Original Research Article

A study on prescribing pattern and medication adherence in elderly COPD and bronchial asthma patients in a tertiary care teaching hospital

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ABSTRACT

Background: Chronic obstructive pulmonary disease and bronchial asthma are common among elderly people and have become a major public health concern of today. The purpose of this study is to identify the prescription pattern and role of medication adherence in the COPD and bronchial asthma. Prescription pattern monitoring (PPMS) are mainly focus on prescribing, dispensing, administering of drugs they promote appropriate use of monitored drugs and reduction of abuse/misuse.

Methods: A hospital based prospective observational study was conducted at department of medicine in Rajah Muthiah Medical College and Hospital. A total of 90 patients were enrolled based on inclusion and exclusion criteria and the data was collected using designed data collection form.

Results: Out of 90 patients, male (81.10%) and female (18.90%) are reported with COPD and bronchial asthma. On prevalence 57 (63.34%) of patients with co-morbidities and without co-morbidities 33 (36.66%). Among co-morbidity patients, 38.90% of patients has type-2 diabetes mellitus. PPA indicate that cephalosporins (46.68%), macrolides (38.88%) class of antibiotic are used prominently along with corticosteroids of hydrocortisone 47 (62.66%) and prednisolone 28 (37.34%). 47 (62.66%) patients received expectorants and anti-tussive in that, Ipratropium bromide + levosalbutamol (50%) are commonly prescribed.

Conclusions: This study concludes that COPD and bronchial asthma was most predominant in elderly patients and its treated with mainly antibiotics and corticosteroids with bronchodilators in the way of inhalers and nebulizers. The rational use of drugs and patient counselling reflects a better medication adherence.

Keywords: COPD, Bronchial asthma, Gold criteria, Medication adherence

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) has major public health concern in day-to-day life among elderly patients. Due to increasing prevalence rate, morbidity and mortality of COPD, it is progressing as significant health issue and also becoming strong challenge for future. COPD known as irreversible airflow obstruction which encompasses into two serious lung disease emphysema and chronic bronchitis (CB) which results in long term airway inflammation and progressive loss of lung function. However, if obstruction remains unchanged for years may worsen as it progresses. Commonly reported symptoms of COPD are breathing difficulty, shortness of breath, wheezing, chronic cough, sputum production, exercise intolerance and poor quality of life.

One of the prominent events in COPD is an exacerbation which is defined as the presence of worsening symptoms along with local and systemic inflammation. COPD is considered as one of emerging health challenge globally. According to who, 65 million people have moderate to severe COPD. In 2005, many people died of COPD, which corresponds to 5% of all deaths globally particularly lower- and middle-income countries accounts to 90% of COPD related death.[2]

Among risk factors, tobacco smoking is the highest susceptible cause of having COPD while possible other factors such as hereditary deficiency of alpha 1-antitrypsin, exposure to tobacco smoke, prolonged inhalation of air pollutants and dust, may increase oxidative stress and inflammation in the lungs. For longer period of time, COPD is observed to be a male centric disease, due to increased consumption of tobacco among the male than the female. Since, undiagnosed form of COPD for years which causes an irreversible effect on lung, in order to control the worsening prognosis early diagnosis is better way. Among the common challenges patient adherence in chronic diseases remains a task, resulting in poor health outcomes and increased healthcare expenditures. Increased frequency of exacerbations, recurrent hospital admissions and mortality rate happens by non-adherence to COPD treatment. Therefore, educating the patient on their condition, warning signs, symptoms and adherence to medications can help reduce exacerbations and also promote positive clinical outcomes.[2]

In COPD patient's pharmacotherapy accounts a major health expenditure. In a modern clinical practice, the irrational use of corticosteroids is the major concern, now a days more than a 50% of drugs are prescribed and dispensed and sold in appropriate way. Although COPD and bronchial asthma is an incurable disease, progressive, pharmacologically can help control symptoms and reduce exacerbation.[7] The main course of pharmacological therapy for COPD and bronchial asthma is bronchodilation with the following group of medications, such a long-acting muscarinic antagonist (LAMA), a long-acting β2-agonist (LABA), or a combination of both medications, based on the severity of breathlessness and patient's risk rate of exacerbations. However, a long-acting bronchodilator fails to control the breathlessness and risk rate of exacerbation in significant proportion of patients with COPD and bronchial asthma, such as a LAMA or LABA, in monotherapy. Prescribing of multiple bronchodilators with or without an inhaled corticosteroid (ICS) will depend on the patient's severity (COPD assessment test or modified medical research council breathlessness scores) and risk of exacerbations. The highly sensitive predictor of COPD is exacerbation rate in future comparatively with past. Current treatment guidelines recommend the use of triple therapy with an ICS/LAMA/LABA as per gold criteria for patients in bronchodilators are suspected for future exacerbation.[5]

METHODS

A prospective observational study was conducted in the department of medicine at Rajah Muthiah medical college and hospital, Annamalai university, during the period of six months from November 2019 to April 2020. Patients who admitted inpatient department with the complaints of COPD and bronchial asthma with the age group of 55 years and above were included in the study after obtaining their signed consent form. The patients were given an explanation about the procedure, objective, and benefits of the research before obtaining informed consent.

The data was collected using designed data collection form. Patients with other co-morbidities conditions like hypertension, type 2 diabetes mellitus, varicose vein, gastritis, anaemia, hyponatraemia, metabolic encephalopathy were included. Mentally ill patients and patients who are not willing to participate in the study were not included in the study. Patients treated at ICU was excluded.

Recording of complete details of the patients in the data collection sheet. The information regarding patient's demographic details, medication history, laboratory data and therapeutic management were collected from patient's case sheets. The following parameters were analysed; biochemical profile such as hba1c, fasting blood sugar {FBS}, randomized blood sugar (RBS), post prandial blood sugar (PPBS), LFT, RFT and all data around the culture was collected from lab report.

Statistical analysis

The data was collected and entered in Microsoft excel software 2007 and interpreted by descriptive statistics that was presented to analyse and express the report as counts and percentages in the form of tables and figures.

RESULTS

Sample for research included 90 patients who visited for inpatient service in department of medicine at Rajah Muthiah Medical College and Hospital. The research was conducted over a period of 6 months from November 2019 to April 2020.

Demographical profile of participants

Among 90 study participants, 73 (81.10%) were male and 17 (18.90%) were female. Age-wise distribution of participants are 59 (65.56%) patients between 55-65 years, 18 (20%) patients between 66-75 years, 13 (14.44%) patients aged >75 years. Past history of family members with COPD and asthma analysis shows that 29 (32.22%) patients has presence of known history and 61 (67.78%) of patients has no known history in the family. Further, 73.34% of participants has personal habitual history of smoking 18 (20%), alcohol consumption 32 (35.56%),

both smoking and alcoholic 16 (17.78%) and least of 24 (26.66%) of participants reported with no history.

Table 1: Indicates age wise distribution of patients.

Age (in years)	N (%)
55 – 65	59 (65.56)
66 – 75	18 (20)
>75	13 (14.44)

Table 2: Indicates social habit wise distribution.

Social habits	N (%)
Smoker	18 (20)
Alcoholic	32 (35.56)
Smoker and alcoholic	16 (17.78)
No social habit	24 (26.66)

Table 3: Indicates disease conditions prevalence in geriatric patients.

Co-morbidity	N (%)
HTN	20 (22.22)
HTN + type 2 diabetes mellitus	12 (13.33)
Anemia	09 (10)
Type 2 diabetes mellitus	35 (38.90)
Varicose veins + gastritis	01 (1.11)
HTN + metabolic encephalopathy	01 (1.11)
Gastritis	07 (7.78)
Anemia + hypoprotenemia	04 (4.44)
Metabolic encephalopathy	01 (1.11)

Table 4: Indicates distribution of prescribed antibiotics.

Antibiotics	N (%)
Cephalosporins	46 (51.11)
Penicillin derivatives	10 (11.11)
Aminoglycosides	03 (3.33)
Macrolides	35 (38.88)

Table 5: Indicates distribution of prescribed of corticosteroid.

Drugs	N (%)
Hydrocortisone	47 (52.22)
Prednisolone	28 (31.11)

Co-morbidity wise prevalence among the participants

On prevalence of co-morbidity among study participants shows 57 (63.34%) of patients with co-morbidities and without co-morbidities 33 (36.66%). Among co-morbidity patients, 35 (38.90%) of patients has type-2 diabetes mellitus, 20 (22.22%) patients with hypertension, 12 (13.33%) patients has hypertension with diabetes mellitus, followed by gastritis 7 (7.78%), anemia 9 (10%), anemia with hypoproteinemia 4 (4.4%), varicose veins with

gastritis 1 (1.1%), hypertension with metabolic encephalopathy 1 (1.1%), metabolic encephalopathy 1 (1.1%).

Table 6: Indicates distribution of expectorant and anti-tussives.

Expectorant and anti-tissues	N (%)
Ambroxol + guaifenesin + levosalbut/amol	47 (52.22)
Chlorpheniramine + dextromethorphan	18 (20)
Bromhexine + guaifenesin + menthol + terbutaline	10 (11.11)

Table 7: Indicates distribution of nebulizers prescribed.

Nebulizers	N (%)
Levosalbutamol	07 (7.78)
Ipratropium bromide + levosalbutamol	38 (42.22)
Budesonide	45 (50)

Table 8: Indicates distribution of inhalers prescribed.

Inhalers	N (%)
Fluticasone + salmeterol	10 (11.11)
Tiotropium + formeterol	35 (38.88)
Budesonide + formeterol	08 (08.89)

Table 9: Indicates drug prescribing pattern analysis based on who prescribing indicators.

Prescribing indicators	Study values obtained	WHO standards
Average number of drugs per prescription	7.5	1.6 to 4.8
Drugs prescribed by generic name	31.66%	100%
Prescription of an antibiotics	83.33%	20 to 26.8%
Prescription of an injections	61.66%	13.4 to 24.1%
Prescription of an inhalers	58.33%	30 to 40%
Drugs prescribed from essential medical list or formulary	85%	100%

Distribution of prescribed antibiotics

Among 90 study participants, on treatment pattern observation shows that cephalosporins 46 (51.11%) were commonly prescribed in comparison other antibiotics such as macrolides 35 (38.88%), penicillin derivatives 10 (11.11%) and aminoglycosides 3 (3.33%). By the way the

cephalosporins are the antibiotic which is readily prescribed for the COPD and bronchial asthma.

Table 10: Indicates medication adherence value.

Adherence	Score	Before patient counselling N (%)	After patient counselling N (%)
Non – adherent	0-3	62 (68.89)	11 (11.11)
Partial adherent	4-6	18 (20)	17 (18.90)
Adherent	7-10	10 (11.11)	62 (68.89)

Distribution of corticosteroids prescribed

Corticosteroids plays important and major role to reduce inflammation in lungs – bronchioles, alveoli and airway. Thorough reduction of inflammation leads normal breathings. In that hydrocortisone 47 (52.22%) is mostly prescribed drug and alternatively prednisolone 28 (31.11%) was prescribed.

Distribution of supporting treatment (expectorant and anti-tussives)

Among 90 study participants, supplements therapy used are fixed dose combination of ambroxol (30 mg), guaifenesin (50 mg), levosalbutamol (1 mg) in liquid dosage form is widely prescribed with 47 (52.22%) patients followed by chlorpheniramine (10 mg), dextromethorphan (2 mg) fixed dose combination with 18 (20%) patients and bromhexine (2 mg), guaifenesin (50 mg), menthol (0.5 mg), terbutalin (1.25 mg) fixed dose combination with 10 (11.11%) patients.

Distribution of nebulizers and inhaler prescribed

Among 90 study participants, nasal delivery of levosalbutamol (7.78%), ipratropium bromide + levosalbutamol (42.22%), budesonide (50%) are commonly used bronco-dilating agent among COPD and asthma patients. Further, 53 (59%) patients required inhaler delivery of fixed dose combination therapy of tiotropium + formeterol 35 (38.88%), fluticasone + salmeterol 10 (11.11%), budesonide + formeterol 08 (08.89%).

Drug prescribing pattern analysis based on who prescribing indicators

WHO standards used as a comparator to analyse the prescription to understand the prescribing pattern of the 90 study subjects.

Medication adherence

Among 90 study participants, using Morisky medication adherence rating scale analysed the patient's compliance to therapy found that 68.89% patients are adherent followed by 18.90% patients are partially adherent to treatment, least of 11.11% of patients only noncompliance to the therapy.

DISCUSSION

Now a days, an increasing way has been observed in the incidence of COPD and asthma. As this chronic disease requires a long-term treatment, irrational use of the drugs may possible to lead certain consequences. Prescribing pattern and medication adherence are an essential part of pharmacoepidemiologic studies by which understanding of drug use, according to the guidelines can be assessed to know the more common prescribing pattern. Its also used in conducting the training programs and adapting the given treatment, based on the current guidelines and gold criteria.[8]

In the present study, the 90 prescriptions that were observed in the study period, the incidence of COPD and asthma in male patients was higher than female patients (81.1% versus 18.9%). It similar to the results of a study done by Afonso as et al which reported a higher prevalence of COPD in males than in females. Study patients from the age group of 55-65 years had a higher prevalence of COPD and asthma. There can be an increased exposure to environmental pollutants, due to this factor the specific population mostly gets affected.[7]

Enrolled patient's demographic details are in the study revealed patients due to their occupation they fall under lower socioeconomic status. This is in accordance with a study by Veettil et al which shows the patients with a low socioeconomic status as a hospital study was conducted in a rural area and also is explainable by the gold guidelines which says that people of low socioeconomic status, tend to have a greater risk of developing COPD. When study population was screened for their literacy, 81% of the patients were unaware about their disease condition and the medications being prescribed to them. Poor health knowledge can lead greater risks for worsening of COPD condition, this study urge to provide a counselling to the patients about their health – disease condition, medications prescribed, dosing intervals and their indication. In this study, we found that out of the 90 prescriptions, 36.66% of the patient presented with alone COPD, were as 63.34% of patients presented COPD with co-morbidities. In that 72 (80%) of these patients had a single co-morbid condition, while the remaining 18 (20%) of the patients had 2 or more co-morbid conditions. The most commonly observed comorbid conditions was diabetes mellitus 35 (38.90%) and hypertension 20 (22.22%). Factors like increasing age, stress and lifestyle - occupation, co-morbidities which overall affect the functioning of lungs and heart leads to acquiring COPD more easily.[6]

Now a days the physicians are more challenged by the risk factors of COPD to treat it and get better patient outcome. The common risk factors are smocking, alcoholism and tobacco consumption. As per the survey done in the present study 18 (20%) patients have a smoking status. Were the results of maximum smoking duration was observed to be more than 30 years as in the present study.[3]

In the 90 observed prescriptions, more than 5 drugs are present in the 70% of the prescriptions. Acute and exacerbation patients required a antibiotics and corticosteroids and drugs in combination format, because of a single drug not efficient to treat COPD and bronchial asthma.so the number of drugs in the prescription were increased.[11]

We assessed the 90 prescription that contains a different class of drugs to treat COPD and bronchial asthma. Among them, antibiotics were mostly prescribed (83.33%) and corticosteroids (83.33%). When compared to the study conducted by Maazuddinl et al, our results were not in accordance, as the use of antibiotics was higher in that study (86.7%). It shows the prevalence of infections in patients in patients of acute exacerbation of COPD admitted in different demographic areas.[2]

In our study, the management of COPD the antibiotics which is commonly prescribed was found as ciprofloxacin. Antibiotics gives better response in the treatment of COPD. Hence it become as essential part of the treatment in COPD.[10]

In the COPD treatment course, the antibiotics along with corticosteroids in the form of nebulizers and inhalers plays important role. Due that immediate systemic effect of inhaler and nebulizers gives immediate relief from dyspnoea and remaining forms gives slow response and effect. Deriphylline was the most prescribed methylxanthine (13.9%). When observed in other studies, budesonide was most commonly used inhaled corticosteroid for COPD patients. This showed a similarity that, our study also showed high use of budesonide (50%) as the inhaled corticosteroid. Among the combination therapies, salbutamol with ipratropium bromide was the most preferred combination (42.22%). These findings were similar to results from a previous study where the salbutamol with ipratropium bromide combination was used in 42% of the cases. In older patients' salbutamol with ipratropium bromide was majorly preferred and cardiovascular complications also prevented. Meanwhile β2 agonist drugs of high doses one can avoid.[3]

A significant barrier to optimal management is posed by nonadherence to medication regimens even though the COPD treatment was advanced. The most common cause of poor adherence are underuse, overuse, and improper use. Patients adherence to medication regimens are aften partially optimal when patients undergo a long-term pharmacological therapy using same prescription as repeatedly. Adherence to inhaled medications are mostly suboptimal in patients with COPD and branchial asthma. Gold guidelines provide effective way to improve a patient medication adherence by the clinical experts. In our 90 study subjects gone through Morisky medication adherence scale by analysing a prescription, we found that an average of 68.89% of patients with COPD didn't adhere to prescribed therapy.[1]

Adherence to therapy in COPD and BA is complex. Patient with COPD and bronchial asthma required a proper adequate education about their illness and disease progression, comorbidities, and different medications and device usage. They often need to make important behavioural and lifestyle changes such as starting a smoke cessation program, adherence to an exercise program, in geriatrics, higher levels of independence and self-reliance have been associated with medication adherence.[9]

Explain the disease condition, importance of drugs used to control the symptoms (dose, dosage, dosing intervals) to the patient by the clinical pharmacist using a leaflet. Medication adherence were analysed with the scale of Morisky questionaries. It denotes at which pre patient counselling states the patient medication adherence was (11.11%) and post patient counselling states the patient medication adherence was (68.89%) probably increased.[9]

Limitations of the study was that mentally ill and unconscious patients and patients treated at ICU was excluded. patients who are not willing to participate in the study and Patients under the age group of 54 were not included.

CONCLUSION

As COPD and bronchial asthma in elderly patients is a challenging issue, medication adherence is the basic element for its treatment success. Demographic analysis shows that elderly patients associated with long-term comorbidities, also affected COPD making it more severe and causes a risk for life. Also, poor socio-economic status and health literacy are associated with negative clinical outcome. Among prescribing pattern observation in COPD patients, mainly corticosteroids, β2 agonists and anticholinergics agents along with antibiotics are used for the management. In final analysis, we found as the majority of the drugs prescribed for the COPD and bronchial asthma were complies with the gold criteria recommendations. The medication adherence was greatly increased by patient counselling given by the clinical pharmacist.

ACKNOWLEDGEMENTS

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