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Short Communication

DRUG UTILIZATION PATTERN IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE INPATIENTS AT A TERTIARY CARE HOSPITAL

ASWATHY UNNI*[1], AKSHAYA K JAYAPRAKASH[2], YADUKRISHNAN MC.[3], UMA DEVI P.[4]

[1,2]Department of Pharmacy Practice, [3]Department of Pharmaceutics, [4]Department of Pharmacology, Amrita School of Pharmacy, Amrita Vishwa Vidyapeetham University, AIMS Health Sciences Campus, Kochi, Kerala 682041, India
Email: umadeviaims@gmail.com

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ABSTRACT

Objective: Drug utilization studies provide useful insights into the current prescribing practices. In view of this, the present study was designed to establish the drug utilization pattern in hospitalized chronic obstructive pulmonary disease (COPD) patients.

Methods: In this retrospective study, all patient data relevant to the study were obtained by examination of patient's medical records and hospital information system.

Results: A total of 237 patients with acute exacerbation were evaluated. The population predominantly consisted of males (92.4%) and most of the patients were in the age group of 61 to 70 y (39.7%). Cough, sputum production and dyspnea were observed in 88.2%, 80.6% and 37.6% patients, respectively. Hypertension (49.4%) was the most common co-morbidity. *Candida albicans* (16%) and *Pseudomonas aeruginosa* (4.6%) were the most common microorganisms isolated from sputum samples.

Majority of the patients were on multidrug therapy during both hospital stay (98.7%) and at the time of discharge (99.6%). During hospital stay, the most commonly prescribed drugs were ipratropium (91.6%) and levosalbutamol (88.2%); antibiotics and systemic corticosteroids were received by 96.2% and 83.1% patients, respectively. At discharge, antibiotics, inhaled corticosteroids, methyl xanthines, long acting beta-2 agonist and tiotropium were received by 94.1%, 93.7%, 92.4%, 86.1% and 56.5% patients, respectively.

Conclusion: The prescribing trend observed at our hospital appears to be in concordance with the current guidelines for the management of COPD patients.

Keywords: Drug utilization, Chronic obstructive pulmonary disease, Bronchodilators.

Chronic obstructive pulmonary disease (COPD) is a significant public health problem worldwide including India, with cigarette smoking being the primary risk factor. It is projected that COPD will be the fourth leading cause of death in 2030, accounting for 7.8 % of total deaths. There are wide variations in the prevalence of COPD across countries, with it being higher in patients with a smoking history, those over 40 y of age, and in men than in women [1-4].

Exacerbation in COPD is defined as an acute event characterized by a worsening of the patient's respiratory symptoms that is beyond normal day-to-day variations and leads to a change in medication. Several factors exacerbate COPD and the common factors are bacterial or viral respiratory tract infections. The treatment of exacerbations in COPD is with bronchodilators, corticosteroids and antibiotics [1, 5-7].

According to World Health Organization, drug utilization is defined as the marketing, distribution, prescription and use of drugs in a society with special emphasis on the resulting medical, social and economic consequences [8]. Drug utilization studies provide useful insights into the current prescribing practices and can thus help in reforming and updating practices in clinical medicine and pharmacotherapy. In view of this, the present study was designed to establish the drug utilization pattern in hospitalized COPD patients.

This retrospective study was conducted in the Pulmonary Medicine Department of Amrita Institute of Medical Sciences and Research Centre. The research protocol was approved by the Institutional Ethics Committee. The study population included adult COPD inpatients of either sex evaluated during the study period (January 2012 to June 2013). Pregnant and lactating females; and patients with any malignancy or those who were immunocompromised were excluded. Information on patient's age, sex, smoking history, COPD signs and symptoms, co-morbid conditions, microbiology details and medications prescribed (during hospital stay and at discharge) were extracted from medical records and hospital information system in computer and then transcribed into standard data collection forms.

A total of 237 patients admitted due to exacerbations of COPD were evaluated. The study population predominantly consisted of males (92.4%). Most of the patients were above 40 y (99.2%) with majority being in the age group of 61 to 70 y (table 1). The mean age of the patients was 67.8 y (age range: 33-89 y). The sex and age distribution of the patients in the present study further provided support to previous reports that have accounted male sex and patients over 40 y of age to be more affected by the disease [1, 9].

Among the 237 patients, 148 patients were ex-smokers while 29 patients were current smokers. Three patients had no smoking history. Data on smoking history were not available for 57 patients.

Cough was the most common symptom observed in 209 patients (88.2%). Sputum production, fever, dyspnea, chest pain, anorexia, weight loss, hemoptysis, sleep disturbance and fatigue were observed in 80.6%, 46%, 37.6%, 13.1%, 9.7%, 8.9%, 7.6%, 5.1% and 1.3% patients, respectively.

Chronic obstructive pulmonary disease often coexists with other diseases and cardiovascular diseases are considered to be the major co-morbidity [1]. In the present study, co-morbid condition was found in 215 (90.7%) patients, with 48 patients (20.2%) suffering from a single co-morbid condition, and 167 (70.5%) suffering from more than one co-morbid condition. Majority of the patients (27%) were suffering from two co-morbid conditions. Hypertension (49.4%) was the most common co-morbid condition followed by respiratory failure (36.3%), diabetes mellitus (34.6%) and coronary artery disease (18.6%). However, in another study reported from Kerala, only 77.5% patients had a co-morbid condition with alcoholism being the most commonly observed co-morbid condition; diabetes and hypertension were observed in 30% patients' each [9].

Table 1: Age distribution among patients

Age (Y)	No. of patients (%)
31-40	2 (0.8)
41-50	7 (3.0)
51-60	38 (16)
61-70	94 (39.7)
71-80	82 (34.6)
81-90	14 (5.9)

Among the respiratory infectious agents, bacteria and viruses have been implicated as a major risk factor for the development of a COPD exacerbation [7]. *Hemophilus influenzae, Streptococcus pneumoniae* and *Moraxella catarrhalis* are considered to be the most common pathogens involved in an exacerbation [10]. In the present study, sputum samples from 161 patients were sent for culture. Among these, for six patients, no organism grew in the culture while for 61 patients the culture grew only normal flora. The most common microorganism isolated was *Candida albicans* (16%) followed by *Pseudomonas aeruginosa* (4.6%). *Candida non-albicans* and *Escherichia coli* each accounted for 3% of the cases. *Aspergillus* species were isolated from eight patients. Widespread use of inhaled steroids, systemic steroids, and antibiotics may be likely contributing to more frequent fungal colonization and growth [11]. *Pseudomonas aeruginosa* is beginning to be recognized as a relevant pathogen in COPD that is associated with an intense airway inflammation and poor prognosis for those with the disease. The prevalence of *Pseudomonas aeruginosa* infection in acute exacerbation is estimated to be approximately 4% [12], which is in concordance to our results.

In the present study, majority of the patients were on multidrug therapy during both hospital stay (98.7%) and at the time of discharge (99.6%). This prescribing trend may be attributed to the goals of COPD therapy to minimize symptoms, to prevent recurrent exacerbations, to reduce the need for hospitalizations and to maintain near normal pulmonary function.

During hospital stay, the most commonly prescribed drugs were ipratropium (91.6%) and levosalbutamol (88.2%). Nearly 76% patients were receiving the fixed dose combination (FDC) of levosalbutamol and ipratropium. Our findings are in concordance with Global Initiative for Obstructive Lung Disease (GOLD) guidelines, which recommends inhaled short acting beta-2 agonist (SABA) with or without short acting anticholinergic agent as the preferred bronchodilators for treatment of an exacerbation since they can rapidly improve respiratory symptoms during an exacerbation. Inhaled bronchodilators are known to reduce respiratory symptoms, increase exercise tolerance, reduce the frequency of exacerbations, and improve quality of life [1]. Combining bronchodilators with different mechanisms and duration of action may increase the degree of bronchodilation for equivalent or fewer side effects [13].

Tiotropium was prescribed to 23.2% patients. Among the methyl xanthines, combination of etophylline+theophylline was most commonly prescribed (87.8%) followed by aminophylline (21.5%) and doxophylline (4.2%), which is similar when compared to another study from Kerala [9].

As per GOLD guidelines, systemic corticosteroids and antibiotics can shorten recovery time, improve lung function and arterial hypoxemia, and reduce the risk of early relapse; treatment failure and length of hospital stay [1]. In the present study, during the hospital stay, systemic steroids like methylprednisolone, prednisolone and hydrocortisone were received by 64.5%, 29.9% and 29.1% patients, respectively. Inhaled corticosteroids like budesonide and fluticasone were used by 87.3% and 32.9% patients, respectively. It has been suggested that, hospitalized patients should receive intravenous treatment with anti pseudomonal penicillin, a third-generation cephalosporin, a newer macrolide or a fluoroquinolone, as determined by local bacterial resistance patterns [10]. In the present study, levofloxacin (47.7%) was the most commonly prescribed antibiotic, followed by cefoperazone+sulbactum (40.5%), ceftriaxone (35.4%), piperacillin+tazobactum (16.9%) and azithromycin (16.4%). In a previous study reported from Kerala, antibiotics were used in nearly 87% patients with azithromycin being the most frequently used antibiotic followed by ampicillin, gentamicin, benzyl penicillin and cefotaxime [9]. Mucolytics were received by 27.8% patients, with ambroxol being most frequently prescribed (25.3%) followed by N-acetylcysteine (2.5%). The drug utilization pattern during hospital stay is presented in table 2.

Table 2: Drug category received during hospital stay

Drug category	No. of patients (%)
Antibiotics	228 (96.2)
Short acting beta-2 agonist	225 (94.9)
Anticholinergic agent	223 (94.1)
Inhaled corticosteroids	221 (93.2)
Methylxanthines	217 (91.6)
Systemic corticosteroids	197 (83.1)
Long acting beta-2 agonist	87 (36.7)
Mucolytics	66 (27.8)

In the present study, at the time of discharge, the most commonly prescribed drugs were etophylline+theophylline (86.9%) followed by fluticasone (79.3%) and salmeterol (75.9%). Nearly 81% of patients received FDC of inhaled corticosteroid and long acting beta-2 agonist (LABA), with 74% patients being prescribed fluticasone+salmeterol combination. Combination of inhaled corticosteroid and LABA has been reported to be more effective than the individual components in improving lung function and health status and reducing exacerbation in patients with moderate to very severe COPD [1]. Tiotropium and ipratropium were used by 56.5% and 19.4% patients, respectively. Other LABA prescribed were formoterol (17.7%) and indacaterol 2.1%. The utilization of LABA and tiotropium was thus more than doubled at the time of discharge. Systemic steroids like prednisolone, methylprednisolone and hydrocortisone were received by 73%, 7.2% and 1.7% patients, respectively. Mucolytics were received by 15.2% patients (ambroxol 13.9%; N-acetylcysteine 0.8%; bromhexine 0.4%). The common antibiotics prescribed were cefpodoxime+potassium clavulanate (58.2%), levofloxacin (36.3%), doxycycline (10.5%), cefuroxime (7.2%) and clarithromycin (6.8%). The drug utilization pattern at the time of discharge is presented in table 3.

Table 3: Drug category received at discharge

Drug category	No. of patients (%)
Antibiotics	223 (94.1)
Inhaled corticosteroids	222 (93.7)
Methylxanthines	219 (92.4)
Long acting beta-2 agonist	204 (86.1)
Systemic corticosteroids	193 (81.4)
Anticholinergic agents	171 (72.2)
Short acting beta-2 agonist	70 (29.5)
Mucolytics	36 (15.2)

A limitation of the study was that data was collected retrospectively. However, the present study provides a representative data of drug utilization likely to be encountered in hospitalized COPD patients.

Consistent with the current guidelines, bronchodilators, corticosteroids and antibiotics were among the most commonly prescribed drugs for the management of an acute exacerbation in COPD patients. Characterization of the microbiological spectrum of COPD exacerbation may help in establishing an antimicrobial treatment protocol for better patient management.

CONFLICT OF INTERESTS

Declared None

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