ipratropium bromide, Salbutamol and Budesonide was the most common prescribed drug. Other common drugs were Methylxanthenes, Montelukast & Antihistamine Combination, Pentaprazole and Amoxicillin-Clavulanic acid combination. In antibiotics, penicillin (97 drugs, 40.9%) was most common dug followed by cephalosporin (68 drugs, 28.7%) and floroquinolone (26 drugs, 11%) and in corticosteroids Budesonide was the commonest prescribed drug (144 drugs, 56.5%).* ***Conclusion:*** *Average number of drugs per prescription should be reduced and special programs should be initiated to reduce number of COPD.*

Key words: *Drugs, Prescription pattern, Respiratory disorders*

Address for correspondence: *Dr. Aleemuddin NM, Residential address, 20-6-530 Shahlibunda Hyderabad 500065 Andhrapradesh India. Mobile Number: 09949671249, Email: aleem95@yahoo.com*

Introduction

Drug utilization research is an essential part of pharmacoepidemiology as it describes the extent, nature and determinants of drug exposure. Drug utilization evaluation can be used for the description of drug use pattern; early signals of irrational use of drugs; interventions to improve drug use; quality control cycle; continuous quality improvement. The principal aim of drug utilization research is to facilitate the rational use of drugs in populations. Drug utilization research can be used to compare the observed patterns of drug use for the treatment of a certain disease with current recommendations or guidelines. [1]

Respiratory tract infections are a major health problem in developing countries. Infection of the respiratory tract is the most frequent and important cause of short-term illness in the population. Respiratory tract infections occur more frequently than they are reported and are

often thought of as inconveniences of life that will pass away quickly; however, they are responsible for more days of bed disability, restricted activity and lost time from work and school than any other category of reported acute illness in the United States. An estimated 2.2 million people worldwide, die yearly because of acute respiratory infections. [2] Acute respiratory infections (ARI) contribute to more than 75 per cent of health care seeking in primary health care facilities. Majority of ARIs are of viral etiology, but prescribing antimicrobials for these illnesses is a common phenomenon. Because of the commonness of the problem, antimicrobial therapy for ARIs is a major predictor for the spread of resistant strains of microbes in the community. [3] Incorrect antibiotic prescribing exposes patients to the risk of side effects with little therapeutic benefit. It may encourage the emergence of drug resistance which has increased dramatically across a wide range of important antimicrobial chemotherapeutic groups including those used to treat tuberculosis (TB). [4]

Current evidence indicates that both developed and developing countries are experiencing inappropriate and unnecessary use of different drugs in their health care facilities. Despite the importance of this problem, limited information exists in the field, in particular regarding the respiratory medication prescription pattern. [5]

Materials and Methods

A total of 152 cases were enrolled for the study in which 77 (50.7%) were males and 75 (49.3%) were females. Age range of the patients was in between 19 years to 90 years. 3 (2.0%) patients died during the study period. The cross sectional study was conducted in inpatients at tuberculosis and chest department of Deccan College of Medical Sciences, Hyderabad, India. Study period was from January 2012 to June 2013. Cases with respiratory disorders including bronchial asthma, chronic obstructive pulmonary diseases (COPD) and acute respiratory disorders etc. were included. Demographic details like age, sex, socioeconomic status was noted and complete prescription details were noted and analyzed. Cases were diagnosed and managed by team of institutional chest physicians and no interference was done in their management. Institutional ethics committee clearance was obtained before commencing the study.

Results

In the studied population male/female ratio was 1.026. Mean age was 55.51years with the range of 19 to 90 years. 125 (82.2%) patients never smoked while 11 (7.2%) had history of smoking and 16 (10.5%) were presently chronic smokers. 87 (57.2%) patients were diagnosed as COPD cases while 23 (15.1%) as infectious, 28 (18.4%) as asthma and 14 (9.2%) as other respiratory disorder cases (Table- 1). Most common co-morbid condition (33 cases, 21.7%) was cardiovascular disorders along with endocrine diseases (Diabetes) followed by cardiovascular diseases (26 cases, 17.1%) alone and endocrine diseases (9 cases, 5.9%). One (0.7%) each of schizophrenia, psoriasis and haemorrhoids was also associated as co-morbid condition. But in 81 (53.3%) cases no co-morbid condition was observed.

Table- 1: Distribution of patients based on Age, Sex and Disease (n=152)

Age	Sex	COPD		Infections		Asthma		Others	
		Cases	%	Cases	%	Cases	%	Cases	%
Adult	Male	20	13.2	4	2.6	4	2.6	5	3.3
	Female	16	10.5	10	6.6	17	11.2	5	3.3
Geriatric	Male	32	21.1	6	3.9	5	3.3	1	0.7
	Female	19	12.5	3	2.0	2	1.3	3	2.0
Total		87	57.2	23	15.1	28	18.4	14	9.2

A total of 2246 drugs prescribed to 152 patients with an average of 14.78. Less than 10 drugs were prescribed to 26 (17.1%) cases, 11-15 drugs were prescribed to 66 (43.4%) cases while 16 or more drugs were prescribed to 60 (39.5%) patients. Average number of drug prescription was between 13 to 15 drugs in COPD, infection and asthma cases while it was 22 drugs in other respiratory conditions (Table- 2).

Table- 2: Drug Prescription

Disease	Number of Patients	Drugs Prescribed	Average
COPD	87 (57.2%)	1280 (57.0%)	14.71
Infections	23 (15.1%)	360 (16.00%)	15.65
Asthma	28 (18.4%)	371 (16.51%)	13.25
Others	14 (9.2%)	310 (13.80%)	22.14

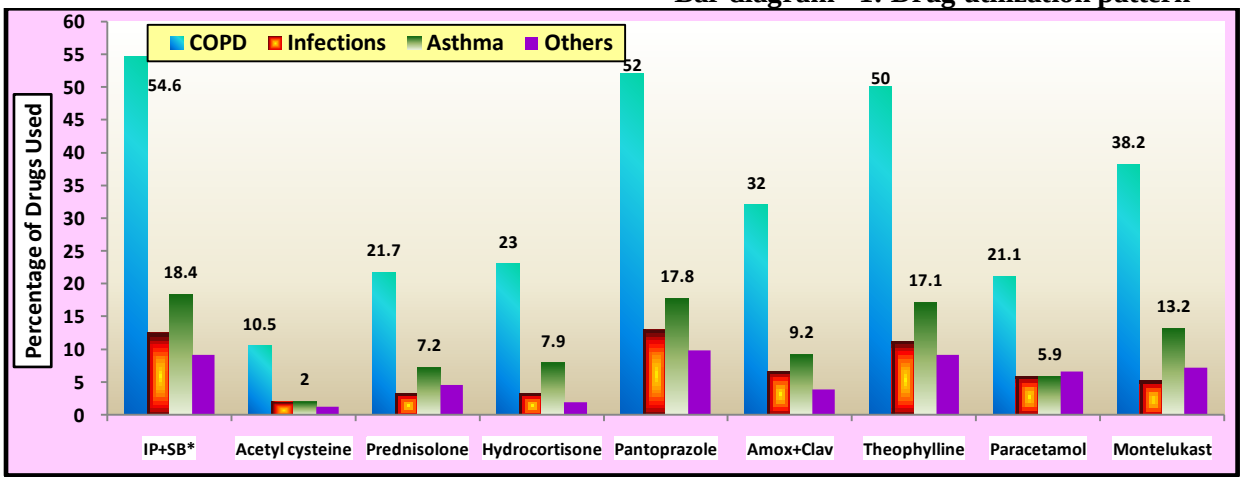
Most of the formulations were in oral 878 (39.1%) & parenteral 795 (35.4%) form table- 3.

Table- 3: Dosage form

Type of dosage form	Frequency	%
Oral Tablets/Capsules	878	39.1
Syrup	201	8.9
Nebulisation	279	12.4
Parenteral	795	35.4
Inhaler	61	2.7
Others (topical & rectal)	32	1.4
Total	**2246**	**100**

Most common drug prescribed in COPD was combination of Ipratropium bromide, Salbutamol and Budesonide (83 cases, 54.6%) followed by Pantaprazole (79 cases, 52%), Theophylline (76 cases, 50%), Montelukast & Antihistamine Combination (58 cases, 38.2%) and Amoxicillin-Clavulanic acid combination (49 cases, 32%). In respiratory infections, combination of Ipratropium bromide, Salbutamol and Budesonide (19 cases, 12.5%) followed by Pantaprazole (20 cases, 13%), Theophylline (17 cases, 11.2%), Amoxicillin-Clavulanic acid combination (10 cases, 6.6%) and Paracetamol (9 cases, 5.9%) were commonly prescribed. In asthma most common drugs prescribed were combination of Ipratropium bromide, Salbutamol and Budesonide (28 cases, 18.4%) followed by Pantaprazole (27 cases, 17.8%), Theophylline (26 cases, 17.1%) and Montelukast Antihistamine Combination (20 cases, 13.2%). While in other respiratory conditions Pantaprazole (15 cases, 9.9%), followed by combination of Ipratropium bromide+Salbutamol+Budesonide and Theophylline (14 cases, 9.2%) each were prescribed most commonly (Bar diagram- 1).
Overall in all conditions, xanthine derivatives were the most commonly prescribed drugs (266 drugs, 11.8%) without combination followed by corticosteroids (255 drugs, 11.4%), beta 2 agonist (252 drugs, 11.2%) and antibiotics (237 drugs, 10.6%). While in antibiotic category most commonly used drugs were penicillin (97 drugs, 40.9%) followed by cephalosporin (68 drugs, 28.7%) table- 4 and in corticosteroid category Budesonide was the commonest prescribed drug (144 drugs, 56.5%) table- 5.

Bar diagram - 1: Drug utilization pattern



***Ipratropium Bromide + Salbutamol & Budesonide**

Table- 4: Antibiotic utilization

Antibiotics	COPD	%	Infection	%	Asthma	%	Other	%	Total	%
Penicillin	58	59.8	15	15.5	16	16.5	8	8.2	**97**	**40.9**
Cephalosporin	35	36.1	8	8.2	16	16.5	9	9.3	**68**	**28.7**
Fluoroquinolone	17	17.5	3	3.1	3	3.1	3	3.1	**26**	**11**
Macrolide	6	6.2	4	4.1	3	3.1	3	3.1	**16**	**6.8**
Anti-Tubercular	0	0.0	13	13.4	1	1.0	1	1.0	**15**	**6.3**
Nitro-imidazole	8	8.2	2	2.1	1	1.0	0	0.0	**11**	**4.6**
Aminoglycoside	1	1.0	2	2.1	1	1.0	0	0.0	**4**	**1.7**
Total	**125**	**128.9**	**47**	**48.5**	**41**	**42.3**	**24**	**24.7**	**237**	**100**

Table- 5: Corticosteroid utilization

Corticosteroids	COPD	%	Infections	%	Asthma	%	Others	%	Total	%
Budesonide	83	32.5	19	7.5	28	11.0	14	5.5	**144**	**56.5**
Hydrocortisone	35	13.7	5	2.0	12	4.7	3	1.2	**55**	**21.6**
Prednisolone	33	12.9	5	2.0	11	4.3	7	2.7	**56**	**22.0**
Total	**151**	**59.2**	**29**	**11.4**	**51**	**20.0**	**24**	**9.4**	**255**	**100**

For the management of co-morbid conditions a total of 47 (2.1%) anti-diabetic drugs were prescribed while in the category of drugs affecting cardiovascular system diuretics were the most common drugs (54 drugs, 2.4%) followed by anti-coagulants (43 drugs, 1.9%), statins (39 drugs, 1.7%) and anti-platelets (30 drugs, 1.3%) table- 6.

Table- 6: Drug used for co-morbid conditions

Category of Drug		Drugs	%
Anti-diabetic drugs		47	2.1
Cardiovascular agents	Beta blockers	20	0.9
	Calcium channel blockers (CCB)	24	1.1
	Angiotensin receptor blockers	12	0.5
	ACE inhibitors	10	0.4
	Diuretics	54	2.4
	Vasodilators	14	0.6
	Cardiac glycosides	5	0.2
	Statins	39	1.7
	Beta blockers + CCB	6	0.3
	Beta blockers + Diuretics	1	0.0
	ARB + Diuretics	7	0.3
	Anti-platelets	30	1.3
	Anti-coagulants	43	1.9

ARB= Angiotensin receptor blockers

Discussion

In the present study mean age was 55.5 years with the range of 19 to 90 years and most of cases belong to lower socioeconomic status. Commonest diagnosis was COPD (57.2%). Our centre is an urban centre in which most of the patients are from lower socioeconomic class as it offers cheap alternative for costly management of variety of disorders. In one of the study conducted by Sanoj Vaskey and Suchandra Sen found a statistically significant co-relationship between age, gender, locality of residence and socio-economic status with the prescribing pattern in pulmonary department.[1] Above 50 years of age respiratory diseases are relatively common in low socioeconomic status patients in urban areas as such regions have more environmental pollution. Our centre belongs to metropolitan city of India hence we observed highest number of COPD cases among all the diagnosed respiratory diseases.

We found an average prescription of 14.78 drugs per patients. Patel Pindal et al found that multiple drug therapy was opted for a significant

number of patients as compared to single drug therapy in their study of "analysis of prescription pattern and drug utilization in asthma therapy". [36] Such pattern might be because of the cases as those patients also have associated diabetes and or chronic cardiovascular diseases which needs multiple drugs hence number of drugs prescribed more, although in the present study average prescription is much higher which should be reduced since it increases overall disease management cost. Awinash Pandey et al in Gorakhpur district of India observed use of multiple drug therapy (81%) in significant number of patients as compared to single drug therapy (19%) and use of oral dosage form (56.3%) more commonly in comparison to inhalation form in the management of bronchial asthma (33.8%). [7] In the present study most of the drug formulations were in oral and parental form (almost 75%) and only 2.7% drugs were used by inhalation route. It is quite natural as patients were mostly of COPD, infection and other categories and only 18% were of bronchial asthma. Moreover, they were also associated with cardiovascular diseases and diabetes for which many drugs were used.

We found use of combination of Ipratropium bromide, Salbutamol and Budesonide was the most common practice for the management of respiratory diseases and other common drugs were Methylxanthenes, Montelukast, Pentaprazole and Amoxicillin-Clavulanic acid combination. Thamby et al in Kedah Malaysia found use of both monotherapy and combinational therapy for the management of asthma. In monotherapy salbutamol was most common drug followed by montelukast and prednisolone. The most commonly prescribed combinational therapy was symbicort (budesonide and formeterol) followed by seretide (ipratropium bromide & salbutamol) and combivent (salmeterol and fluticasone) in their study. [8] Shimpi et al concluded that 76% asthma cases were treated with combination therapy and in all therapies methylxanthines were the drug of choice for asthmatic patients due to their lower cost. [9] Sanoj Vaskey and Suchandra Sen found most commonly prescribed drug was Budesonide + Formoterol (78.4%) combination in their study. [1] Patel Pindal et al concluded that bronchodilators were the most frequently prescribed anti-asthmatic drugs followed by corticosteroids and methyl xanthenes preparations in their study. [6] While Awinash Pandey et al showed that Beta agonist (40%) were the most prescribed anti-asthmatic followed by Methylxanthines (27%), Corticosteroids (25%), Leukotrienes antagonist (4.4%) and Anti-histaminics (3.6%) was the least prescribed drug. [7]

In the present study most commonly used antibiotics were penicillin (97 drugs, 40.9%) followed by cephalosporin (68 drugs, 28.7%) and floroquinolone (26 drugs, 11%). Smith JA et al observed use of Amoxicillin most frequently in acute exacerbations of chronic obstructive pulmonary disease and in antibiotic treated group 53% patients were given dual therapy, most commonly a macrolide antibiotic with either amoxicillin or a cephalosporin. They opined that antibiotic treatment was not optimal, and there was overuse of antibiotics, especially intravenous and dual therapy. [10] Svein Gjelstad revealed that large variations exists among general practitioner's antibiotic prescription habits as in 27% of respiratory tract infection cases, an antibiotic was used mostly Penicillin V (37%) followed by Macrolide (28%) and Quinolones and cephalosporins were only rarely prescribed. [11] Yanina Balabanova in Russia found that in nearly all cases of acute bronchitis and in majority of COPD and pneumonia cases at least one antibiotic was used. Every forth case of simple upper respiratory patient also received antibiotics. Penicillins were the mostly commonly prescribed drugs followed by fluoroquinolones and macrolides. [4]

For the management of co-morbid conditions, anti-diabetic, diuretics, anti-coagulants, statins and anti-platelet drugs were used in the present study as in most of the co-morbid situations patients were either suffering from diabetes or cardiovascular diseases or with both. And as common pattern in India, statins and anti-platelets are routine drugs of most of the cardiovascular diseases.

Conclusion

Use of combination and multidrug therapy is common practice for the management of all respiratory disorders. Number of drugs per prescription is also high which should be reduced as much as possible to decrease overall disease management cost. Number of COPD cases is much higher in comparison to all other respiratory disorders; furthermore female to male gender-ratio of COPD prevalence is high in comparison to other studies: such pattern of diseases can be changed by identification of cases and implementation of suitable programs.

Acknowledgement

We are thankful to Ihtisham Sultan, Shoebullah Adil, Amer Khan, Nematullah Khan, Interns in Deccan School of Pharmacy Darussalam Hyderabad for their invaluable help during data collection.

Source(s) of support: *Nil*
Conflict of Interest: *None declared*

References

1. Sanoj Varkey, Suchandra Sen. Prescribing patterns of corticosteroids in pulmonology department. International Journal of Pharmacy Teaching & Practices 2012;3(3):334-337.
2. Sushma Dawadi, Rao BS, Khan GM. Pattern of antimicrobial prescription and its cost analysis in respiratory tract infection. Kathmandu University Journal of Science Engineering and Technology 2005;1(1):1-9.
3. Kumari Indira KS, Chandy SJ, Jeyaseelan L, Kumar R, Suresh S. Antimicrobial prescription patterns for common acute infections in some rural & urban health facilities of India. Indian J Med Res 2008;128:165-171.
4. Balabanova Y, Fedorin I, Kuznetsov S, Graham C, Ruddy M, Atun R, Coker R, Drobniewski F. Antimicrobial prescribing patterns for respiratory diseases including tuberculosis in Russia: a possible role in drug resistance?. Journal of Antimicrobial Chemotherapy 2004;54:673–679.
5. Montes de Oca M, et al. Use of respiratory medication in five Latin American cities: The PLATINO study. Pulm Pharmacol Ther 2008;21(5):788-793.
6. Patel PD, Patel RK, Patel NJ. Analysis of prescription pattern and drug utilization in asthma therapy. International Research Journal Of Pharmacy 2012;3(7):257-260.
7. Pandey A, Tripathi P, Pandey RD. Prescription pattern in asthma therapy at Gorakhpur hospitals. Lung India 2010;27(1):8-10.
8. Thamby SA, Juling P, Wan Xin BT, Chooi Jing N. Retrospective studies on drug utilization patterns of asthmatics in a government hospital in Kedah, Malaysia. International Current Pharmaceutical Journal 2012;1(11):353-360.
9. Shimpi RD, Salunkhe PS, Bavaskar SR, Laddha GP, Kalam AA, Patel K, Jain SS. Drug utilization evaluation and prescription monitoring in asthmatic patients. International Journal of Pharmacy and Biological Sciences 2012;2(1):117-122.
10. Smith JA, Redman P, Woodhead MA. Antibiotic use in patients admitted with acute exacerbations of chronic obstructive pulmonary disease. European Respiratory Journal 1999;13:835-838.
11. Gjelstad S, Dalen, Lindbaek M. GPs' antibiotic prescription patterns for respiratory tract infections– still room for improvement. Scandinavian Journal of Primary Health Care 2009;27:208-215.