



A PROSPECTIVE OBSERVATIONAL STUDY ON CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS UNDER NEBULIZATION THERAPY OUTCOMES IN A TERTIARY CARE TEACHING HOSPITAL

Clinical Research

Dr. Kanamala Arun Chand Roby*

Narayana Pharmacy College Nellore *Corresponding Author

Syed Shabana

Narayana Pharmacy College Nellore

Kareti Brahmani

Narayana Pharmacy College Nellore

Nagasuri Balaji

Narayana Pharmacy College Nellore

Pavan Sai Ram

Dr. Kudipudi

Narayana Pharmacy College Nellore

Harinadha Baba

ABSTRACT

Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. The chronic airflow limitation that is characteristic of COPD is caused by a mixture of small airways disease (e.g., obstructive bronchiolitis) and parenchymal destruction (emphysema), the relative contributions of which vary from person to person.

Materials and Methods: Study design: The study was a prospective observational study conducted in a pulmonology department of tertiary care teaching hospital.

Study site : The study was conducted at Pulmonology unit IP of Narayana hospital, Nellore.

Study population: The study was done in 52 patients who are suffering with COPD.

Study duration: The study was conducted for 6 months (Dec 2018- May 2019)

Study criteria / Patient enrollment: Patients are enrolled in the study based on inclusion and exclusion criteria

Inclusion criteria:

- All the patients suffering with COPD
- Patients age in between 18-80
- Patients of both sexes.

Exclusion criteria:

- Pregnancy women
- Lack of interest to give information
- Pediatrics
- Who's verbal communication was poor.
- Unconscious patients.

RESULTS:

In our study the data was collected from the pulmonology department by using questionnaire and was analyzed by using statistical software's.

DISCUSSION: The study attempts to assess real pattern of drug treatment for the COPD in which 54 patients are considered for the study and out of which 30 are willing to provide the information of the age group between 18 to above 60 of both sexes in which maximum were males 18 (60%) and minimum females 12(40%). Reasons for admission the hospital were maximum of shortness of breathing, emphysema, bronchitis, chest tightness, wheezing, unintended weight loss and exacerbations is seen in all patients and minimum were chronic cough, and lack of energy and swelling in ankles. cough observed in patients suffering with COPD maximum days is 3 days 30(100%), 1 week is 10(30%), 2 weeks is 10(30%), 3 weeks is 10(30%), 4 weeks is 10(30%), 5 weeks is 10(30%), 6 weeks is 10(30%), 7 weeks is 10(30%), 8 weeks is 10(30%), 9 weeks is 10(30%), 10 weeks is 10(30%), 11 weeks is 10(30%), 12 weeks is 10(30%), 13 weeks is 10(30%), 14 weeks is 10(30%), 15 weeks is 10(30%), 16 weeks is 10(30%), 17 weeks is 10(30%), 18 weeks is 10(30%), 19 weeks is 10(30%), 20 weeks is 10(30%), 21 weeks is 10(30%), 22 weeks is 10(30%), 23 weeks is 10(30%), 24 weeks is 10(30%), 25 weeks is 10(30%), 26 weeks is 10(30%), 27 weeks is 10(30%), 28 weeks is 10(30%), 29 weeks is 10(30%), 30 weeks is 10(30%), 31 weeks is 10(30%), 32 weeks is 10(30%), 33 weeks is 10(30%), 34 weeks is 10(30%), 35 weeks is 10(30%), 36 weeks is 10(30%), 37 weeks is 10(30%), 38 weeks is 10(30%), 39 weeks is 10(30%), 40 weeks is 10(30%), 41 weeks is 10(30%), 42 weeks is 10(30%), 43 weeks is 10(30%), 44 weeks is 10(30%), 45 weeks is 10(30%), 46 weeks is 10(30%), 47 weeks is 10(30%), 48 weeks is 10(30%), 49 weeks is 10(30%), 50 weeks is 10(30%), 51 weeks is 10(30%), 52 weeks is 10(30%).

Conclusions: Our study concluded that the patients who are under the treatment of Nebulization or COPD shows better effects in the hospitals after the discharge it is difficult or nebulization. So the Nebulization should be reduced and the inhalers make the better outcome for the patients in and out of the hospital.

KEYWORDS

pulmonology, Chronic Obstructive Pulmonary Disease, Statistical Software, Questionnaire.

INTRODUCTION:

Chronic Obstructive Pulmonary Disease (COPD) is an umbrella term used to describe progressive lung diseases including emphysema, chronic bronchitis, and refractory (non-reversible) asthma. This disease is characterized by increasing breathlessness.

COPD is a progressive and (currently) incurable disease, but with the right diagnosis and treatment, there are many things you can do to manage your COPD and breathe better. People can live for many years with COPD and enjoy life.

Emphysema

Damage to the alveoli (air sacs) causes emphysema. The walls inside the alveoli disappear, making many small sacs become larger, single sacs. These larger sacs do not absorb oxygen as well. So, less oxygen is absorbed into the blood.

Chronic Bronchitis

Damage to the bronchial tubes causes chronic bronchitis. Bronchitis occurs when the bronchial tubes are irritated and swollen. This causes coughing and shortness of breath. If mucus comes up with the cough and the cough lasts at least three months for two years in a row, the bronchitis has become chronic bronchitis.

Refractory (non-reversible) asthma

Refractory (non-reversible) asthma is a type of asthma that does not respond to usual asthma medications. In an asthma attack, bronchial airways tighten up and swell. Medications can usually reverse this, opening up the airways and returning them to how they were before the asthma attack. In refractory asthma, medications cannot reverse the tightening and swelling of the airways.

Signs and Symptoms of COPD

It's easy to think of shortness of breath and coughing as a normal part of

aging, but these could be signs of COPD. That's why it is important to talk with your healthcare provider as soon as you notice any of these symptoms. COPD can progress for years without noticeable shortness of breath. Ask your healthcare provider about ordering a SPIROMETRY TEST.

Symptoms of COPD can be different for each person, but common symptoms are:

- Increased shortness of breath
- Frequent coughing (with and without mucus)
- Increased breathlessness
- Wheezing
- Tightness in the chest

COPD and Other Health Problems (Comorbidities)

Comorbid conditions seem to be more common in people with COPD than in people with other medical problems. These conditions may include:

High blood pressure, High cholesterol, Heart disease, Diabetes, Osteoporosis, Depression, Arthritis, Sleep Apnea, Cancer and Other medical problems.

COPD Diagnosis

A spirometry test measures how well your lungs are working. It's a simple and easy test that can help diagnose COPD.

A person may have Chronic Obstructive Pulmonary Disease (COPD) but not notice symptoms until it is in the moderate stage.

Spirometry test

Spirometry is a simple, non-invasive test that is used to diagnose COPD. When you take the test, you will be asked to blow all the air out of your lungs into a mouthpiece connected to a machine known as a spirometer.

A spirometry test can also show your doctor how severe your COPD may or may not be. There are several stages of COPD. The extent of your COPD is classified into 4 different stages that are defined by your symptoms and the results of your Spirometry Test.

Less than 80% of predicted is considered moderate COPD, and less than 50% of predicted is severe. People with asthma will have a low FEV1/FEV6 ratio when they are having an attack, and then will return to normal or almost normal after using fast-acting medications.

Your doctor may order additional tests to see if your symptoms are caused by lung disorders other than COPD.

Treatment

A diagnosis of COPD is not the end of the world. Most people have mild forms of the disease for which little therapy is needed other than smoking cessation. Even for more advanced stages of disease, effective therapy is available that can control symptoms, reduce your risk of complications and exacerbations, and improve your ability to lead an active life.

Smoking cessation

The most essential step in any treatment plan for COPD is to stop all smoking. It's the only way to keep COPD from getting worse — which can eventually reduce your ability to breathe. But quitting smoking isn't easy. And this task may seem particularly daunting if you've tried to quit and have been unsuccessful.

Medications

Doctors use several kinds of medications to treat the symptoms and complications of COPD. You may take some medications on a regular basis and others as needed.

Bronchodilators

These medications — which usually come in an inhaler — relax the muscles around your airways. This can help relieve coughing and shortness of breath and make breathing easier. Depending on the severity of your disease, you may need a short-acting bronchodilator before activities, a long-acting bronchodilator that you use every day or both.

Short-acting bronchodilators include albuterol (ProAir HFA, Ventolin HFA, others), levalbuterol (Xopenex HFA), and ipratropium

(Atrovent). The long-acting bronchodilators include tiotropium (Spiriva), salmeterol (Serevent), formoterol (Foradil, Perforomist), arformoterol (Brovana), indacaterol (Arcapta) and aclidinium (Tudorza).

Inhaled steroids

Inhaled corticosteroid medications can reduce airway inflammation and help prevent exacerbations. Side effects may include bruising, oral infections and hoarseness. These medications are useful for people with frequent exacerbations of COPD. Fluticasone (Flovent HFA, Flonase, others) and budesonide (Pulmicort Flexhaler, Uceris, others) are examples of inhaled steroids.

Combination inhalers

Some medications combine bronchodilators and inhaled steroids. Salmeterol and fluticasone (Advair) and formoterol and budesonide (Symbicort) are examples of combination inhalers.

Oral steroids

For people who have a moderate or severe acute exacerbation, short courses (for example, five days) of oral corticosteroids prevent further worsening of COPD. However, long-term use of these medications can have serious side effects, such as weight gain, diabetes, osteoporosis, cataracts and an increased risk of infection.

Phosphodiesterase-4 inhibitors

A new type of medication approved for people with severe COPD and symptoms of chronic bronchitis is roflumilast (Daliresp), a phosphodiesterase-4 inhibitor. This drug decreases airway inflammation and relaxes the airways. Common side effects include diarrhea and weight loss.

Theophylline

This very inexpensive medication may help improve breathing and prevent exacerbations. Side effects may include nausea, headache, fast heartbeat and tremor. Side effects are dose related, and low doses are recommended.

Antibiotics

Respiratory infections, such as acute bronchitis, pneumonia and influenza, can aggravate COPD symptoms. Antibiotics help treat acute exacerbations, but they aren't generally recommended for prevention. However, a recent study shows that the antibiotic azithromycin prevents exacerbations, but it isn't clear whether this is due to its antibiotic effect or its anti-inflammatory properties.

Lung therapies

Doctors often use these additional therapies for people with moderate or severe COPD:

Oxygen therapy. If there isn't enough oxygen in your blood, you may need supplemental oxygen. There are several devices to deliver oxygen to your lungs, including lightweight, portable units that you can take with you to run errands and get around town.

Some people with COPD use oxygen only during activities or while sleeping. Others use oxygen all the time. Oxygen therapy can improve quality of life and is the only COPD therapy proven to extend life. Talk to your doctor about your needs and options.

Pulmonary rehabilitation program. These programs generally combine education, exercise training, nutrition advice and counseling. Pulmonary rehabilitation may shorten hospitalizations, increase your ability to participate in everyday activities and improve your quality of life. Talk to your doctor about referral to a program.

Materials and Methods:

Study design: The study was a prospective observational study conducted in a pulmonology department of tertiary care teaching hospital.

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- Unconscious patients.

Sample size:

Calculation o sample size:

$$n = Z^2 d^2 / pq$$

Where Z = Risk o type I error (value o Z² is 1.96²)

d = Absolute precision

p = Assumed prevalence.

q = 1 - p

From the previous study conducted by Abbas Ghorbaniet al. the prevalence was reported as 58.7%(82). Assuming this as prevalence and taking precision of 5% with a level of significance of 95% the minimum sample size required or the study is 30.

Study materials:

- Patients informed consent form.
- ST.George's respiratory questionnaire form

Study method: The study will be initiated after obtaining the permission from the Institutional ethical committee. The patient will be enrolled in the study after taking informed consent from them. The enrollment of patients will be done on the basis of inclusion and exclusion criteria.

The data or the present study will be collected by "**Patient interview and chat review method**", which is well suited to identify all the necessary and relevant baseline information, which will be collected on a specially design patient data collection proforma and ST.George's questionnaire. Which includes patients demographics like age, socio-economic status, family income, educational status, high risk actors, past and present medical/medication history, lab investigation data, radiographic data, physician medication order form, nurse's medication administration records(drug chart) and any other verbal communication data.

RESULT :

Demographics	No of patients (n=30)	Frequency (%)
Age		
18- 24	5	16.6
24-40	6	20
41-60	12	40
Above 60	7	23.4
Sex		
Male	18	60
Female	12	40
Educational status		
Primary	9	30
Secondary	9	30
Tertiary	12	40
Nutritional status		
Poor	9	30
Average	7	23.33
Better	14	46.67
Hygienic conditions		
Poor	11	36.66
Average	6	20
Better	13	43.34
Nutritional status		
Poor	9	30
Average	7	23.33
Better	14	46.66
Family history of COPD	14	46.66
Smoker	18	60
Alcoholic	18	60

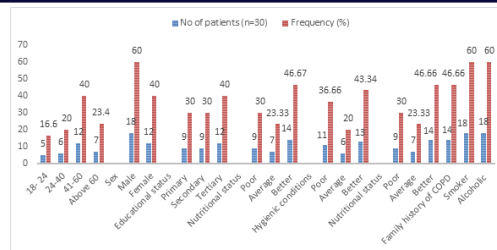


Table 2: Reasons for admissions in the hospital

Reasons	No of patients	Frequency (%)
Shortness of breathing	30	100
Emphysema	12	40
Bronchitis	14	46.6
Chest tightness	24	80
Wheezing	30	100
Unintended weight loss	27	90
Swelling in ankles	2	6.66
Exacerbations	30	100
Chronic cough	30	100
Lack of energy	28	93.33

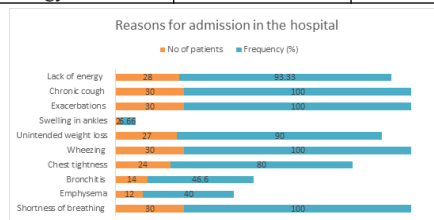


Table 3: Cough observed or Number of days

Cough observed	No of patients	Frequency (%)
3 days	30	100
1 week	15	50
2 week	12	40
3 week	14	46.6
4 weeks	8	26.6
Above 5 weeks	5	16.6

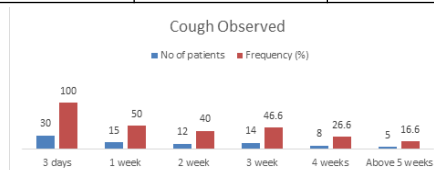


Table 4: Cough with sputum

Cough with sputum	No of patients	Frequency (%)
Light colored	6	20
Yellowish	12	40
Dark yellow	15	50
Bloody sputum	18	60

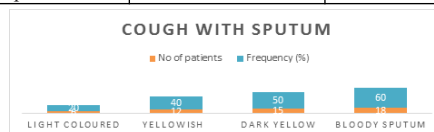


Table 5: Diagnosis of COPD

Diagnosis of COPD	No of patients	Frequency (%)
Pulmonary function tests	30	100
Chest x- ray	30	100
CT scan	5	16.6
Arterial blood gas analysis	3	10
Alpha-1- anti trypsin deficiency	5	16.6

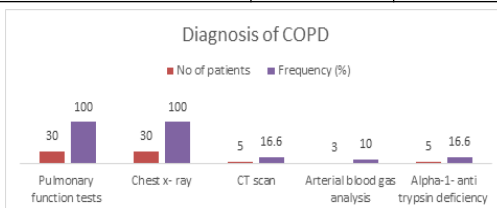
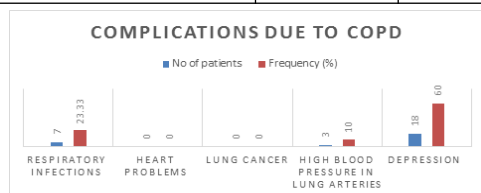
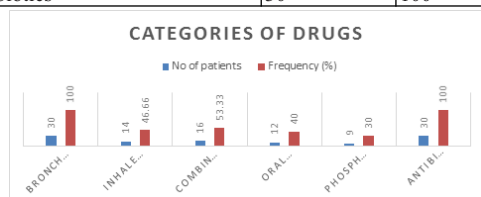


Table 6: Complications observed due to COPD

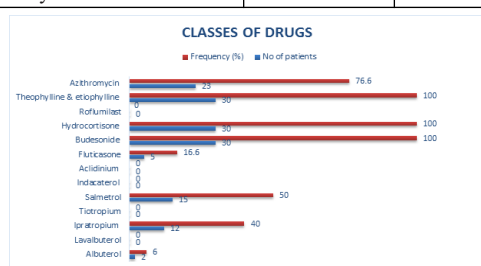
Complications	No of patients	Frequency (%)
Respiratory infections	7	23.33
Heart problems	0	00
Lung cancer	0	00
High blood pressure in lung arteries	3	10
Depression	18	60

**Table 7: Categories of drugs used for COPD**

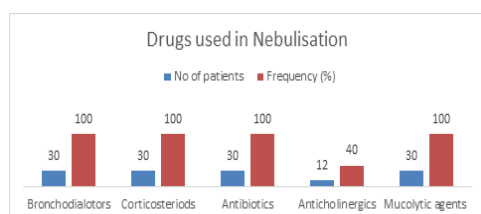
Categories of drugs	No of patients	Frequency (%)
Bronchodilators	30	100
Inhaled steroids	14	46.66
Combination inhalers	16	53.33
Oral steroids phosphodiesterase-4 inhibitors	12	40
Antibiotics	9	30
	30	100

**Table 8: Classes of drugs**

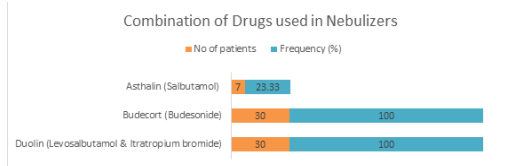
Classes of drugs	No of patients	Frequency (%)
Albuterol	2	6
Lavalbuterol	0	0
Ipratropium	12	40
Tiotropium	0	0
Salmeterol	15	50
Indacaterol	0	0
Acclidinium	0	0
Fluticasone	5	16.6
Budesonide	30	100
Hydrocortisone	30	100
Roflumilast	0	0
Theophylline & etioophylline	30	100
Azithromycin	23	76.6

**Table 9: Type of Drugs used in Nebulization to treat COPD**

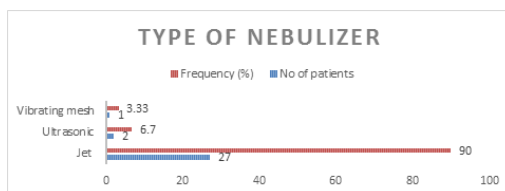
Drug Used in Nebulization	No of patients	Frequency (%)
Bronchodilators	30	100
Corticosteroids	30	100
Antibiotics	30	100
Anticholinergics	12	40
Mucolytic agents	30	100



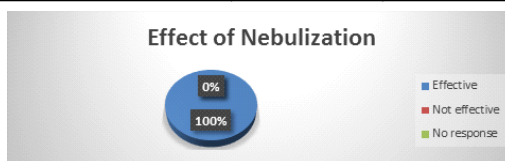
Combination of Drugs in Nebulizers	No of patients	Frequency (%)
Duolin (Levosulbutamol & Ipratropium bromide)	30	100
Budecort (Budesonide)	30	100
Asthalin (Salbutamol)	7	23.33

**Table 10: Type of nebulizers**

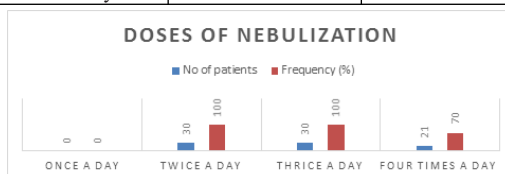
Nebulizer	No of patients	Frequency (%)
Jet	27	90
Ultrasonic	2	6.7
Vibrating mesh	1	3.33

**Table 11: Effect of nebulization**

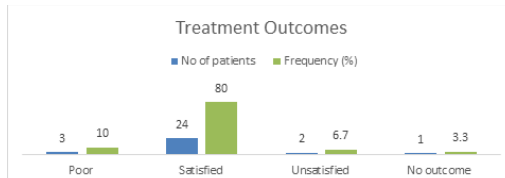
Effect of Nebulization	No of patients	Frequency (%)
Effective	30	100
Not effective	0	0
No response	0	0

**Table 12: Doses of nebulization**

Doses of nebulization	No of patients	Frequency (%)
Once a day	0	0
Twice a day	30	100
Thrice a day	30	100
Four times a day	21	70

**Table 13: Treatment outcomes**

Treatment outcomes	No of patients	Frequency (%)
Poor	3	10
Satisfied	24	80
Unsatisfied	2	6.7
No outcome	1	3.3

**DISCUSSION:**

The study attempts to assess real pattern of drug treatment for the COPD in which 54 patients are considered for the study and out of which 30 are willing to provide the information of the age group between 18 to above 60 of both sexes in which maximum were males 18 (60%) and minimum females 12(40%). The education status were maximum tertiary 12(40%), secondary 9(30%) and minimum were primary 9(30%) with nutritional status of better 14(46.67%) and the

average 7 (23.33%) and the least was poor 9 (30%), hygienic conditions was better is 13 (43.34%), and minimum was poor 11(36.66), nutritional status better was observed in 14(46.66%) and the poor was seen in 9(30%). Family history of COPD was observed in 14 (46.66%), smoker 18 (60%) and alcoholic 18 (60%). Reasons for admission the hospital were maximum of shortness of breathing, emphysema, bronchitis, chest tightness, wheezing, unintended weight loss and exacerbations is seen in all patients and minimum were chronic cough, and lack of energy and swelling in ankles. cough observed in patients suffering with COPD maximum days is 3 days 30(100%), 1 week is 15 (50%), Diagnosis of COPD in the hospitalized patients are gone mainly through pulmonary function test 30 (100%), chest x - ray 30 (100%), CT scan 5 (16.6%), ABG analysis 3 (10%), alpha 1- anti trypsin deficiency 5 (16.6%). complications observed in COPD patients are mainly respiratory infections 7 (23.33), and mainly depression 18 (60%). And classes o drugs in COPD albuterol 2(06%), lavalbuterol 0(00%), ipratropium 12(40%), tiotropium 0(00%), salmetrol 15(50%), indacaterol 0 (00%), acclidinium 0(00%), fluticasone 5(16.6%) budesonide 30(100%), hydrocortisone 30(100%) roflumilast 0(00%) theophylline & etioophylline 30(100%) azithromycin 23(76.6). The drugs used in the nebulizer is duolin 30 (100%), budecort 30(100%) and asthalin 7 (23.66). The type of nebulizers used in the hospital are mainly jet nebulizer 27 (90%), ultrasonic were 2 (6.7%) and vibrating mesh 1 (3.33%), effect o nebulization to the patients were effective 30 (100%) and the doses o nebulization given to the patients are maximum twice a day and thrice a day 30(100%) and inally treatment outcomes was also analyzed and found that the patients are satisfied 24 (80%), unsatisfied were 2 (6.7%) and least was poor 3 (10%).

CONCLUSIONS:

Our study concluded that the patients who are under the treatment of Nebulization or COPD shows better effects in the hospitals after the discharge it is difficult or nebulization. So the Nebulization should be reduced and the inhalers make the better outcome for the patients in and out of the hospital. As we are the clinical pharmacists we should advice the patients about the benefits of inhalers to the patients than nebulization and the drugs to be used or the beneficial of their life. The clinical centers are also having the knowledge regarding Bronchodilators, corticosteroids and antibiotics usage to be monitored.

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Conflict of interest

Yes.

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