Research Article

Int Jou Hea Bio Sci, 6(3), 2025, 4-8

International Journal of Health care and Biological Sciences

Content available at www.saap.org.in Online ISSN: 2582-7499

Open Access

COST EFFECTIVENESS OF THERAPEUTIC CARE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) PATIENTS IN TERTIARY HOSPITALS.

Billu Chandu[1], Nelaturu Hemalatha[1], Pallikonda Sravya Sri[1], Taanguturi Jyothi[1], Udatha Trisharika[1], M. Sowjanya[2], Y. Prapurna Chandra[3]

[1]B. Pharmacy, IV Year, Ratnam Institute of Pharmacy, spsr Nellore, Andhra Pradesh.
[2]Assistant professor, Department of Pharmacy practice, Ratnam Institute of Pharmacy, spsr Nellore, Andhra Pradesh.
[3]Principal of Ratnam Institute of Pharmacy, spsr Nellore, Andhra Pradesh

Article History

Received on: 26-06-2025
Revised on: 09-07-2025
Accepted on: 18-08-2025

Abstract

Cost effectiveness of Therapeutic Care of Chronic Obstructive Pulmonary Disease (COPD) patients in tertiary hospitals. To assess the prescription pattern in Chronic Obstructive Pulmonary Disease (COPD) patients. To analyze the cost effectiveness of drugs prescribed to the Chronic Obstructive Pulmonary Disease (COPD) patients. During the study, 96 patient's prescription both in-patient and out-patient were included for the data analysis as per the inclusion and exclusion criteria. The patients were divided in 7 groups as per the age groups. Most of the patients were found in the age group of 61 – 70 in Males and 41-50 in females. Out of 74 prescriptions analyzed that 62 were male and 12 were female. Majority of the prescription were of the age group 61-70 in males and 41-50 in females. A study conducted by Poonam Salman and co-workers in the year 2020 showed similar frequency of COPD patients in the age group of our study. The minimum number of drugs per prescription was 2 and maximum was found to be 12.Outof 74 prescriptions patients with COPD alone were 41 patients (55.4) and COPD with co morbidities were 33 patients (44.59%) and combination therapy was found to be more when compared to monotherapy. The present study which includes analysis of prescription pattern and cost of illness of a COPD patient provided a baseline data about the most commonly prescribed COPD drugs and cost effectiveness of those drugs. Out of 74 total number of prescription, the minimum cost of drug is 29.6 and maximum cost of drug is301. An Average of 5.92 drugs was prescribed for every prescription. The average cost of therapy is found to be373.28 rupees. From this study it has been concluded that majority of the COPD prescriptions in our hospital are prescribed following the gold guidelines.

Keywords: Chronic Obstructive Pulmonary Disease (COPD), prescription, cost effectiveness, therapeutic care, co morbidities.

***Corresponding Author**
Dr Yalma Ramsey Msheliza

DOI: https://doi.org/10.46795/ijhcbs.v6i3.723

Introduction

Chronic obstructive pulmonary disease (COPD) is defined as a "common, preventable and treatable progressive lung disease that is characterized by persistent respiratory symptoms that includes Airflow obstruction due to alveolar abnormalities which is functional unit of lungs. It is usually caused by smoking and significant exposure to noxious or deleterious particles of gases" [1].

Prevalence

COPD is a significant global health concern so, the exact prevalence of COPD worldwide is largely unknown, but estimates have been varied from 7 to 19%. The Burden of Obstructive Lung Disease (BOLD) study was found that global prevalence of COPD is 10.1%. In this analysis men were found to have a pooled prevalence of 11.8% and women 8.5% [2].

Evidence provided that the prevalence of COPD is appreciably higher in smokers and ex-smokers when compared to the non-smokers. In those people, more than or equal to 40 years of age and less than 40years of men are more prone compared to women.

In each country, the prevalence of COPD increased steeply with age, with the highest prevalence among those above 60 years of age. As per the data analysis in 2019 approximately in the worldwide 212.3 million COPD cases are recorded.

BOLD reported worse lung function than earlier studies, with a prevalence of COPD grade 2 or higher of 10.1% overall, 11.8% for men, and 8.5% for women and a substantial prevalence of COPD of 3-11% among no smokers [3].

Classification

The most commonly occurring of these diseases are chronic bronchitis and emphysema.

- Emphysema mainly destroys the air sacs in the lungs which interfere with outward air flow.
- Bronchitis is inflammation and narrowing of bronchial tubes which allows mucus to build up [4].

Signs and Symptoms

- Chronic obstructive pulmonary disease is characterized by difficulty in breathing. Symptoms may be mild at the beginning with intermittent coughing and shortness of breath. As disease progresses symptoms become more constant where it can become more difficult to breathe.
- Early symptoms are occasional shortness of breath, especially after exercise, mild but recurrent cough. Symptoms can get progressive that may be worse and harder. As lungs become more damaged there will be shortness of breath, even after mild forms of exercise like walking a flight of stairs, wheezing, chest tightness, chronic cough with or without mucus ,frequent cold, flu or other respiratory infection.
- In later stages of chronic obstructive pulmonary disease the symptoms may include fatigue, swelling of the feet, ankles and leg, weight loss. Symptoms are likely to be much worse if you smoke or are regularly exposed to secondhand smoke [4].

Risk Factors

- Most people with chronic obstructive pulmonary disease are at least 40 years old and have at least some history of smoking. The longer and more tobacco products you smoke the greater is the risk of COPD. In addition to cigarette smoke or pipe smoke and secondhand smoke the risk of the COPD is greater if you have asthma and smoke.
- COPD can also occur if you are exposed to chemical and fumes in the workplace, long-term exposure to air pollution and inhaling dust.
- Also along with tobacco smoke, home that are poorly ventilated force the family to breathe fume from burning fuel used for cooking and heating. There may be genetic predisposition for developing COPD; people who have deficiency in a protein called Alpha 1 antitrypsin are more prone to develop COPD. The deficiency of Alpha 1 antitrypsin causes the lung to deteriorate and also affect the liver4.
- Among the industrialized and developing countries COPD is one of the leading causes of morbidity and mortality.

Patophysiology of COPD

1. COPD result from the combined process of peripheral Airway inflammation and narrowing of the Airways, leading to the airflow limitation, destruction and loss of alveoli terminal bronchioles and surrounding capillary vessels and tissues which results in the airflow limitation and leads to decrease the gas transfer capacity. The extent of airflow limitation is determined by severity of inflammation and development of fibrosis
2. Reduced air flow on exhalation leads to air trapping resulting in reduced aspiratory capacity which may cause breathlessness (also called as dyspnea) on exertion and reduced exercise capacity. Abnormalities in gas transfer occur due to reduced air flow or ventilation and as a result of loss of alveolar structure and pulmonary vascular bed. Low blood oxygen levels that is hypoxemia and raised carbon dioxide levels (hypercapnia) result from impaired gas transfer and Canvas as the disease progress [5].

Aim and Objectives

1. Cost effectiveness of Therapeutic Care of Chronic Obstructive Pulmonary Disease (COPD) patients in tertiary hospitals.
2. To assess the prescription pattern in Chronic Obstructive Pulmonary Disease (COPD) patients.
3. To analyze the cost effectiveness of drugs prescribed to the Chronic Obstructive Pulmonary Disease (COPD) patients.

Methodology

Pre designed case record form was used for factoring patient's demographic details and prescribed drug and their cost analysis. The Government Hospital, Nellore, Andhra Pradesh. The cross sectional study was conducted for a period of 6 months.

Inclusion criteria include: Prescriptions Of patient with either sex, and prescription of patients above 18 years of age.

Exclusion criteria include: Prescription of pediatrics and pregnancy women. Prescription of patients that are over a year old.

Results

During the study, 96 patient's prescription both in-patient and out-patient were included for the data analysis as per the inclusion and exclusion criteria. The study was conducted for a period of 6 months in the year 2024-2025 at Government Hospital, Nellore, Andhra Pradesh. The various parameters analyzed as follows:

Age and Sex

The patients were divided in 7 groups as per the age groups. Most of the patients were found in the age group of 61-70 in Males and 41-50 in females. Out of 74 prescriptions analyzed that 62 were male and 12 were female.

Table 01. Age and Gender wise distribution of patients:

AGE	MALE	FEMALE
31-40	1	0
41-50	4	5
51-60	14	2
61-70	28	3
71-80	11	2
81-90	4	0
90 ABOVE	0	0
TOTAL	62	12

Social Activities

The social activities such as smoking, tobacco (in any form) and alcohol consumption are taken consideration. Out of 74 prescriptions, the highest was smoking (55 %) and tobacco (32%) and alcohol (13%).

Table 02. Social activities of patients:

SOCIAL ACTIVITIES	NO OF PATIENTS
SMOKING	58
TOBACCO (ALL FORM)	13
ALCOHOL	34

Drugs Prescribed For COPD

Table 03. COPD drugs prescribed

DRUGS PRESCRIBED	TOTAL NO OF PRESCRIPTION	PERCENTAGE
SALBUTAMOL	20	12.42%
SALBUTAMOL + IPRATROPIUM BROMIDE	50	31.05%
BUDESONIDE	28	17.39%
FORMOTERO L + BUDESONIDE	14	8.70%
THEOPHYLLINE	14	8.70%
ACEBROPHYLLINE+ ACETYLCYSTINE	28	17.39%
ACEBROPHYLLINE	6	3.73%
FLUTICASONE PROPIONATE + SALMETEROL	1	0.62%
TOTAL NO OF DRUGS	161	100%

Other Drugs Prescribed

Table 04. Other drugs prescribed

OTHER DRUGS	NO. OF PRESCRIPTION
PANTOPRAZOLE	48
ANTIPYRETIC	29
ANTIBIOTICS	48
ANTI DIABETIC DRUG	14
ANTIHYPERTENSIVE DRUG	27
ANTIPLATELETS	6
VITAMIN SUPPLEMENT	31
IVF	7
MONTAIR LC	10
CORTICOSTEROIDS	6
ONDANSETRON	5
DIGOXIN	3
HEPATOPROTECTIVE	2
CNS DRUGS	3
OTHERS	5
TOTAL	244

Cost of COPD Drugs Prescribed

Table 05. Cost of COPD drugs prescribed

DRUGS PRESCRIBED	COST / DAY /PRESCRIPTION
SALBUTAMOL	Rs. 29.6
SALBUTAMOL+IPRATROPIUM BROMIDE	Rs.69
BUDESONIDE	Rs.118.85
FORMETEROL + BUDESONIDE	Rs. 301

THEOPHYLLINE	Rs.27
ACEBROPHYLLINE	Rs.142.45
ACEBROPHYLLINE +ACETYLCYSTINE	Rs. 127
FLUTICASONE PROPRIONATE + SALMETEROL	Rs.209

Interpretation

The level of significance was set at $p<0.05$. Since the p value is less than the level of significance, we can reject the null hypothesis (H_o). Thus, we conclude that there is significant difference between no of drugs for COPD with or without co morbidity.

Statistical Analysis of Cost of Prescription for Copd with and Without Comorbidity

As we see in above statistical analysis of no. of drugs prescribed for COPD with and without co morbidity shows that there is significant difference in number of drugs prescribed so hence there can be burden so illness.

Hypothesis

H_0: There is no significant difference between cost of prescription for COPD with and without co morbidity.

H_a: There is significant difference between cost of prescription for COPD with and without co morbidity.

Interpretation

The level of significance was set at $p<0.05$. Since the p value is more than the level of significance, we cannot reject the null hypothesis (H_o). Thus, we conclude that there is no significant difference between cost of prescription for COPD with or without co morbidity. i.e., burden of illness is same as two groups even there is significant different no of drugs prescribed.

Discussion

The present study was aimed to assess the prescription pattern and pharmacoeconomic analysis in Chronic Obstructive Pulmonary Disease (COPD) with drugs used in treatment to generate data with respect to the extent of variability of drug usage as well as the cost, among group of patient suffering from COPD. In our study prescriptions of 74 patients were studied [11, 12]. On analysis of prescription it was found that COPD was reported more in male patients (62) than in females (12).

Majority of the prescription were of the age group 61-70 in males and 41-50 in females. A study conducted by Poonam Salman and coworkers in the year 2020 showed similar frequency of COPD patients in the age group of our study [13].

The minimum number of drugs per prescription were 2 and maximum was found to be 12.Outof 74 prescriptions patients with COPD alone were 41 patients (55.4) and COPD with comorbidities were 33 patients (44.59%) and combination therapy was found to be more when compared to monotherapy [14,15]. This is similar to the study conducted by Shiv Kumar and his coworkers in the year 2019. The result of this study demonstrates similar prescribing pattern in comparison with the present study [16].

The overall Utilization of the COPD drugs were found to be beta agonist (Salbutamol) (12.52%), combination of beta agonist and Anti-Muscarinic agent (Salbutamol + Ipratropium Bromide) (31.05%), inhaled corticosteroids (Budesonide) (17.39%),Xanthine derivatives (Theophylline) (8.70%).This is similar to the study conducted by Shiv Kumar et al (2019) [17].

In other medications prescribed pantoprazole and antibiotics (48) was the most prescribed drug of the total other than COPD medications.

All the COPD medications were in accordance with the GOLD guidelines in the 74 prescriptions having drugs Salbutamol, Ipratropium Bromide, Budesonide, Formoterol, Salmeterol, Theophylline, Acebrophylline, Acetylcysteine, Fluticasone propionate.

In the study it was found that for COPD most of the prescription had inhalation dosage form when compared to oral dosage form. Inhalational route of administration gives instant action and efficacy due to which inhalational dosage forms of the drugs were prescribed as it causes a high local concentration in the lungs with a low systemic delivery, significantly improves the therapeutic effectiveness and minimizes systemic side effects. This is similar to the study conducted by Paul D Terry and his coworkers in the year 2020 [18].

The average cost of prescription for the management of COPD is found to be 373.8. When taken into account of COPD drugs only, the costliest drug was found to be Formoterol+Budesonide. The high cost of prescription observed in the prescriptions may be attributed to high usage of inhalational corticosteroids in these prescriptions. KrutiD. Patel and co-workers has revealed that pharmacoeconomics evaluation of COPD is essential to obtain optimal therapy at lowest price [19]. Our study also revealed that Salbutamol was most commonly presented drug for COPD [20].

Conclusion

The present study which includes analysis of prescription pattern and cost of illness of a COPD patient provided a baseline data about the most commonly prescribed COPD drugs and cost effectiveness of those drugs. Out of 74 total number of prescription, the minimum cost of drug is 29.6 and maximum cost of drug is301. An Average of 5.92 drugs was prescribed for every prescription. The average cost of therapy is found to be373.28 rupees. From this study it has been concluded that majority of the COPD prescriptions in our hospital are prescribed following the gold guidelines. The prescription pattern study showed high usage of Beta agonist alone and in combination with Ant muscarinic agents (salbutamol +ipratropium

bromide) followed by inhaled corticosteroids and Xanthine derivatives which are according to the gold guidelines.

Thus evaluation of prescription pattern helps to analyze the commonly prescribed drugs and its efficacy which will help the Healthcare professionals to follow the practice of prescribing drugs with higher efficacy and optimum cost thereby reducing the medical and financial burden of the patient resulting in the improvement of the health of the patient.

Prescription pattern studies can play a key role in helping the Healthcare system to understand, interpret and improve the use of medication. Information generated through such surveys may assist health care system and hospitals to design education programs that may improve prescribing, drug use, cost of therapy and educate patients.

Funding

Nil

Ethical Approval and Inform Consent

Not Applicable

Acknowledgement

Not Applicable.

Author Contribution

Both Authors contributed equally

Conflict of Interest

None Declared

References

1. Vestbo J, Anderson JA, Brook RD, Calverley PM, Celli BR, Crim C, Martinez F, Yates J, Newby DE. Fluticasone furoate and vilanterol and survival in chronic obstructive pulmonary disease with heightened cardiovascular risk (SUMMIT): a double-blind randomised controlled trial. The Lancet. 2016 Apr 30;387(10030):1817-26.
2. Medscape. What is the worldwide prevalence of chronic obstructive pulmonary disease (COPD)? [Internet]. 2021 [cited 2021 Aug 13]. Available from: https://www.medscape.com/answers/297664-7353/what-is-the-worldwide-prevalence-of-chronic-obstructive-pulmonary-disease-copd
3. Contributor N. COPD 1: pathophysiology, diagnosis and prognosis [Internet]. Nursing Times. 2021 [cited 2021 Aug 13]. Available from: https://www.nursingtimes.net/clinical-archive/respiratory-clinical-archive/copd-1-pathophysiology-diagnosis-and-prognosis-23-03-2020/
4. Healthline. Everything You Need to Know About Chronic Obstructive Pulmonary Disease (COPD) [Internet]. 2021 [cited 2021 Aug 13]. Available from: https://www.healthline.com/health/copd
5. Wikipedia. Chronic obstructive pulmonary disease [Internet]. 2021 [cited 2021 Aug 13]. Available from: https://en.m.wikipedia.org/wiki/Chronic_obstructive_pulmonary_disease
6. Mayo Clinic. COPD - Diagnosis and treatment [Internet]. 2021 [cited 2021 Aug 13]. Available from: https://www.mayoclinic.org/diseases-conditions/copd/diagnosis_tmt/drc-20353685
7. Burkhardt R, Pankow W. The diagnosis of chronic obstructive pulmonary disease. Dtsch Arztebl Int. 2014;111(49):834–45, quiz 846.
8. Safka KA, McIvor RA. Non-pharmacological management of chronic obstructive pulmonary disease. Ulster Med J. 2015;84(1):13–21.
9. Montuschi P. Pharmacological treatment of chronic obstructive pulmonary disease. Int J Chron Obstruct Pulmon Dis. 2006;1(4):409–23.
10. Terzikhan N, Verhamme KMC, Hofman A, Stricker BH, Brusselle GG, Lahousse L. Prevalence and incidence of COPD in smokers and non-smokers: the Rotterdam Study. Eur J Epidemiol. 2016;31(8):785–92.
11. Torabipour A, Hakim A, Ahmadi Angali K, Dolatshah M, Yusofzadeh M. Cost analysis of hospitalized patients with chronic obstructive pulmonary disease: A state-Level Cross-sectional study. Tanaffos. 2016;15(2):75–82.
12. Susmitha N, Venkatesh P. Review on infectious diseases. Int J Indig Herbs Drugs. 2022 Jan 30:18–21.
13. Narasimha GL, Dornadula GR. A Case Report on Pleural Effusion Induced by Pulmonary Tuberculosis Reactivation. Int J Sci Res (IJSR). 2019;8(8).
14. Vestbo J, Hurd SS, Agustí AG, Jones PW, Vogelmeier C, Anzueto A, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. Am J Respir Crit Care Med. 2013 Feb 15;187(4):347–65.
15. Gunturu LN, Pamayyagari K, Dornadula GR. A Case Report on Herpes Zoster Eruption Associated with Chronic Obstructive Pulmonary Disease. Int J Ther Appl. 2020;37.
16. Vamsi V, SomaSekhar K, Sandeep R, Meghana B, Sharmila S. Case Report on Pulmonary mucormycosis. Int J Healthc Biol Sci. 2023 Nov 25:7–9.
17. Venkatesh P. Review on tuberculosis. UPI J Pharm Med Health Sci. 2022 Jan 26:15–8.
18. Srujana K, Vyshnavi P, Jessy R, Venkatesh P. Study of the utilization of antimicrobial agents at a tertiary care hospital, Nellore. UPI J Pharm Med Health Sci. 2022 Jun 28:44–50.
19. Kumar S, Madhuri G, Wilson A, George TS, Saini K, Singh R, et al. Study of prescribing pattern of drugs in chronic obstructive pulmonary disease in tertiary care teaching hospital. Indian J Pharm Pract. 2019 Jul;12(3):161.