INDIAN JOURNAL OF
APPLIED BASIC
MEDICAL SCIENCES

IJABMS
Peer Reviewed Journal
E-ISSN: 2249-7935
ISSN: 0975-8917

OUTCOME OF PATIENTS PRESENTED WITH ACUTE EXACERBATION OF COPD TO EMERGENCY DEPARTMENT OF A TERTIARY CARE HOSPITAL

Dr Nolesh J Patel, *Dr Mehul P Gajjar, Dr Rohan Parekh, Dr Shrushti Patel, Dr Vikash Gupta, Dr Advait V Thakor

3rd year resident, Emergency Medicine.

*M.D., General Medicine, Assistant Professor, Emergency Medicine. mehul.mpg@gmail.com

2nd year resident, Emergency Medicine.

1st year resident, Emergency Medicine.

Senior resident, Emergency Medicine.

M.D., Anesthesia, Professor & Head, Emergency Medicine.
Emergency Medicine Department, SVP hospital and Smt. NHL Municipal Medical College, Ellisbridge, Ahmedabad-380006.

Abstract

The purpose of this article is to study and provide an overview of the epidemiology, clinical presentation, disposition and outcome of COPD in India, which is one of the most affected countries in the world and contributes significantly to the morbidity and mortality of this disease, to the Emergency physicians as they are the front-line force for diagnosing and managing all the emergencies in the hospital. ***Materials and methods:*** *The current work represents a single institutional retrospective study on epidemiology, clinical presentation, disposition and outcome of COPD carried out in tertiary care teaching hospital, Ahmedabad. The data was obtained from the record of 200 patients and reviewed and analysed from October-2017 to September-2019.* ***Results:*** *The data of 200 patients was collected from the record for this study. COPD was found more common in male and 5th- 6th decade. Smoking and tuberculosis were the major risk factors. COPD patients were most commonly presented with breathlessness, fever and cough. In the patients of COPD, emphysematous changes were found more commonly.*

Keywords: *Acute exacerbation of COPD, smoking, tuberculosis.*

INTRODUCTION

Global initiative for chronic obstructive lung disease (GOLD) has defined chronic obstructive pulmonary disease (COPD) as "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."[1] COPD has two main forms: chronic bronchitis, defined in clinical terms, and emphysema, defined in terms of anatomic pathology. Typical symptoms of COPD include dyspnoea, chronic cough and chronic sputum production, but spirometry detected persistent airflow limitation (post-bronchodilators forced expiratory volume in 1 second (FEV1)/forced vital capacity (FVC) < 0.7) is required to establish the clinical diagnosis.[1]

Globally, about 328 million people are estimated to suffer from COPD, which is 4.77% of the world population. [2] It is one of the major leading causes of death worldwide.[3] Globally, the most common cause of chronic airflow obstruction is smoking and exposure to tobacco smoke. The next most potent risk factor is a history of tuberculosis.[4] Occupational exposure, air pollution and individual predisposition also play an important role. Acute exacerbation of COPD (AECOPD) is a common cause of emergency room visits and is the major cause of mortality and morbidity.[5] Moreover,

more than half of the patients discharged with the diagnosis of AECOPD often require readmission in the subsequent six months. Thus, the economic and social burden of AECOPD is extremely high.

COPD is the second most common lung disorder after pulmonary tuberculosis in India.[6] As on 2016, three out of five leading causes of mortalities constitute non-communicable diseases whereas COPD is the second biggest cause of death in India today.[6] Different studies have revealed varying range of prevalence of COPD in different states in India. The prevalence ranged between 2 to 22% among the men and 1.2 to 19% among women in different population-based studies across India. [7] Incidences were higher in males due to higher prevalence of smoking, but now it is common in males and females. It is a disease of middle aged and elderly people, less common below the age of 35 years.
Data from a United States administrative data set analysis suggest that AECOPD account for approximately 0.8% of ED visits, that 49% of patients were hospitalized after an ED visit for COPD and that average length of stay was approximately 4 days.[8] European studies report admission rates of up to 65%.[9] There is minimal detailed data about demographic and clinical features, assessment, treatment, disposition and outcome of patients with AECOPD treated in ED of India. Recent guidelines[10] recommend a number of treatments in the acute phase of care in order to optimize outcomes. These include the use of controlled oxygen therapy, inhaled bronchodilators, systemic corticosteroids, antibiotics if there is clinical, laboratory or chest X-ray (CXR) evidence of infection, the taking of a CXR, blood gas analysis for patients classified as more than mild and non-invasive ventilation (NIV) in patients with significant respiratory acidosis (pH < 7.30). There are limited data regarding compliance with these aspects in ED.

AIMS & OBJECTIVES

To study-

- Demographic data in terms of age and sex distribution
- Clinical presentation of patients with COPD in ED
- Disposition and outcome of patients with AECOPD treated in ED of tertiary care hospital.

METHODOLOGY

During the period of 24 months i.e., from October-2017 to September-2019, the retrospective study on "A STUDY ON EPIDEMIOLOGY, CLINICAL PRESENTATION, DISPOSITION AND OUTCOME OF PATIENTS PRESENTED WITH ACUTE EXACERBATION OF COPD TO EMERGENCY DEPARTMENT OF A TERTIARY CARE HOSPITAL" has been done in tertiary care teaching hospital which is affiliated with Gujarat University, Ahmedabad.

Inclusion Criteria

- Who was diagnosed with COPD
- Age > 25 years

Exclusion Criteria

- COPD who were admitted for surgical, traumatic or other reasons
- History of following diseases in absence of COPD like - Bronchial Asthma, Pulmonary tuberculosis, Interstitial Lung Disease, Primary pulmonary hypertension, Coronary Artery Disease, Valvular Heart Disease, Sleep Apnoea Syndrome.

With the above inclusion and exclusion criteria, data was obtained from the medical record department. Data was entered in Microsoft excel sheet and analysed using the updated version of SPSS software. The level of significance was set at 0.05. Help of statistician was taken as and when required.

OBSERVATION & RESULTS

The data of 200 patients who fulfilled the inclusion criteria was collected from the records.

1. Age wise distribution of patients (table I, figure I):

Table I: Age wise distribution

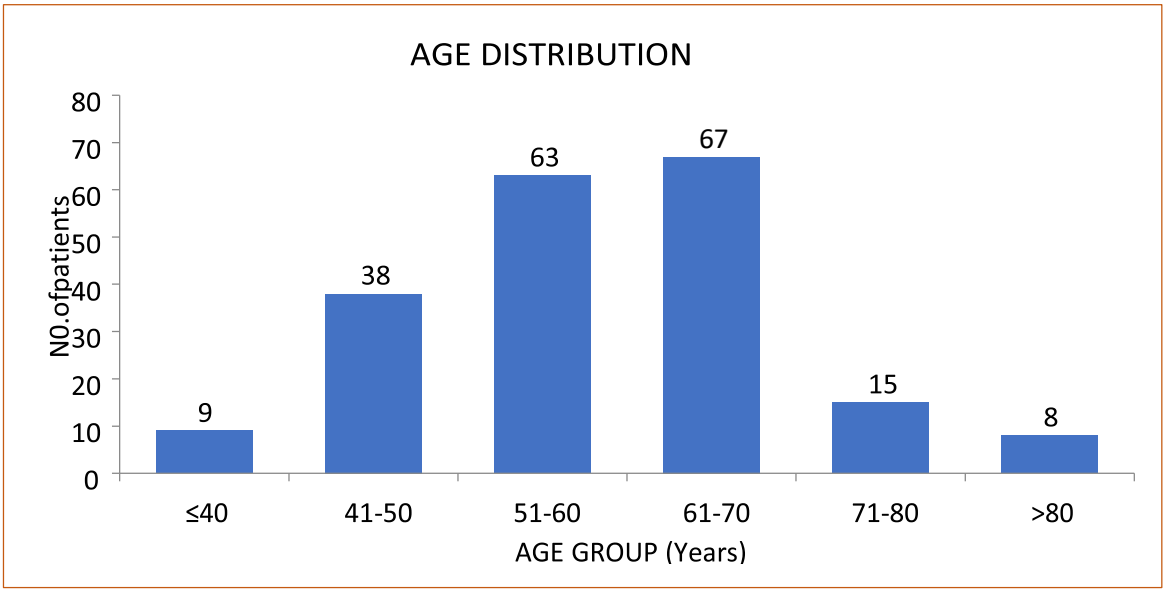
AGE DISTRIBUTION (Years)	No of patients (n=200)	Percentage (%)
≤40	09	04.5
41-50	38	19.0

INDIAN JOURNAL OF
APPLIED BASIC
MEDICAL SCIENCES

IJABMS
Peer Reviewed Journal
E-ISSN: 2249-7935
ISSN: 0975-8917

51-60	63	31.5
61-70	67	33.5
71-80	15	07.5
>80	08	04.0

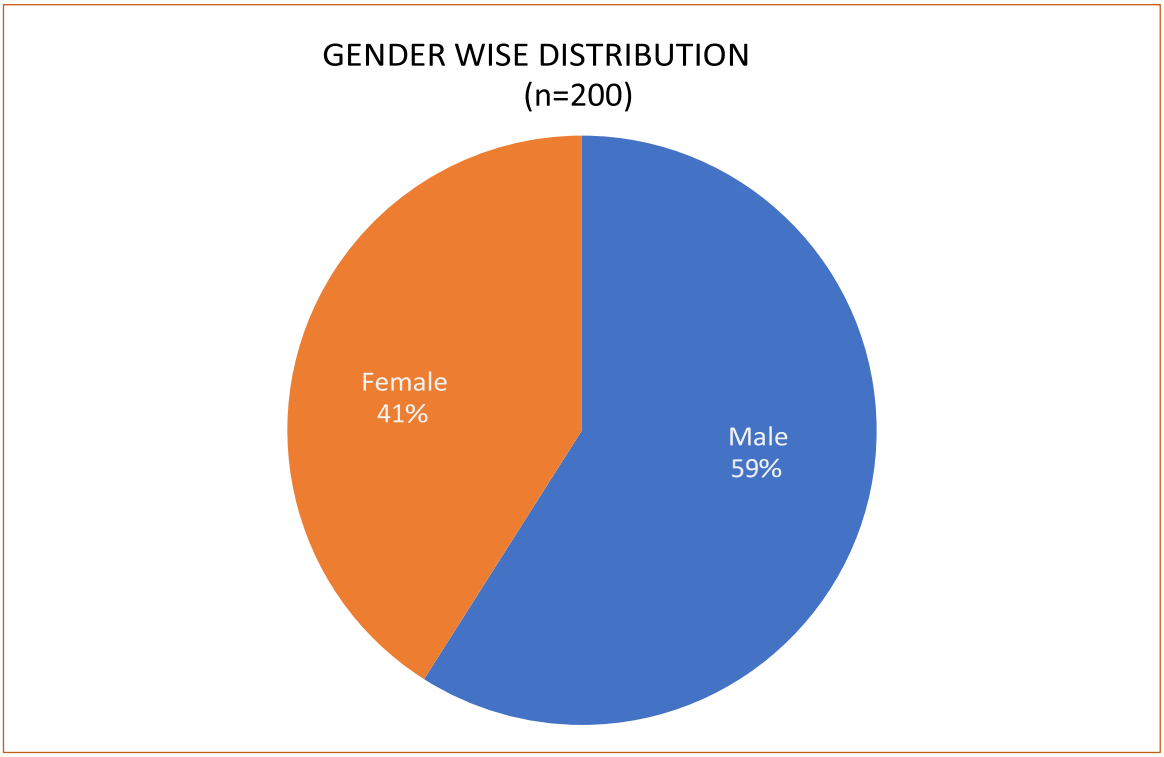
Figure I: Age wise distribution



The maximum number of patients were within the age group of 61-70 years followed by 51-60 years of age group.

2. Gender wise distribution (figure II):

Figure II: Gender wise distribution



In this study, 118 patients were males and 82 patients were females with male to female ratio of 1.44:1.

INDIAN JOURNAL OF
APPLIED BASIC
MEDICAL SCIENCES

IJABMS
Peer Reviewed Journal
E-ISSN: 2249-7935
ISSN: 0975-8917

3. Risk factors for COPD (table II)

Table II: Risk factors for COPD

RISK FACTOR	No. of Patients (n=200)	Percentage (%)
SMOKING	116	58.0
OLD AGE (>60)	86	43.0
HISTORY OF PULMONARY KOCH'S	54	27.0
INDOOR AIR POLLUTION	32	16.0
FAMILY HISTORY OF COPD	24	12.0

In the present study, smoking was the most common risk factor for COPD (58 %), followed by old age >60yrs (43%), pulmonary Koch's (27%) and indoor air pollution from home based biogas fuel, wood & kerosene (16%).

4. Clinical presentation (table III)

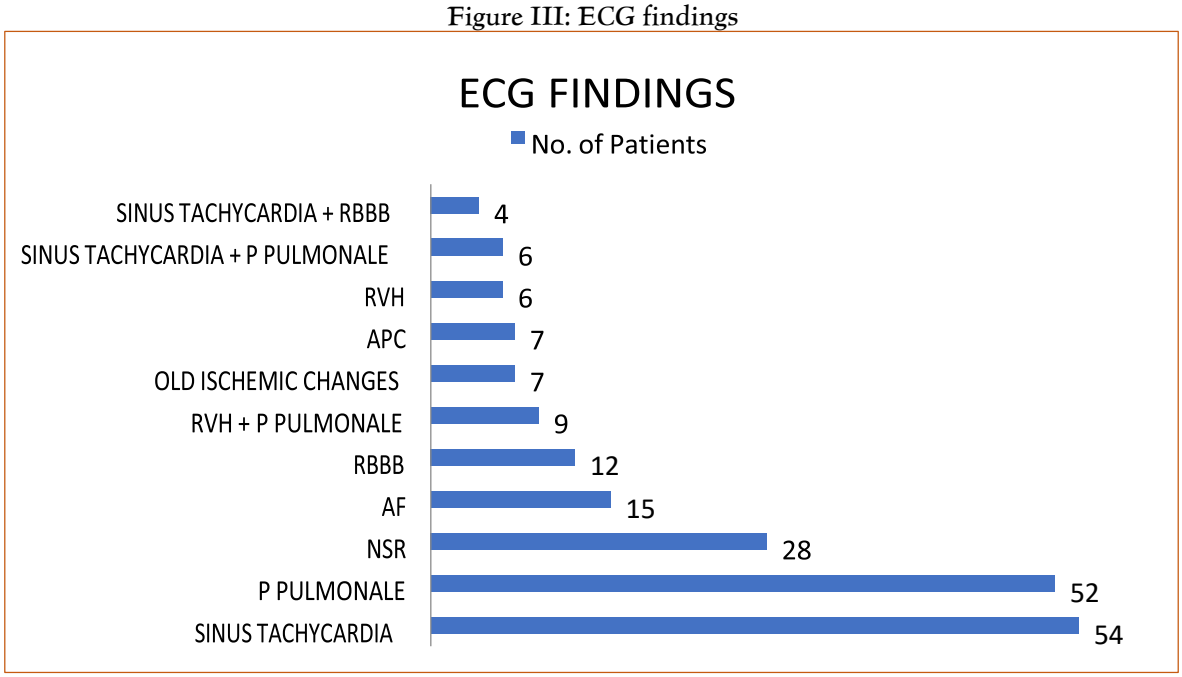
Table III: Clinical presentation

PRESENTATION OF PATIENTS	No. of Patients (n=200)	%
BREATHLESSNESS, COUGH & FEVER	146	73.0
BREATHLESSNESS	28	14.0
ALTERED SENSORIUM	09	04.5
BREATHLESSNESS, COUGH, CHEST PAIN & PEDAL OEDEMA	09	04.5
PRODUCTIVE COUGH	08	04.0

In this study, maximum number of patients had breathlessness with cough & fever (73%) followed by only breathlessness (14%), altered sensorium (4.5%) and breathlessness, cough, chest pain and pedal oedema (4.5%).
Some patients (4%) has isolated productive cough as clinical presentation.

5. ECG findings (figure III)

Figure III: ECG findings



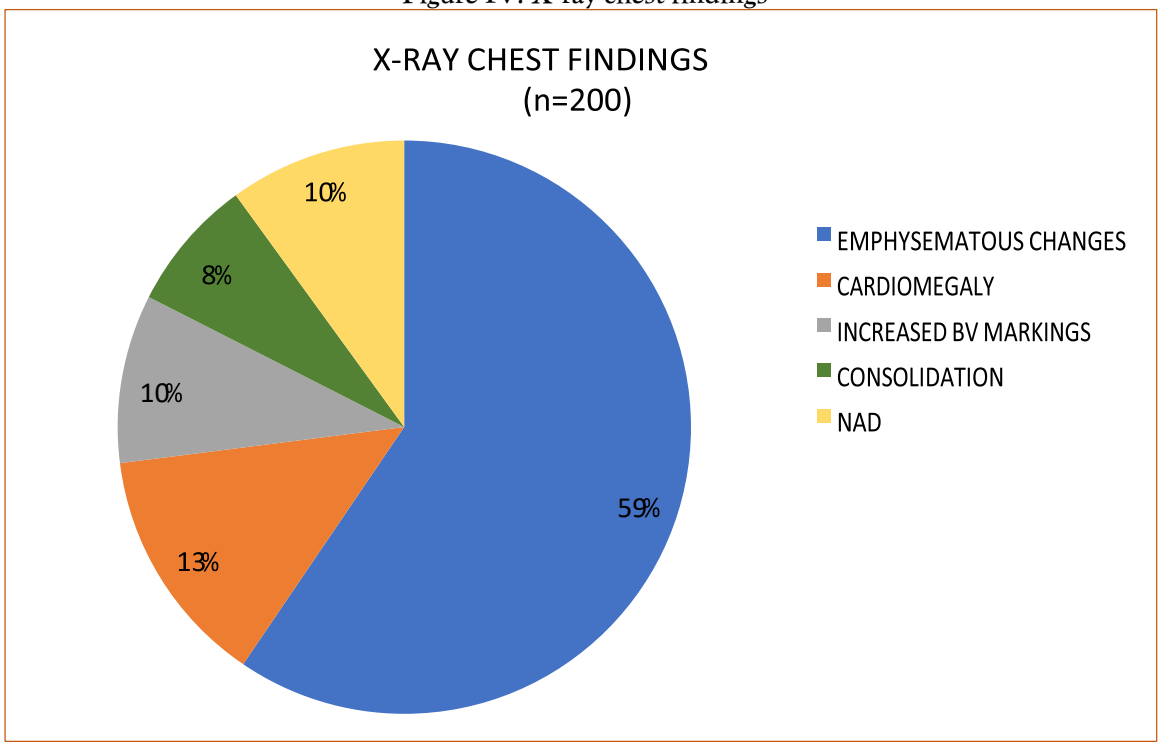
INDIAN JOURNAL OF
APPLIED BASIC
MEDICAL SCIENCES

IJABMS
Peer Reviewed Journal
E-ISSN: 2249-7935
ISSN: 0975-8917

In the present study, the most common ECG finding was Sinus tachycardia (27%) followed by P Pulmonale (26%). Sinus tachycardia + RBBB (2%) and Sinus tachycardia + P Pulmonale (3%) are the least common ECG findings. 14% of patients were found with normal sinus rhythm (NSR).

6. X-ray chest findings (figure IV)

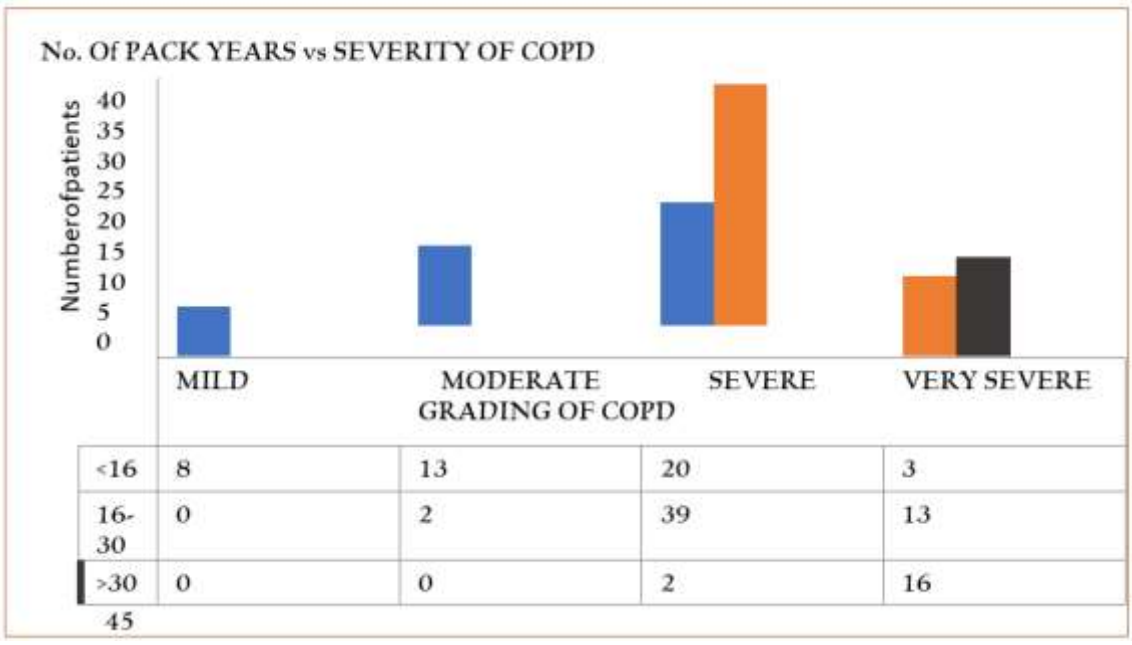
Figure IV: X-ray chest findings



In this study, maximum patients were found with emphysematous changes (59.5%) followed by cardiomegaly (13%) and increased broncho-vascular markings. 8% of patients were found with consolidation in right or left lung.

7. Association of pack per years of smoking with severity of disease (figure V)

Figure V: Association of pack years of smoking with severity of disease



In this study, out of 18 smokers with > 30 pack years of smoking, 16 patients were found with very severe disease, while in 54 smokers with 16-30 pack years of smoking, 39 had severe and 13 had very severe disease and only 2 were with moderate disease. In <16 pack years of smokers, 20 had severe followed by 13 with moderately severe, 8 with mild and 3 with very severe disease.

8. Requirement of ventilatory support (table IV)

Table IV: Requirement of ventilatory support

REQUIREMENT OF VENTILATORY SUPPORT	No. of Patients (n=200)	%
NIV	107	53.5
INVASIVE	20	10.0
NO	73	36.5

In this study, 53.5% patients required NIV support, while 10% patients required invasive ventilator support.

9. Disposition from ER (table V)

Table V: Disposition from ER

No. of Patients DISPOSITION (n=200)		Percentage (%)
MICU	64	32.0
WARD	115	57.5
DAMA	14	07.0
EXPIRED	07	03.5

57.5% patients were shifted to the general ward (57.5%) while 32% patients were shifted to ICU. 3.5% were expired.

10. Factors predicting poor outcome (table VI)

Table VI: Factors predicting poor outcome

No. of Patients FACTORS PREDICTING POOR OUTCOME Expired	
AGE (>60 Yrs)	7
PACK YEARS (>40)	5
NO. OF HOSPITAL ADMISSION FOR SAME COMPLAINTS (>2)	7
MECHANICAL VENTILATION	7
FEV1 (VERY SEVERE)	5
ECG (AF)	5
HEART RATE (>140)	6
ABGA (TYPE 2 RESPIRATORY FAILURE)	7
pH (<7.05)	6
pCO_2 (>80)	6
pO_2 (<60)	7
SpO_2 (<70)	5
RESPI. RATE (>35)	5

Patients of 60 years or more, who had 40 or more pack years of smoking, who was previously hospitalized for 2 or more times for the same complaints with need for mechanical ventilation, who had very severe disease stage, presented with heart rate of >140 and AF in ECG with SpO_2 < 70, pH<7.2 and pCO_2 >80 are very prone for poor outcome.

INDIAN JOURNAL OF
APPLIED BASIC
MEDICAL SCIENCES

IJABMS
Peer Reviewed Journal
E-ISSN: 2249-7935
ISSN: 0975-8917

DISCUSSION

COPD is one of the leading causes of chronic morbidity and mortality worldwide. This study consisted of 200 patients admitted at a tertiary care hospital.

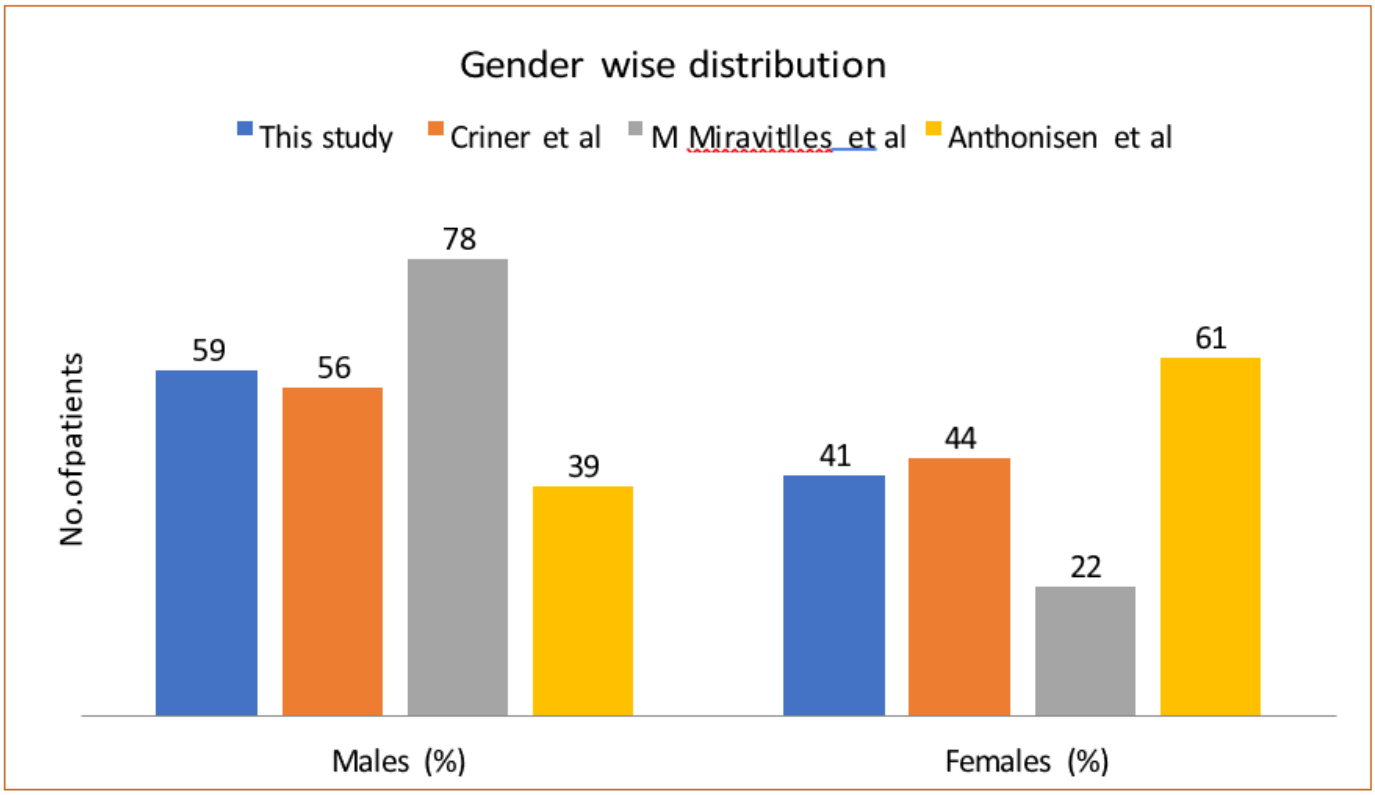
Age

COPD is a disease that occurs more commonly in the 5th to 6th decade. Mean age of COPD in this study was 59.3 years. Various studies suggested that COPD is a disease of the old age (because of the decrease in FEV_1 with increasing age). In study, conducted by Anthonisen et al[11], the mean age for COPD was 73 years, while Criner et al[12] found it to be 62.2 years which is comparable to this study. In a study by Teeku sinha et al[13] in chhattisgarh, mean age was 57.1 yrs which is very close to this study while Goksu[14] et al found mean age to be around 69 years. In a study conducted at Delhi by Vibha et al[15], maximum patients suffering from COPD were of >70 yrs of age group (35.6%), while in this study 11.5 % of patients were found in the same age group. It was followed by 28.1% in 60-69 yrs of age group which is comparable to this study (33.5%).

Gender

In this study, COPD was found to be more common in males (59%) compared to female (41%), as in India, smoking is more common in males compared to females. These results are comparable to Criner et al[12] study.

Figure VI:



Risk Factors

Smoking is a known major risk factor for COPD. In this study, 58% patients were smoker or had a history of smoking comparable to 62.3 % in FARIECE[16] study and 73.2% in study by M Miravitlles et al[17], with 22.24 years is the mean duration of smoking with a range of 7.5 to 60 years, which is similar to 22.62 years of mean duration of smoking in study by Radha krishnan et al.[18]

History of pulmonary koch's is the 2nd most common risk factor found in 16.5% of patient in this study as compared to 28.4% in study by Alladi mohan et al.[19]

Old age (>60 years) is also an important risk factor for COPD because of the continuous decline in FEV_1 with increasing age. In FARIECE[16] study 55.7 % patients were >60 yrs of age compared to 43% in this study.

Family history of the disease is also an important risk factor, particularly in the young age, as found in 12% of patients in this study in comparison to 7.5% in FARIECE study.[16]

ECG Findings

In this study, P Pulmonale was the most significant ECG finding present in 33.5% of the patients which is comparable to 32.25% in study by Venkateshwara rao et al.[20]

Right bundle branch block was found in 6% of patients in this study which is again close to 8% in Chaudhari R et al[21] study.

Criteria for RVH used in this study was R/S ratio >1 in V_1 and <1 in V6. 7.5% patients had RVH in this study compared to 21.09 % of study by Ramakrishna et al.[22]

Clinical presentation

In this study breathlessness with cough and fever was the most common complaint of the patients (73%). Out of 200 patients in this study, 183 patients had breathlessness as one of the main complaint which is almost similar to the studies conducted by Alladi mohan et al[19], Jatav VS et al[23] and study by Sinha T et al.[13] Cough with sputum production is also an important symptom and was the 2nd most common symptom after breathlessness (81.5%) compared to almost 100 % in Alladi mohan[19] study and 80% in Jatav VS et al[23] results.

Pedal oedema was present in 4.5% of patients in this study compared to 17.3% in Sinha T et al.[13] In this study, 94% of patient had respiratory rate >24/min on admission which is almost similar to 94% of Alladi mohan study.[19]

X-Ray Chest findings

Most common CXR finding in this study was emphysematous changes (like flattened diaphragm, hyperinflation and increase in retrosternal lucency), which was present in 59.5% of patients which is near to 72% in study by Jatav VS et al.[23]

Increased broncho-vascular markings were present in 9.5% which are suggestive of chronic bronchitis, compared to 42% in Jatav VS et al study.[23]

Cardiomegaly was present in 13.5% of our patient while it was present in 24% in Chaudhari R et al[21] study. Requirement of Ventilator support

56.9% patients needed NIV support in study by Durao V et al[24] which is almost similar to 53.5% in this study.

CONCLUSION

This study offered an opportunity to study the demographic data, Clinical presentation, disposition and outcome of COPD patients in Emergency Department at our institute. Emergency physicians are the front line force for diagnosing and managing all the emergencies in the hospital. All COPD exacerbations require prompt treatment and supportive care. Smoking cessation is the most important step to stop disease progression and improvement of patients of COPD as smoking is the single most important factor. Patients of COPD who are smokers should be encouraged to quit smoking from the first hospital visit itself even in the ED after stabilization.

LIMITATION OF STUDY

There are some limitations that should be considered when interpreting these results. This study did not confirm diagnosis or severity using spirometry. This was usually not available in the participating ED and is rarely used in acute ED practice. Data may have been collected retrospectively so may be subject to the risk of data omission.

ACKNOWLEDGEMENT

We are grateful to Dr. Pankaj R Patel, Dean, Smt NHL Municipal Medical College, Ahmedabad and Dr. S T Malhan, superintendent, SVP Hospital, Ahmedabad for allowing for this study.

CONFLICT OF INTEREST: None.

SOURCE OF FUNDING: Self

REFERENCES

GOLD. Global Strategy for the Diagnosis, Management and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease [GOLD]; 2018. http://www.goldcopd.org/. Accessed July 17, 2018.

Lopez-campos JL, Tan W et al. Global burden of COPD; 2016. Journal of Respirology; ;21(1):14-23.

Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study. Lancet; 380(9859):2095-2128

Peter J. Barnes. Chronic obstructive pulmonary disease; Primer: 2015. The New England Journal Of Medicine.

Alladi Mohan, R Premanand, L N Reddy, M H Rao et al. Clinical presentation and predictors of outcome in patients with severe acute exacerbation of chronic obstructive pulmonary disease requiring admission to intensive care unit. BMC Pulmonary Medicine 2006, 6:27. http://www.biomedcentral.com/1471-2466/6/27 ICMR-PHFI-IHME (2017) India : Health of the Nation's States.

Jindal SK, Aggarwal AN, Gupta D (2001). A review of population studies from India to estimate national burden of chronic obstructive pulmonary disease and its association with smoking. Indian Journal of Chest Diseases and Allied Sciences 43(3): 139-47

Singh JA, Yu S. Utilization due to chronic obstructive pulmonary disease and its predictors: a study using the U.S. National Emergency Department Sample (NEDS). Respir. Res. 2016; 17: 1.

Pomares X, Monton C, Bare M, Pont M, Estirado C, Gea J, Quintana JM, Vidal S, Santiago A; IRYSS-COPD Appropriateness Study Group. Emergency hospital care for exacerbation of COPD: is inhaled maintenance therapy modified? COPD 2016; 13: 11 –8.

Abramson MJ, Crockett AJ, Dabscheck EJ, Frith PA, George J, Glasgow N, Jenkins SC, McDonald CF, McDonald

VM, McKenzie D et al. The COPDX Plan: Australian and New Zealand Guidelines for the Management of Chronic Obstructive Pulmonary Disease Version 2.39 October 2014. [Accessed 2 Feb 2015.] Available from URL: http://www.copdx.org.au/

Anthonisen NR, Manfreda J, Warren CPW, et al. Antibiotic therapy in exacerbations of chronic obstructive pulmonary disease. Annual journal of Internal Medicine; 106:196-204 (1987).

G.J. Criner et al. Simvastatin for the Prevention of Exacerbations in Moderate-to-Severe COPD: 2014. The New England Journal of Medicine; 370: 2201.

Teeku sinha et al. A study of clinical profile of patients with chronic obstructive pulmonary disease: 2017. International Journal of Community Medicine and Public Health; 4(4):1000-1004.

Goksu E et al. Factors affecting revisit of COPD exacerbated patients presenting to emergency department: 2010. European journal of emergency medicine; 17(5):283-5.

Vibha, B sinha et al. An epidemiological profile of chronic obstructive pulmonary disease: A community-based study in Delhi: 2017. Journal of postgraduate medicine;(1) 63:29-35.

J.C. Fernández de Córdova-Aguirre et al. Risk factors for chronic obstructive pulmonary disease: Results of the FARIECE study: 2015. Medical journal of General Hospital of Mexico;78(4):162-68.

M miravitlles et al. Characteristics of a population of COPD patients identified from a population-based study. Focus on previous diagnosis and never smokers: (2005). Journal of Respiratory Medicine; 99, 985–995.

Radha krishnan and Srihari B. A study on the severity of right ventricular dysfunction in correlation with the severity of Lung dysfunction in COPD patients: 2015.. American Journal of Scientific Medical Research; 1(1):112-9.

Alladi Mohan et al. Clinical presentation and predictors of outcome in patients with severe acute exacerbation of chronic obstructive pulmonary disease requiring admission to intensive care unit: 2006. BMC Pulmonary Medicine; 6:27. http://www.biomedcentral.com/1471-2466/6/27.

V. Venkateswara Rao, Dr. Eswaramma, Dr. Soujanya. Study of cardiovascular changes in COPD by ECG & 2D echo and correlation with duration and severity of COPD: 2016. Scholars Journal of Applied Medical Sciences; 4(12D):4430-4438.

Rajan Chaudhary, Lalit Shrimali. Study of clinical, electrocardiographic and echocardiographic profile in patients with chronic obstructive pulmonary disease: May 2018. International Journal of Research in Medical Sciences; 6(5):1716-1720

Ramakrishna Rachakonda, Suryakumari Beri et al. Study of ECG and Echocardiographic findings in COPD in a tertiary care centre. Journal of evolution of medical and dental sciences; 5 (24); 1276 (2016).

Vinod Singh Jatav, S. R. Meena, Shivcharan Jelia et al. Electrocardiographic characteristics of patients with chronic obstructive pulmonary disease and its correlation with disease severity: 2017. International Journal of Advances in Medicine; 4(2):514-518.

Durão V, Grafino M et al. Chronic respiratory failure in patients with chronic obstructive pulmonary disease under home noninvasive ventilation: Real-life study: 2018. Journal of Pulmonology; 24(5); p 280-288.