

Study of Medication Adherence Pattern in Patients with Asthma and Chronic Obstructive Pulmonary Disease in Tertiary Care Teaching Hospital

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Abstract

Background and Aim: Lack of patient compliance with prescribed regimen is major clinical problem especially in patients suffering from chronic illnesses. Asthma and Chronic Obstructive Pulmonary Disease (COPD) are the two main chronic lung disorders which are particularly vulnerable for medication non-adherence problem. Present study aims to investigate the adherence pattern in the management of asthma and COPD patients.

Material and Methods: A prospective observational study was undertaken at Tertiary care Institute of India among 150 Patients. The information regarding patient's demographic characteristics, medication history, laboratory data and treatment management were acquired from patient's case sheets. The following parameters were investigated; biochemical profile such as HBA1c, fasting blood sugar, randomised blood sugar, post prandial blood sugar, liver function test, renal function test and all data around the culture was obtained from lab report.

Results: On prevalence of co-morbidity among study participants reveals 96 (64%) of patients with co-morbidities and without co-morbidities were 54 (36%). Among 150 study participants, on treatment pattern observation suggests that cephalosporins 75 (50%) were widely administered in contrast other antibiotics such as macrolides 55 (38.66%), penicillin derivatives 17 (11.33%) and aminoglycosides 5 (3.33%). Using the Morisky medication adherence rating scale, researchers looked at the compliance of 150 study participants and discovered that 69% of them adhered to their treatments, followed by 19% who just partially followed, and only 12% who did not followd.

Conclusion: Medication adherence is a crucial component of successful treatment for COPD and bronchial asthma in elderly adults since these conditions are difficult to manage. Elderly patients with long-term comorbidities also had COPD, which made it more severe and put their lives at risk. Future studies should include newer strategies to assess the adherence level and long term and large population studies.

Keywords: Asthma, Chronic Obstructive Pulmonary Disease, Cephalosporins, Prescription Pattern Monitoring.

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Introduction

Medication adherence is one of the most important factors that determine therapeutic outcomes, especially in patients suffering from chronic illnesses. Whatever the efficacy of a drug, it cannot act unless the patient takes it. Low medication adherence has assumed importance as it seriously undermines the benefits of current medical care and imposes a significant financial burden on individual patients and the healthcare system as a whole. Studies on drug use are effective instruments for examining and determining the place of drugs in society. These studies will be beneficial for improvement of sociomedical and economic foundation of healthcare. Despite the intricacy of drug use, the World Health Organization has created, standardised, and validated a number of indicators (WHO) [1]. These indicators help remedy departures from expected standards and planning in addition to measuring drug usage in outpatient facilities and measuring the best resource use in such facilities.

The daily lives of older persons with chronic obstructive pulmonary disease (COPD) are a major public health concern. The prevalence, morbidity, and mortality rates of COPD are rising, making it a serious health concern and a formidable task going forward. Emphysema and chronic bronchitis (CB), two significant lung diseases that cause long-term airway inflammation and progressive loss of lung function, are included in COPD, also known as irreversible airflow restriction. However, if an obstruction persists unabated for a while, it might get worse over time. Breathing problems, shortness of breath, wheezing, a persistent cough, sputum production, intolerance to physical activity, and a poor quality of life are all common symptoms of COPD. Smoking is the major risk factor most

likely to result in COPD, although other variables, such as a familial alpha 1-antitrypsin deficiency, exposure to cigarette smoke, protracted exposure to air pollution, and dust, may also exacerbate oxidative stress and inflammation in the lungs.

Pharmacotherapy is a key source of medical expense for COPD patients. The overuse of corticosteroids in contemporary clinical practise is of particular concern; currently, more than 50% of medications are prescribed, distributed, and marketed appropriately. Despite the fact that COPD and bronchial asthma are incurable conditions, pharmacological treatments that are progressive can help regulate symptoms and lessen exacerbations [2]. One or more long-acting bronchodilators, such as long-acting beta 2 agonists (LABAs) or long-acting muscarinic antagonists (LAMAs), are used for long-term maintenance treatment in patients with moderate to severe illness. Short-acting bronchodilators are used for rapid symptom relief. While inhaled corticosteroids (ICS) are essential in the management of COPD, their place in the treatment of asthma remains debatable.

The severity of the patient's condition (measured by the COPD assessment test or modified Medical Research Council dyspnea scores) and likelihood of exacerbations will determine whether multiple bronchodilators with or without an inhaled corticosteroid (ICS) are prescribed. The exacerbation rate in the future in comparison to the past is a highly sensitive predictor of COPD. According to current treatment recommendations, patients who are at risk for a future exacerbation of their bronchodilator-induced asthma should receive triple therapy with an ICS/LAMA/LABA [3-7].

Material and Methods

A prospective observational study was conducted in Medicine inpatient department, at a tertiary care teaching hospital of India, over the period of a year. Ethics committee approval was taken from Institutional ethics committee. Confidentiality of all the data was maintained. After collecting their signed consent forms, a total of 150 patients who were hospitalised to the inpatient department with complaints of bronchial and COPD were included in the study. A specially created data collecting form was used to gather the data. Patients with co-morbidities such as metabolic encephalopathy, hypertension, type 2 diabetes mellitus, varicose veins, gastritis, anaemia, and hyponatraemia were included. Patients who were mentally ill or who refused to take part in the study were excluded from the trial. Patients receiving ICU care were not included. in the study. The structured questionnaire was used to interview these patients. Complete patient information being entered on the data collection form. Case record form used to gather data on the patient demographics, medical history, laboratory results, and therapeutic care. The biochemical profile, such as hb1c, fasting blood sugar (FBS), randomised blood sugar (RBS), post-meal blood sugar (PPBS), LFT, and RFT, as well as any information related to the culture, were examined. This information was taken from the lab report.

Statistical Analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

Out of 150 participants in the study, 123 (82%) were men and 27 (8%) were women. The age distribution of participants was as follows: 22

(14.66%) patients over 75 years, 30(20%) patients between 66 to 75 years, and 98 (65.33%) patients between 55 to 65 year. Analysis of the family's history of COPD and asthma showed that 48 (32%) of the patients had a known history, whereas 102 (68%) have no such history. In addition, 74% of participants reported having a personal history of smoking 30 (20%), drinking 53 (35.33%), smoking and drinking together 26 (17.33%), or having no history at all. (Table 1) shows that 96 (64%) of study participants had co-morbid conditions, while 54 (36%) had none (co-morbidity prevalence). Co-morbidity patients include 58 (38.66%) with type-2 diabetes mellitus, 33 (22%) with hypertension, 20 (13.33%) with hypertension and diabetes mellitus, and 11 (7.33%) with gastritis, 15 (10%) with anaemia, 7 (4.6%) with anaemia and hypoproteinemia, 2 (1.33%) with varicose veins and gastritis, and 2 (1.33%) with hypertension and metabolic encephalopathy.

Among the 150 study participants, analysis of the treatment patterns reveals that cephalosporins were most frequently administered 75 times (or 50%), compared to other antibiotics such macrolides 55 times (or 38.66%), penicillin derivatives 17 times (or 11.33%), and aminoglycosides 5 times (or 3.33%). (Table 2) By the way, cephalosporins are an antibiotic that is frequently used for bronchial asthma and COPD.

Distribution of prescription corticosteroids
The impact of corticosteroids in reducing airway, alveolar, and bronchiolar inflammation in the lungs is significant and vital. Decreased lung inflammation results in improvement of symptoms. Prednisolone 47 (31.33%) was also frequently administered, although hydrocortisone 78 (52%) predominates.

Among the 150 participants in the study, 78 (52%) patients received a fixed dose combination of ambroxol (30 mg), guaifenesin (50 mg), and levosalbutamol (1 mg), followed by 30 (20%) patients who received a fixed dose

combination of chlorpheniramine (10 mg), dextromethorphan (2 mg), and 17 (11.33%) patients who received a fixed dose combination of bromhexine (2 mg), guaifenesin. Distribution of recommended nebulizers and inhalers Levosalbutamol delivered nasally (7.33%), ipratropium bromide plus levosalbutamol (42.66%), and budesonide were the most frequently used bronchodilators among the 150 trial participants. (Table 4)

Additionally, 88 (58.66%) patients needed to receive a fixed dosage combination therapy using the inhalers to administer the drugs tiotropium + formeterol 58 (38.66%), fluticasone + salmeterol 17 (11.33%), and

budesonide + formeterol 13 (8.66%). To understand the prescribing patterns of the 150 study individuals, a drug prescribing pattern analysis based on WHO prescribing indicators guidelines was conducted.

Using the Morisky medication adherence rating scale, researchers looked at the compliance of 150 study participants and discovered that 69% of them adhered to their treatments, followed by 19% who just partially did so, and 12% who did not. Table 5 describes Adherence pattern among 150 patients. Major reason for missing dose was Forgetfulness followed by Carelessness. Side effects was chief reason for discontinuation.

Table 1: Social habit wise distribution of patients

Social Habits	Number	Percentage (%)
Smoker	30	20
Alcoholic	53	35.33
Smoker and alcoholic	26	17.33
No social habit	41	27.33

Table 2: Distribution of drugs prescribed to patients

Antibiotics	Number	Percentage (%)
Cephalosporins	75	50
Penicillin derivatives	15	10
Aminoglycosides	5	3.33
Macrolides	55	38.66

Table 3: Indicates distribution of expectorant and anti-tussives

Expectorant and anti-tissues	Number	Percentage (%)
Ambroxol + guaifenesin + levosalbut/amol	78	52
Chlorpheniramine + dextromethorphan	30	20
Bromhexine + guaifenesin + menthol + terbutaline	17	11.33

Table 4: Indicates distribution of nebulizers prescribed

Nebulizers	Number	Percentage (%)
Levosalbutamol	11	7.33
Ipratropium bromide + levosalbutamol	64	42.66
Budesonide	75	50

Table 5: Adherence pattern among 150 patients

Characteristics	No. of patients (%)
Patient who had missed dose	Patient who had missed dose
Reason for missing dose n=65	
Forgetfulness	22(33.84)
Carelessness	18 (27.69)
Forgetfulness + Carelessness	12 (18.46)
Financial issues	8 (12.30)
Too many medications	5 (7.69)
Patients who had discontinued dose	
Reason for discontinuation=60	
Side effects	32 (53.33)
Symptomatic relief (lack of clinical symptoms)	20 (33.33)
Lack of motivation	8 (13.33)

Discussion

Pharmacoepidemiologic studies must include information on prescribing patterns and medication adherence in order to evaluate how well people understand how to take drugs safely and effectively and identify the more typical prescribing patterns. It is also utilised to carry out training programmes and modify the offered treatment in accordance with the most recent standards and benchmarks [8].

In the current study, male patients had a greater incidence of COPD and asthma than female patients among the 90 prescriptions that were observed over the study period. This was in line with the findings of the reports by Gigi A. *et al* [9] and Niffy A. *et al* [10].

The study's demographic information on the participants found that the patients have lower socioeconomic status as a result of their work. The GOLD guidelines, which state that people with low socioeconomic status tend to have a greater risk of developing COPD, can also be used to explain this. A study by Veetil *et al.* found that patients with low socioeconomic status had a higher risk of developing COPD. This hospital study was conducted in a rural area [11].

According to this study, out of the 90 prescriptions, 36.66% of patients had COPD

on its own, while 63.34% of patients had COPD along with other co-morbid conditions. In that 18 patients (20%) had two or more co-morbid conditions, while 72 patients (80%) had only one co-morbid condition. Diabetes mellitus 35 (38.90%) and hypertension 20 (22.22%) were the most often seen concomitant conditions. Ageing, stress, lifestyle choices, co-morbidities are predisposing risk factor for development of COPD [11].

The risk factors for COPD are a greater problem for doctors today as they try to treat it and improve patient outcomes. Smoking, drunkenness, and tobacco use are common risk factors. According to the survey conducted for this study, 18 patients (20%) smoke. The results of the current study's maximum smoking duration were observed to be greater than 30 years [12]. Smoking tobacco has an impact on many organ systems and is linked to a variety of so-called tobacco-related diseases, such as chronic respiratory conditions like chronic obstructive pulmonary disease (COPD), elevated levels of carbohydrate deficient transferrin (CDT), an increase in T lymphocytes and macrophages, and an imbalance between oxidants and antioxidants [13]. Lifetime alcohol use was found to be a significant predictor of chronic cough and

chronic phlegm but not symptoms, according to Garshick E *et al* [14]. Alcohol's independent effects were inversely linked with interactions between smoking and alcohol consumption.

We evaluated the 90 prescriptions for several classes of medications used to treat bronchial asthma and COPD. Corticosteroids and antibiotics were typically provided to these patients (83.33% each). Our findings did not match the findings of the study by Maazuddin *et al.* because more antibiotics were used there (86.7%). This outcome was consistent with earlier research by Unni A. *et al* [15] and Niffy A. *et al* [9]. All patients received antibiotics, it was discovered, and the second most frequently prescribed medications were anticholinergics, short-acting β_2 agonists, and medications that controlled disease, like inhaled steroids and methylxanthine group medications.

Despite the advancements in COPD treatment, nonadherence to medication regimens remains a substantial obstacle to successful control. Underuse, overuse, and inappropriate use are the most frequent causes of poor adherence. When patients receive long-term pharmacological therapy using the same prescription repeatedly, their adherence to drug regimens is frequently only partially ideal. Patients with COPD and bronchial asthma typically adhere to inhaled medicines less than optimally. Clinical specialists can increase a patient's drug compliance by using gold criteria. In our 90 study participants who completed the Morisky medication adherence scale by examining a prescription, we discovered that, on average, 68.89% of COPD patients did not follow the recommended therapy. Therapy compliance in COPD and BA is challenging. Patients with COPD and bronchial asthma needed to be properly informed about the course of their conditions, comorbidities, and how to use various drugs and medical equipment. In geriatrics, higher degrees of independence and self-reliance have been connected with medication adherence. They frequently need to undertake significant

behavioural and lifestyle adjustments, such as beginning a smoke-cessation programme and adhering to an exercise programme [16].

In India, poor people don't have health or medical insurance as like in western countries. So we can emphasize on these insurance policies by individual or by government policies to give economic support to such patients. In rural India, we still lack access to healthcare or drug store. In a process of civilization in future, we can expect good access to healthcare or drug store in rural or remote part of India.

Conclusion

Medication adherence is a crucial component of successful treatment for COPD and bronchial asthma in elderly adults since these conditions are difficult to manage. According to demographic data, COPD is made worse and poses a risk for life in older individuals with long-term comorbidities. Additionally, a poor socioeconomic level and a lack of health literacy are linked to poor clinical outcomes. Corticosteroids, β_2 agonists, and anticholinergic medications, together with antibiotics, are the most often prescribed medications for COPD patients. Patients counseling may be effective to resolve these problems associated with medication non-adherence except high cost of medications and lack of access to medications/hospital which require further strategies. Future studies should include newer strategies to assess the adherence level and long term and large population studies.

References

1. Ghei P. How to investigate drug use in health facilities. Selected drug use indicators. Health Policy 2004;1:73. Available from: <https://apps.who.int/iris/handle/10665/60519>.
2. Ana SM, Afonso, Katia MC, Verhamme, Miriam CJM, Sturkenboom *et al.* COPD in general population: prevalence, incidence

- and survival. *Respiratory Medicine*. 2011;105(120):872-1884.
- Mahesh PA, Parthasarathi G, Parthasarathi G, Hansen KN, Nahata MC. Medication Adherence, Textbook of Clinical Pharmacy Practice, Essential concepts and skills. Orient Longman Publications Pvt. Ltd; 2004. 54-71.
 - Dolce JJ, Crisp C, Manzella B, Richard MJ, Hardin M, Bailey CW. Medication Adherence Pattern in chronic obstructive Pulmonary Disease. *CHEST* 1999; 99(4): 837-41.
 - James PNE, Anderson JB, Prior JG, White JP, Henry JA, Cochrane GM. Pattern of drug taking in patients with chronic airflow obstruction. *Postgraduate Medical Journal* 1985; 61(711): 7-10.
 - Sawant MP, Padwal SL, Kale AS, Pise HN. Study of drug prescription pattern among COPD patients. *International Journal Of Basic & Clinical Pharmacology*. 2018;6(9):2228.
 - Bogart M, Stanford RH, Reinsh T, Hull M. Clinical characteristics and medication patterns in patients with COPD. *Science direct*. 2018;142.
 - Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease Update. 2010.
 - Niffy A, Vikneswari A, Sunny N, Sherlet G. Analysis of Prescribing Pattern Of Drugs In Obstructive Lung Diseases. *EJPMR* 2017;2:710-714.
 - Gigi A, Sunil S, Hepzhiba P, *et al*. Assessment of Drug Prescribing Pattern in Chronic Obstructive Pulmonary Disease Patients at a Tertiarycare Hospital. *J Pharm Res* 2015;0:45.
 - Veetil SK, Kumar S, Rajiah K. Study of drug utilization pattern for acute chronic exacerbation of pulmonary disease. *Journal Of Family Medicine And Primary Care*. 2014;(3):250.
 - Spandana M, Vaishnavi M, Pravalika P. Assess the clinical usage of nebulization therapy and antibiotics in patient with COPD. *Pharmatutor*. 2018.
 - Adams SG, Pugh JA, Kazis LE, *et al*. Characteristics Associated with Sustained Abstinence from Smoking Among Patients with COPD. *Am J Med* 2006;5:441-447.
 - Garshick E, Segal MR, Worobec TG, *et al*. Alcohol consumption and chronic obstructive pulmonary disease. *Am Rev Respir Dis [Internet]* 1989 [cited 2019 Jul 9];2:373-378. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/2764374>.
 - Unni A, *et al*. Drug utilization pattern in chronic obstructive pulmonary disease in patients at a tertiary care hospital. *Int J Pharm Pharm Sci [Internet]* 2015;11:389-391. Available from: http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L606756610%0Ahttp://sfx.hul.harvard.edu/sfx_local?sid=EMBASE&issn=09751491&id=doi:&atitle=Drug+utilization+pattern+in+chronic+obstructive+pulmonary+disease+inpatients+at+a+tertiary+c.
 - George M. Adherence In asthma and COPD. *Respiratory Care*. 2018;63(6):818-31